



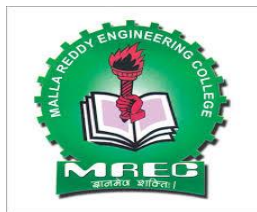
MALLA REDDY ENGINEERING COLLEGE

(Autonomous) - Main Campus

(A UGC Autonomous Institution, Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad).
Accredited by NAAC with 'A++' Grade (Cycle- III),
NIRF Rank Band 101-150, ARIIA Band Performer,
NBA Tier-I Accredited (B.Tech- CE, EEE, ME, ECE & CSE, M.Tech - CSE, EPS, TE)
Maisammaguda, Medchal-Malkajgiri District, Secunderabad- 500100,
Telangana State. www.mrec.ac.in



LIST OF UGC JOURNALS IN THE CALENDAR YEAR-2022



MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
(UGC Autonomous Institution, Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad). Accredited by NAAC with 'A++' Grade,
Maisammaguda (H), Medchal-Malkajgiri District, Secunderabad,
Telangana State – 500100, www.mrec.ac.in

Faculty Research Publication in the Calendar Year - 2022

LIST OF UGC JOURNALS

S.No	Department	No.of Journals
1	Electronics and Communication Engineering	64
2	Computer Science and Engineering	11
3	Humanities and Science	07
4	Master of Business Administration	57
5	Mechanical Engineering	08
Total		147



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 Telangana State – 500100, www.mrec.ac.in

Sl. No	Title of paper	Name of the author/s	Department	Name of journal	Year of publication	ISSN number	Journal soft copy link
1	A Review Paper on Advancements in Solar PV Technology, Environmental Impact of PV Cell Manufacturing	V. Raja Sekhar P. Pradeep	ECE	International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)	2022	2581-9429	https://ijarsct.co.in/
2	Web Based Wireless Notice Board	Konda Mallesh Dr.A.Pradeep Kumar	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
3	Wireless Agribot for Plough Seed and Sprinkler	Yamuna Ankadala P. Sowjanya	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
4	Secter Data Hiding using Inter Frames for Copyright Protection	Ch.Navya sai prasanna kumar Dr.Sk.Fairooz	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
5	Development of Fingerprint based high Security Voting	Aaradhana N.Pandu Ranga Reddy	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/

6	Implementation on Banking System Using Fingerprint Module	Chenna Nithin Dr.Sk.Fairooz	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
7	Improved Security to School Children using GSM	Dandi Chaitanya Y.Murali	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
8	Remote Metal Detecting Robot	Somula Anusha Dr .M. J C Prasad	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
9	Missile Detection and Auto Collision System	Bonath Suman N.Pandu Ranga Reddy	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
10	Optimization of Image Features for MRI Brain	Sirikonda Shashidhar Dr.M J C Prasad	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
11	Railway track fault detection enhancement using Arduino and IoT	P Manmohan Shashank Varma P.Sowjanya	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
12	Real-Time Vehicle Monitoring and Accident Alert System	Hari babu. J Vutkuri Srinivas	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
13	RFID based Bus Identification System for Blind with Voice Alerts	Viligilla Ramya Vutkuri Srinivas	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
14	Accident Avoidance by Using Road Sign Recognition System	Reddygari Ajay Kumar Reddy Dr.	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/

		Manikanda Devarajan					
15	Smart City Using IOT	Bollibattula Shiva teja P.Sandeep Kumar	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
16	Student Security System Using RFID	Kalapalli Abilash Dr.Pradeep Kumar	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
17	High Performance, Low Power Architecture of 5-Stage FIR Filter using Wallace Tree	Manne Usha Sri S Pavan Kumar Shaik Sameena Dasari Sainath Reddy Shaik Fairouz	ECE	Science, Technology And Development Journal	2022	0950-0707	http://journalstd.com/
18	Multi-User MOCZ for Mobile Machine Type Communication	Rani Barre Dontula Gopala Krishna Kunja Santosh Sai Vardhan Dr.G.S.K.Gayatri Devi	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
19	Millimetre Wave MIMO-OFDM with Index Modulation: A Pareto Paradigm on Spectral-Energy Efficiency Trade-off	Gadigoppula Poojitha Arutla Abhinav Reddy Talapalli Vikas	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/

		R. Saiteja Dr.N.Manika nda Devarajan					
20	Lung Cancer Detection and Classification Using Deep CNN	Y. Sai Sameepya G. Manoj Kumar Ch. Ishitha S. Sai Charan Dr.T Srinivas Reddy	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/
21	Approximate Multiplier Design Using Novel Dual Stage 4:2 Compressor	K. Mounika Reddy A. Lakshmi Chenna Keshava M. Sai Kiran Reddy K. Krishna Sreekar MrsP. Sowjanya	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
22	ASIC Implementation of High-Speed Adaptive Recursive Karatsuba Multiplier with Square root Carry select adder	N.Sai Bhargav Md Rahman R.Bhanuchandra Reddy S.Vijay Kumar Dr.J.Shirisha	ECE	Science, Technology And Development Journal	2022	0950-0707	http://journalstd.com/
23	Broadcast Gadget for cars using Sensors & GPS Module	K.S.V.S. Greeshma K. Pravallika	ECE	Science, Technology And Development Journal	2022	0950-0707	http://journalstd.com/

		Meghna Suresh T.Rikesh Mrs.Sk.Shakira Begam					
24	Hydroponic Farming Using Nutrient Film Technique	B. Priyanka S. Swetha Ch. Adarsh Reddy V. Sai Meghana Ms.N.Sravya Sruthi	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/
25	Design and Implementation of smart gloves for deaf and tonguetied disabled	Arigela Srinivas Durgapu Vennela Kechela Praveen Mittapalli Varshith Ms.K.Maheswari Devi	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
26	Application and Research of Dark Channel Defogging Algorithm	P. Bhuvanachandra P. Ajay M. Shiva Kumar G. Gopi Mr.P.Nandha Kumar	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/

27	Efficient Modular Adder Designs Based on Thermometer and One-Hot Coding	K. Harshavardhan Sreeja A P.Shaik Azaruddin G. Shashank Dr. A Pradeep Kumar	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
28	Modified High Speed 32-bit Vedic Multiplier Design and Implementation	B. Pavan Kumar BVVNS. Sai Datta B. Keerthana Priyanka Dole Mr.A.Adi Narayana	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/
29	IOTbased Monitoring System for Comatose Patients	B.Sravanthi Bobbili Dharani Gundu Divya Yallampalli Lavanya Mr.Vutkuri Srinivas	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
30	Live Monitoring of Urban Air Quality and Sound Levels	P Chandrashekar Uppuluri Harika Anvesh Karthik Chimmula	ECE	Science, Technology And Development Journal	2022	0950-0707	http://journalstd.com/

		Mr.P.Sandeep Kumar					
31	Power Optimization Monitoring and Controlling System Over IOT	Nossam Yaswanth Reddy Kolagotla Rahul Reddy Mirza Ibrahim Baig Avula Nikitha Mrs.Beril Susan Philip	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/
32	Low Light Image Enhancement using CNN	V. Sai Deepika M. Madhumitha K. Nithin Mohan K. Kavyasree Md. Abdul Asif Dr. Sima Sahu	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
33	Power Allocation Algorithms for Stable Successive Interference Cancellation in Millimeter Wave Noma Systems	Alasyam Chandana Gouru Hari Prasad Kanaparthi Venkata Manoj Medithi Gowtham Babu	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/

		Dr. Syed Jalal Ahmed					
34	Image quality enhancement algorithm based on game theory model	J Purna Tejaswi B Solomon B Sri Snigdha Priya Nava Teja Dr. M Nithin Varma	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/
35	Machine Learning Based Image Retrieval Using Intensity Pixel Algorithm	J. Sai Anudeep Ch. Saran Shankar C. Sai Prakash K. Sonia Dr. Sima Sahu	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/
36	Low Light Enhancement using DCE-NET Aided by Pack and Unpack Operations	Jinka KrishnaTeja Ajmeera Anilkumar Sandeep Pasupula Sujatha Dr. M Nithin Varma	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/
37	Dual CNN based Channel Estimation for MIMO-OFDM Systems	Dwivedula Sahiti Govind Srikanth Adicherla Haneeth	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/

		A. Yuva Naga Teja Mrs.C.Silpa					
38	Visual Object Tracking using Deep Reinforcement Learning	G. Shruthika M. Srichakra D. Gandhi P. Sandeep Mrs.K. Uma Rani	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
39	Contactless Robot for Virus Attacked Hospitalized People	Gopari Ravali Laxman Lyagala Dokku Navya Sri Varala Deepika Mr.G.Prasan na Kumar	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
40	IoT based Unmanned Tollbooth Monitoring System	Gadasanthala Pratyusha Gumpu Vijayakumari Gundala Sravya Lukulap Devika Dr. Sk.Mastan Sharif	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
41	Pruning the Pilots: Deep Learning-Based Pilot Design and Channel	J. Shanthi G. Sai Teja P.Shilpitha	ECE	International Journal of Research	2022	2236-6124	http://ijrpublisher.com/

	Estimation for MIMO-OFDM Systems	Reddy V.Suvidha Mrs. K. Uma Rani					
42	Automatic Rain Sensing Umbrella for Harvest Protection	M.Viswatej T.Harsha Vardhini Ch.Vamshi M.Sindhu B.Teja Mr.Y.Murali	ECE	International Journal of Research	2022	2236-6124	http://ijrpublisher.com/
43	High-Capacity Reversible Data Hiding scheme using prediction tuning model	S. Siraj K. Praneeth Kumar Reddy N. Sandeep Reddy A. Kranthi Mr.J.Sunil Kumar	ECE	International Journal of Research	2022	2236-6124	http://ijrpublisher.com/
44	Dual Axis Intensity Based Solar Tracking System	Alakuntla Sai PrashanthDurgam AjaySalsabeel ShaikhMohammed Aman Dr.Sk.Mastan Sharif	ECE	International Journal of Research	2022	2236-6124	http://ijrpublisher.com/
45	High Speed Area-Efficient VLSI Architecture of Three-Operand Binary Adder	G. Harish Kumar K. Bhaskar Rao P. Sangeetha	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/

		D. Naveen Kumar Mrs.N. Durga Sowdamini					
46	Conservatory Monitoring and Control System using IoT	Alluri Amulya Bommireddy Lokesh Reddy Gurramkonda Suneetha Kaduru Karthik Dr.N.Manika nda Devarajan	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
47	Identification of Stuck-at- faults of full adder using BIST as testing device	Mrs.K. Anuradha S.V. Charani Reddy P. Aparna B. Hruthik Reddy M. Akshara	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
48	Admin Room Device Control Using IOT	Dusa Jaya Krishna Katukojwala Saichandu B.Nandini Penumaka Havila Setty Kamal Mrs.G.Krishn aveni	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/

49	Energy-efficient resource allocation for 5G cognitive radio NOMA using game theory	K.Mounika L.Asritha R.Likith T.Sampath Mr.N. Pandu Ranga Reddy	ECE	Journal of Interdisciplinary Cycle Research	2022	0022-1945	http://www.jicrjournal.com/
50	Performance Analysis of Matrix Inversion Algorithms for Massive MIMO Precoding under Rural and Urban Scenarios	Maraju Sindhu Priya Padakanti Shylendra Pathireddy Shashindhar Reddy Saya Rishitha Dr. Syed Jalal Ahmad	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
51	Efficient Algorithm to Curtail the Attenuation in Terahertz Communication Networks	B. Nimisha D. Hema Vardhan Reddy P. Kaveri R. Rakesh Babu Dr. Madhu Babu Sikha	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
52	Design Implementation and Comparative Analysis of Advanced Encryption Standard (AES) Algorithm	S. Charan N. Sai Pavan N. Surjeeth V. Akhil Dr. A. Pradeep Kumar	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/

53	IOT based Antenna Positioning System	Potula Rajesh P.Raja Shekar Reddy D.Keerthi Rupani Gopi Mr.Vutkuri Srinivas	ECE	Journal of Engineering Sciences	2022	0377-9254	https://www.jespublication.com/
54	Covid-19 Smart Wearable Mask Using BMP Sensor	C.V.S.S. Sumanth A. Sai Krishna V. Yeshwanth Reddy E. Jhansi Mr.P.Sandeep Kumar	ECE	Journal of Interdisciplinary Cycle Research	2022	0022-1945	http://www.jicrjournal.com/
55	Generative Adversarial Networks for Retinal Image Enhancement with Pathological Information	Aitha Shashanthika Akula Sowmya Ch.N.V.Meena kshi Vemula Neeraj Kumar Dr.T.Srinivas Reddy	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
56	Implementation of Optimized Digital Filter using Kogge-Stone Adder	Pasam Gopi Reddy Thonukunoori Shiva Vakulabharanam Sathvika Posanipally	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/

		Jyothsna Dr. Shankaranan d Jha					
57	High Speed and Efficient ALU using Modified booth Multiplier and Reversible Logic Gates	M Sowmya Sree Dosakayala Sairam A Sharanteja Gunuganti Lahari Dr.Shankaran anda Jha	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
58	Implementation of D&F Relay Node for Cooperative MIMO Systems through SDR platform	Balemula Bhargava Reddy Gourishetty Ruchitha Vemi Reddy Sandeep Reddy Dr.G.S.K.Gay atri Devi	ECE	Journal of Interdisciplinary Cycle Research	2022	0022-1945	http://www.jicrjournal.com/
59	Smart Foot Over Bridge in the Railway Station	BhupathiSatwi ka Siramsetty Keerthana Kure Rohith TR.Ananth Sai Reddy Mrs.E.Aparn a	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/

60	Optimized Precoders for Massive MIMO OFDM Dual Radar Communication Systems	Anjana Raj Nayakam Sai Kiran Sharon Sanjana Nenavath Swapna Dr.M.Jagadeesh Chandra Prasad	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/
61	Trends and Challenges for the Spectrum Efficiency in NOMA and MIMO based Cognitive Radio in 5G Networks	Puchakayala Pranay Teja Rathlavat Mounika Shaik Nabi Rasool P Subramanya Srujan Mr.N. Pandu Ranga Reddy	ECE	The International journal of analytical and experimental modal analysis	2022	0886-9367	http://www.ijaema.com/
62	Fog Fumigation Machine to room sanitization for CORONA Area	Ganugula Vineeth Maroju Manikanta Pavan Acharya Pulimi Amulya Sudnapu Sai Kumar B. John Vijay Prathyush	ECE	Journal of Interdisciplinary Cycle Research	2022	0022-1945	http://www.jicrjournal.com/
63	Design and Implementation of NOC Router	V.B.S. Senthana B. Abhilash	ECE	The International journal of analytical	2022	0886-9367	http://www.ijaema.com/

		Reddy Gutta Bhavani Archana Kamineni Dr Shaik Fairooz		and experimental modal analysis			
64	Automatic Fall Detection for Elderly People Using MEMS	Ch. Sai Kumar Reddy D. Karthik V.Pooja Y.Manoj Dr. Telugu Maddileti	ECE	JASC: Journal of Applied Science and Computations	2022	1076-5131	http://j-asc.com/
65	Deep Learning based Convolutional Neural Networks (DLCNN) on Classification Algorithm to De tect the Brain Turnor Diseses using MRI and CT Scan Images	Dr P Srinivas,T Jagadeeswari	CSE	IJISRT	22-Aug	2456-2165	https://zenodo.org
66	Efficient Cloud Platform for Developing a Chatbot	Arun Kumar Kandru	CSE	IJISRT	05-May	2456-2165	https://www.ijisrt.com/
67	Skip Cloud In Open Source Clustering data distribution Networks Live Content in trusted Vbroker Users Systems	Ms.Sadagari. Viharika,Ms. Katti Mounika,Dr.P .Srfinivas	CSE	IJRTI	Jun-22	2456-3315	www.ijrti.org
68	Homehealthcaresystemusi ngiot based on cloud	Mr.P.V.Rama naMurthy,Dr. p.Srinivas	CSE	IJCRT	05-May	2320-2882	www.ijcrt.org

69	COMBINATION OF KEY PROCESS WITH USER PROXY TESTER ENABLED FOR TIMING AND RE-ENCRYPTION ROLE FOR ONLINE HEALTH CLOUDS	Dr.B.Hari Krishna,Mrs. Sudha Ramya PG Student	CSE	The International journal of analytical and experimental modal analysis	01-Apr	0886-9367	www.mrec.ac.in
70	A QUERY BASED APPROACH TO SOLVING THE ENTITY INFORMATION	Dr. J Anitha,Mand ali Mamatha PG Student	CSE	Journal of Information and Computational Science	01-Apr	1548-7741	www.mrec.ac.in
71	MUTUAL AND APPROVAL BASED ON FILTER OF ONLINE SOCIAL RANKING	Dr.Manyam Thaile,Cheku rtha Archana PG Student	CSE	Journal of Information and Computational Science	01-Apr	1548-7741	www.mrec.ac.in
72	WEBSITE PRIVACY PROTECTION FOR ASSIGNING TASKS IN DEDICATED MOBILE NETWORK USING CLOUD COMPUTING	Dr Jose Moses,Banda Naga Jyothi Pg STUDENT	CSE	Journal of Information and Computational Science	01-Apr	1548-7741	www.mrec.ac.in
73	DISCOVERY AND INVESTIGATION OF MONEY FILTER VERSION IN SOCIAL NETWORKS USING MACHINE LEARNING	Dr D Krishna Madhuri,G K Shruthi PG Student	CSE	Journal of Information and Computational Science	01-Apr	1548-7741	www.mrec.ac.in
74	ANALYSIS AND PREDICTION OF CARDIO VASCULAR DISEASE USING	Dr N Lakshmipathi Anantha,CH REvan	CSE	Journal of Information and Computational Science	01-Apr	1548-7741	www.mrec.ac.in

	MACHINE LEARNING CLASSIFIERS	Kumar PG Student					
75	Cloud Based Home Health Care System Using Iot	Mr.P.V.Rama naMurthy,Dr. p.Srinivas	CSE	IJSR	04-Apr	2456-2165	https://zenodo.org
77	Advanced Semiconductor Alloy Al _x In _{1-x} for Engineering and Medicine	Dr Alla Srivani ^{1*} , Gurram Vasanth ² , Dr. GVS Subbaroy Sharma ³ , M. Srinivasa Rao ⁴ , Dr. P Ramesh ⁵	physics	Journal of Community Pharmacy Practice	2022	2799-1199	http://journal.hmjournals.com/index.php/JCPP
78	Emerging Trends in Transmission Electron Microscopy for Medical Applications	Dr. Alla Srivani, Gurram Vasanth, Dr. GVS Subbaroy Sharma, M. Srinivasa Rao, Dr. P Ramesh, Dr. A Raghavendra & Dr. G Krishna Kumari	physics	Global Journal of Science Frontier Research: A Physics and Space Science	2022	0975-5896	Emerging Trends in Transmission- Electron - Microscopy for Medical Applications - Global Journal of Science Frontier Research
79	SINGULARLY PERTURBED TWO-POINT BOUNDARY VALUE PROBLEM BY APPLYING HYPERBOLIC	G.GANGADHAR	H&S MATHS	International journal of engineering applied science and technology Vol 7 ISSUE 1	2022	2455-2143	https://www.ijeast.com/Pastissues.php?-title=Volume%207%20Issue%2001DOI:

	DECENT DYNAMIC METHOD						10.33564/IJEAST.2022.v07i01.037
80	INVESTOR BEHAVIOUR TOWARDS VARIOUS INVESTMENT ALTERNATIVES	Dr.N.Ramanjaneyulu	MBA	Journal of Interdisciplinary Cycle Research	Jan-22	0022-1945	http://www.jicrjournal.com/VOLUME-XIV-ISSUE-I-JANUARY-2022/
81	Recent innovations in indian banking sector	Dr.N.Ramanjaneyulu	MBA	Journal of Management and Science	Jan-22	2249-1260	https://jms.eleyon.org/index.php/jms/-article/view/528/473
82	Tools for Conducting Effective Online Learning	Dr.N.Ramanjaneyulu	MBA	International Conference on Research and Development in Science, Technology, Engineering, Management, Applied Sciences, Pharmacy, Education, Law and Humanities: The Futuristic Approach	Feb-22	2349-6002	https://ijirt.org/master/publish-edpaper/-IJIRT153977_PAPER.pdf
83	Crowdfunding: A New Fund Raising Approach to Startup for Business	Dr.N.Ramanjaneyulu	MBA	International Conference on Research and Development in Science, Technology, Engineering, Management, Applied Sciences, Pharmacy, Education, Law and	Feb-22	2349-6002	https://ijirt.org/master/publish-edpaper/-IJIRT153972_PAPER.pdf

				Humanities: The Futuristic Approach			
84	Impact of E – Shopping on Retail Business	Dr.N.Ramanjaneyulu	MBA	International Conference on Research and Development in Science, Technology, Engineering, Management, Applied Sciences, Pharmacy, Education, Law and Humanities: The Futuristic Approach	Feb-22	2349-6002	https://ijirt.org/master/publishedpaper/-IJIRT153962_PAPER.pdf
85	IMPACT OF SALES PROMOTION ON CONSUMER PURCHASING BEHAVIOUR	Dr.N.Ramanjaneyulu & S.Rajani	MBA	International Journal of Research	Apr-22	2236-6124	http://ijrpublisher.com/Volume-XI-Issue-IV-APRIL/2022/
86	STUDENTS AND TEACHERS PERCEPTION TOWARDS ONLINE LEARNING	Dr.N.Ramanjaneyulu	MBA	International Journal of Research	Apr-22	2236-6124	http://ijrpublisher.com/Volume-XI-Issue-IV-APRIL/2022/
87	COMPARATIVE STUDY OF LIFE INSURANCE PLANS OF LEADING PRIVATE INSURANCE COMPANIES IN HDFC LIFE	A. STHIRAMATHI & DR. N. RAMANJANEYULU	MBA	Juni Khyat	Jul-22	2278-4632	http://junikhyatjournal.in/no_2_Online_22/13.pdf
88	A STUDY ON WORKLIFE BALANCE AT ISPATIAL	A. RAJANI & DR. M. RAJESH	MBA	International Journal of Environmental Economics,	Jul-22	2348 – 814X	https://eprajournals.com/IJCM/-article/7372/abstract

	TECHNO SOLUTIONS - HYDERABAD			Commerce and Educational Management			
89	ANALYSIS ON FOREIGN EXCHANGE RISK MANAGEMENT WITH REFERENCE TO RELIGARE ENTERPRISES LIMITED	B. BINDU MOUNIKA & DR. N. RAMANJANE YULU	MBA	Dogo Rangsang Research Journal	Jul-22	2347-7180	https://journal-dogorangsang.in/-no_2_Online_22/21.pdf
90	A STUDY ON EQUITY ANALYSIS WITH REFERENCE TO IT INDUSTRY	B. MAHESH & DR. N. RAMANJANE YULU	MBA	EPRA INTERNATIONAL JOURNAL OF MULTIDISCIPLIN ARY RESEARCH	Jul-22	2455-3662	https://eprajournals.com/IJMR/article/-7312/abstract
91	ANALYSIS OF RISK MANAGEMENT IN DERIVATIVES WITH REFERENCE TO ANGEL ONE PRIVATE LIMITED	B. SHIRISHA & DR. N. RAMANJANE YULU	MBA	Juni Khyat	Jul-22	2278-4632	http://junikhyatjournal.in/no_2_Online_22/15.pdf
92	A STUDY ON EFFECTIVENESS OF SALES AND DISTRIBUTION CHANNEL OF TATA MOTORS LTD	C. RAVI TEJA & MR. B. KIRAN KUMAR REDDY	MBA	A Journal Of Composition Theory	Jul-22	0731-6755	http://www.jctjournal.com/gallery/-18-july2022.pdf
93	A STUDY ON EMPLOYEE JOB SATISFACTION AT COCO COLA PRIVATE LIMITED, HYDERABAD	D. SOWMYA & DR. M. RAJESH	MBA	A Journal Of Composition Theory	Jul-22	0731-6755	http://jctjournal.com/gallery/-11-july2022asdf.pdf

94	A STUDY ON PAYROLL MANAGEMENT AT HERITAGE - HYDERABAD	D. PUNAM GANESH & DR. G. HEMA	MBA	International Journal of Engineering Technology and Management Sciences	Jul-22	2581-4621	http://ijetms.in/Vol-6-issue-4/Vol-6-Issue-4-70.pdf
95	A STUDY ON RECRUITMENT AND SELECTION AT BIG BAZAAR-HYDERABAD	G. BHUVANESH WARI & DR. M. RAJESH	MBA	International Journal of Research & Development (IJRD)	Jul-22	2455-7838	https://eprajournals.com/IJSR/-article/7366
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A Review Paper on Advancements in Solar PV Technology, Environmental Impact of PV Cell Manufacturing

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Abstract: *Technological advancement, reduction in the cost of materials, and Government support for sustainable development help improvement in solar PV technology in recent years. Photovoltaic technology is majorly employed to generate electricity worldwide in the renewable energy category. To establish a good market base for Solar PV the efficiency of solar cells plays a significant role. Presently, extensive research work is going for efficiency improvement of solar cells for commercial use. The efficiency of monocrystalline silicon solar cells has shown very good improvement year by year. It starts with only 15% in the 1950s and then increases to 17% in the 1970s and continuously increases up to 28% nowadays. The growth in solar photovoltaic technologies including worldwide status, materials for solar cells, efficiency, factor affecting the performance of PV modules, an overview of a cost analysis of PV, and its environmental impact are reviewed in this paper.*

Keywords: Photovoltaic, Monocrystalline, Sustainable Development and Renewable Energy

I. INTRODUCTION

Due to the fast development, demands of comfort, higher mobility, and growing world population, energy consumption is rising tremendously year by year. In the present scenario, fossil fuels as coal, oil, and gas, are playing a lead role to meet the energy demand. Environmental pollution is also a serious problem today due to the huge use of fossil fuels. To decrease pollution and save the environment, renewable energy technologies have good potential to meet the global energy demand. It is known that among renewable energy sources, solar energy is the most promising and reliable energy source in most countries, government is providing an incentive to set up solar energy-based power plants. To convert solar energy into energy forms usable for human needs there are several thermodynamic pathways. In general, heat, kinetic energy, electric energy, and chemical energy can be provided via solar energy conversion.

1.1 Types of Solar Energy

Solar thermal generating systems: In this, the heat is created by focusing sunlight onto a spot rather than burning fuels, but the remainder of the electricity generation process is the same as conventional utility generation. Photovoltaics: it is another mechanism for converting Sunlight into electricity. This review paper presents about photovoltaics.

1.2 Introduction to Photovoltaics

Photo = light; Volt = electrical potential — literally: electricity from light.

The photovoltaic cell is the device that converts the energy of light directly into electricity by the photovoltaic effect. Photovoltaic systems contain cells that convert sunlight into electricity. It is a form of a photoelectric cell that, when exposed to light, can generate and support an electric current without being attached to any external voltage source. Inside each cell, there are layers of semiconducting material.

Solar cells produce direct current (DC) power which fluctuates with the sunlight's intensity. For practical use, this usually requires conversion to certain desired voltages or alternating current (AC), through the use of inverters. Multiple solar cells are connected inside modules. Modules are wired together to form arrays, then tied to an inverter, which produces power at the desired voltage, and for AC, the desired frequency/phase.

PV is currently a technically and commercially mature technology able to generate and supply short/mid-term electricity using solar energy.

II. MATERIALS FOR SOLAR CELLS

Silicon is a leading technology in making solar cells due to its high efficiency. However, due to its high cost, most researchers are trying to find new technology to reduce the material cost to produce solar cells and to date, thin-film technology can be seen as a suitable substitute [1]. The reasons behind the low cost of thin-film technology are because it uses less material and the layers are much thinner compared to mono- and polycrystalline solar cells thus lowering the manufacturing cost. However, the efficiency of these technology-based solar cells is still low. Three materials that have been given much attention under thin-film technology are amorphous silicon, CdS/CdTe, and CIS, but researchers are continuously putting in more effort to enhance the efficiency. However, all of these materials have some bad impacts on the environment [2]. Another solution for thin-film technology has been carried out by researchers by using polymer or organic as a solar cell material. Polymer materials have many advantages like low cost, lightweight, and environmentally friendly [3]. The only problem is it has very low efficiency compared to other materials with just 4–5% [2].

2.1 Crystalline Materials

From all other solar cell materials, the crystalline silicon-based solar cell has the highest efficiency compared to others. On top of that, silicon supply can be easily available since it is the second easiest raw material that can be found on earth [4]. A brief overview of crystalline materials is given below.

2.1.1 Monocrystalline Cells

This type of material has been widely used in developing PV cells due to its high efficiency compared to polycrystalline cells by 15%. Among other types of solar cell material, the monocrystalline solar cell has the highest efficiency with more than 20% but for commercialization, the efficiency claim from the manufacturer normally lies between 15% and 17%. Most of the monocrystalline silicon has been developed using the Czochralski process [5].

In this process, high-purity, semiconductor-grade silicon is melted in a crucible, usually made of quartz. Dopant impurity atoms such as boron or phosphorus are added to the molten silicon in precise amounts to dope the silicon, thus changing it into n-type or p-type silicon. This influences the electronic properties of silicon. A precisely oriented rod-mounted seed crystal is dipped into the molten silicon. The seed crystal's rod is slowly pulled upwards and rotated simultaneously. By precisely controlling the temperature gradients, rate of pulling, and speed of rotation, it is possible to extract a large, single-crystal, cylindrical ingot from the melt. The occurrence of unwanted instabilities in the melt can be avoided by investigating and visualizing the temperature and velocity fields during the crystal growth process. This process is normally performed in an inert atmosphere, such as argon, or an inert chamber, such as quartz.

A. Solar Cell Fabrication

1. Reduction of sand to metallurgical-grade silicon.
2. Purification of MG-Si to semiconductor grade silicon.
3. Conversion of semiconductor grade silicon to single crystal silicon wafers.
4. Processing of single-crystal silicon wafer into solar cells.
5. Solar cell to solar module

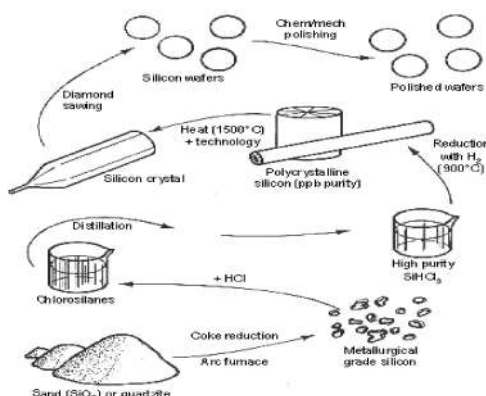
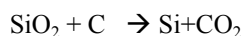


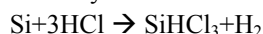
Figure 1: Solar PV cell fabrication process

The silica is reduced (oxygen removed) through a reaction with carbon in the form of coal, charcoal, and heating to 1500-2000 °C in an electrode arc furnace.

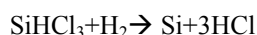


The resulting silicon is metallurgical grade silicon (MG-Si). It is 98% pure and is used extensively in the metallurgical industry.

A small amount of metallurgical grade silicon is further refined for the semiconductor industry. Powdered MG-Si is reacted with anhydrous HCl at 300 °C in a fluidized bed reactor to form SiHCl₃.



Finally, the pure SiHCl₃ is reacted with hydrogen at 1100°C for ~200 – 300 hours to produce a very pure form of silicon.



2.1.2 Polycrystalline Cells

The polycrystalline cell is a suitable material to reduce cost for developing PV modules; however, its efficiency is low compared to monocrystalline cells and other developing materials [6]. Even though, polycrystalline cells have low flaws in metal contamination and crystal structure compared to monocrystalline cells [7]. Polycrystalline is produced by melting silicon and solidifying it to orient crystals in a fixed direction producing a rectangular ingot of polycrystalline silicon to be sliced into blocks and lastly into a thin wafer.

2.2. Gallium Arsenide (GaAs)

GaAs is a compound semiconductor form by gallium (Ga) and arsenic (As) that has a similar structure as silicon. Compared to silicon-based solar cells, GaAs have high efficiency and thickness is also less. The bandgap energy for GaAs is 1.43 eV. The efficiency of GaAs solar cells can be increased by alloying them with certain materials such as Al, In, P, and Sb. The alloying process will result in the formation of multi-junction devices and band gap values will also be increased [8]. GaAs is normally used for concentrator PV module and space application since it has high heat resistance [9]. In addition, GaAs are lighter compared to poly- and monocrystalline silicon [10]. However, GaAs material and manufacturing can be costly [11]

2.3 Thin-Film Solar Cells

Compared to the solar cells that are based on crystalline silicon, thin-film technology is less expensive since it uses few materials and has less manufacturing process. Since it uses less material, a solar cell that is made from this technology is very thin—around which is 35–260 nm.

2.3.1 Amorphous Silicon

In thin-film technology, amorphous silicon is very popular compared to other materials such as CIS/CIGS and CdS/CdTe due to its efficiency [12]. Amorphous silicon is a non-crystalline form of silicon in a disordered structure and has a 40 times higher rate of light absorptive nature compared to monocrystalline silicon [11]. The advantage of its random structure is it gives a high band gap which is 1.7 eV [13]

2.3.2 Cadmium Telluride (CdTe) and Cadmium Sulphide (CdS)

This material can produce high efficiency as 15% and is also known to give an ideal band-gap (1.45 eV) since the direct absorption coefficient is high [14]. The process to produce CdS/ CdTe solar cell is by evaporating a thin CdS layer on top of a conductive glass substrate, followed by another evaporation of a thick CdTe layer and the deposition of a metal contact layer to complete the initial process. After that, a cell will be treated for a short time at a temperature of around 450 °C, usually with a CdCl₂ flux that causes a partial crystallization of the semiconductors, and this allows for the copper doping of the CdS in the same process (the flux or other components at the outer interface of the CdTe layer provides the source for this doping) [16]. CdS/CdTe has also been known for their stability for a longer time [15]. However, this technology faces some problems such as environmental-related and problems with telluride (Te) raw material [17].

2.4 Copper Indium Gallium Selenide/ Copper Indium Selenide

This material is still in its developing phase since it is a new technology and is set to compete with other silicon solar cells. An efficiency of 13% for modules and 20% for cells has been recorded [18]. Its direct bandgap can be as high as 1.68 eV with slight modification with Sulphur (S).

2.5 Organic and Polymer Cells

An organic solar cell is a new technology and is still in its developing phase like CIS/CIGS. Even though it has a very low efficiency which is around 4–5%, but other advantages like mechanical flexibility, disposable nature, and cost efficiency have brought much interest in this material [19].

2.6 Hybrid Solar Cell

Generally, the idea of a hybrid is by combining crystalline silicon with non-crystalline silicon [20]. A higher ratio of performance to cost has been evaluated by Wu et al. [21] by adopting amorphous silicon with crystalline silicon. It is called HIT (combination of Heterojunction and Intrinsic thin film layers solar cell).

New technology for PV cell production Other than searching for new material to improve solar cell output, new technology processing PV solar cells has been ascertained. Nanotechnology or sometimes referred to as “third-generation PV” [22] is used to help increase the conversion efficiency of the solar cell since the energy band-gap can be controlled by nanoscale components [23]. Nanotubes (CNT), quantum dots (QDs), and “hot carrier” (HC) solar cells are three devices used in nanotechnology for PV cell production [46]. The advantages of using this technology are: (i) Enhance material mechanical characteristics, (ii) Low cost, (iii) Lightweight, and (iv) Good electrical performances.

III. THE EFFICIENCY OF SOLAR CELL

The efficiency of solar cells is one of the important parameters to establish this technology in the market. Presently, extensive research work is going for efficiency improvement of solar cells for commercial use. The efficiency of monocrystalline silicon solar cells has shown a very good improvement year by year. It starts with only 15% in the 1950s and then increased to 17% in the 1970s and continues to increase up to 28% nowadays. According to Zhao et al. [56] research work, the role of light trapping in polycrystalline solar cells and improvement of contact and surface of solar cells help in increasing the efficiency. The polycrystalline solar cell also achieved 19.8% efficiency to this date but the commercial efficiency of polycrystalline is coming in between 12% and 15% [1].

IV. FACTORS AFFECTING PV CELL EFFICIENCY

As we know that efficiency is the main parameter for the establishment of PV technology in the market but some factors are affecting PV efficiency. The main factors are (1) temperature of solar cells, (2) effect of dust on solar cells

4.1 Temperature

It is widely accepted that the efficiency of photovoltaic solar cells decreases with an increase of temperature, and cooling is necessary at high illumination conditions such as concentrated sunlight, or cosmic or tropical conditions. The temperature plays a critical factor that leads to a decrement of PV efficiency and its output power. This is due to the shrinkage of the bandgap as temperature increases, thus the open circuit voltage will drop [26]. During this time, energy charge carriers from the valence band to conduction band increase since more incidents light has been absorbed [27]. Temperature influence has a high impact on monocrystalline silicon compared to polycrystalline silicon and thin-film solar cells. Efficiency decreases by 15% and 5%, respectively for monocrystalline silicon solar cells and thin-film solar cells [28].

4.2 Dust

Dust is also affecting the PV efficiency because it may block the coming irradiance onto PV modules. Kaldellis and Kapsali [29] simulated the dust effect on the energy performance of photovoltaic generators based on experimental measurements. According to the results of this study, a considerable reduction of PV energy was yielded and efficiency was observed when dust particles were deposited on the panels' front sides and the mass accumulated on the panel's surface. A similar study for the effect of dust with different physical properties on the performance of photovoltaic cells was done by El-Shobokshy and Hussein [30]. They used different types of dust i.e., limestone, cement, and carbon particulates. Well-controlled experiments were conducted using a solar simulator as a light source. For the experiment, five types of dust with different physical properties were used of which three are different classes of limestone, cement, and carbon. It is concluded that fine particles gives a great effect on the PV performance more than coarse dust. They concluded that fine particles and building material like cement and some others which are present in the atmosphere of urban areas significantly deteriorate the performance of photovoltaic cells through short circuit current and output power when deposited onto the surface of photovoltaic cells.

V. ENVIRONMENTAL IMPACT OF SOLAR PV TECHNOLOGY

To generate electricity by PV module, some manufacturing processes are needed to produce PV modules with different materials. The environmental sensitivity factors and key points of pollution prevention, environmental impact analysis, and life cycle assessment for the crystalline PV system.

Polysilicon cell manufacture chain contains "High-purity multi-crystalline Si", "Si wafer", "Mono- and multi-crystalline Si cell", "PV modules seal". In the process of high-purity multi-crystalline Si production, metallurgical silicon is transformed into SiHCl_3 , and then SiHCl_3 is deoxidated by hydrogen. In the whole process, about 25% of SiHCl_3 is turned into polysilicon, and the rest is poured into the exhaust gas, generating the-product- SiCl_4 . The solution suggested is for a PV system to be decommissioned at the end of its useful life, recycled, and disposed of safely to keep the environmental harm to a minimum, alleviate the shortage of the raw materials of PV devices to some extent, and avoid waste of resources. The environmental impact assessment for this stage should focus on different recycling technical methods for PV systems.

As discussed above in the material technology part, different materials i.e., silicon, CIS, CdTe, and others are used in solar cell manufacturing. To get the raw materials for PV production, mining operation needs to be done and this may cause danger to miners. In addition, mining machine involves usage of petrol and diesel so it may cause air pollution. The emission of hazardous gases and heavy metals from different types of PV cells emits a high volume of sulfur oxide, nitrogen oxide, and carbon dioxide compared to other PV. Sulfur and nitrogen oxide can be combined with water thus producing acidic rain that harms living beings and deteriorates many other materials, while carbon dioxide constitutes the main reason for global warming. The thin-film technology is expected to be the future of PV technology

with a lifetime between 25 and 35 years. However, after they reached the end of their lifecycle, they may harm the environment by becoming toxic if not disposed of properly.

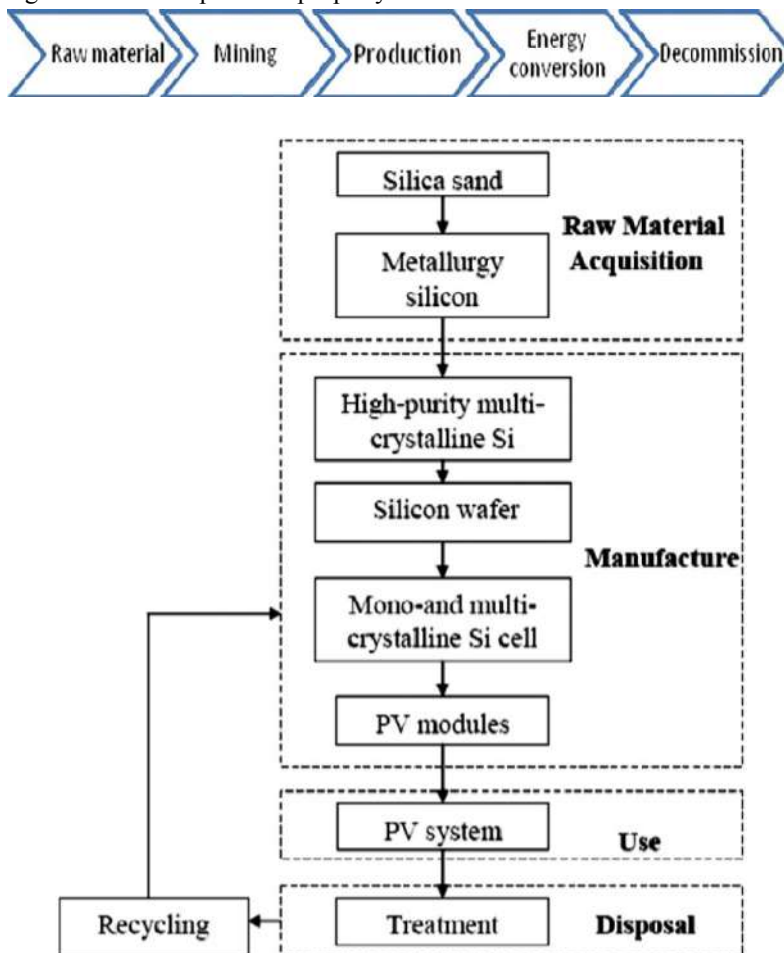


Figure 2: Life cycle stages of crystalline PV system

Srivastava et al. [31] conducted the research work on environmental aspects of four major solar cell technologies i.e., multi-crystalline silicon (mc-Si), amorphous silicon (a-Si), cadmium telluride, and CuInSe₂. In this study, the following aspects were considered (i) energy requirements and energy payback time, material requirements and resource depletion, environmental emissions, waste handling, possibilities for recycling of modules, occupational health and safety, and external safety. For the consideration of emission estimation and risks from cadmium or selenium use in CdTe and CIS modules, respectively, it is acceptable in comparison with some existing products or services like NiCad batteries or coal-fired electricity production. This study concludes that no single technology score is good or excellent on all considered aspects, although future a-Si technology, seems to be the most “environmentally friendly” technology, with mc-Si as a good second. The full assessment about CdTe-based PV modules and their processing material was also conducted by Fthenakis[32]. They compared the usage of Cd in PV modules and Ni-Cd battery and concluded that CdTe is a harmful material but during usage in PV module and under normal conditions, it does not generate any emissions. They also discussed the environmental issues for CdTe in case of fire where glass–glass modules would not be released because Cd dissolves into the molten glass and is retained there. Other comparisons with cadmium emissions from modern coal-powered plants are erroneous because they compare unlikely potential accidental emissions from PV systems to routine (unavoidable) emissions from conventional power plants. In reality, when PV replaces coal burning for electricity generation, it will prevent Cd emissions as well as large quantities of CO₂, NO_x, and particulate emissions.

Solar cell production has some disadvantages on the environment during manufacturing and process time but it is much more advantageous during use. Electricity production through PV systems is clean and safe for the environment compared to coal and fossil fuel.

VI. CONCLUSION

Worldwide energy consumption is increasing every year and different technologies are using to produce electricity to compete for the energy demand. Environmental pollution is also a serious problem nowadays due to the more use of fossil fuels for energy production. Solar PV technology is growing rapidly in past decades and can play an important role to achieve the high energy demand worldwide. Presently, mono- and polycrystalline PV technology have more than 40% market share with 15–17% efficiency. However, thin-film, polymer-based solar cells, and third generation-based solar cells are also in a development stage and extensive research work is going for efficiency improvement for commercial use. The efficiency of solar cells is one of the important parameters to establish this technology in the market. The performance of solar cells also depends on its surrounding such as temperature, irradiation, and dust. Temperature can affect PV performance drastically and due to that fact, studies have focused on lowering the temperature by extracting heat and use it for another purpose such as water or air heating. For dust problems, it is advised that PV surfaces need to be clean often to maintain performance. Every developed technology should have advantages and disadvantages to the environment. Solar cell production has some disadvantages on the environment during manufacturing and process time but it gives much more advantages during use. Electricity production through PV systems is clean and safe for the environment in comparison to coal and fossil fuel. Electricity production through PV modules reduces the carbon dioxide emission in the environment and is safe for the global warming problem. The issue related to space for installation of PV is also important but building-integrated PV and roof or wall-based PV system can solve the small scale installation. At the end of PV module life, it can be recycled, and safely disposal will give minimum effect on the environment. So, research for recycled PV materials is also a key issue for minimizing the environmental effect of PV technology during the entire period of life.

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Web Based Wireless Notice Board

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Abstract - Notice boards are playing very important role in our day-to-day life. By replacing conventional Analog type notice board with digital notice board, we can make information dissemination much easier in a paperless community. Here the admin can control notice board through internet. Therefore, the information can be sent anywhere in the world and can be displayed within seconds. Information is in the form of text. PC is used for sending information and Arduino is connected to internet at the receiving side using Wi-Fi Module. By creating a web-application on the server end, the user can login using his login credentials and then type in the message that has to be displayed on the display unit. Once he clicks on the submit button the information from the server is received by the Arduino using Wi-Fi module and then it is passed to the display unit.

Keywords- Arduino, Wi-Fi Module, web-application

I. INTRODUCTION

Notice Board is primary thing in any institution or organization or public utility places. In this type of notice board, sticking various notices day to day is a difficult process. Using this notice board, we can display day to day information continuous or at regular intervals during working hours. These devices can be set up at various places in the campus. This will help to send information quickly. Amazon web services are used to host the web application. Web application is created on the server end so that user can access using login credentials. After login, we will type the message to be displayed. Arduino using Wi-Fi module will receive this message and then it will appear on the display unit. The rest of the paper is organized as follows: Section 2 represents the background and motivation, Section 3 we represent our approach, In section 4 we represent our simulated result, Section 5 conclude the paper.

II. Background and Motivation

Notice Board is the most common and primary apparatus in any institution, organization, or public utility places like a bus station, railways stations, and parks. However, sticking various notices day today is a difficult process. This project deals with a wireless notice board. The main objective of the project is to develop a wireless notice board that displays messages sent from the web server. When a user sends a message, a Wi-Fi Module through Local Web Server receives it.

A display connected to a server system should continuously listen for the incoming messages from the user, process it, and display it on the LCD screen. The message displayed should be updated every time the user sends new information. Only authenticated people should update the data to be displayed on the LCD.

III. Proposed Approach

Arduino

The Arduino is a family of microcontroller boards to simplify electronic design, prototyping and experimenting for artists, hackers, hobbyists, but also many professionals. People use it as brains for their robots, to build new digital music instruments, or to build a system that lets your houseplants tweet you when they are dry. Arduinos are built around an ATmega microcontroller — essentially a complete computer with CPU, RAM, Flash memory, and input/output pins, all on a single chip. Unlike, say, a Raspberry Pi, it's designed to attach all kinds of sensors, LEDs, small motors and speakers, servos, etc. directly to these pins, which can read in or output digital or analog voltages between 0 and 5 volts. The Arduino connects to your computer via USB, where you program it in a simple Language from inside the free Arduino IDE by uploading your compiled code to the board once programmed. The Arduino can run with the USB link back to your computer, or stand-alone without it — no keyboard or screen needed, just power.

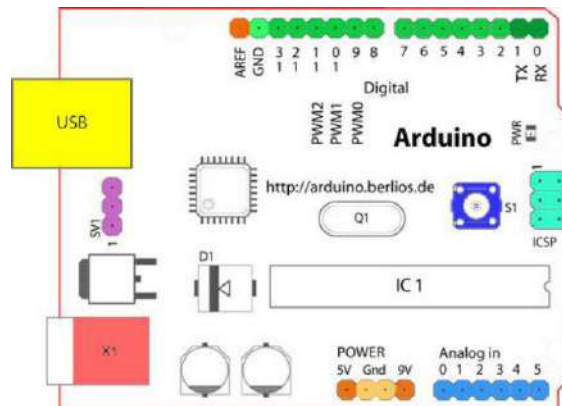


Fig. 1 Structure of Arduino Board

ESP 8266 Description

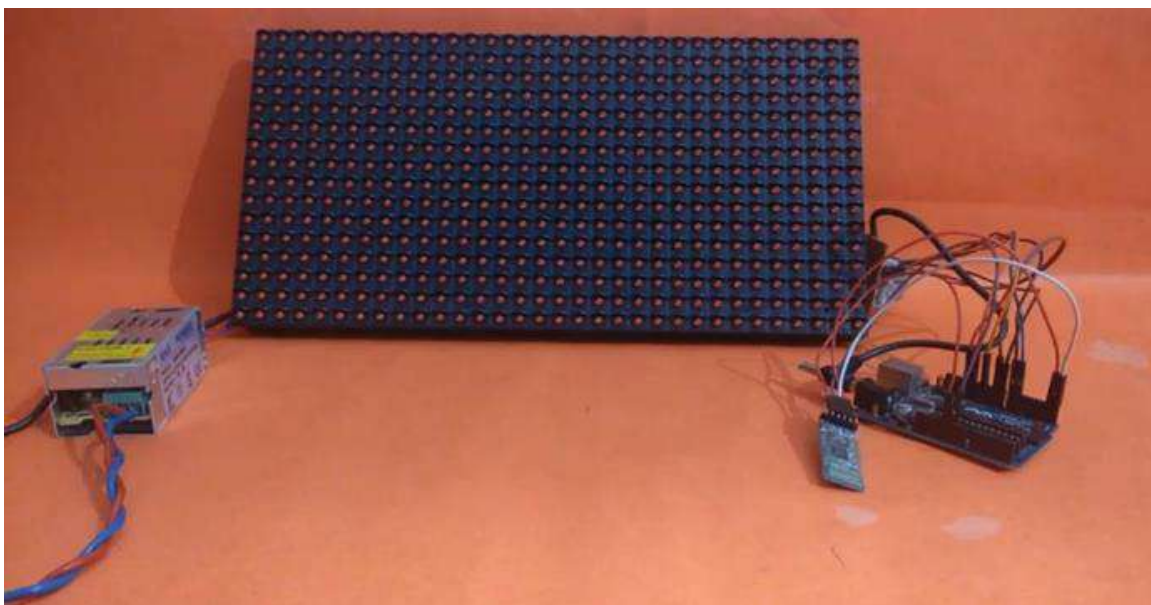
The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi ability as a Wi-Fi Shield offers. The ESP8266 Module is an extremely cost-effective board with a huge, and ever growing, community.

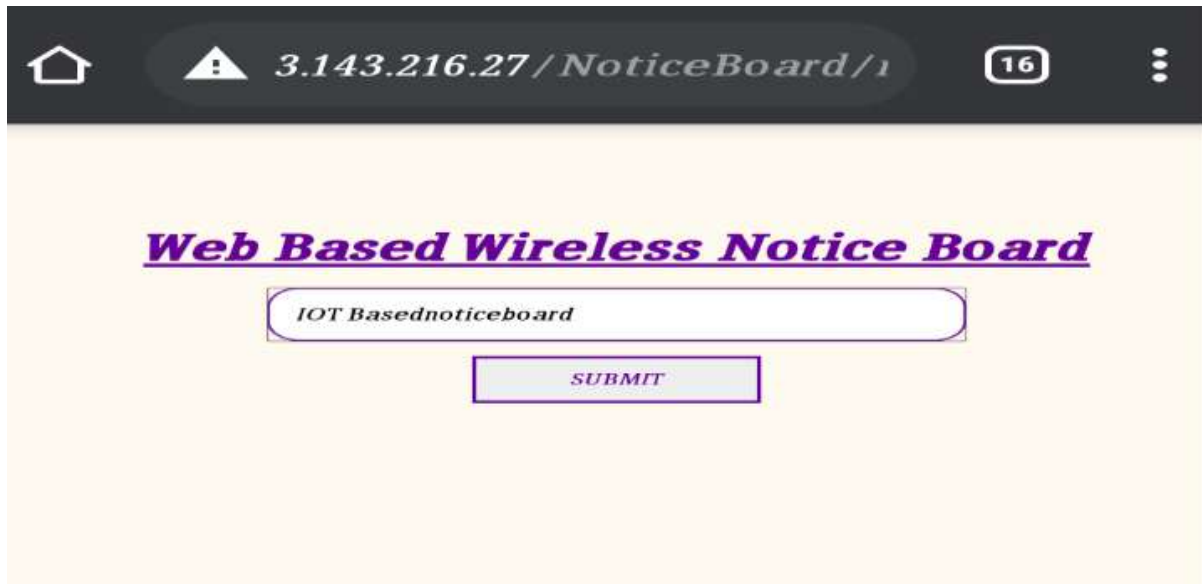


IV. Simulated Result

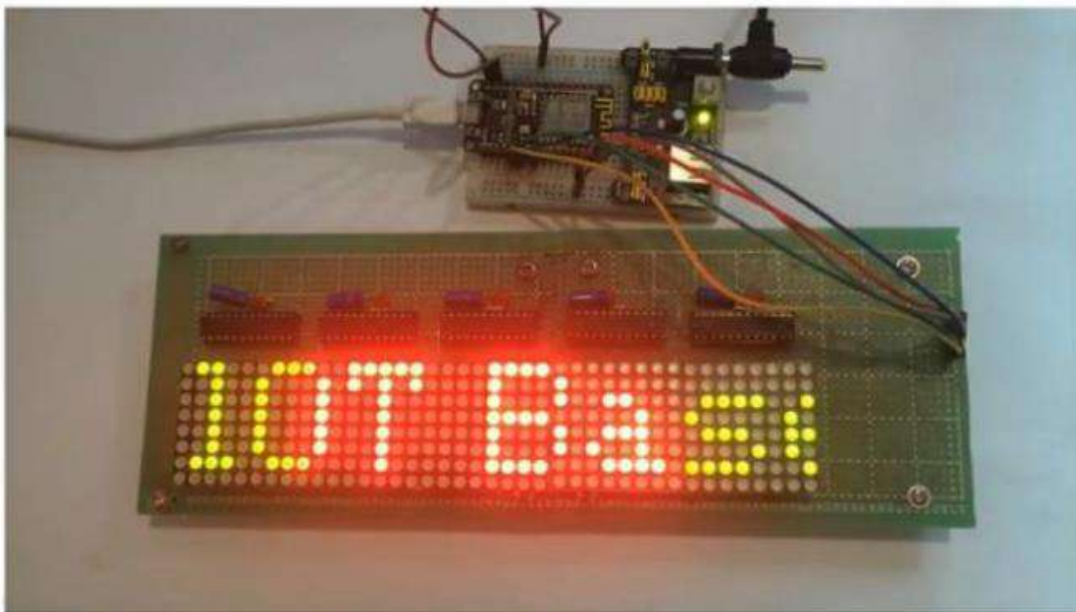
The web based wireless notice board hardware kit is as shown in the below figure which can be implemented in daily life and can be made more eye appealing by making more design changes.

Web Based Notice Board Hardware





Message through web page



Message display on led

Thus, the message can be sent from anywhere and it can be displayed in the notice board as it is connected through the internet as long as there is a suitable connection and no interruption in the network.

V. Conclusion

We can use the project in college Notice Board, a professor can send message for the immediate gathering of students at the department. It can be used on highways for traffic control, like traffic on one side of the road may be blocked in view of the VVIP movement or jam ahead.

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Wireless Agribot for Plough Seed and Sprinkler

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Abstract— Agriculture is an essential thing for survival of the humans and the farmers who do agriculture spend so much of time in ploughing the field and irrigating the field etc. The proposed system is a boon to farmers which combines the robotics with agriculture and capable of moving around the field like a farmer and plough the field and sow the seed in the pre determined row and irrigate the field along the rows autonomously. In addition to this, obstacle detection and clearance are also done. All these operations are controlled via Bluetooth module.

Keywords— Watermark, Discrete wavelet Transformation (DWT), Singular Value Decomposition(SVD),2D Barcode,Steganography

I. INTRODUCTION

Agriculture is considered to be the basis of life for the human species as it is the main source of food grains and other raw materials. It plays a vital role in the growth of country's economy. It also provides large ample employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, the traditional methods of farming are still used by many farmers which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. This paper therefore proposes a system which is useful in monitoring the field data as well as controlling the field operations which provides the flexibility. The proposed system concentrates on performing functions like ploughing, sowing seeds, irrigation, detection of obstacles. Engineering research in field of agriculture holds a key for sustainable future of Mankind. Technological advancements in farming, referred to as Agtech as grabbed a massive attention among researchers, investors and end users. It focuses on every aspect of farming, starting from Crop selection, Land Preparation, Seed Selection and sowing till the crop is harvested. In past half decade the trends in Agtech have been promising with countries like USA, Canada, Australia, India and Brazil. Agtech is automation of conventional farming techniques using modern day robots and drones. Initially, the main use of Agricultural robots had been in harvesting of crops. However, the Drones revolutionized the orthodox laborious techniques to easy, quick and more precise methods which help in maintaining the nutritional values of soil and improving crop quality thereby, increasing the overall yield.

II. SIGNIFICANCE OF WORK

In modern agriculture, maximizing and sustaining crop yields are the main objectives. One of the major problems constraining the development of an economically successful agriculture is nutrient deficiency for crop production. The existing agricultural robot performs basic elementary functions like harvesting, planting and spreading the pesticides. The Proposed system aims at designing multipurpose autonomous agricultural robotic vehicle which can be controlled through Bluetooth for ploughing, seeding and irrigation systems. The main motive for developing Agricultural Automation Technology is decreasing labor force, a phenomenon common in the developed world. The reasons are the need for improved food quality. Robotics offer solutions in precision agriculture to processes related to seeding, ploughing, sprinkling, etc. to improve productivity and efficiency.

III. METHODOLOGY

The agriculture has always been the backbone of India's sustained growth. As the population of India continues to grow, the demand for production will also grows. Hence, there is a great need for multiple cropping in the farms and this in turn requires efficient and time saving machines. The paper discusses the modern way agriculture which will

be helpful for the agriculture industry to move towards mechanization. The methodological procedure, circuit diagram and the block diagram are included in this section. The development of the agricultural robot consists of the integration of hardware techniques and software tools. Arduino Uno microcontroller is the master controller of the developed robot. All the operations of the robot are controlled through Bluetooth connectivity. The robot for agricultural purpose is an autonomous robot which is controlled remotely through a wireless Bluetooth connectivity between the Smartphone and the robot. The Bluetooth electronics app is used to control each and every operation of the robot. The Bluetooth HC-05 module is fixed on to the robot which receives signals from the Bluetooth electronics app and sends these signals to the microcontroller for processing of operations.

IV. LITERATURE SURVEY

A technological revolution is taking place in the area of machine tools, inspection devices and handling equipment. This new revolution has been triggered off by electronics and sustained by ever-increasing capabilities of computers. This has led to emergence of a new technology called mechatronics symbolizing the synthesis of mechanical as Computer controlled robots are used in industry for welding, assembling and machining, and to handle various materials. Over the past few years, there has been significant interest in designing smart agricultural systems. The use of smart farming techniques can enhance the crop yield, while simultaneously generating more output from the same amount of input. But still, most of the farmers are unaware of the latest technologies and practices. Due to this the yield of crops are becoming low. Also, there are a number of factors that contribute to the low yield of crops such as proper soil preparation, seed rate, seed cultivar, different sowing time, lack of moisture in the fields, water logging and salinity, lack of application of fertilizers, plant protection, adoption of modern technologies, proper marketing and lack of investment. Farmers suffer large financial losses because of usage of incorrect irrigation mechanisms, insect pests and attack of plant diseases, usage of uncalculated number of pesticides and insecticides, and wrong prediction of weather. For getting higher yield on Crops, monitoring is the vital task for the farmers. Due to the various constraints involved in agriculture, there is an urgent need to develop enhanced and economically realistic strategies in growing of crops. The farm irrigation systems in the previous years used simple timers and switches to control the irrigation mechanism for a predetermined time period irrespective of the weather conditions or moisture content present in the soil. By incorporating various advanced sensing and controlling techniques, the crop yield has increased to some extent while simultaneously the labour costs have decreased. Thus, there is a need for wireless technologies and automation in agriculture farming.

V. SOFTWARE AND ITS IMPLEMENTATION

Step one:

Install the Arduino Software that is appropriate for your specific desktop operating system.

Step Two:



Fig:1 Install the Arduino Software

After you have downloaded and installed the Arduino software, connect your Arduino/Arduino Uno board with the mini-USB port to your computer. You will see the green power LED on once connected.



Fig 2: USB port

Mac Users:

Launch the Arduino software. You will need to first select the Arduino Uno board from the menu options. This is under Tools -> Boards -> Arduino/Genuino Uno:

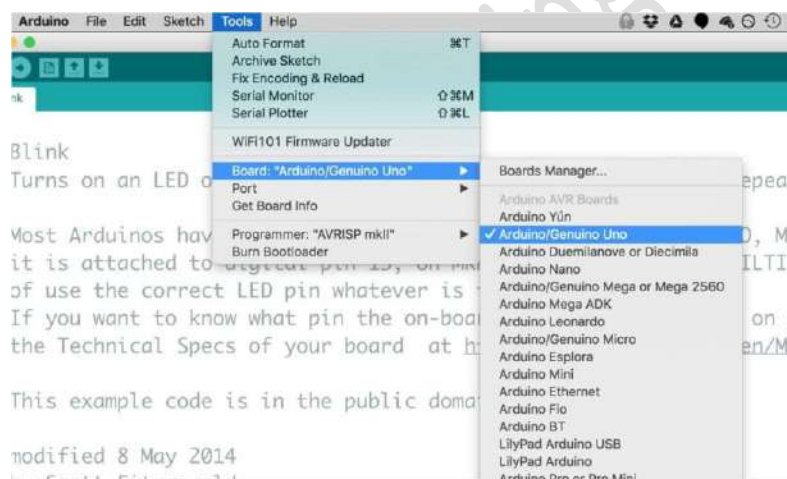


Fig 3: Launch the Arduino software

After, you will need to select the serial port. Thus, will show up as a USB device:

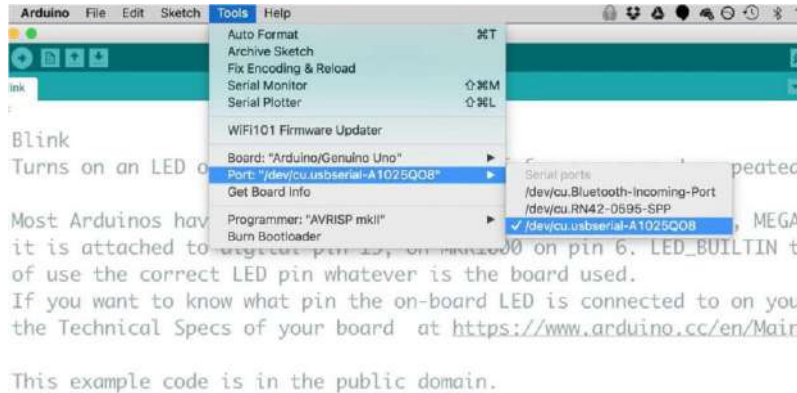


Fig 4: select the serial port

Windows Users:

After you have installed the Arduino software, the Arduino serial port drivers are not setup by default. You will need to manually install the drivers. Open the Device Manager. Scroll down to “other devices” and you should see FT232R USB UART device connected if you have connected your Arduino to your computer. Right click and install the drivers. Windows will prompt you the drivers have been successfully installed.



After properly installed, you will see a device named “USB Serial Port COM...” Navigate back to arduino. Select the Arduino UNO and the COM.. from the port menu:

Step Three:

After you have selected the Arduino UNO board and serial port, navigate to the “blink” example built into the

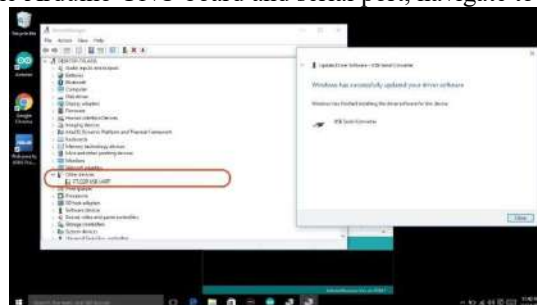


Fig 5: Arduino UNO board and serial port

Arduino software: Press the upload button while the Arduino board is connected to load the blink example in the Arduinos internal memory:



Fig 6:Uploading

Once you have uploaded the code, you will see the TX/RX led flash and then the onboard LED connected to pin 13 will blink. This blink test verifies that you have connected the UNO to your computer successfully.



Fig 7: connected the UNO

VI.FUTURE SCOPE

This type of robots has very high future scope because it is very useful for agriculture by reducing the workload. It reduces the time-consuming process of spraying pesticides and water, and can work very effectively. It can work in any weather condition by reducing workload and can work in any season by configuring through mobile. It helps in reducing health conditions of farmers which generally happen due to inhalation of chemicals from pesticides and other animals too.

VII. CONCLUSION

This system may improve the way of agriculture is done by the farmer to save money, time and energy. This system may monitor and report real time situation of the robot in an accurate manner to the farmer's mobile, thus helping the farmer to be aware of the tasks performed. By implementing this project in the field of agriculture we can help the farmers in the various stage of agriculture i.e., during the Seeding and fertilizing. This project is very useful for the farmers who are intended to do agriculture activity but facing the labor problem.

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Secret Data Hiding Using Inter frames for Copyright Protection

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Abstract— Data is the new form of resource today. Data is created and available everywhere today which can be perfectly copied and rapidly transited at large scale today. This data creation and transmission is playing vital role in functioning of various institutions but the major challenge here is protection and security for the data. Content owners are raising concerns that, traditional data protection mechanisms such as encryption, is no longer reliable. In this paper, we present a secret data hiding mechanisms through watermarking technology. A Watermark is a recognizable image or pattern in pattern that appears as various shades of lightness/darkness when viewed by transmitted light (or when viewed by reflected light), caused by thickness and density variations in the paper. The purpose of watermarks is to protect content and to claim ownership of an asset. Without watermarks, valuable digital assets can be susceptible to content theft or unauthorized use. The working model is developed and tested periodically..

Keywords— Watermark, Discrete wavelet Transformation (DWT), Singular Value Decomposition(SVD),2D Barcode,Steganography

I. INTRODUCTION

More and more digital multimedia data are available today, which can be perfectly copied and rapidly disseminated at large scale. Watermarking technology is used to provide data security to this digital data. A watermark is a recognizable image or pattern in paper that appears as various shaded by thickness or density variations in the paper. Watermarks vary greatly in their visibility, while some are obvious on casual inspection others require some study to pick out. Various aids have been developed, such as watermark fluid that wets the paper without damaging it.

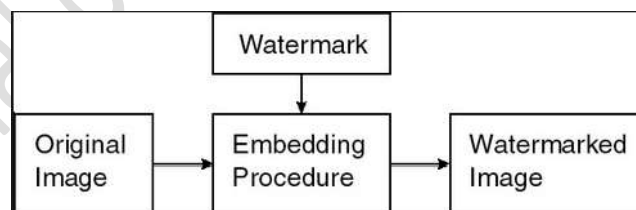


Fig.1.1Block Diagram



Fig.2.2 Symbols of Watermarks

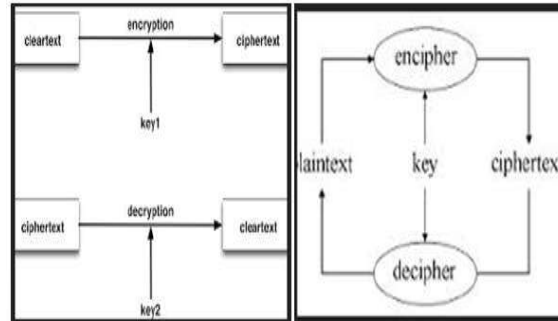


Fig. 1.3 Cryptography Process

II. PAGE LAYOUT

An easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it. An easy way to

Types of watermark

1. Division based on human perception
2. Division based on applications
3. Division based on level of information required
4. Based on user's authorization to detect the watermark
5. Division based on knowledge of the user on the presence of the watermark

The watermarking uses discrete wavelet transformation (DWT) and singular value decomposition technologies. The combination of Discrete Wavelet Transformation (DWT) and Singular Value Decomposition (SVD) of Blue channel is used to embed the watermark. With separable filters, applying a 1-D transform to all the rows of the input and then repeating on all of the columns can compute the 2-D transform.

III. SIGNIFICANCE OF WORK

Unless you're giving prints or files to someone who has paid for them in some way, you should always use watermarks on all your publicly displayed electronic images. Most people are probably innocently unaware; they see an image they like, right click it.

IV. APPLICATIONS OF WATERMARKING:

A. ID card security

Information in a passport or ID, Can also be included in the person's photo that appears on the ID. By extracting the embedded information and comparing it to the written text, the ID card can be verified.

B. Medical application

Names of the patients can be printed on the X-ray reports and MRI scans using techniques of visible watermarking. The medical reports play a very important role in the treatment offered to the patient. If there is a mix up in the reports of two patients this could lead to a disaster. Watermarks are often used as security features of banknotes, passports, postage stamps and other documents to prevent counterfeiting. Watermarking proposes an effective, robust and imperceptible video watermarking scheme. The combination of Discrete Wavelet Transformation (DWT) and Singular Value Decomposition (SVD) of Blue channel is used to embed the watermark. The wavelet transform has gained widespread acceptance in signal processing in general and in image compression research in particular. With separable filters, applying a 1-D transform to all the rows of the input and then repeating on all of the columns can compute the 2-D transform.

Literature survey is the most important step in software development process. Before developing the tool it is necessary to determine the time factor, economy and company strength. Once these things are satisfied, then next step is to determine which operating system and language can be used for developing the tool. Once the programmers start building the tool the programmers need lot of external support. The drawbacks of SVD-based image watermarking are false positive, robust and transparency. The former can be overcome by embedding the principal components of the watermark into the host image, the latter is dependent on how much the quantity (i.e., scaling factor) of the principal components is embedded. The experimental results demonstrate that the performance of the proposed methods outperforms than those of the existing methods. Now a day's digital multimedia data exchange through internet is main idea which requires protection to enhance security. The 2D barcode with a digital watermark is a widely interest research in security. The Project presents an effective, robust and imperceptible video

invisible watermarking scheme. This scheme embeds the watermark into any of frame from video. Here the blue channel of frame will be selected for watermarking based on Discrete Wavelet transformation and Singular Value Decomposition. Digital watermarking can be defined as embedding information into digital signals. Original signal is distorted as a result of watermarking. The goal in reversible watermarking is to reconstruct the original signal from the watermarked signal without error.

V. CRYPTOGRAPHY

Cryptography is the practice and study of techniques for secure communication in the presence of third parties. More generally, it is about constructing and analyzing protocols that overcome the influence of adversaries and which are related to various aspects in information security such as data confidentiality, data integrity, authentication and non-repudiation. Cryptography prior to the modern age was effectively synonymous with encryption, the conversion of information from a readable state to apparent nonsense.

VI. STEGANOGRAPHY

Steganography is the art or practice of concealing a message, image, or file within another message, image, or file. The word steganography combines the Ancient Greek words stegano meaning "covered, concealed, or, protected", and graphing meaning, "writing".

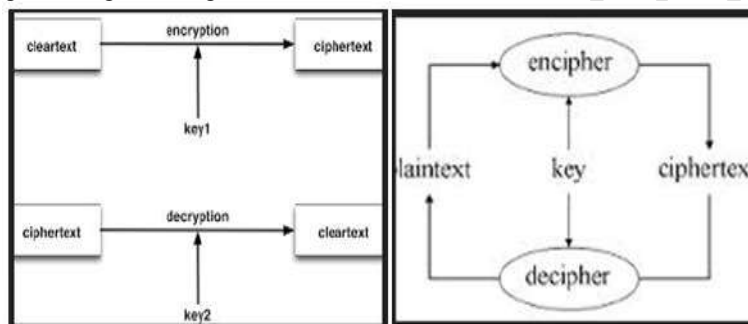


Fig.3.4 Cryptography Process

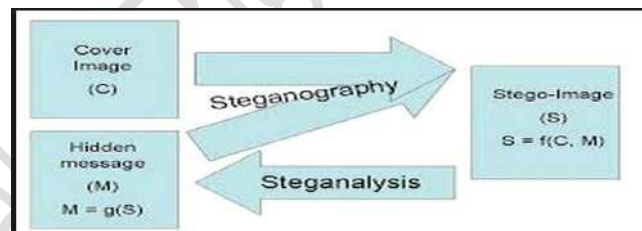


Fig.4.5 Steganography Process

VII. WATERMARK EMBEDDING

The human eyes are more sensitive to noise in lower frequency range than its higher frequency counterpart, while the energy of most natural images are concentrated on the lower frequency range.

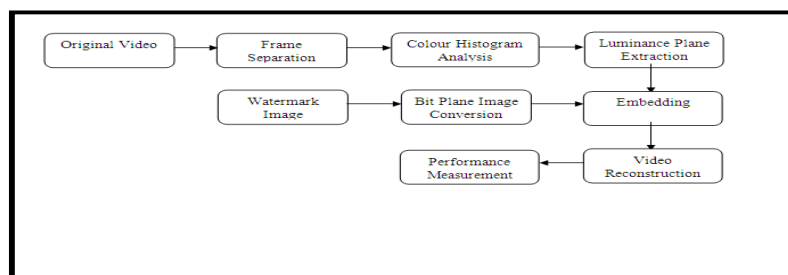


Fig.5.6 Watermark Embedding Process

VIII. WATERMARK EXTRACTION

The extraction of watermark requires the original frame, the watermarked frame and also the digital watermark. First of all, both the original frame and the watermarked frame are DCT transformed.

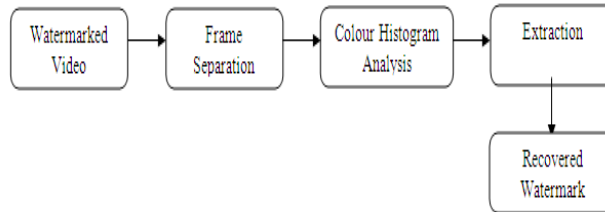


Fig.6.7 Watermark Extraction process

Extracting Process

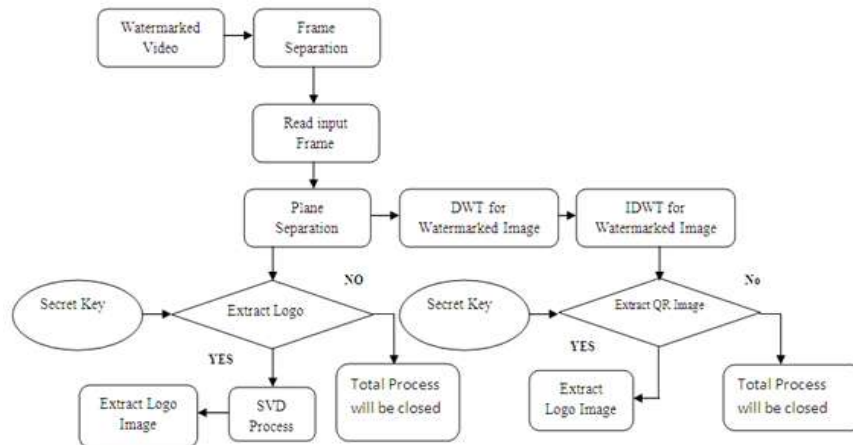


Fig.7.8 Flow Chart for Extraction Process

VIDEO

Digital video refers to the capturing, manipulation, and storage of moving images that can be displaced on computer screens. This requires that the moving images be digitally handled by the computer.

Advantages

Ease of manipulation

Editing is easier and faster with a digital video.

Preservation of data

It is not true that DV is better simply because it is digital. Big screen films are not digital and are still highly esteemed as quality images. However, it is easier to maintain the quality of a digital video.

MPEG

Stands for Moving Picture Experts Group. It used to name the set of digital video compression standards and file formats developed by this group.

AVI

Stands for Audio Video Interlaced. It is one of the oldest formats. It was Created by Microsoft to go with Windows 3.1 and it's "Video for Windows" application.

MOV

It is able to store both video and sound. Simultaneously, the format was once superior to AVI.

FRAME SEPARATION

Frame processing is the first step in the background subtraction algorithm, the purpose of this step is to prepare the modified video frames by removing noise and unwanted object's in the frame in order to increase the amount of information gained from the frame and the sensitivity of the algorithm.

Coding for Frame Separation

```
file=aviinfo('movie1.avi');
frm_cnt=file.NumFrames
str2='.bmp'
h = waitbar(0,'Please wait...');
for i=1:frm_cnt
    frm(i)=aviread(filename,i);
    frm_name=frame2im(frm(i));
    frm_name=rgb2gray(frm_name);
    filename1=strcat(strcat(num2str(i)),str2);
    imwrite(frm_name,filename1);
    waitbar(i/frm_cnt,h)
end
close (h)
```

COLOUR FRAME [Color Image (RGB type) – Three Planes]

An image can be defined as a two-dimensional signal (analog or digital), that contains intensity (gray scale), or color information arranged along an x and y spatial axis. Also it is defined as collection of pixels. An image is a visual representation of something. In information technology, the term has several usages: An image is a picture that has been created or copied and stored in electronic form.

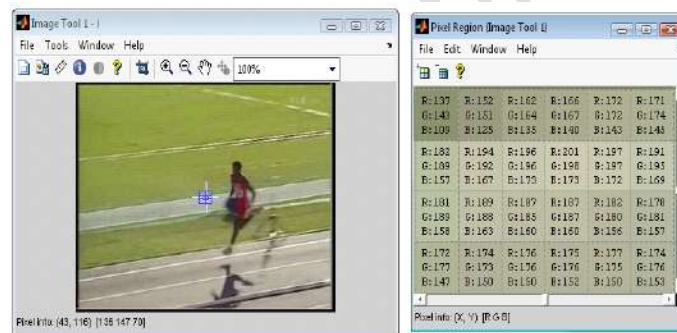


Fig.8.9Color Image with Intensity Planes

An image is a visual representation of something. In information technology, the term has several usages: An image is a picture that has been created or copied and stored in electronic form.

CONVERT INTO GRAY SCALE FRAME[Single plane – Intensity range[0-255]]

Each pixel is a shade of gray, normally from 0 (black) to 255 (white). This range means that each pixel can be represented by eight bits, or exactly one byte.

```
i=imread('frame_no.bmp');
imtool(i);
k=rgb2gray(i);
imtool(k);
```

A grayscale Image is digital image is an image in which the value of each pixel is a single sample, that is, it carries only intensity information. Images of this sort, also known as black-and-white, are composed exclusively of shades of gray (0-255), varying from black(0) at the weakest intensity to white(255) at the strongest.

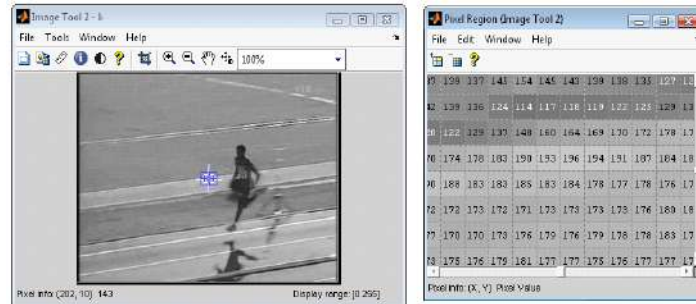


Fig.9.10 Gray Scale Image with Intensity Planes

The basis set of wavelets is generated from the mother or basic wavelet is defined as: $\psi(a, b, t) = \frac{1}{\sqrt{a}} \psi(\frac{t-b}{a})$; a, b and $a > 0$. The variable 'a' (inverse of frequency) reflects the scale (width) of a particular basis function such that its large value gives low frequencies and small value gives high frequencies. The variable 'b' specifies its translation along x-axis in time. The term $1/\sqrt{a}$ is used for normalization. The Two-Dimensional DWT (2D-DWT) converts images from spatial domain to frequency domain.

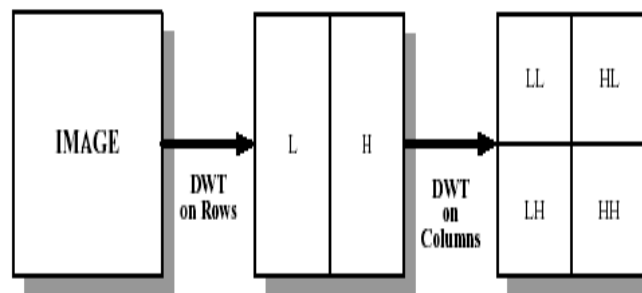


Fig.10.11 Block Diagram of DWT (a) Original Image (b) Output image after the 1-D D applied on row input (c) Output image after the second 1-D applied on row input

The Two-Dimensional DWT (2D-DWT) converts images from spatial domain to frequency domain.

IX. EXPERIMENTAL RESULTS

On watermarking scheme, a set of gray-level images of 512*512 pixels, "Lena", shown in figure 1, was used as host images. A binary image "JNTU LOGO", each with 32*32 bits, was used as watermark in the simulations and is shown in the figure 2.



Fig. 2 DWT for Lena image (a) Original Image (b) Output image after the 1-D applied on column input (c) Output image after the second 1-D applied on row input



BASE PAPER METHOD (Bit Plane Slicing)

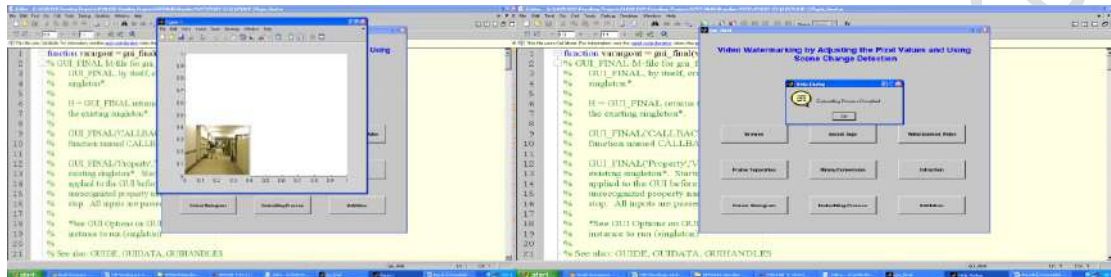


Fig.2.1 Input Video Fig.2.2 Watermark Embedding



Fig. 2.3 Extracted Logo from Watermarked Video

MODIFICATION RESULTS (DWT-SVD Process)

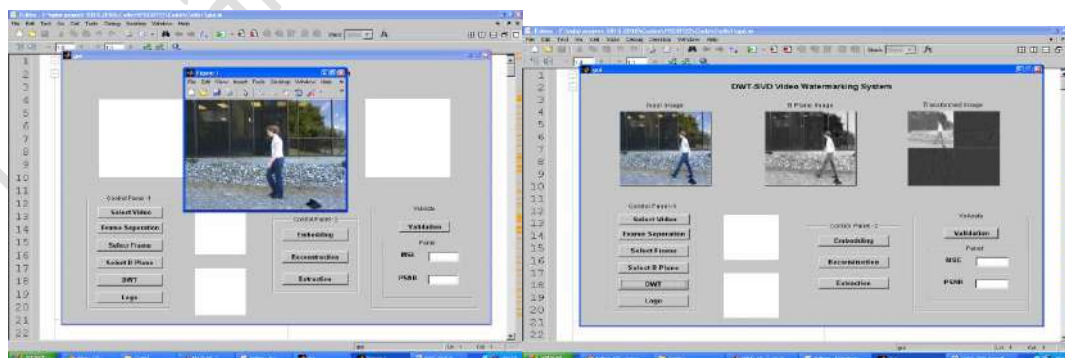


Fig. 2.4 Input Video

Fig. 2.5 DWT

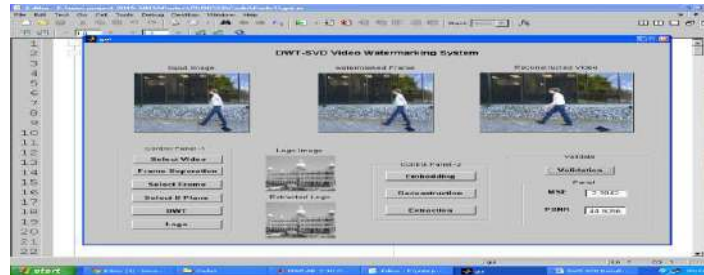


Fig. 2.6 Result Analyses

X. FUTURE SCOPE

The watermark embedding scheme can be extended to include encrypted watermarks. Watermark extraction algorithm can be extended to perform watermark validation automatically. Suitable feature extraction and matching techniques have to be explored. The noise removal scheme has been implemented for stationary images. This can be extended to noise removal in case of non-stationary images for dynamic denoising.

XI. CONCLUSION

The Project presented an effective, robust and imperceptible video watermarking concealment. Here, discrete wavelet transform was used to reserve space for concealing data effectively and chaos encryption was used as to protect image contents. Watermark recognition is used to recognize the input water mark for verification to access the video. This system was generated the Watermark image with less error under maximum data hiding capacity. Finally, the performance of system was evaluated with quality metrics such as error and PSNR factor. It is widely used for copy right protection of image or videos during internet sharing. It was better compatible approach and flexibility with better efficiency rather than prior methods.

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Development of Fingerprint based high Security Voting System

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Abstract— *In the current scenario, most of the countries of the world hold their elections using Electronic Voting Machines, where your vote gets registered electronically with the help of an Electronic Machine without using and wasting ballot paper to vote for elections. The domain of the project is the Internet of Things where we are building Fingerprint Based Biometric Voting Machine using Arduino. We know that IoT is the system of interrelated computing devices, mechanical and digital machines, objects, and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.*

Thus our Fingerprint online module is an application where the user is recognized by his finger pattern. As we know that the a finger of each human being are different, the voter can be easily authenticated. The online system allows the voter to vote through his fingerprint. Once the user has got the voters id and password from the admin the user can log in and vote for the candidates who were nominated. The system will allow the user to vote for only one candidate. In the end, the election result is published by using the election id. Even users can view the election result.

Keywords— *Watermark, Discrete wavelet Transformation (DWT), Singular Value Decomposition(SVD),2D Barcode,Steganography*

I. INTRODUCTION

Biometric Finger print devices are used in the Electronic Voting machine for voter verification. We have designed a finger print based voting machine where there is no need for the user to carry his ID which contains his required details. The person at the polling booth needs only to place his Finger on the device, thus allowing the acquisition of an on-spot fingerprint from the voter which serves as an identification. This Finger print reader reads the details from the tag. This data is passed onto the controlling unit for the verification. The controller fetches the data from the reader and compares this data with the already existing data stored during the registration of the voters. If the data matches with the pre-stored information of the registered fingerprint, the person is allowed to cast his vote. If not, a warning message is displayed on LCD and the person is barred from polling his vote. The vote casting mechanism is carried out manually using the push buttons. LCD is used to display the related messages, warnings and ensuing results.

Also using wifi module the information is transfer to the Server platform. Wi-Fi (Short for Wireless Fidelity) is a wireless technology that uses radio frequency to transmit data through the air. Wi-Fi has initial speeds of 1mbps to 2mbps. Wi-Fi transmits data in the frequency band of 2.4 GHz. It implements the concept of frequency division multiplexing technology. Range of Wi-Fi technology is 40-300 feet.

The main controlling part of the project is ARDUINO micro controller. The Microcontroller is programmed using Embedded C language.

II. EMBEDDED SYSTEMS

An embedded system is a computer system designed to perform one or a few dedicated functions often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical

parts. By contrast, a general-purpose computer, such as a personal computer (PC), is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use today.

In general, "embedded system" is not a strictly definable term, as most systems have some element of extensibility or programmability. For example, handheld computers share some elements with embedded systems such as the operating systems and microprocessors which power them, but they allow different applications to be loaded and peripherals to be connected. Moreover, even systems which don't expose programmability as a primary feature generally need to support software updates. On a continuum from "general purpose" to "embedded", large application systems will have subcomponents at most points even if the system as a whole is "designed to perform one or a few dedicated functions", and is thus appropriate to call "embedded". A modern example of embedded system is shown in fig: 1.

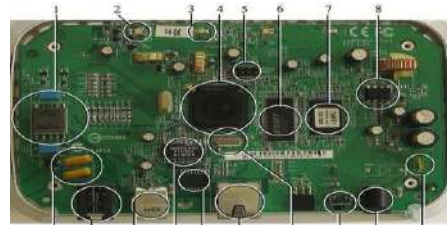


Fig 1:A modern example of embedded system

III. METHODOLOGY

Step 1: Parts

Arduino IDE installed

on your PC

Step 2: The

Approach

We use the Arduino UNO to bootstrap the ATmega328 that is sitting on the Arduino-on-a-Breadboard.

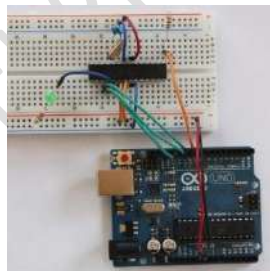


Fig 2: Arduino-on-a-Breadboard

Step 3: Program your Arduino UNO as an ISP



Fig 3: Arduino Program

We need to program the Arduino UNO to act as an ISP (In-System Programmer), so that it can burn the bootloader onto the Breadboard chip.

1. Open the Arduino IDE
2. Open the ArduinoISP sketch (under File, Examples)
3. If you're using version 1.0 of the IDE:

Search for *void heartbeat* and change the line that reads:

Connect your UNO to the PC, making sure it's not connected to the Arduino on a Breadboard. Ensure your UNO is selected under the Boards menu option, and upload the sketch.

Step 4: Connect your ATmega328

Now connect your ATmega to your UNO as follows:

- UNO 5v ---> ATmega pin 7 (VCC)
- UNO GND ---> ATmega pin 8 (GND)
- UNO pin 10 ---> ATmega pin 1 (RESET)
- UNO pin 11 ---> ATmega pin 17 (MOSI)
- UNO pin 12 ---> ATmega pin 18 (MISO)
- UNO pin 13 ---> ATmega pin

19 (SCK) Step 5: Which ATmega328 are you using?

I learnt the hard way that there is more than one type of ATmega328. The two variants that are of interest to us are the ATmega328-PU and the ATmega328P-PU.

The **-PU** suffix means that the chips are in a PDIP package, the format we need for our breadboard. The **328P** is a picoPower processor, designed for low power consumption, and is used on the Arduino boards. Given low power consumption this is first choice.

Step 6: ATmega328-PU workaround



Fig 4: Compilation of Program

In your Arduino folder, find the subfolder: `..\hardware\tools\avr\etc`

1. Make a backup copy of the file: *avrdude.conf*
2. Open the file *avrdude.conf* in a text editor
3. Search for: `"0x1e 0x95 0x0f"` (this is the ATmega328P signature)
4. Replace it with: `"0x1e 0x95 0x14"` (this is the ATmega328 signature)
5. Save the file

6. Restart the Arduino IDE
7. Continue with the rest of the steps in the instructable, and once bootloading is complete restore the backup copy you made.

Step 7: Bootload the ATmega328

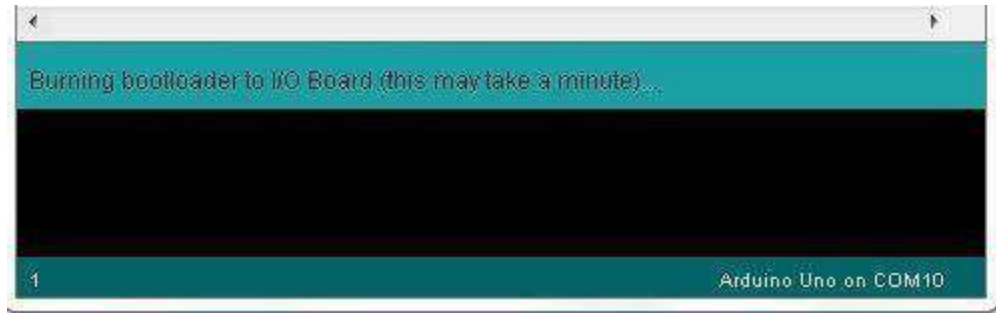


Fig 5: Burning bootloader to I/O Board

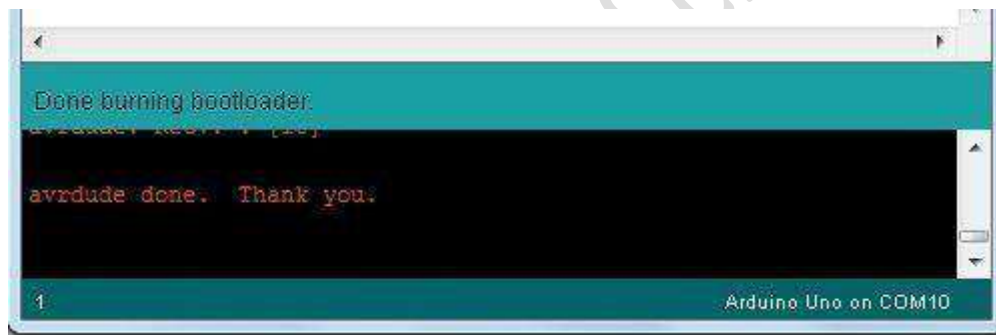


Fig 6: Done burning bootloaderIn the Arduino IDE, from the *Tools* menu:

- under the *Board* option choose *Arduino UNO*
- under the *Serial Port* option ensure the correct port is selected
- under the *Programmer* option choose *Arduino as ISP*

To burn the Bootloader, choose *Burn Bootloader* from the *Tools* menu. You should see a message "Burning bootloader to I/O Board (this may take a minute)". Once the bootloader has been burned, a message of confirming the success gets displayed. "Congratulations: You're now ready to load sketches onto your Arduino on a breadboard!"

IV. RESULT

Schematic diagram and interfacing of ARDUINO microcontroller with each module is considered.

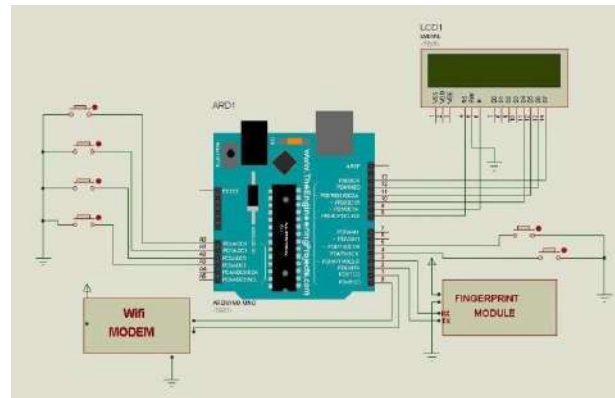


Fig 7: schematic diagram of FINGERPRINT BASED HIGH SECURITY VOTING SYSTEM

The above schematic diagram of **FINGERPRINT BASED HIGH SECURITY VOTING SYSTEM** explains the interfacing section of each component with micro controller.

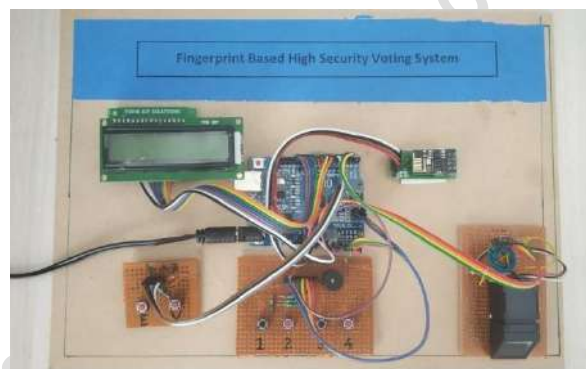


Fig 8 : fingerprint based high security voting system

This project can be used for voting since it over came all the drawbacks so far an ordinary voting machine also provide additional security. Its main advantage is that since finger prints of every person is unique and hence this system completely reduces the chance of invalid votes. This system can be manufactured simply as well as cheap

V. Conclusion

This project can be used for voting since it over came all the drawbacks so far an ordinary voting machine also provide additional security. Its main advantage is that since finger prints of every person is unique and hence this system completely reduces the chance of invalid votes. This system can be manufactured simply as well as cheap.

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Implementation on Banking System Using Fingerprint Module

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Abstract— *This project aims at designing and developing biometric finger print technology based money transaction system. As more global financial activity becomes digitally-based, banks are utilizing new technologies to develop next-generation identification controls to combat fraud, make transactions more secure, and enhance the customer experience.*

The sensor is a solid-state fingerprint sensor that reliably captures fingerprint information. It is designed to integrate into devices for improved security and convenience. The sensor provides a reliable, quick and user-friendly alternative to passwords, PIN's and other forms of user authentication. User need not carry any physical cards (credit, debit etc.) or mobile phones for money transaction. User just need to keep finger print enter transaction amount using keypad. This transaction information is sent to server over secure IoT (Wi-Fi) and further processing done there.

Keywords— *Wi-Fi, next-generation, Singular Value Decomposition (SVD), 2D Barcode, Steganography*

I.INTRODUCTION

Theft is one of the major problem in today's world places like in offices and other public places should not be secured so that issues to make secure our documents and precious things so we have decided to make this type of security system that will be more usable to all the people . This system assures the perfect use on the fingerprints for door opening and closing. Through the project we can provide high security to users. The fingerprint most of the banks have lockers such that one key is with the user and the bank has a master key. They also have password which the user has to tell the bank before going in the locker room, now if the user loses the key then, it is a big security risk. there are many thieves around us that they can easily or forcefully break our lockers so we can lost our property so to overcome this problem we are creating this type of security system Many of the bank lockers do not guarantee full safety of the user. In the fingerprint bank locker system we can easily add more than 1 fingerprint in the system so we can add our family member fingerprint as a nominee. And we can insert our multi hand fingerprint if we are facing accident and if we wound or a cut in our finger so we can use our nominee fingerprint or other multi hand fingerprint. If we are away from our house and we required urgent document or property so our family members can also use our lockers. this is a very a unique idea instead to keep keys or to protect that keys. Biometric devices are highly secured security identification and authentication device. Such devices use automated methods of verifying and recognizing the identity of a living person based on a physiological behavioral characteristic. These characteristics include fingerprints, facial images, iris and voice reorganization

Fingerprint - is unique and not similar to anybody and using fingerprint can provide more security .even illiterate people are also capable of using this security method. This method takes less time to be operated by the user. The fingerprint can also be used in forensic departments while catching the suspect who can be a murderer or a thief. Even the zoological experts use the fingerprint technique to check on the animals in the forest that if the animal is dead or alive by this way they carry on the census of the animals. The new species can also be discovered by using their fingerprint to check on to the new species and the already existing species

II. SIGNIFICANCE OF WORK

An embedded system is a special-purpose computer system designed to perform one or a few dedicated functions, sometimes with real-time computing constraints. It is usually embedded as part of a complete device including hardware and mechanical parts. In contrast, a general-purpose computer, such as a personal computer, can do many different tasks depending on programming. Embedded systems have become very important today as they control many of the common devices we use. Since the embedded system is dedicated to specific tasks, design engineers

can optimize it, reducing the size and cost of the product, or increasing the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale. Physically, embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure. In general, "embedded system" is not an exactly defined term, as many systems have some element of programmability. For example, Handheld computers share some elements with embedded systems — such as the operating systems and microprocessors which power them — but are not truly embedded systems, because they allow different applications to be loaded and peripherals to be connected. An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is specifically designed for a particular kind of application device. Industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines, and toys (as well as the more obvious cellular phone and PDA) are among the myriad possible hosts of an embedded system. Embedded systems that are programmable are provided with a programming interface, and embedded systems programming is a specialized occupation. Certain operating systems or language platforms are tailored for the embedded market, such as Embedded Java and Windows XP Embedded. However, some low-end consumer products use very inexpensive microprocessors and limited storage, with the application and operating system both part of a single program. The program is written permanently into the system's memory in this case, rather than being loaded into RAM (random access memory), as programs on a personal computer are. The uses of embedded systems are virtually limitless, because every day new products are introduced to the market that utilizes embedded computers in novel ways. In recent years, hardware such as microprocessors, microcontrollers, and FPGA chips have become much cheaper. So when implementing a new form of control, it's wiser to just buy the generic chip and write your own custom software for it. Producing a custom-made chip to handle a particular task or set of tasks costs far more time and money. Many embedded computers even come with extensive libraries, so that "writing your own software" becomes a very trivial task indeed. From an implementation viewpoint, there is a major difference between a computer and an embedded system. Embedded systems are often required to provide Real-Time response. The main elements that make embedded systems unique are its reliability and ease in debugging.

III. LITERATURE SURVEY

Embedded systems often reside in machines that are expected to run continuously for years without errors and in some cases recover by them if an error occurs. Therefore the software is usually developed and tested more carefully than that for personal computers, and unreliable mechanical moving parts such as disk drives, switches or buttons are avoided. Specific reliability issues may include: The system cannot safely be shut down for repair, or it is too inaccessible to repair. Examples include space systems, undersea cables, navigational beacons, bore-hole systems, and automobiles. The system must be kept running for safety reasons. "Limp modes" are less tolerable. Often backups are selected by an operator. Examples include aircraft navigation, reactor control systems, safety-critical chemical factory controls, train signals, engines on single-engine aircraft. The system will lose large amounts of money when shut down: Telephone switches, factory controls, bridge and elevator controls, funds transfer and market making, automated sales and service. A variety of techniques are used, sometimes in combination, to recover from errors both software bugs such as memory leaks, and also soft errors in the hardware: Watchdog timer that resets the computer unless the software periodically notifies the watchdog Subsystems with redundant spares that can be switched over to software "limp modes" that provide partial function Designing with a Trusted Computing Base (TCB) architecture[6] ensures a highly secure & reliable system environment An Embedded Hypervisor is able to provide secure encapsulation for any subsystem component, so that a compromised software component cannot interfere with other subsystems, or privileged-level system software. This encapsulation keeps faults from propagating from one subsystem to another, improving reliability. This may also allow a subsystem to be automatically shut down and restarted on fault detection. Immunity Aware Programming

IV. METHODOLOGY

The working principle of the fingerprint sensor mainly depends on the processing. The fingerprint processing mainly includes two elements namely enrolment and verification. In fingerprint enrolling, every user requires to place the finger twice. So that the system will check the finger images to process as well as to generate a pattern of the finger and it will be stored. When matching, a user places the finger using an optical sensor then the system will produce a pattern of the finger & compares it with the finger library templates. the system will evaluate the exits finger with a

precise pattern which is selected within the module. Similarly, for 1: N matching, the scanning system will look for the complete finger records for the finger matching. In both situations, the scanning system will go back to the corresponding result, success otherwise crash.

V. RESULTS

When the finger is placed, the image of finger is captured and resized and gets enhanced. A dialogbox is appeared that the image is matched when it gets matched with the image in database. Likewise a dialog box is appeared when the image gets mismatched. The LCD will display therequired content

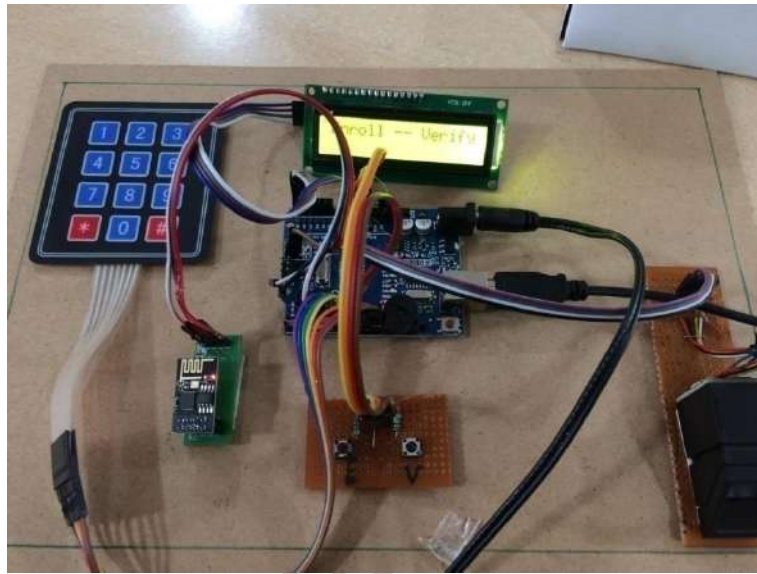


Fig1 : Output

VI. CONCLUSION

The Biometric finger vein bank locker system is a highly secured bank locker system which can provide access to only authorized persons and it prevents the concept of proxy because finger veins are unique for an individual. It can be employed in banking & finance, retail ATM, etc.

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Improved Security to School Children Using GSM

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Abstract— *Children's missing is becoming a global concern, especially in India. School children these days face 'n' number of security challenges which is evident with the growing crime rate at a significant level. As it is impossible for school going children to think themselves and take decisions, taking good care of them is a difficult task. Technology should be imperative to safe guard the society. In this paper, we present a GSM based school children security system using RFID that monitors and updates the child status to parents and school principal from time to time. The developed working model considered RF ID Technology and an advanced ARM 7 processor and GSM Technology. The return status of the child is secured by providing the message to the parent in advance is encouraged to meet the challenges in the child security. The working model is developed and tested periodically for constant monitoring.*

Keywords— Aurdino, Microcontrollers, PHP, Gateway Provider

I. INTRODUCTION

The project aims at the total security of the children. Counters are used at the entrance and exit locations of bus, at the entrance of the school, playground, washrooms and etc.. The school children are required to scan their tags and the corresponding messages will be sent to their parent's mobiles. Thus child arrival and departure details will be regularly sent to parents using GSM technology. This paper focused to provide the security to the children from starting location to destination with applied RF technology [1]. School children safety is the most significant component encouraged to precede research with the support of advanced technology. Several bitter incidents forced to develop an innovative methodology to provide secure life for children. The safety mechanism to the children travelling from school to home and vice versa is very important. A GSM Module is basically a GSM Modem (like SIM 900) connected to a PCB with a different types of output taken from the board – say TTL Output (for Aurdino, 8051 and other microcontrollers) and RS232 output to interface directly with a PC. M.Navya et.al proposed GSM-GPS technology to track children, GSM sends information to parent [2]. G.Bharathi, L.Ramurthy proposed a mechanism to trace the missed student using GSM-GPS technology. Latitude and altitude are given by GPS [3][4][5].

EM-18 RFID reader is one of the commonly used RFID reader to read 125KHz tags. It features low cost, low power consumption, small form factor and easy to use. It provides both UART and Wiegand26 output formats. It is used as a system that transmits the identity of an object using radio waves by Kumar[6]. V.Sivasankaran et.al proposed a RFID-GSM technology to provide security. RFID tags are attached to the children bags and GSM messages [7].

The rest of the paper is organized as follows. Section 2 presents the practical implementation. Section 3, presents the working of the model. In Section 4, we present aurdino code to connect the RFID. In Section 5, we present our verified results. Section 6 concludes the paper.

II. PRACTICAL IMPLEMENTATION

A. Connecting Aurdino with GSM module

We use SIM900 GSM module . You need to double check your GSM modules power requirements. Our GSM module requires a 12 volts input. So we feed it using a 12V,1A DC power supply. We have seen GSM modules which require 15 volts and some other types which needs only 5 volts input. They differ with manufacturers. You can feed the data from GSM module directly to Arduino only if the module is enabled with TTL output pins. Otherwise you have to convert the RS232 data to TTL using MAX232 IC and feed it to Arduino.

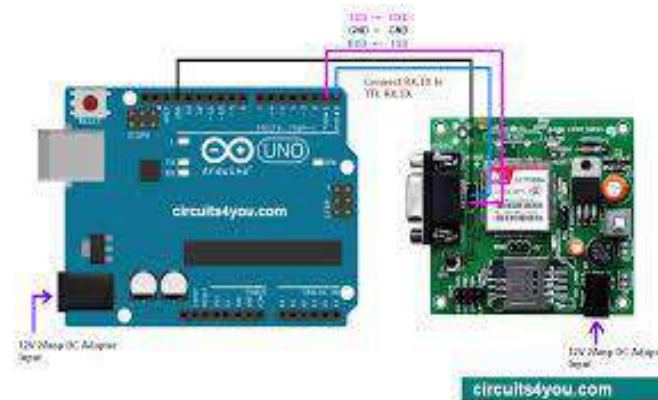


Fig.1Connecting Aurdino with GSM

B. Connecting Aurdino with EM 18 RFID

It can be directly interfaced with microcontrollers using UART and with PC using an RS232 converter. Connect the Arduino 5v supply to vcc of the EM 18 module and connect the ground pin of Arduino to EM 18. Transiver of the EM 18 is connected to the rx pin of the arduino to transfer the 12 digit code information from the EM 18 to Arduino.

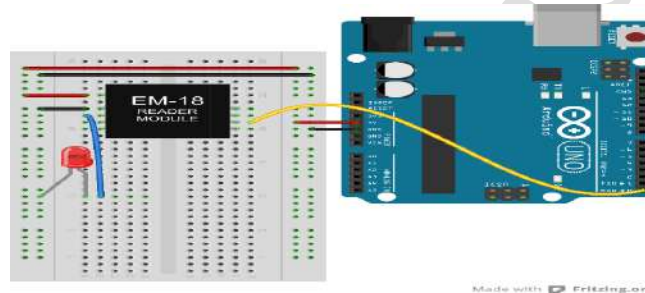


Fig. 2ConnectingAurdino with EM 18 RFID

C. Connecting LCD with Aurdino

It has 16 pins and the first one from left to right is the Ground pin. The second pin is the VCC which we connect the 5 volts pin on the Arduino Board. Next is the Vo pin on which we can attach a potentiometer for controlling the contrast of the display. Next, The RS pin or register select pin is used for selecting whether we will send commands or data to the LCD. For example if the RS pin is set on low state or zero volts, then we are sending commands to the LCD like: set the cursor to a specific location, clear the display, turn off the LCD and so on.

Next comes the R / W pin which selects the mode whether we will read or write to the LCD. Here the write mode is obvious and it is used for writing or sending commands and data to the LCD. Next is the E pin which enables the writing to the registers, or the next 8 data pins from D0 to D7. And the last two pins A and K, or anode and cathode are for the LED back light.

After all we don't have to worry much about how the LCD works, as the Liquid Crystal Library takes care for almost everything. From the Arduino's official website you can find and see the functions of the library which enable easy use of the LCD. We can use the Library in 4 or 8 bit mode. In this tutorial we will use it in 4 bit mode, or we will just use 4 of the 8 data pins.

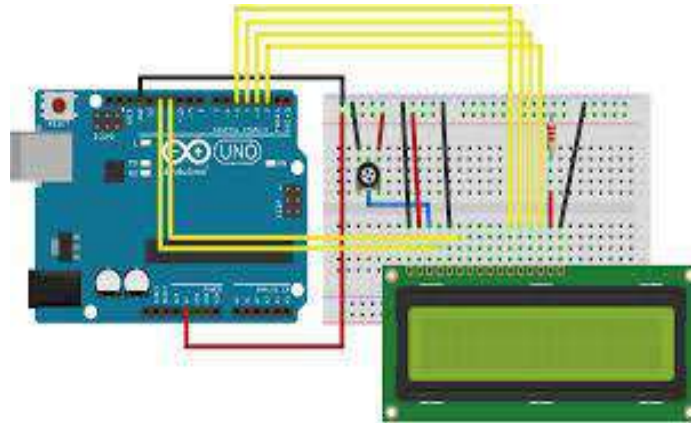


Fig. 3Connecting LCD with Aurdino

III. WORKING OF THE MODEL

RS232 serial port to signals suitable for use in TTL compatible digital logic circuits (power range: 0 V to + 5 V). If the microcontroller reads the data from the RFID reader, the LED will be turned on to indicate the successful read of the tag number. The flow chart is as follows: Testing is very crucial part to validate the functionality of the proposed system. It should be designed to increase the likelihood of finding an error and checking the functionality of the proposed system. The units were implemented individually at first and then they were integrated and configured as required for the system. The unit test was held for all the units in our system: RFID reader and tags, GSM modems and school server.

1. Bus Unit: The bus unit consists of an RFID reader, a GSM modem and a control unit. The RFID reader detects the children when they board/leave the bus. It is located inside the bus. The GSM modem is used to send this data to the school unit. A microcontroller is used to interface the RFID reader with the GSM modem. ATmega32 microcontroller is used to interface the reader and the GSM modem in the bus unit for data exchange.

The reader communicates with microcontroller using serial communication interface RS232. However, due to the difference in voltage levels, a max232 chip is used to convert signals from that are responsible for sending and receiving SMS and calling.

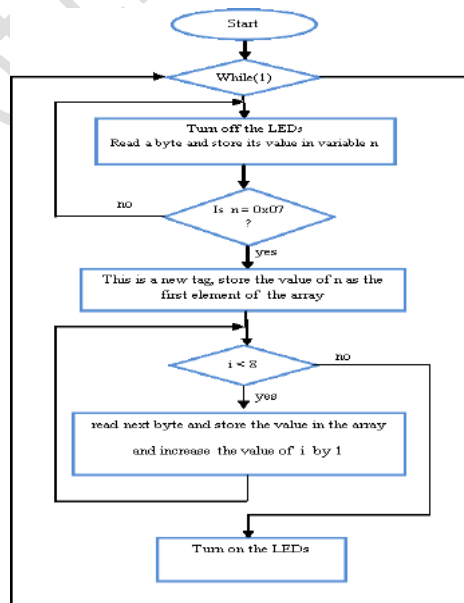


Fig. 3.2Flow chart

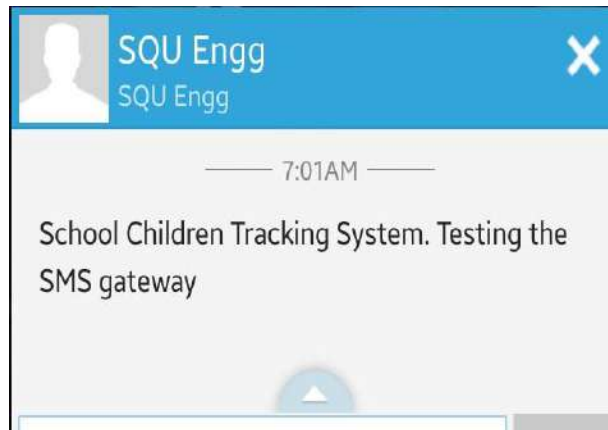


Fig. 4 SMS gateway test

GSMModem

GSM modems connectivity was tested using TMAS GSM-GPRS modem test program with the at commands

D. Communication between TwoModems

Two TMAS GSM/GPRS modems were used to send data from the bus unit to the school unit. One of modems is located in the bus unit to send SMS which contains the tag serial numbers to another GSM modem in the school.

E. Receivingthe Data from the BusUnit

A code written in PHP reads the received SMS, updatesdatabase, and notifies the parents if needed.

F. SMSNotifications

The PHP code written for the SMS gateway was tested. To use the SMS gateway, the following parameters are set: user ID, password, language, recipients, and the messages. The user ID and password are given by the gateway provider. The language has to be set before writing the text so that it can be sent properly. There are many integer values for different languages. The result of testing the code is shown in figure2.4.

G. Code to connect the RFID

```

if(Serial.available())
{
delay(100);
  buf1 = String(Serial.readString());
Serial.println(buf1);
for(i=0;i<12;i++)
{
if(buf1[i]==s1[i])j++;if(buf1[i]==s2[i])k++;if(buf
1[i]==s3[i])l++;
delay(5);
}
if((j<12))j=0;if((k<12))k=0;if((l<12))l=0;
if(j>=11)
{
state=state+1;
if(state%2==1)
{
lcd.clear();
lcd.setCursor(0,0);
lcd.print("Alert! YOUR SON/Daughter");
lcd.setCursor(0,1);
lcd.print("Present Today");
mySerial.print("AT+CMGF=1\r");
delay(1000);
mySerial.print("AT+CMGS=\"+917013814892\"\\
r"); //Number to which you want to send the sms
delay(1000);

```

```

#include <SoftwareSerial.h>
SoftwareSerialmySerial(10, 11);
#include<LiquidCrystal.h>
LiquidCrystallcd(9,8,7,6,5,4);
staticint state=0;
constint sw1=2;
constint sw2=3;
constint sw3=12;
char s1[12] = "0800A727BE36";
char s2[12] = "0800A6FFA9F8";
char s3[12] = "0800A6C8F096";
String buf1; //stringTwo;
inti,j=0,k=0,l=0,total=0;
void setup()
{
Serial.begin(9600); // Serial port for connection to
host
mySerial.begin(9600);
lcd.begin(16, 2);
lcd.print("GSM SCHOOL ");
lcd.setCursor(0, 1);
lcd.print("SECURITY SYS ");
delay(2000);
}
void loop()
{
//Serial.println(digitalRead(sw3));

```

```

lcd.print("FEE DUE :10K");
lcd.setCursor(0,1);
lcd.print("PAYMENT DONE");
mySerial.print("AT+CMGF=1\r");
delay(1000);
mySerial.print("AT+CMGS=\"+919553012627\
\r"); //Number to which you want to send the
sms
delay(1000);
mySerial.print("FEE DUE :10K");
mySerial.print(" PAYMENT DONE");
delay(1000);
mySerial.write(0x1A);
delay(1000);
k=0;
}
if(l>=11 &&digitalRead(sw1)==1)
{
lcd.clear();
lcd.setCursor(0,0);
lcd.print("YOUR SON/DAUGHTER");
lcd.setCursor(0,1);
lcd.print("PRESENT TODAY");
mySerial.print("AT+CMGF=1\r");
delay(1000);
mySerial.print("AT+CMGS=\"+919553012627\
\r"); //Number to which you want to send the
sms
delay(1000);
mySerial.print("YOUR SON/DAUGHTER ");
mySerial.print("PRESENT TODAY");
delay(1000);
mySerial.print("YOUR SON/DAUGHTER ");

```

```

mySerial.print("Alert! YOUR SON/Daughter ");
mySerial.print(" Present Today");
delay(1000);
mySerial.write(0x1A);
delay(1000);
}
j=0;
if(state%2==0)
{
lcd.clear();
lcd.setCursor(0,0);
lcd.print("Alert! YOUR SON/Daughter");
lcd.setCursor(0,1);

lcd.print("LEFT From Clg");
mySerial.print("AT+CMGF=1\r");
delay(1000);
mySerial.print("AT+CMGS=\"+919553012627\
\r"); //Number to which you want to send the
sms
delay(1000);
mySerial.print("Alert! YOUR SON/Daughter ");
mySerial.print(" Left FromClg");
delay(1000);
mySerial.write(0x1A);
delay(1000);
}
}
if(k>=11)
{
lcd.clear();
lcd.setCursor(0,0);

```

```

delay(1000);
l=0;
}
if(l>=11 &&digitalRead(sw3)==1)
{
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("PLEASE ALERT");
  lcd.setCursor(0,1);
  lcd.print("EMERGENCY CONDTN");
  mySerial.print("AT+CMGF=1\r");
  delay(1000);
  mySerial.print("AT+CMGS=\"+919553012627\r");
  //Number to which you want to send the sms
  delay(1000);
  mySerial.print("PLEASE ALERT");
  mySerial.print("EMERGENCYCONDTN");
  delay(1000);
  mySerial.write(0x1A);
  delay(1000);
  l=0;
}
}

```

```

mySerial.print("PRESENT TODAY");
delay(1000);
mySerial.write(0x1A);
delay(1000);
l=0;
}
if(l>=11 &&digitalRead(sw2)==1)
{
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("ATTENDANCE IN %");
  lcd.setCursor(0,1);
  lcd.print("72");
  mySerial.print("AT+CMGF=1\r");
  delay(1000);
  mySerial.print("AT+CMGS=\"+919553012627\r");
  //Number to which you want to send the sms
  delay(1000);
  delay(1000);
  mySerial.print("ATTENDANCE IN % ");
  mySerial.print(" 72");
  delay(1000);
  mySerial.write(0x1A);
}

```

IV. RESULT

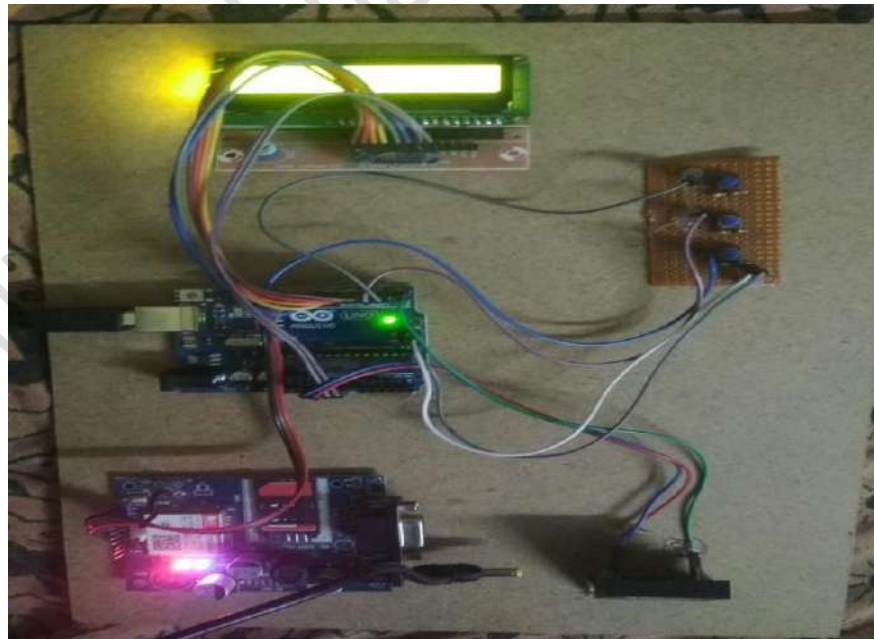


Fig. 5 Hardware diagram of the proposed approach

V. CONCLUSIONS

The developed working model is implemented on 30 feet length road constructed in the laboratory. The bus driving mechanism is able to move the bus with no deviations and the children security imparted to promote for real time applications. While returning to their home with this mechanism no student is permitted to move away from security without knowing the authorities. The return information message is sending to the parent in an advance will be an added advantage of the children from kidnapping. In future this proposed methodology is enhanced with anti-collision mechanism and biometric system is to be proposed to replace with the existing RFID technology.

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REMOTE METAL DETECTING ROBOT

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Abstract— *To develop a robotic vehicle that can sense metals ahead of it on its path similar to sensing land mines. Metal detector robot using Arduino uno this robot is designed for metal detection in places where human being can't reach easily. Metal detector robot detects metal through metal detector sensor. It detects metals coming to it ways. Wherever it goes, it keeps detecting metal. In case of metal detection, a sound will be produced at the control room or receiver side. This research will give you brief idea about how metal detector robot works.*

Keywords— *robotic vehicle, metal detection, arduino uno, sensor.*

I. INTRODUCTION

Metal detectors are fascination machine; this research is to develop a robotic vehicle that can sense metals ahead of it on its path similar to sensing land mines. It consists of a proximity sensor that detects the metals ahead of it and image in front of the surrounding is sent to the mail. Arduino uno is used for the desired operation. A proximity sensor is mounted on the robot body and its operation is carried out automatically on sensing any metal underneath. As soon as the robot senses this metal it sends the alert. This alerts the operator of a possible metal ahead on its path. A metal detector is a device which responds to metal that may not be readily apparent. The simplest form of a metal detector is the proximity sensor which detects the metal when it is close to some target and it sends the control signal. A highly sensitive proximity sensor and a zigbee is fixed to this robot. When the robot is moving on a surface, proximity sensor detects the metal when the metal is detected the zigbee sends an alert. The rest of the paper is organized as follows: Section 2 represents the related work, Section 3 represents the background and motivation, In Section 4 we present our approach, In Section 5 we present our simulated results, Section 6 concludes the paper.

II. Related Work

The first industrial metal detectors were developed in the 1960s and were used extensively for mining and other industrial applications [1]. Uses include de-mining (the detection of land mines), the detection of weapons such as knives and guns, especially in airport security, geophysical prospecting, archaeology and treasure hunting. Metal detectors are also used in the construction industry to detect steel reinforcing bars in concrete and pipes and wires buried in walls and floors.

II. Background and Motivation

In the present-day scenario, we are facing many threats by bomb blasts. We have existing methods like human surveillance for bomb detection so our research aim is to prepare an unmanned vehicle which detects metal as bombs are usually made of metal.

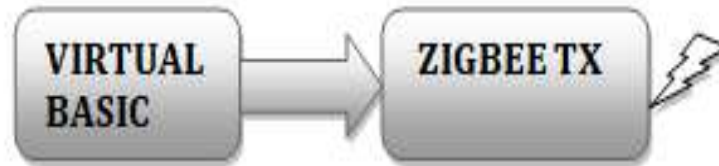
III. Proposed Approach

In this research we develop a robotic vehicle that can sense metals ahead of it on its path similar to sensing land mines. Arduino Uno is a microcontroller board based on 8-bit ATmega328P microcontroller. Along with ATmega328P, it consists other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller [2]. Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, A Power barrel jack and a reset button.

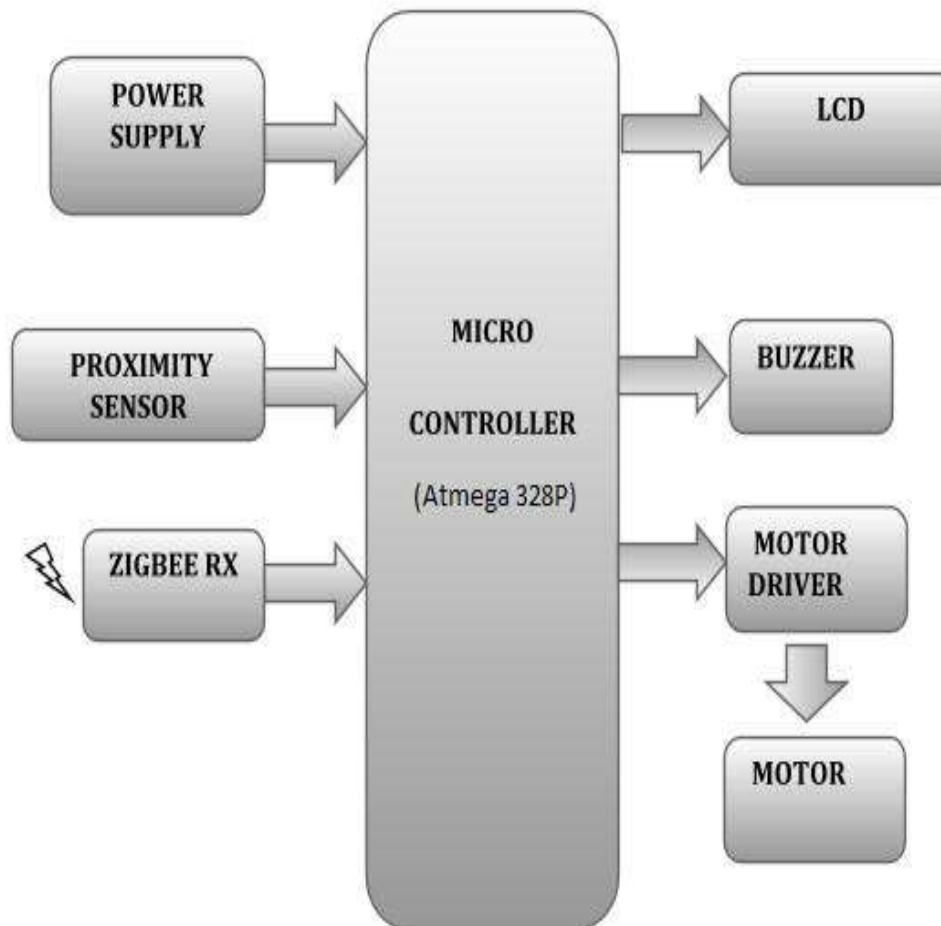
Zigbee works under the IEEE 802.15.4/ZigBee stand with 2.4GHz [3]. Interoperability and worldwide usability needed for only two major modes (Tx/Rx or sleep). Low data rate, low cost and ultra-low power consumption.

The L293D is an integrated circuit motor driver that can be used for simultaneous, bidirectional control dc motors. L293D is a dual H-Bridge motor driver. DC motors which can be controlled in both clockwise and counter clockwise direction.

Transmitter Section

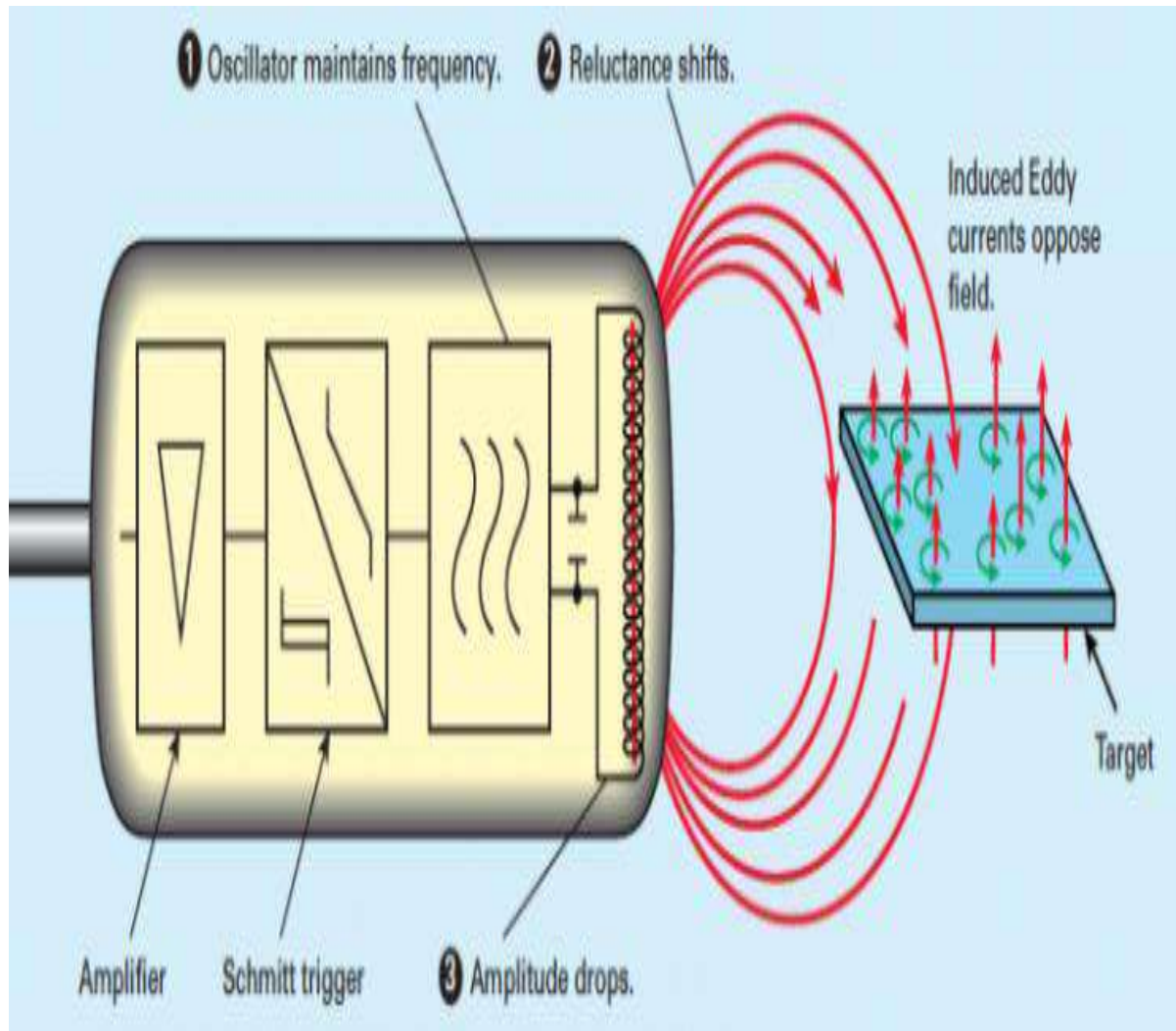


Robot (Receiver Section)



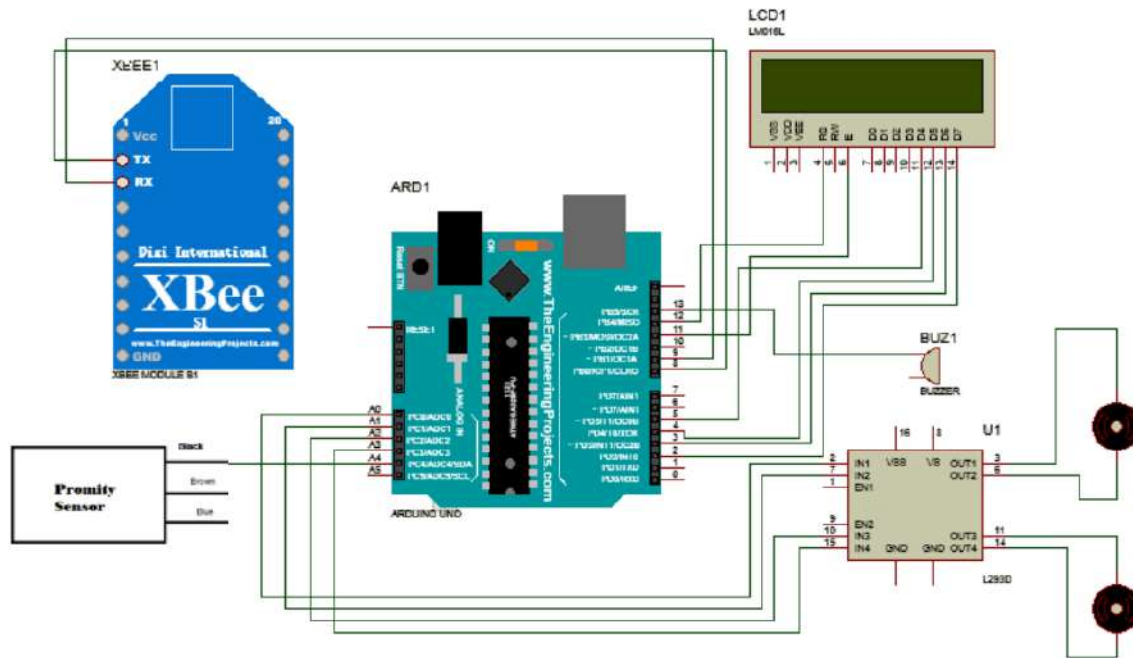
An inductive proximity sensor is a type of non-contact that is used to detect the position of metal objects. Inductive proximity sensors enable the detection, without contact, of metal objects at distances of up to 60 mm, high operating rates, fast response, excellent resistance to industrial environments, solid state technology: no moving parts, therefore service life of sensor independent of the number of operating cycles. Inductive proximity sensors are solely for the detection of metal objects. They basically comprise an oscillator whose windings constitute the sensing face.

An alternating magnetic field is generated in front of these windings. When a metal object is placed within the magnetic field generated by the sensor, the resulting currents induced from an additional load and the oscillation causes.



IV. Simulated Result

This project works with the proximity sensor as its metal detector. When the metal is detected, it alerts the operator. The signal alert is also sent to the arduino uno. The arduino uno directly cannot drive the motors. So arduino uno sends the output to the L293 motor driver. This motor driver runs the motors. There are two DC motors. The motors will drive the robot. It consists of a proximity sensor. Whenever the robot finds any metal in its path it stops there and the proximity sensor sends the alert to the control unit. Further the project can be enhanced by live streaming so that the movements of the robot can controlled remotely by watching it on a screen.



It is most advanced technology. It is of low cost. By using this technology, we can detect the bomb as early as possible and dismantle it easily so that we can easily save the life of the human beings. We can use better sensors and high-end modules to detect metals more precisely.

V. Conclusion

This research presents a metal detecting robot using Arduino uno and zigbee. The mine sensor worked at a constant speed without any problem despite its extension, meeting the specification required for the mine detection sensor. It contributed to the improvement of detection rate, while enhancing the operability as evidenced by completion of all the detection work as scheduled. The tests demonstrated that the robot would not pose any performance problem for installation of the mine detection sensor. On the other hand, however, the tests also clearly indicated areas where improvement, modification, specification change and additional features to the robot are required to serve better for the intended purpose. Valuable data and hints were obtained in connection with such issues as control method with the mine detection robot tilted, merits and drawbacks of mounting the sensor, cost, handling the cable between the robot and support vehicle, maintainability, serviceability and easiness of adjustments. These issues became identified as a result of our engineers conducting both the domestic tests and the overseas tests by themselves, and in this respect the findings were all the more practical.

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Missile Detection and Auto Collision System

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Abstract— *This system is designed to detect the target (missile) moving in multiple directions. The target destroying system moves automatically in the direction of missile and fires it upon fixing the target. This system consists of an intelligent sonar based object tracking system that continuously monitors the target. Upon detecting the target it sends the target's location to a Central Control System. The Central Control System takes the action of moving the firing mechanism in the direction of target (missile). Upon fixing the direction, it sends the control command to firing system for attacking the target. In this project we are making use of ultrasonic radar system and a DC geared motor driven firing unit interfaced with a Microcontroller based control unit. We prefer ultrasonic sensor to IR sensor, because the Ultrasonic sensors covers larger sensing distance and it can detect the target in all the lighting conditions (day or night). The programming of Microcontroller is done using Embedded 'C'.*

Keywords— *Embedded 'C', DC geared motor, Singular Value Decomposition(SVD), 2D Barcode, Steganography*

I. INTRODUCTION

We come across situations where we need to keep a watch over prohibited areas to avoid trespassing. Now keeping human labor for this purpose is not so effective and also not reliable for keeping a watch an area 24x7. The purpose of this project is to design and construct automatic missile detection and destroying system. This system is designed to detect the target (missile) moving in multiple directions. The target destroying system moves automatically in the direction of missile and fires it upon fixing the target. This system consists of an intelligent sonar based object tracking system that continuously monitors the target. Upon detecting the target it sends the target's location to a Central Control System. The Central Control System takes the action of moving the firing mechanism in the direction of target (missile). Upon fixing the direction, it sends the control command to firing system for attacking the target. In this project we are making use of ultrasonic radar system and a DC geared motor driven firing unit interfaced with a Microcontroller based control unit. We prefer ultrasonic sensor to IR sensor, because the Ultrasonic sensors covers larger sensing distance and it can detect the target in all the lighting conditions (day or night). The programming of Microcontroller is done using Embedded 'C'.

II. SIGNIFICANCE OF WORK

An embedded system is a special-purpose computer system designed to perform one or a few dedicated functions, sometimes with real-time computing constraints. It is usually embedded as part of a complete device including hardware and mechanical parts. In contrast, a general-purpose computer, such as a personal computer, can do many different tasks depending on programming. Embedded systems have become very important today as they control many of the common devices we use. Since the embedded system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product, or increasing the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale. Physically, embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure. In general, "embedded system" is not an exactly defined term, as many systems have some element of programmability. For example, Handheld computers share some elements with embedded systems — such as the

operating systems and microprocessors which power them — but are not truly embedded systems, because they allow different applications to be loaded and peripherals to be connected.

An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is specifically designed for a particular kind of application device. Industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines, and toys (as well as the more obvious cellular phone and PDA) are among the myriad possible hosts of an embedded system. Embedded systems that are programmable are provided with a programming interface, and embedded systems programming is a specialized occupation. Certain operating systems or language platforms are tailored for the embedded market, such as Embedded Java and Windows XP Embedded. However, some low-end consumer products use very inexpensive microprocessors and limited storage, with the application and operating system both part of a single program.

III. METHODOLOGY

Initially as the system power ups, the servo motor and ultrasonic sensor attached to it, sets its position to 0 degrees. After that the servo motor starts to rotate and ultrasonic sensor starts to emit sound waves. If the transceiver receives any reflected signal by hitting an object, it inputs the arduino which then estimates the distance of the object by analyzing the time taken to reflect and receive at transceivers end. Arduino gives the co-ordinates of the incoming object to DC motor which aims at the object and fires the anti-missile. When no missile is detected the system turns on green LED meaning its safe and LCD displays "NO MISSILE DETECTED". As the missile is detected the red LED turns on and also LCD also displays "MISSILE DETECTED".

RESULTS



Fig 1: ultrasonic sensor

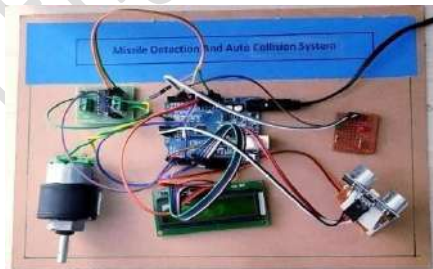


Fig 2: Circuit design board

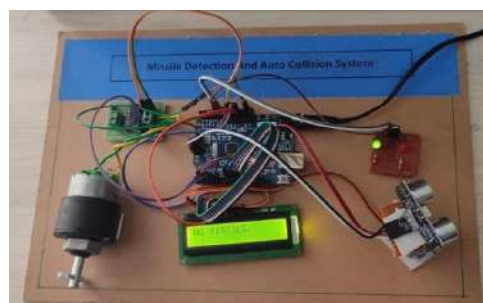


Fig 3:Output

IV . FUTURE SCOPE

This type of robots has very high future scope because it is very useful for agriculture by reducing the workload. It reduces the time-consuming process of spraying pesticides and water, and can work very effectively. It can work in any weather condition by reducing workload and can work in any season by configuring through mobile. It helps in reducing health conditions of farmers which generally happen due to inhalation of chemicals from pesticides and other animals too.

V. CONCLUSION

This system may improve the way of agriculture is done by the farmer to save money, time and energy. This system may monitor and report real time situation of the robot in an accurate manner to the farmer's mobile, thus helping the farmer to be aware of the tasks performed. By implementing this project in the field of agriculture we can help the farmers in the various stage of agriculture i.e., during the Seeding and fertilizing. This project is very useful for the farmers who are intended to do agriculture activity but facing the labor problem.

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Optimization of Image Features for MRI Brain

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Abstract- *The fundamental step for Magnetic resonance imaging (MRI) brain scans classifiers is their ability to extract meaningful features. As a result, many works have proposed different methods for features extraction to classify the abnormal growths in the brain MRI scans. The major challenge faced with DIP algorithms is the efficiency. In this paper, a deep learning feature extraction algorithm is proposed to extract the relevant features from MRI brain scans. In parallel, handcrafted features are extracted using the modified gray level co-occurrence matrix (MGLCM) method. Subsequently, the extracted relevant features are combined with handcrafted features to improve the classification process of MRI brain scans with support vector machine (SVM) used as the classifier. The obtained results proved that the combination of the deep learning approach and the handcrafted features extracted by MGLCM improves the accuracy of classification of the SVM classifier up to 99.30%*

Keywords- *Deep learning, MGLCM, MRI brain scans, feature extraction, SVM classifier.*

I. Introduction

Medical imaging is the practice of acquiring diagnostic images by using a range of technologies to produce accurate representation of patients' body for the purposes of diagnosis, monitoring or treatment of medical conditions. It is considered as a one of the most powerful available resources to gain a direct insight of the human body with no needs for surgery or other invasive procedures. Each type of medical imaging technology provides different information about the pathological area being studied or treated. Recently image processing has been embedded in most medical systems, which deal with the information used by clinicians to analyze and diagnose any pathological area in a short-time. Medical imaging is one type among many technologies that are utilized to view the internal organs of the human body through cross-sectional slices to diagnose, and monitor the medical conditions. These technologies give different information about the pathological area being studied or treated.

Among these medical technologies is magnetic resonance imaging (MRI) which is a volumetric imaging modality that gives information about the position, and size of the tumours. MRI technology is based on observing the behaviour of protons' orientation inside a large magnetic field after manipulating radiofrequency wave and recovering their equilibrium state. The provided scans by MRI scanners include a very high diagnostic value which can be used to diagnose and monitor some physiological processes such as water diffusion and blood oxygenation. MRI is competent to precisely differentiate soft tissues with high resolution and is more sensitive to tissue density changes that reflect the physiological alternation. The spatial resolution is a process of digitizing the collected signal by MRI scanner and allocating a value to each pixel in the original image.

The output of an MRI investigation is a set of images for tissue with different contrast visualization. These pulse sequences provide valuable anatomical information that help clinicians diagnose the pathological conditions precisely. The MRI technologies are categorized into: T1-weighted (T1-w) images which are routinely used in neuroimaging studies. They are used as an anatomical reference, because they are characterized by a high resolution and less artifacts. T2-weighted (T2-w) images are an important MRI sequences that are suitable for recognizing the boundaries of pathological structures, where most of these structures produce hyper-intense signals due to high water content, while much less common of these pathological structures appear as a hypo-intense or dark area in T2-weighted images.

The main drawback of T2-weighted sequence is that the intensity distributions of cerebrospinal fluid (CSF), grey matter (GM) and tumors are closed together. Clinically, the use of these two MRI sequences are essential in diagnosing brain tumors but can produce some difficulties in differentiating tumors from non- tumorous areas in addition to grading. Subsequently, a utilization of contrast medium is important to clarify the tumor boundary compared with non- tumorous tissue on T1-w and T2-w images.

Following the success of Convolutional neural networks as an alternative approach for automatic feature extraction method from images while training, we propose a new feature extraction method based on Convolutional neural networks (CNN) which allow us to extract a wide range of features, then combined these features with handcrafted features that are extracted by using the modified grey level co-occurrence matrix (MGLCM) method for classification of MRI brain scans which represent the main contribution of this study. For the CNN based deep learning feature extraction, a simple CNN architecture is used. One input layer is used, followed by three Convolutional layers and two pooling layers, and ended by a fully connected layer.

The rest of the paper is organized as follows: Section 2 represents the related work, Section 3 represents the background and motivation, In Section 4 we present our approach, In Section 5 we present our simulated results, and Section 6 concludes the paper.

II. Related Work

Recently, the use of Convolutional neural networks (CNNs) in multiple medical imaging disciplines started outperforming other proposed models in medical image classification. CNNs represent powerful tools for extracting features and learning useful characteristic or attribute of medical images. Many of the handcrafted features of image that are extracted by traditional methods and fed to classification methods are typically ignored compared to complex features which are learnt automatically by CNNs. Experimentally, the best results were achieved by using three layers of CNN with convolution kernel size of 4×4 or 5×5 and a pooling kernel in each layer of 2×2 van der Burgh et al [1] applied a deep learning algorithm to predict the remaining time of amyotrophic lateral scleral sick person using both the MRI scan, and the clinical characteristics, such that, the clinical characteristics and MRI data are combined into a layered CNN which further improved the predictions about the survival time. B. Wicht, used deep learning networks to extract automatically relevant features from images in an unsupervised manner and compared these features against handcrafted features [2]. The author concluded that learned features by deep learning were superior to handcrafted features.

Moreover, the deep learning approach is more adaptable to work on a variety of datasets. Automatic brain tumor classification is a very challenging task in large spatial and structural variability of surrounding region of brain tumour. The use of deep learning was also applied for classification of tumour regions in MRI images. An automatic classification method for brain tumour using CNN approach was proposed by. The accuracy achieved was 97.5% with low complexity. A new tumour classification approach using CNN was proposed by [3]. The experimental result of the classification accuracy of cranial MR images is 97.18%. Another approach for MRI classification was proposed by [4] in which a dataset of 66 brain MRI were used to classify tumours into 4 classes. The experimental results achieved 96.97% classification accuracy. In the handcrafted methods of feature extraction, regardless of which features are extracted, it is not adequate to extract all important features of the medical images. As a result, we need to perform a combination between hand craft and deep learning as a new feature extraction approach to improve the classification task.

III. Background and Modulation

Texture analysis has been studied for a long period and researchers have developed different methods for automated brain tumour classification. In [5] Hasan and Meziane applied a new modified gray level co-occurrence matrix (MGLCM) to extract statistical texture features which were enough to discriminate the normality and abnormality of the brain by using a single MRI modality (T2-w). A classification accuracy of 97.4% was achieved by using a multi-layer perception neural network (MLP) classifier. In [6] Nabizadeh and Kubat used five efficacious statistical texture extraction methods: first order statistical features, gray level run length matrix (GLRLM), local binary pattern (LBP), gray level co-occurrence matrix (GLCM), and histogram of oriented gradient (HOG). The achieved classification accuracy to classify a database that included 25 abnormal (pathological) MRI brain scan was 97.40% Sachdeva et al [7] used GLCM, Laplacian of Gaussian (LoG), Gabor wavelet, rotation invariant local binary patterns (RILBP), intensity-based features (IBF) and shape-based features (SBF) to develop an automated system to classify MRI brain tumors. The features were optimized by using a genetic algorithm (GA). Both MLP, and SVM were used individually to classify brain tumors in MRI scans and the achieved accuracies were 91.7% and 94.9%, respectively.

IV. Proposed Approach

The aim of this study is to improve the accuracy of MRI brain scans classification by combining handcrafted (MGLCM) and deep learning (DF) features. It starts with the dataset that was collected and classified into normal and abnormal (pathological) MRI scans [8]. The proposed method comprises the following stages: MRI scan pre-processing, the MGLCM feature extraction, deep learning feature extraction, and finally the classification.

A. MRI Scan Pre-processing

Prior to subjecting individual slices of MRI scans to any type of statistical analysis, a set of pre-processing algorithms are commonly implemented to reduce the impact of random variations in intensity of MRI slices and noise that may result from patient motion, respiration, anxiety or from the scanner itself. Generally, image pre-processing includes image enhancement; MRI slices resizing, which is essentially needed when the images are collected from different MRI scanners; as well as the intensity normalization, which is used to reduce the impact of intra-scan and inter-scan variations. Moreover, sometimes mid-sagittal plane detection and correction (MSP) is required and considered as a prior step for estimating the tumour detection. The human brain has two bilaterally-symmetrical hemispheres around the MSP. The symmetry of the brain is an important index to measure brain normality or abnormality due to tumors, bleeding and stroke.

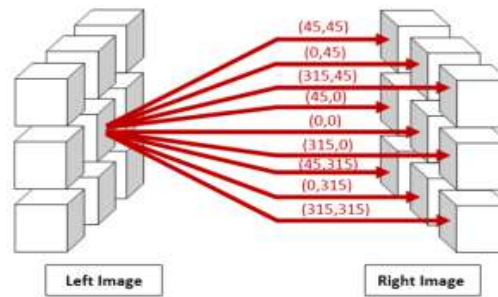


FIG 1. The relationship between the reference pixels and the opposite nine pixels.

B. The MGLCM Feature Extraction

MGLCM is a statistical method which was modified by Hasan and Meziane, and was used to extract the second order texture features by inspecting the combined frequencies of all grey levels of pixel configuration of each pixel in the left hemisphere (reference pixel) with one of nine opposite pixels that exist in the right hemisphere. These features measure statistically the degree of symmetry between both sides of the brain. Symmetry is an important parameter that is used within the diagnosing process to detect the normality and abnormality of the human brain. Consequently, nine co-occurrence matrices are extracted for each MRI slice under nine offsets θ D (45, 45), (0,45), (315,45), (45,0), (0,0), (315,0), (45,315), (0,315), (315,315), and one distance as shown in Fig. 1. The co-occurrence relative frequencies between joint pixels are calculated after normalization by the total sum of all its elements, equation (1):

$$P(i, j)_{(\theta_1, \theta_2)} = \frac{1}{256^2} \sum_{x=1}^M \sum_{y=1}^N \begin{cases} 1, & \text{if } L(x, y) = i \\ & \text{and } R(x + \Delta x, y + \Delta y) = j \\ 0, & \text{otherwise} \end{cases} \quad (1)$$

where L and R are the left and right parts of the brain's hemispheres respectively, M and N are the width and height of MRI slice respectively, i and j are the co-occurrence matrix's coordinates, Δx and Δy values are subject to the directions of measured matrix and undergo to a set of rules that are demonstrated clearly in, and P is the resulting co occurrence matrix. There are twenty-one texture measures extracted from each co-occurrence matrix and these measures represent the most common and widely-used texture features. Hasan and Meziane refined these texture measures by ignoring the irrelevant features using analysis of variance method (ANOVA) and reduced to eleven texture measures for each co-occurrence matrix, namely, the contrast, the dissimilarity, the correlation, the sum of square variance, the sum variance, the sum average, the difference entropy, the inverse difference normalized (IDN), the information measure of correlation I (IMC1), the inverse difference moment normalized (IDMN) and the weighted distance in addition to the cross correlation. The total number of texture measures was reduced from 190 to 100 feature measures after using ANOVA.

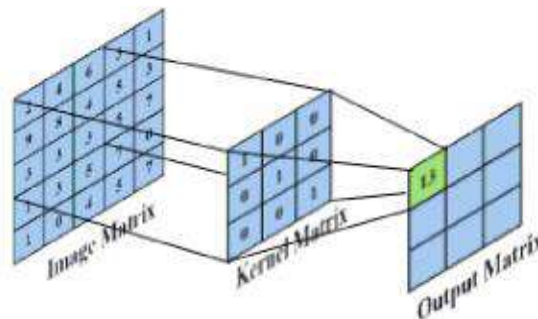


FIG 2. Convolution of a 5×5 image with a 3×3 kernel.

C. Deep Learning Feature Extraction

Deep neural networks, or more concretely, the Convolutional neural networks (CNNs) are an adaptation of the artificial neural network. The multiple layers of convolutions with pooling layers are used as a mapping function to transform a

multidimensional MRI slice into a desired output after training. The advantage of applying deep learning is that the network learns to extract features while training. Deep neural networks or CNNs extract features by themselves using their convolution kernels. Additionally, there is a set of small parameterized filters in the Convolutional layers. They are usually called kernels or Convolutional filters, and are applied to every layer to produce a tensor of feature maps as shown in Fig. 2. How far the filter moves in every step from one position to the next position is named 'a stride'. In practice, only strides by one and two pixels perform well, while increasing the stride more declines the performance of CNNs significantly. Moreover, the stride must be set in a way that the output volume is an integer and not a fraction.

In some cases, if the convolution filter does not cover all the input image, zero-padding is needed to pad the border of input image with zeros to keep always the same spatial dimensions. The feature maps that are produced from a Convolutional layer, are calculated through rectified linear unit (ReLU) activation function in the activation layer. The ReLU is the most commonly used activation function in deep learning models that is used to suppress all negative values in the feature maps to zero. The rectified feature maps are fed through the pooling layers to reduce the dimensionality by generating small non-overlapped regions as input and determine a single value for each region. Two popular functions are the max function and the average function, which are frequently used in the pooling layer. A batch normalization layer is typically used after activation layers to normalize feature maps. This layer works as a regulator.

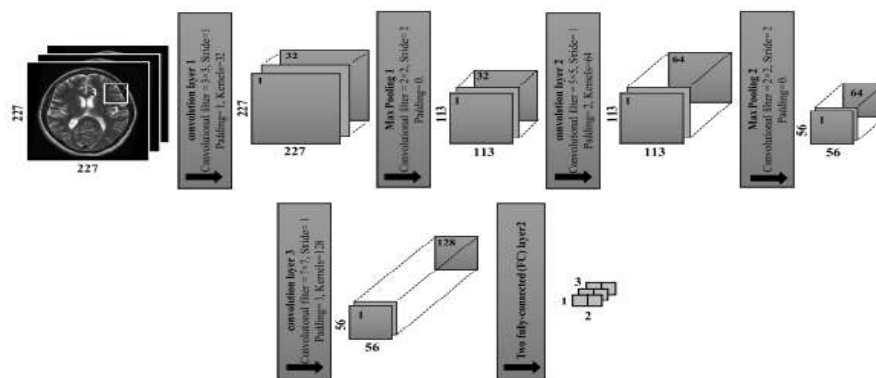


FIG 3. Architecture of deep CNN as features extractor with three Convolutional layers and two pooling layers for the network, and speeds up the training process.

The last Convolutional layer is followed by the fully-connected layer (FC). The power of CNN depends essentially on how the network is architected and how the layers are connected as well as how the proper weights are set. Gradient back-propagation represents the main algorithm for learning all types of neural networks. To design a new CNN architecture of CNN for a specific task, it is essential to understand the requirements to be met and how the data is fed to the network. The size of each Convolutional layer for a given MRI slice can be determined by using equation (2) and equation (3) respectively:

$$Conv_{width} = \frac{MRISlice_{width} - C_{fwidth} + (2 \times ZP)}{S_{width}} + 1 \quad (2)$$

$$Conv_{height} = \frac{MRISlice_{height} - C_{fheight} + (2 \times ZP)}{S_{height}} + 1 \quad (3)$$

Where C_f denotes the Convolutional filter, ZP is the number of zero padding if required, and S refers to the number of strides. The architecture of the CNN network with input images of 227×227 pixels is illustrated in the following steps and shown in Fig. 3: i- Conv1 (Convolutional filters of size 3×3 , stride of 1, padding of 1, and kernels of 32) are applied

$$Conv_1 = \frac{227 - 3 + (2 \times 1)}{1} + 1 = 227$$

For the square feature maps, there are $227 \times 227 \times 32$ D 1648928 neurons in the feature map of the first convolution layer ii- Max Pooling1 is equal to the previous image size divided by the stride number: Max Pooling1 D $227 / 2 \approx 113$

For the square feature maps, there are $113 \times 113 \times 32$ D 408608 neurons in the feature map of the first max pooling layer iii- Conv2 (Convolutional filters of size 5×5 , stride of 1, padding of 2 and kernels of 64) are applied. Conv2 D $113 - 5 + (2 \times 2) = 113$

For the square feature maps, there are $113 \times 113 \times 64$ D 817216 neurons in the feature map of the second convolution layered- MaxPooling2 is determined by the same way that is used in MaxPooling2:Max Pooling2 D 113 2 \approx 56

For the square feature maps, there are $56 \times 56 \times 64$ D 200704 neurons in the feature map of the second max pooling layer- Conv3 (Convolutional filters of 7×7 applied with stride of 1, padding of 3 and kernels of 128). Conv3 D $56 - 7$ C (2×3) 1 C 1 D 56

For the square feature maps, there are $56 \times 56 \times 128$ D 401408 neurons in the feature map of the third convolution layer vi- The fully-connected (FC) layer calculates the class scores, producing a volume of size $1 \times 1 \times 2$. This layer combines all features which are learned by the previous layers.

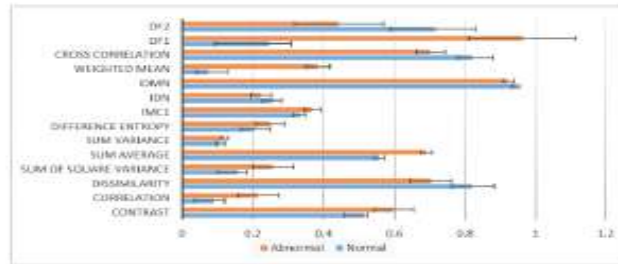


FIG 4. Extracted features (mean \pm standard deviation) of normal and pathological MRI brain scans.

The output size of FC is equal to the number of classes of the data set. In this study the input size of FC is equal to 401408 and the output size is equal to 2. In the proposed algorithm, the mean and standard deviation between the two groups (normal and abnormal) are calculated for MGLCM features and for deep feature (DF) extraction process. As shown in Fig. 4 the combined features that are extracted by the proposed method, significantly reflect the changes between the normal and pathological MRI brain scans.

V. Simulated Results

In this study, a total of 6000 MRI axial slices from 600 patients (300 normal, and 300 abnormal) were collected from the Iraqi centre for research and magnetic resonance of Al-Kadhimain Medical City. These MRI scans were acquired using SIMENS MAGNETOM Avanto 1.5 Tesla scanner and PHILIPS Achieva 1. 5 Tesla, that have plane resolutions (256×256) and (512×512) respectively. The voxel resolution of the latter is $(1 \times 1 \times 3 \text{ mm}^3)$ and the former is $(1 \times 1 \times 5 \text{ mm}^3)$. The number of slices for each MRI scan is about 75 slices. The collected dataset was diagnosed and classified into normal and pathological scan by the clinicians of this centre. T2-w images are used in this study due to their high sensitivity to tissue pathology and clearly show tumor boundaries. The collected MRI dataset is adopted to validate the proposed method. Support vector machine (SVM) with 10-fold cross validation method are applied for accuracy rate estimation of the proposed method.

The dataset is divided randomly into 10 folds that are roughly of equal size. Each MRI slice in the given dataset was normalized with 'zero centre' before submission to CNN. A sample of the images dataset is shown in Fig 5. The first row is for normal class images, while the second row is for abnormal class images. The code was developed using MATLAB 2018b. The architecture design of CNN was optimized by using a trial and error approach which was used to determine the optimal number of Convolutional layers, number of neurons in each layer, learning rate and kernel size. Table1 summarizes the architecture of the CNN which is used in this study. There are seven layers, ordered as I, C1, C2, C3, P4, P5 and F6 in sequence. Where, I is the input layer, C represents the Convolutional layers, P represents the pooling layers and F refers to the fully connected layer.

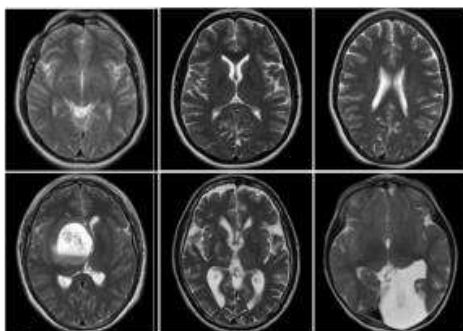


FIG 5. Sample of used images

Layer Name	Kernel Size	Feature Map
I	(227×227)	
C1	(3×3)	$(227 \times 227 \times 32)$
P1	(2×2)	$(113 \times 113 \times 32)$
C2	(5×5)	$(113 \times 113 \times 64)$
P2	(2×2)	$(56 \times 56 \times 64)$
C3	(7×7)	$(56 \times 56 \times 128)$
F6	$(1 \times 1 \times 2)$	(1×2)

TABLE 1. Architecture of CNN as feature extractor

Weights play a pivotal role in CNN. Fig.6 shows the weights of Convolutional kernels of the three Convolutional layers of CNN. In the training process of deep learning, the momentums are set to 0.9. The initial learning rate is 0.0001, and the max iteration number is 100. The training process graph is shown in Fig.7. By looking at the result shown in Fig.7, we could see that the training accuracy shows an increasing trend with respect to the number of iterations. This indicates the good performance of the proposed CNN architecture for the classification process of MRI brain scans. It is noted that different features may be extracted using different convolution kernels and they become more and more abstract after using several Convolutional and pooling layers.

In this study, the effectiveness of deep learning features is evaluated and compared with the MGLCM features through classification results using the quadratic SVM. The image dataset is randomly divided into 10 folds with equal size. Nine folds for training, while the remainder is used for testing. The MATLAB R2018b (Math Works, Natick, MA, USA) on Windows 10 is used to implement the proposed method. In the proposed algorithm, the mean and standard deviation measures can numerically summarize the experimental results. These measures are calculated for MGLCM features and for deep feature (DF) extraction process. As shown in Fig. 10, the mean and standard deviation give a clue about statistical significance between normal and abnormal groups of features extracted by the MGLCM and DF

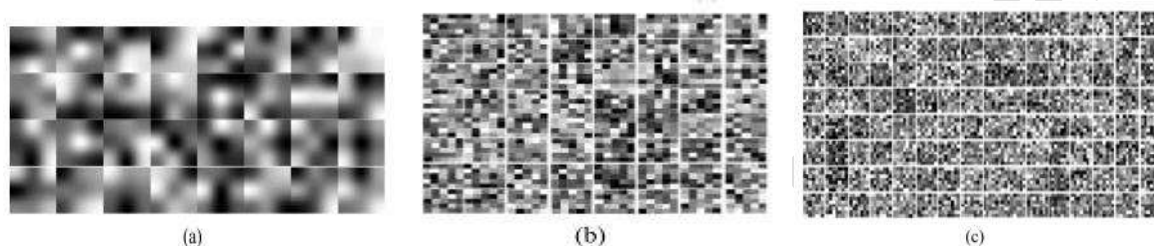


FIG 6.Learned weights of the Convolutional layers of CNN, (a) learned weights of first Convolutional layer (1×32), (b) learned weights of second Convolutional layer (1×64), and (c) learned weights of third Convolutional layer (1×128)

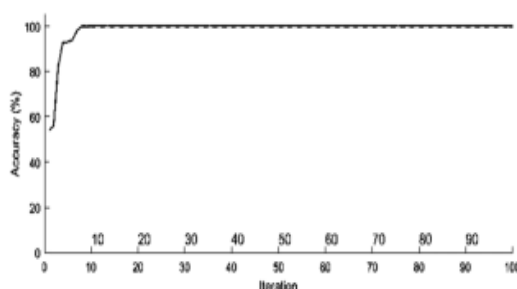


FIG 7.The training process of deep learning

The performance is also evaluated by calculating the TN which symbolizes the number of true negatives (abnormal) cases, and TP which means the number of true positives (normal) cases. The performances of two methods MGLCM and DF of feature extraction and the proposed MGLCM-DF are presented in Table 2. A classification accuracy rate of 99.30% is obtained by the proposed method MGLCM-DF. The next best performance is achieved by deep learning features (97.80%). The MGLCM texture features method produced an accuracy rate of 96.10%. Moreover, the proposed MGLCM-DF is capable of combining the advantages of hand-crafted MGLCM texture features and deep learned features DF to improve the classification accuracy rate by the SVM classifier.

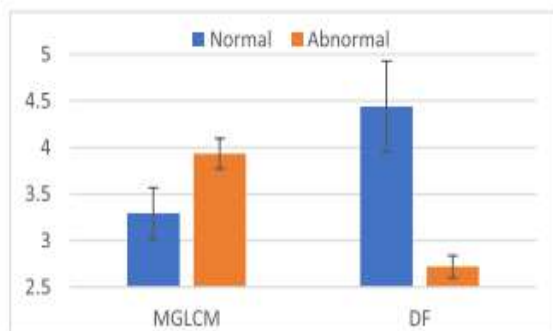


FIGURE 8.The average means standard deviations for extracted features of normal and abnormal (pathological) MRI scan by DF and MGLCM feature extraction

Algorithm	Accuracy	TN	TP
	100%	100%	100%
MGLCM	96.10%	94%	94%
Deep learning features	97.80%	97%	99%
The proposed MGLCM-DF	99.30%	97%	100%

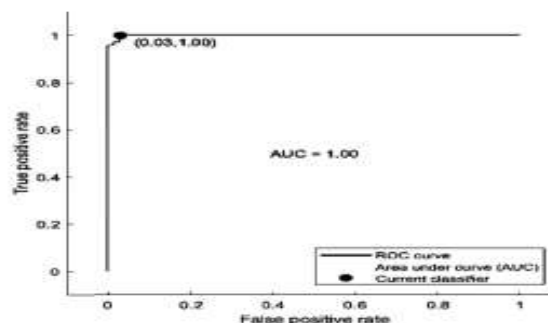


TABLE 2: The performances of two methods MGLCMDF and proposed MGLCM-DF

FIG 9: The ROC curve of the MGLCM-DF feature extraction.

The ROC curve for the classification results of the proposed MGLCM-DF is shown in Fig.9. The ROC curve was evaluated by considering the normal cases in MRI images as a positive class (TP), and the abnormal cases in MRI images as a negative class (FP). We can see that the normal cases accuracy is (1.00) which represents 100% accuracy for the normal cases. The area under curve (AUC) is 1.00, showing the best classification accuracy for using MGLCM-DF. The performances of the proposed deep learning feature extraction model using our collected image dataset are further compared with the features extracted by transfer learning through using three standard pre-trained deep learning networks (Alex Net, Google Net, and Squeeze Net) and the results are presented in Table 3.

Algorithm	Features Dimension	Accuracy 100%	TN 100%	TP 100%
AlexNet	1000	81.50	72	91
GoogLeNet	1000	86.10	83	89
SqueezeNet	1000	77.80	61	94
Proposed MGLCM-DF	23	99.30	97	100

Algorithm	Classifier	Accuracy 100%
[2]	MLP	97.80%
[12]	SVM	97.40%
[16]	SVM	91.70%
The proposed MGLCM-DF	SVM	99.30%

TABLE 3. The performances of proposed DF and TABLE 4.Comparison with other methods.

Other pre-trained deep learning networks using same collected image dataset.

Alex Net is a CNN of 8 layers deep and used to classify images into 1000 classes. Google Net is a pre-trained model 144 layers, and can classify images into 1000 classes. And finally, the Squeeze Net is a pre-trained model, and can classify images into 1000 classes. The code was developed in MATLAB 2018b (The Math Works Table). Using the transfer learning through using existing pertained models forced feature extraction and classification processes to follow the same pre-trained model which is not similar to the problem we want to solve.

In this study we developed our model for feature extraction by using both MGLCM and deep learning (DF) and combining them in one feature set which is considered as the main contributions of this study [9]. The comparison of the proposed MGLCM-DF with other three works using standard BRATS 2013 MRI dataset is shown in Table 4. The proposed MGLCM-DF method obtained the highest accuracy rate, while the classification methods in [10] achieved accuracy rate of 97.80%. The high accuracy rate by the proposed MGLCM-DF proves the appropriate combination of the feature extraction which makes the classification error significantly lower.

VI. Conclusion

This study proposes a new method (MGLCM-DF) to improve the classification process of MRI brain scans. It comprises a modified texture features extraction (MGLCM) method, combined with deep learning features (DF). In the proposed MGLCM-DF, the MGLCM hand-craft texture features and the deep learning features are extracted from MRI brain scans, and then combined as one final feature to improve the classification process of

MRI brain scans. The MGLCM-DF was capable of combining the benefits of MGLCM and DF as a new approach for feature extractions for improving the classification process of MRI brain scans. The experimental results of MGLCM-DF show a classification accuracy rate of 99.30% when performed on the collected dataset of MRI brain scans. The proposed method can be improved in future studies as a reliable brain tumor feature extraction for classification method to be used with different medical images.

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Railway track fault detection enhancement using Arduino and IoT

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Abstract— Train accidents are very common throughout the globe, each year many train accidents are reported worldwide due to railway defects. Thus, there will be losses of human lives and injury. The system will inform the maintenance team via GSM or SMS so that the repairing job could be done faster. The Railroad Hand-Pump Car is a simple track maintenance vehicle made up of a platform built on 4 flanged railroad wheels and propelled by hand power. Rods, gears and cranks are utilized to enable the car to travel along the rails. These unique vehicles were created in the late 1850's and early 1860's.

Keywords— IoT, Arduino, Sensors, Railway, GSM.

I. INTRODUCTION

Reinach and Gertler [1,2] (2002) state that the train accident and incident rate in railway yards far exceeds the rates across the entire railroad industry. The need for better rail inspections came after a derailment at Manchester, New York, in 1911. Train accidents include collisions and derailments that involve the operation of on-track equipment and those that satisfy the certain reporting thresholds set by the Federal Railroad Administration, (FRA, 2003). A railway crack detection system uses the sensors to detect defects and data log when a crack is detected. The prompt detection of the faults in rails that concede possibility bring about crack or rather a break now plays a vital part in the maintenance of rails global. With the arrival of effective digital signal processors and image processing techniques have been look to plan resolution to the problem of railway crack detection. In spite of the fact that these methods provides good certainty, it uses techniques like image segmentation, morphology and edge discovery, all of that take a lot of processing capacity and an extreme amount of time causing the process to slow down and thereby inconvenient. The understanding of these systems happen invariably thereby improving and making it reliable for movement of rail traffic by non-destructive inspection methods which are used to detect damages on rails [3].

The rest of the paper is organized as follows. Section 2 presents the background and motivation for our research. In section 3 we are presenting our proposed approach. Section 4 presents the software description, we conclude our paper in section 5 and provide with future scope in section 6.

II. BACKGROUND AND MOTIVATION

Arduino: Arduino board designs use a variety of microprocessors and controllers (See Fig.1). The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers.

Global System for Mobile Communication (GSM): GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

GPS: The Global Positioning System (GPS) is the only fully functional Global Navigation Satellite System (GNSS). The GPS uses a constellation of between 24 and 32 Medium Earth Orbit satellites that transmit precise microwave signals, which enable GPS receivers to determine their location, speed. GPS was developed by the United States Department of Defense. Its official name is NAVSTAR-GPS. Although NAVSTAR-GPS is not an acronym, a few

acronyms have been created for it. The GPS satellite constellation is managed by the United States Air Force 50th Space Wing.

Buzzer: A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows.

Infrared Technology: Technically known as "infrared radiation", infrared light is part of the electromagnetic spectrum located just below the red portion of normal visible light – the opposite end to ultraviolet. Although invisible, infrared follows the same principles as regular light and can be reflected or pass through transparent objects, such as glass. [4]

Wi-Fi module ESP8266 (Node MCU): Node MCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from espressif Systems, and hardware which is based on the ESP12 module.

Internet of Things (IOT): The Internet of things (IoT) is the extension of Internet connectivity into physical devices and everyday objects. Embedded with electronics, Internet connectivity, and other forms of hardware (such as sensors), these devices can communicate and interact with others over the Internet, and they can be remotely monitored and controlled. [5,6]

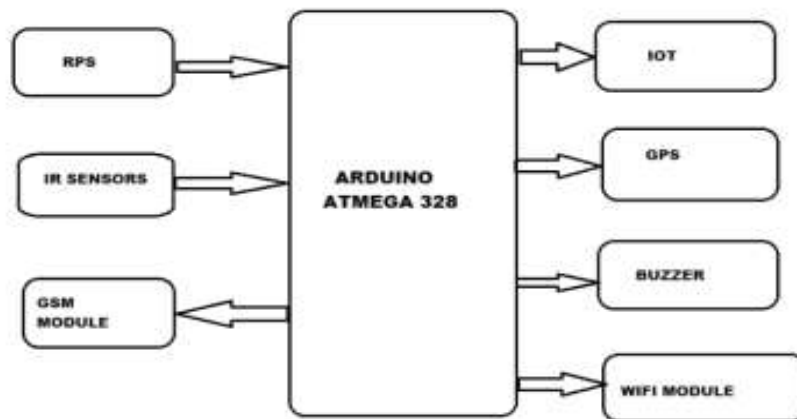


Fig 1: Block Diagram

III. PRACTICAL IMPLEMENTATION

A. Connecting Arduino with Wi-Fi Module (Node MCU):

Connect Rx of ESP12 -> Tx of Arduino.

Connect Tx of ESP12 -> Rx of Arduino.

There is one analog pin available in Node MCU (ESP12), we could use that pin but ESP series can take upto 3.3 volts on their pins. As we are using current sensor which can give upto 5 Volts so, it can damage our Wi-Fi module that's why we are not using standalone Node MCU. To make output of current sensor 3.3V instead of 5V, we cannot use voltage divider circuit between Current sensor and analog pin of Node MCU because as we discussed above about the current sensor that at 2.5Volts output, current is 0Amp (See Fig. 2).

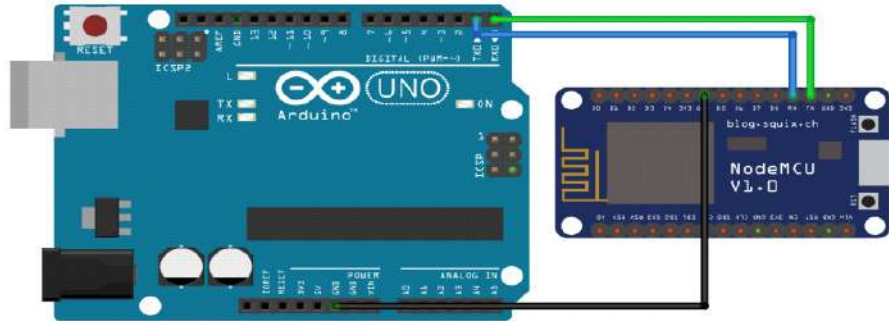


Fig 2: Arduino with Wifi module (NODE MCU)

B. Connecting GPS with Arduino : To connect your GPS module to Arduino, use a +5V from the power side of the Arduino and any ground pin. Any two pins will work for the serial communication, but on this tutorial we will use 3 and 4:

- Connect Arduino pin 3 to the RX pin of the GPS Module.
- Connect Arduino pin 4 to the TX pin of the GPS Module.

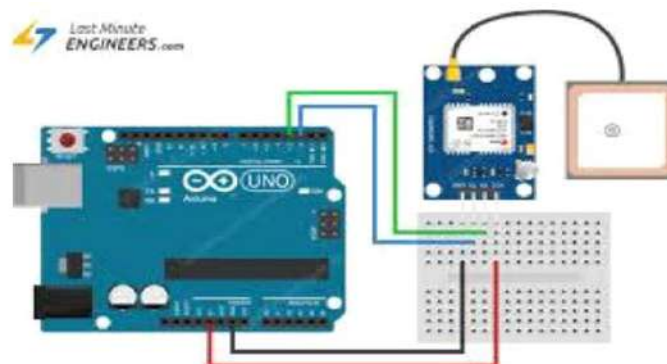


Fig 2: Adriano with GPS Module

C. Connecting IR Sensors with Arduino: First, connect the four LEDs to the Arduino. Connect the positives of the four LEDs to the pins 7, 6, 5, and 4. Connect the negative of the four LEDs to GND on the Arduino through the 220 ohm resistors (See Fig. 3).

- Connect the negative wire on the IR sensor to GND on the Arduino.
- Connect the middle of the IR sensor which is the VCC to 5V on the Arduino
- Connect the signal pin on the IR sensor to pin 8 on the Arduino

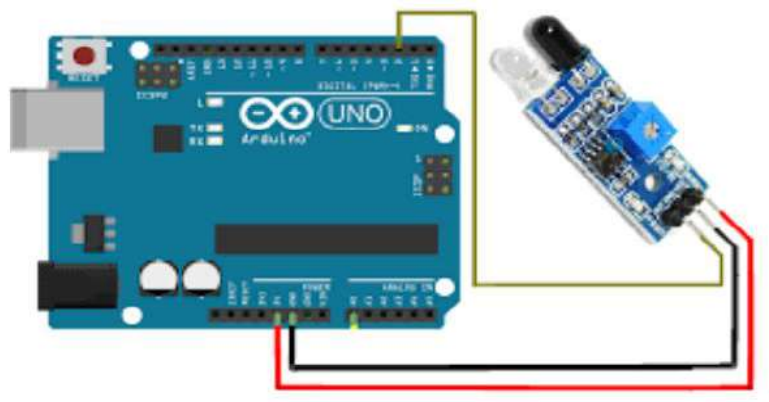


Fig 3: Arduino with IR sensors

There is a built-in LED connected to the digital pin number 13 of the arduino pro-mini board and this particular code is for blinking that led with a delay.

Pin Mode (5, OUTPUT);

To make pin number 6 as input pin Mode(6, INPUT);

In this particular example the pin13 is already defined as led using the statement

int led = 13

and hence came the following statement

pin Mode(led, OUTPUT);

which can make the 13th pin of the arduino board as output.

The digital Write() is another function which can be used to write a digital value (logic 0 or logic high) to a particular pin which has already been made as output using the pin Mode() function. For example to make the pin number 5 as logic high

Digital Write (5, HIGH);

And to make the same pin as logic low

Digital Write (5, LOW);

The function delay () is a very useful function for almost all the projects and it can generate a delay in milliseconds between the code steps.

For example to generate a delay of 5 seconds,
delay (5000);

V. RESULT



Figure 4: Hardware setup of Fault Detection

VI. CONCLUSION

As we know that there is a large number of accident occurring due to the faults in railway tracks, so this project will be helpful to prevent any irregularities in the railway. Monitoring and maintenance by human is very difficult and takes more time. Initially IR sensors were used but since they are less efficient compared to UV-sensors, they are replaced and are being used for slabs on the track and not for the crack detection. To avoid delays our proposed system will immediately notify the current train.

VII. FUTURE SCOPE

In future, we will also use the CCTV systems with IP based camera for monitoring the video visuals captured from the track. It will also increase the reliability for both rails and passengers.

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Real-time Vehicle Monitoring and Accident Alert System

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Abstract— During accident many people lose their life because medical services and family member not getting accidental information on time. Initially the Global Positioning System (GPS) continuously takes input data from the satellite and stores the latitude and longitude values in Arduino's buffer. If we have to track the vehicle, we need to send a message to GSM device, by which it gets activated. It also gets activated by detecting accident on the shock sensor connected to vehicle. Parallely deactivates GPS with the help of relay. Once GSM gets activated it takes the last received latitude and longitude positions values from the buffer and sends a message to the particular number or laptop which is predefined in the program. Once message has been sent to the predefined device the GSM gets deactivated and GPS gets activated. Any kind of accident detected is automatically sent as an alert to the required destination. Accident detection device installed in a vehicles when meets with an accident will send SMS/ messages to the pre-install numbers of the drivers family members, police station, ambulance and nearest hospital. This embedded system is useful for tracking and retrieving the exact position of any vehicle, which has met with an accident by using GPS. This system can monitor the vehicle as well as get auto location when accident occur.

Keywords— Global Positioning System (GPS), GSM, arduino

I. INTRODUCTION

The major death rates in the world are due to the road accidents. India faces the highest death rate in the world. Reasons for the accident are speed driving, lacking sufficient sleep, drink and drive. Automatic accident detection helps to recognize the location of the accident and to find the location of the accident. For an ambulance vehicle, every second is important. If there is a delay in the arrival of ambulance, there will be a loss of life. Delay is caused mainly because of the traffic signals. Therefore, time factor is an important task.

Radio Frequency module is used to control the traffic signals automatically. Therefore, the ambulance vehicle will reach the hospital in exact time to save the human. In addition, the main goals for the automatic accident detection techniques are to detect the accident and to send the message automatically to the emergency contacts along with the location. Emergency contacts include family members, friends, hospitals, police station etc. The incidents of accidental deaths have shown increasing trend during the year 2000-2015 with an increase of 50 percent in the year 2010 as compared to the year 2000. According to Planning Commission of India, the total annual economic loss is 2.5% of India's GDP due to rising number of road fatalities. Another important reason can be improper medical help. Survey shows that each minute that an injured crash victim does not receive emergency medical care can cause into fatality. Most victims lose their lives due to such reasons. Therefore, this idea of saving lives by curing the problem comes into existence.

Real-time position of the vehicles is informed by the system using the pre-install smart sensing accelerometer equipment. This data is recorded and all the information can be observed by remote location to provide the required services to the victims. Tracking of the vehicle can be done in all-weather condition. GPS and GSM technologies are used in this system to provide all the data to the remote server which is then processed and the extracted information is used to provide the services to the individual at the time of emergency.

The rest of the paper is organized as follows: Section 2 represents the background and motivation, In Section 3 we present our approach, In Section 4 we present our simulated results, and Section 5 concludes the paper.

II. BACKGROUND AND MOTIVATION

Due to higher accident rates vehicle tracking is very important now days. This can be done easily by the use of the GPS technology. Various other applications can also be used to do so [1]. These applications are also used in fleet management, anti-theft vehicle systems and accident recovery [2].

Vehicle Tracking: The vehicle tracking technology uses the GPS systems via many applications. These applications are very helpful as the track the vehicles and their partner web applications also monitor the vehicles continuously. There are various ways to track a vehicle. Larger organizations use web services to tract large number of vehicles whereas small scale industries can use various mobile apps. To find exact location, distance and estimating time to reach particular destination an android app is developed [3]. Theoretical it is easy to say we can get the exact location of a vehicle, but practically sometimes it is next to impossible.

Even though we have advanced technology it is very difficult to actually obtain the geographical coordinates correct all the time. Use Kalman filter can be done, to get an exact longitude and latitude position. Location Identifier and immediate recovery of accident: As we already know there are numerous ways to track the location of a vehicle which has already met with an accident. When accidents happen, it becomes very difficult to send help to the victims as no notification the accident has the reached the hospitals, police or the family members of the victim, thus resulting in a huge loss of life. To avoid such situations, we can send an automated SMS to the predefined numbers in the system.

Bluetooth Technology is used as a medium to activate the GPS by the sensors. It is an intermediate between the sensors and the GPS. But now not only Bluetooth technology can be used but also MESA technology can be used to activate GPS and send the location coordinates to the predefined numbers.

III. PROPOSED APPROACH

In this Project it is proposed to design an embedded system which is used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). In this project 8052 microcontroller is used for interfacing to various hardware peripherals. The current design is an embedded application, which will continuously monitor a moving Vehicle and report the status of the Vehicle on demand. For doing so an ARDUINO microcontroller is interfaced serially to a GSM Modem and GPS Receiver. A GSM modem is used to send the position (Latitude and Longitude) of the vehicle from a remote place. The GPS modem will continuously give the data i.e., the latitude and longitude indicating the position of the vehicle. The GPS modem gives many parameters as the output, but only the NMEA data coming out is read and displayed on to the LCD.

A. Global System for Mobile Communication

GSM abbreviates global system for mobile communication, this is a second generation (2G) mobile network. This is widely used in all over the world for mobile communication. This GSM device consists of sim slot in which a sim can be inserted which has a unique number, this unique number is used for contact. This GSM device consists of a unique number called IMEI number and this is different for each and every hardware kit. In our project the device is used for transmitting data. The data from GPS is transmitted to given mobile through this GSM itself.



Fig.1 GSM board with slot for sim card.

B. Global Positioning System

GPS abbreviates global positioning system and this is used to detect the latitude and longitude of the particular position and it also shows the exact time. It detects these values anywhere on the earth. In our project it plays main role and it is the main source of the latitude and longitude of the vehicle to know the accident occurred location, or even for theft tracking of the vehicle. This gadget gets the coordinates from the satellite for each and every second. This device is the main component of vehicle tracking project.

C. Software Description

Express PCB: Breadboards are great for prototyping equipment as it allows great flexibility to modify a design when needed; however, the final product of a project, ideally should have a neat PCB, few cables, and survive a shake test. Not only is a proper PCB neater but it is also more durable as there are no cables which can yank loose. Express PCB is a software tool to design PCBs specifically for manufacture by the company Express PCB (no other PCB maker accepts Express PCB files). It is very easy to use, but it does have several limitations. It can be likened to more of a toy than a professional CAD program. It has a poor part library (which we can work around). It cannot import or export files in different formats. It cannot be used to make prepare boards for DIY production. Express PCB has been used to design many PCBs (some layered and with surface-mount parts). Print out PCB patterns and use the toner transfer method with an Etch Resistant Pen to make boards. However, Express PCB does not have a nice print layout. Here is the procedure to design in Express PCB and clean up the patterns so they print nicely.

Preparing Express PCB for First Use: Express PCB comes with a less than exciting list of parts. So, before any project is started head over to Audio logical and grab the additional parts by morsel, ppl, and tangent, and extract them into your Express PCB directory. At this point start the program and get ready to setup the workspace to suit your style. Click View and then Options. In this menu, setup the units for “mm” or “in” depending on how you think, and click “see through the top copper layer” at the bottom. The standard color scheme of red and green is generally used but it is not as pleasing as red and blue.

Arduino compiling: Download the arduino from the arduino website [4]. In the next step download the library files. As the arduino does not recognize the dictionary name, rename it. Launch arduino by double-click “arduino”. Select target board as “Arduino Uno”. Click Sketch and then Verify/Compile.

IV. SIMULATED RESULTS

Whenever a vehicle is met with an accident then owner can send an SMS to the vehicle to know the location or position of the vehicle. The SMS sent would pass through the GSM service provider and then reach the vehicle, which is travelling, because the vehicle has a GSM device with a SIM card. This GSM modem will receive the SMS and send to the microcontroller in the vehicle. The microcontroller will receive this SMS and compare the password and the command. If the information matches the already programmed one, then it will perform the request required by the owner. It will then send the required location; latitude, longitude and time to the registered number of the owner and the results will be display on the screen of the owner’s mobile phone. The owner can then send a message to stop the engine of the vehicle. Whenever accident or theft of the vehicle is occurred then the device sends message to given mobile device. Message for theft: “Vehicle alert latitude: 2400.0090, N longitude: 12100.0000, E time: 12:00”. Message for accident: “Accident alert latitude: 2400.0090, N longitude: 12100.0000, E time: 12:00”.

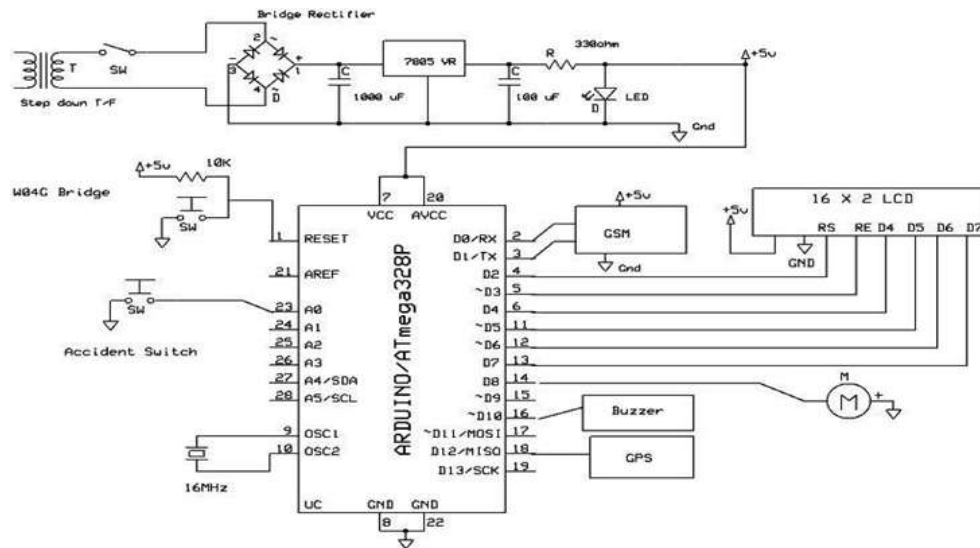


Fig. 2 Schematic diagram of Arduino based Vehicle Tracking.

The above is the schematic figure of the Arduino based vehicle tracking project. The project Arduino based Vehicle Tracking was designed is to mainly intended to applications to track the location of vehicle.

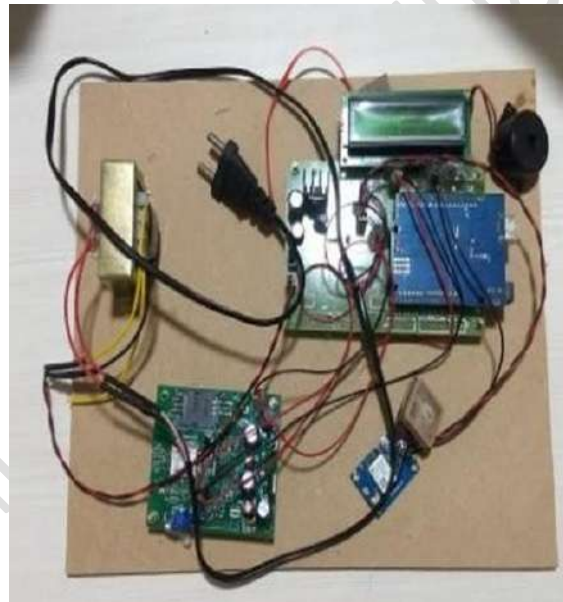


Fig. 3 Arduino based vehicle tracking kit

V. CONCLUSIONS

The vehicle tracking system works mainly by receiving messages from a mobile phone. There is a message command by which we can track the vehicle. And this command is to send an SMS; "TRACK VEHICLE" to the registered SIM card number in the GSM modem. This command initiates the GPS modem and receives the latitude and longitude position and this information will then be sent as SMS to the mobile device. Whenever theft occurs or on demand request of the vehicle's location, the device sends a message to the vehicle owner's mobile.

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RFID BASED BUS IDENTIFICATION SYSTEM FOR BLIND WITH VOICE ALERTS

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Abstract: *Blind people couldn't identify the exact bus related to his/ her destination area. This paper demonstrates a bus detection system to help blind people to travel smoothly and independently from one place to another by providing complete and clear information. This project consists of a RFID module, LCD, Voice Module, and a microcontroller board. The RFID tags are attached to the busses and the entire system is at the bus stop. Whenever the bus reaches the bus stop the system announces the bus information using voice module and also displays on the LCD. In the bus station subsystem, the coming buses will be detected and then announced in the bus station in order to alert the blind people. A complete system prototype has been constructed and tested to validate the proposed system.*

Keywords— *RFI, voice module, system integration, blind, detection.*

I. INTRODUCTION

Blind people desperately need special requirements and services including the public transportation to give them the rights and ability to move smoothly and independently from one place to another. Blindness limits the type of transportation a person can use and hence, the blind may suffer additional delay compared to a normal person because of the limited transportation choices. The most used transport means for blind people is the public transportation, which is considered as one of the important means for travelling in many countries but it is not possible for the blind to identify the bus travelling to his/her desired destination.

The purpose of this paper will be to develop a design and propose a plan to implement RFID technology that will help the blind people navigate. **Radio Frequency Identification (RFID)** refers to a wireless system comprised of two components: tags and readers. The reader is a device that emits radio waves and receives signals back from the RFID tag that has one or more antennas. Buses consist of a RFID tag upon reaching the bus station this tag will be read by the RFID reader and announces the bus information using LCD display and voice module in the bus station to alert the blind people. As the blind people already give their destination information, this information is stored into temporary database, if the bus destination matches the destination database the bus driver is intimated about the number of blind people so, the driver makes sure that they get into the bus.

II. Related Work

Several systems had been proposed for guiding blind people. Here we will just mention the most related ones to the theme of our project. One of these systems is a central announcement system based on Bluetooth technology. In this system, Bluetooth devices are installed in both the bus and the bus station which are connected to a processing subsystem. When a bus approaches the station, the two Bluetooth devices of the bus and the station will connect to each other. After that, the bus Bluetooth device will transmit a message containing bus information to the station's processing subsystem. The transmitted message will be read by a text to speech converter which is interfaced with the processing subsystem in the bus station. Then, an announcement message contains the bus information will be generated through a speaker. But there are two disadvantages in this system: it allows connection of two devices only at once and it can lose connection in certain conditions. To overcome this, we used RFID in place of Bluetooth.

III. PROPOSED APPROACH

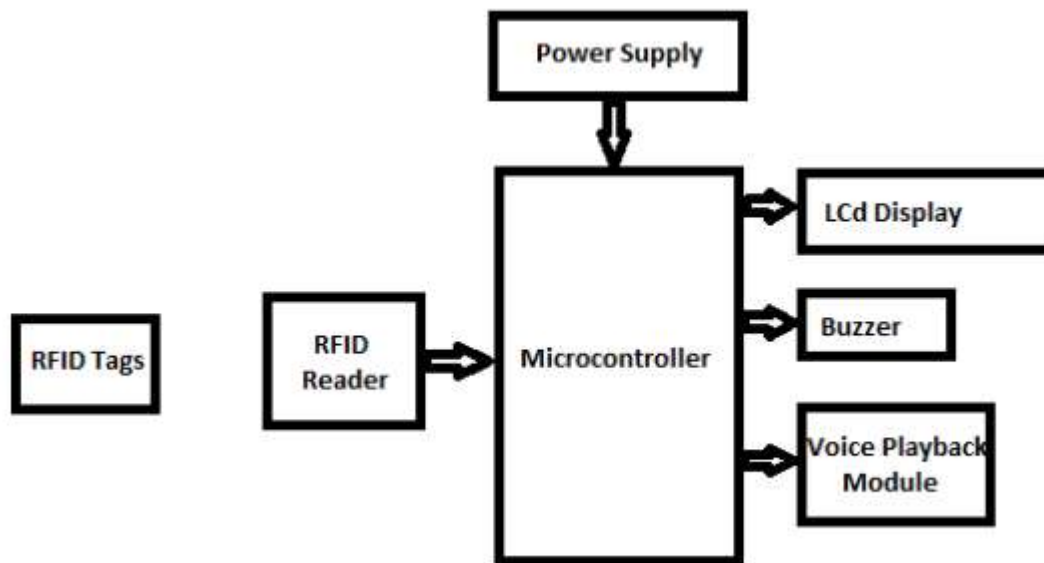


Fig: 1 Block diagram of proposed system

Microcontroller: It provides all of the circuitry necessary for a useful control task: a microprocessor, I/O circuits, a clock generator, RAM, stored program memory and any necessary support ICs.

RFID Tags: RFID tags contain an integrated circuit for modulating and demodulating radio frequency and an antenna for transmitting and receiving signals. Frequency ranges vary from low frequencies of 125 to 134 kHz and 140 to 148.5 kHz, and high frequencies of 850 to 950 MHz and 2.4 to 2.5 GHz

RFID Reader: Tags transmit data to the RFID reader. The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communications interface to a host computer system, where the data can be stored in a database and analyzed at a later time.

Power Supply: A power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load.

LCD Display: An LCD is an electronic display module that uses liquid crystal to produce a visible image. The 16×2 LCD display is a very basic module commonly used in DIYs and circuits. The 16×2 translates to a display 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5×7 pixel matrix.

Buzzer: A buzzer is an audio signaling device which may be mechanical, electromechanical or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as mouse click or keyboard.

Voice playback module: Voice recording module offers true single chip solid state storage capability and requires no software or micro-controller support. It provides high quality

Recording and playback. One button is pushed down to record the message through the on-board electrets microphone; A LED turns on during this time. The other button just has to be momentarily pressed to replay the message.

SOFTWARE REQUIRED-ARDUINO IDE

The **Arduino Integrated Development Environment (IDE)** is a cross platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards.

The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub `main()` into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution. The Arduino IDE employs the program to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware. By default, `avrdude` is used as the uploading tool to flash the user code onto official Arduino boards.

Arduino IDE is a derivative of the Processing IDE; however as of version 2.0, the Processing IDE will be replaced with the Visual Studio Code-based Eclipse IDE framework. With the rising popularity of Arduino as a software platform, other vendors started to implement custom open-source compilers and tools (cores) that can build and upload sketches to other microcontrollers that are not supported by Arduino's official line of microcontrollers.

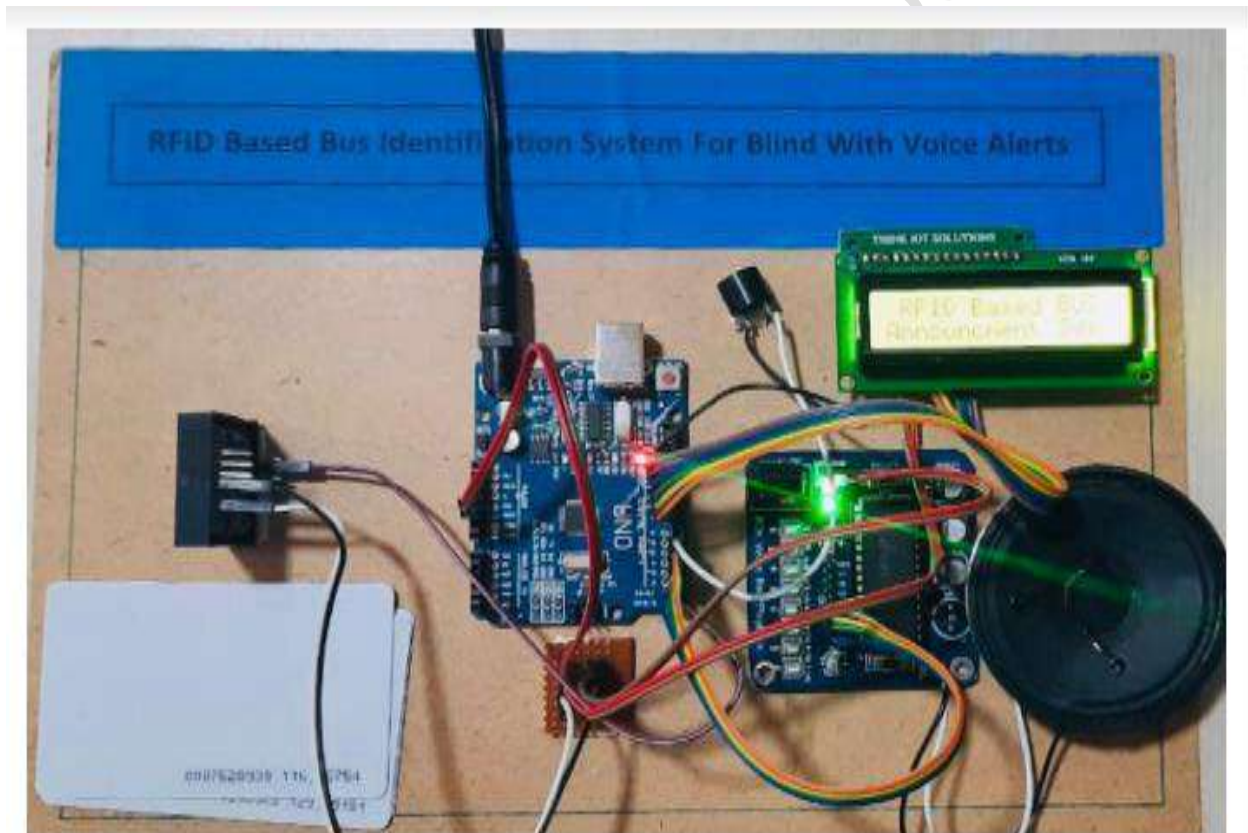
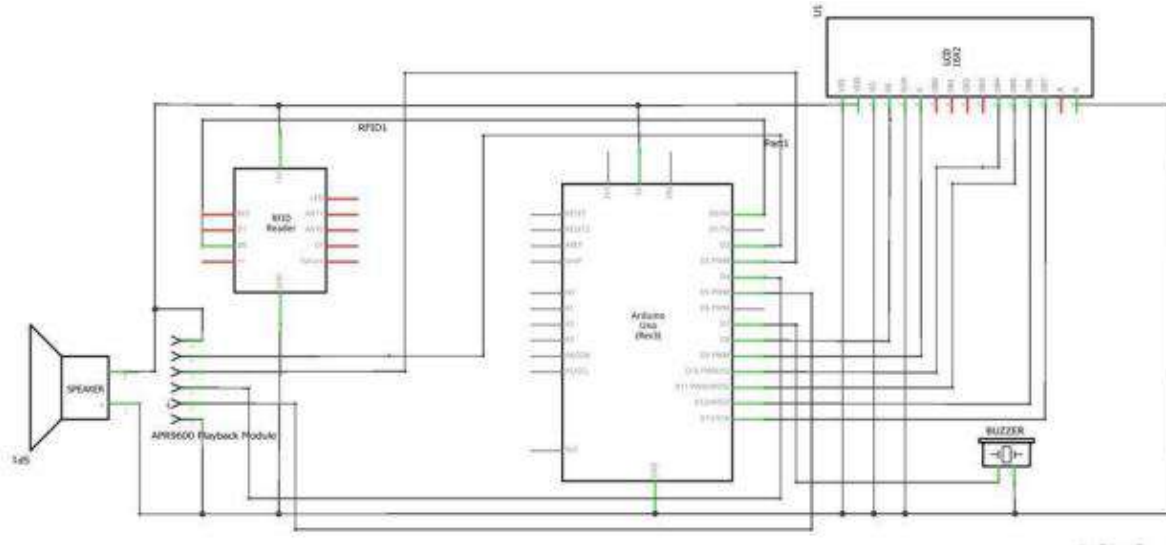


Fig. 2: Hardware implementation kit



IV RESULT

1. When first RFID tag is read by the reader, the respected output is displayed on LCD screen as shown in the below figure and also read it out by the speaker



First output

2. When second RFID tag is read by the reader, the respected output is displayed on LCD screen as shown in the below figure and also read it out by the speaker



Second output

3. When third RFID tag is read by the reader, the respected output is displayed on LCD screen as shown in the below figure and also read it out by the speaker



Third output

IV CONCLUSIONS

A feasible system to assist the blind people to have a safe and normal travel by public transport system has been proposed and the prototype has been tested for different sample RFID tags. The performance of the system is satisfactory and promises to eliminate the difficulties faced by the blind people for their day-to-day travel requirements in availing public transport systems. Using the ultra-high frequency radio waves, we have shown implementing a system which will use the RFID tag and reader setup along with customized program that will help the blind in identifying exact bus. Results of tests indicated that this system could help users to successfully board their desired buses, using the interactive communication modules. Thus, showing the possibility of using the RFID technology to help the blind.

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Accident Avoidance by Using Road Sign Recognition System

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Abstract— The increase in the number of vehicles has led to a number of traffic signs. Therefore, a system that can automatically recognize the traffic signs is being needed to reduce traffic accidents and to drive more freely. Traffic Sign Recognition (TSR) systems employ vehicle mounted cameras that identify traffic signs while driving on these road. Typically, these systems recognize speed limit signs, stop signs and warning signs such as pedestrian crossing; railroad crossing etc. Their primary function is to inform the driver of recent traffic signs that may have been missed due to distraction or in attentiveness. A camera scans the road side for traffic signs. The Raspberry Pi is a credit card sized single computer or SoC that uses ARM1176JZF-Score SoC, or System on a Chip, is a method of placing all necessary electronics for running a computer on a single chip. Raspberry Pi needs an Operating system to start up. In the aim of cost reduction, the Raspberry Pi omits any on-board non-volatile memory used to store the boot loaders, Linux Kernels and file systems as seen in more traditional embedded systems. Rather, a SD/MMC card slot is provided for this purpose. After boot load, as per the application program Raspberry Pi will get execute.

Keywords— Traffic Sign Recognition (TSR), Raspberry Pi, ARM11, System on a Chip.

I. INTRODUCTION

Vehicle driving has become more common in the life of people. Thus, traffic security is very important. Traffic signs are used for traffic warning, regulation, routing and management of important information for autonomous vehicle. These signs are intended to affect the behavior of drivers. Due to the tremendous increase of road vehicles all over the world, the number of road accidents has also increased significantly. Among different causes of accidents, some major causes are ignorance of the road sign occlusion of the road sign and distraction of the drivers. Our work describes the design of an embedded system for the “The Avoidance of Accidents Using Road Sign Recognition”.

Traffic sign is a computer vision technique of driving assistance system in automatically recognition roadside traffic signs. Traffic sign detection and recognition (TSR) is an important research topic that continuously keeps wider interest to the research in the field of intelligent transport system because of its application in the driver assistant system that helps to regulate the traffic, indicate the state of the road, guiding and warning drivers and pedestrians. In recent past also researchers have carried out for the robust TSR system in literature. Many of them used color and shape segmentation for traffic sign detection. A driver assistant system like TSR helps the drivers to recognize the traffic signs and alert them to keep them safe from road accidents.

A. NEED

With this mechanism, safety is ensured to drivers as well as Pedestrians since our system is more reliable and life saving. This is because traffic sign recognition and detection is made easy and reliable. Traffic sign is detected with image processing techniques and the detected traffic sign is given to traffic sign recognition algorithm as a parameter. Speed limit signs, stop signs and warnings such as pedestrian crossing, railroad crossing etc. are detected. The detected traffic signs are recognized using an image processing system that uses segmentation algorithm. The resulting image is processed with Open CV. Another important need is that, even if the driver neglects the road sign while driving, the system can save the lives of the driver and others by recognizing the road sign and altering the speed of the vehicle. The speed of the vehicle is changed according to the road sign detected with the help of Raspberry Pi.

B. INTENT

The main objectives of the system are:

- Providing accuracy by using Open CV.
- Providing an alarm system for alerting the driver in case he neglects the traffic sign.
- Ensuring safety by changing speed of the vehicle according to the road sign detected.

II. LITERATURE SURVEY

In a study, some image processing techniques are used to detect traffic signs and Fuzzy Integral is used to recognize traffic signs. [1] another paper represents road sign detection and recognition system based on speeded up robust feature (SURF) descriptor that is invariant to rotation, skew and occlusion of the sign and artificial neural network (ANN) classifier[2]. The third paper considers the case of a single controllable ego vehicle surrounded by several uncontrollable target vehicles, without communication. Only a map with the current position and velocity of the target vehicles are assumed to be known, but no pre-defined crossing order is given. [3]. In another paper, they have developed novel two-stage approach to detect vehicles and recognize brake lights from a single image in real-time.[4].

III. PROPOSED SYSTEM

The traffic avoidance system detects and recognizes speed limit signs, stop signs and warnings such as pedestrian crossing, railroad crossing etc. The proposed method consists of 3 stages. These stages are Image Acquisition, Traffic Sign Detection and Traffic Sign Recognition. RGB format image that is taken from camera is primarily given to traffic sign detection algorithm as an input parameter. Traffic sign is detected with image processing techniques. In the traffic sign detection stage, RGB format image is firstly converted to NTSC format image. Then, some filter techniques are applied to image. These filter techniques are respectively Un sharp filter, Average filter, Dilate filter and Erode Filter. The signs on the road image are made significant by applying these filter techniques. Then the detected traffic sign is given as input to traffic sign recognition system and traffic sign classification is done by using Fuzzy Integral. Then the speed of the vehicle is changed according to the road sign detected with the help of RaspberryPi.

Advantages

- More safety as the system is more reliable and lifesaving.
- Even though the driver neglects the sign, our system can save the life of the driver and others by recognizing the sign and altering the speed of the vehicle.
- Our system is more accurate due to the fact that is made with open CV.
- Image sign detection is more reliable and easy.

Modules

The major modules in the proposed system,

- Camera feature extraction.
- Image recognition.
- Database feature extraction.
- Motor speed alteration.

Overall Function

The accident avoidance system uses a camera in order to capture the road sign that has been missed while driving. This captured image is sent to the ARM11 processor which recognizes the road sign. The recognized image is given to Raspberry PI controller which alerts the driver of the missed road sign through the display and also via a voice alert. In addition the speed of the vehicle is also altered depending on the detected road sign.

Methodology

Our project uses the segmentation algorithm. Image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics. Each of the pixels in a region

is similar with respect to some characteristic or computed property, such as color, intensity or texture. Adjacent regions are significantly different with respect to the same characteristics.

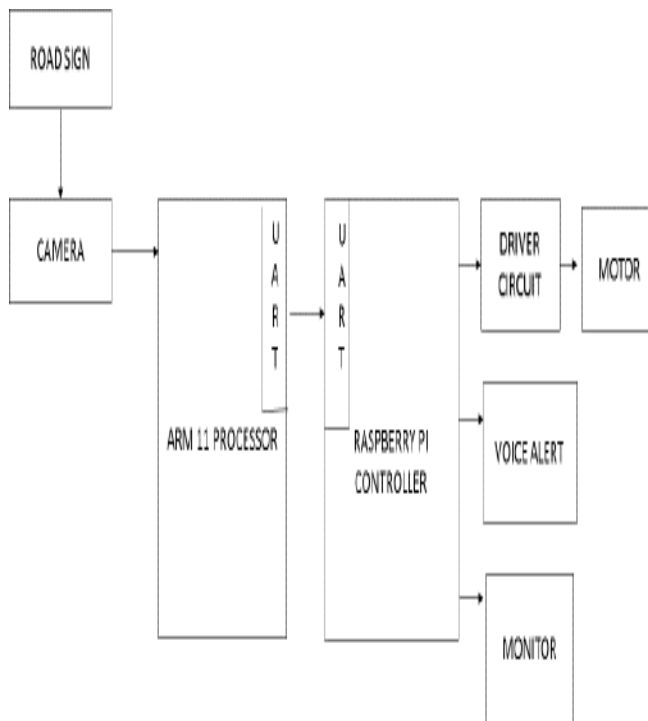


Fig. 1 The overall diagram of the proposed system.

IV. MODULE DESCRIPTION

Camera Feature Extraction

In this module, amicro-camis placed in the vehicle. This cam observes the road signs. Whenever a road sign passes, it takes pictures of them. These images are sent to the image recognition system. The image recognition system recognizes the image.

Image Recognition

The images are received from the Camera feature extraction module. These images are recognized and identified using image processing system with open CV. The algorithm used is segmentation of images using open CV. The main reason of using this algorithm is to accurately identify these images so that proper action is done.

Database Feature Extraction

After identifying the images, the image processing system refers the database. The database contains collection of actions that needs to be done for the appropriate signs.

Motor Speed Alteration

In this module, proper action is taken according to the details contained in the database. Then according to the action the motor speed is altered using Raspberry Pi.

V. RELATED SYSTEMS

The related systems involved in the proposed system are described in detail as follows.

ARM processor

It stands for Acorn RISC Machine or Advanced RISC Machine. It is a RISC architecture for computer processors that is configured for various environments.

Raspberry Pi

It is a series of small single-board computers. The main reason for employing Raspberry Pi as it provides in-built Wi-Fi and Bluetooth. An additional advantage it also has a Random Access Memory (RAM).

GPU

It stands for Graphic Processing Unit. It is an electronic circuit to manipulate memory for producing output for display.

UART

It stands for Universal Asynchronous Receiver/Transmitter. It is a computer hardware device for asynchronous serial communication In which data format and the speeds can be variable.

VI. SYSTEM SPECIFICATION

Software Specification

Operating System : Raspberry Pi Programming Languages Used
: Python

Hardware Specification

Sensors : Camera
Microcontroller Unit : Raspberry Pi and ARM11

VII. CONCLUSIONS

The proposed system automatically detects signs that are missed while driving and the vehicle speed is altered accordingly. In addition a voice alert is also given in order to intimate the driver that he has missed a traffic sign. This project is an initiative to merge technology for safety to provide a better living environment.

VIII. FUTURE WORK

There is scope to modify our proposed system by better refinement. We propose a novel image search re-ranking approach, named spectral clustering re-ranking with click- based similarity and typicality (SCCST).

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Journal of Engineering Sciences

Smart City Using IOT

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Abstract— Most of the world's population today lives in cities. By 2030, the population of the cities around the world is expected to grow from 3.3 billion to 5 billion people. Smart city is an urban development vision to integrate multiple Information and Communication Technology (ICT) and Internet of Things (IOT).

Due to resource constraints, there will be a problem in the future to provide all the services to the residents. To continue to serve and improve the standard of living of the growing population, it is necessary to develop smart cities. The Smart City aims to make optimal and sustainable use of all resources, while maintaining an appropriate balance between social, environmental and economic costs. In the Smart City, maximum use is made of ICT to improve the functioning, management, and supervision of the variety of systems and services, with an emphasis on saving energy, water, land and other natural resources. The IoT is a modular approach to merge various sensors with all the ICT solutions. With over 50 billion objects will be connected and deployed in smart cities in 2020. The heart of smart cities operations is the IoT communications. IoT is designed to support Smart City concept, which aims at utilizing the most advanced communication technologies to promote services for the administration of the city and the citizens.

Keywords— Internet of Things (IOT), ICT, communication technologies

I. INTRODUCTION

We come across the situation where we need to keep a watch over abnormalities like pipeline leakage, garbage overflow, water supply problems etc. Now keeping human labor for this purpose is not so effective for keeping a watch an area 24x7. The purpose of this project is to serve and improve the standard of living of the growing population, it is necessary to develop smart cities. The smart city aims to make optimal and sustainable use of all resources, while maintaining an appropriate balance between social, environmental and economic costs.

This system of consists of ultrasonic sensor that continuously monitors the target, solenoid valve for water supply through web, ESP266 Wi-Fi module used for internet. Upon detecting the target, it alerts a buzzer and displays on LCD and the information of all activities is stored in a AWS web page for the track of the system. The main advantages of the proposed system are maintenance cost reduction, wireless communication, reduction of manpower. The programming of Microcontroller is done using C OR C# Programming.

II. SIGNIFICANCE OF WORK

An embedded system is a special-purpose computer system designed to perform one or a few dedicated functions, sometimes with real-time computing constraints. It is usually embedded as part of a complete device including hardware and mechanical parts. In contrast, a general-purpose computer, such as a personal computer, can do many different tasks depending on programming. Embedded systems have become very important today as they control many of the common devices we use.

Since the embedded system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product, or increasing the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale.

Physically, embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants.

Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure.

In general, "embedded system" is not an exactly defined term, as many systems have some element of programmability. For example, Handheld computers share some elements with embedded systems — such as the operating systems and microprocessors which power them — but are not truly embedded systems, because they allow different applications to be loaded and peripherals to be connected.

An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is specifically designed for a particular kind of application device. Industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines, and toys (as well as the more obvious cellular phone and PDA) are among the myriad possible hosts of an embedded system. Embedded systems that are programmable are provided with a programming interface, and embedded systems programming is a specialized occupation.

Certain operating systems or language platforms are tailored for the embedded market, such as Embedded Java and Windows XP Embedded. However, some low-end consumer products use very inexpensive microprocessors and limited storage, with the application and operating system both part of a single program. The program is written permanently into the system's memory in this case, rather than being loaded into RAM (random access memory), as programs on a personal computer are.

III. METHODOLOGY

The flow chart describes the process of working of the project. At first ultrasonic sensor starts sensing the level of dustbin and also the water level is sensed using two wires. Then, if in the dustbin the trash is more than 75% and if the leakage is detected then the LCD will display that the bin is full and leakage detected. Buzzer also starts beeping and this gives indication to authorities to empty the dustbin and repair the pipeline. At all the time the data is sent to server using wi-fi module.

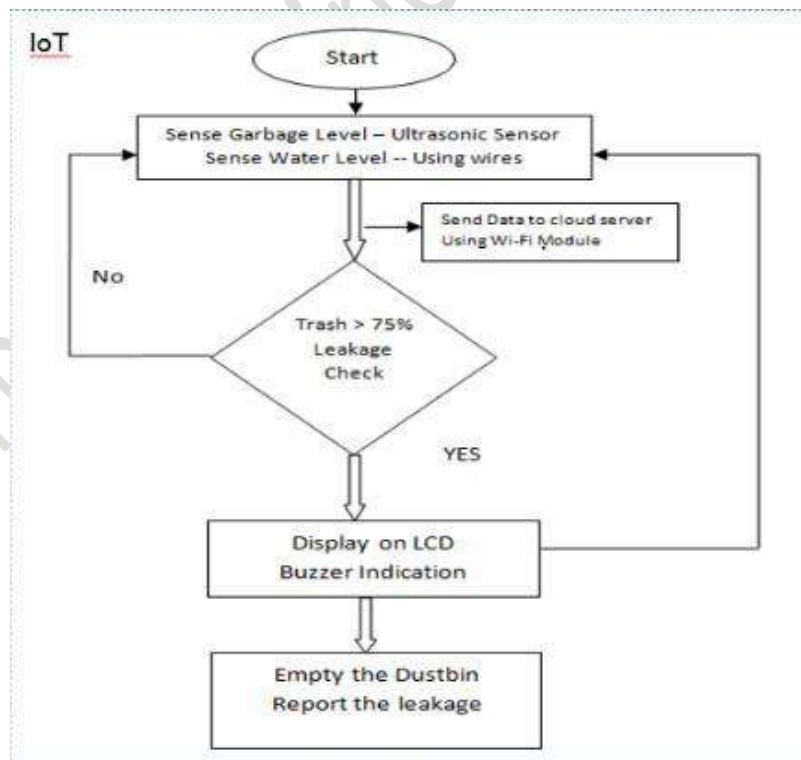


Fig 1: Block Diagram

Below shown is the web page which displays the level of trash in the bin in the range from 0 to 100%. If the bin is above 75% then on the LCD it will be printed that “Bin is Full” and also buzzer will beep. For every 15 seconds the sensor data will be updated in the server.

Bit_Lane_ID	Order_Latitude	Value_Mean	CATN_1986
00.00	No_Latitude	004	00-11-32-10-00-00
00.01	No_Latitude	004	00-42-02-10-00-00
0.00	No_Latitude	007	00-45-42-10-00-00
0.01	No_Latitude	008	00-45-08-10-00-00
0.01	Latitude_Removed	007	00-42-01-10-00-00
0.01	No_Latitude	004	00-42-44-10-00-00
0.00	Latitude_Removed	007	00-45-05-10-00-00
0.00	Latitude_Removed	004	00-44-05-10-00-00
00.00	Latitude_Removed	007	00-45-01-10-00-00
0.00	No_Latitude	003	00-45-43-10-00-00
0.01	No_Latitude	007	00-45-02-10-00-00
0.00	No_Latitude	004	00-45-00-10-00-00
00.00	No_Latitude	007	00-45-40-10-00-00
0.00	No_Latitude	004	00-45-07-10-00-00

IoT based Solenoid Valve Control System

Valve ON

Valve OFF

www.jespublication.com

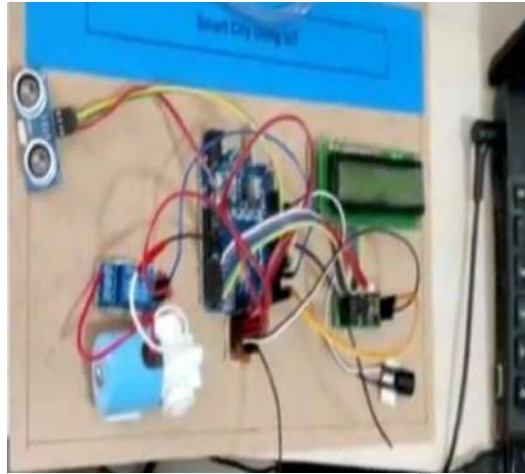


Fig 5: Circuit Design

V. CONCLUSION

The Smart City aims to make optimal and sustainable use of all resources, while maintaining an appropriate balance between social, environmental and economic costs. In the Smart City, maximum use is made of ICT to improve the functioning, management, and supervision of the variety of systems and services, with an emphasis on saving energy, water, land and other natural resources. Hence the smart city aims at utilizing the most advanced communication technologies to promote services for the administration of the city and the citizens.

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Student Security System Using RFID

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Abstract: The Objective of this paper is to develop an embedded system, which is used to verify and authenticate the RFID tag. This paper is implemented using Arduino developed board interfaced with buzzer, LCD, GSM and the reader which is integrated with the Arduino. If the information matches, then access is granted. The information of the student will be send to the parent through one wire protocol GSM and the information of the access system will be displayed on to the LCD which is embedded to the board. This system is used at the entrance of college and it can also be used at the entrance and exit points of the bus.

Keywords: Arduino – RFID – GSM – LCD - Reader- SOS Button.

I. Introduction:

Most of the institutions take attendance by calling out names or passing a sheet of paper. Both have respective drawbacks, For this reason, the college needs to create a system to monitor student's attendance. This paper is to simplify attendance recorder system by using Radio Frequency Identification (RFID) technology and provide better security. The system is used to maintain a record of attendance about the pupil which can be transferred to the parents and head of the department (HOD) via GSM network systems.

This paper can help in approaching the problem of human involvement in attendance tracking. As error rate in machines are very minute compared to that of humans, this ensures accurate access control. And implementing an SOS button, which provides an extra safety option to the candidate by which they can directly contact emergency services when in need. The attendance system is basically an embedded one. Embedded stands for hardware controlled by software. Therefore, the system functionality is not only to record the student's attendance, but also sends alerts to respective parents/guardians.

An embedded system can be defined as a computing device that does a specific focused job. Appliances such as the air-conditioner, VCD player, DVD player, printer, fax machine, mobile phone etc, are examples of embedded systems. Each of these appliances will have a processor and special hardware to meet the specific requirement of the application along with the embedded software that is executed by the processor for meeting that specific requirement. The remaining paper is organized as follows. in section 2 we are presenting our proposed approach

II. Related Work:

Ausecha et al [5] proposed a review paper in which authors are focusing on RF security. Jechlitschek [4] is the one who proposed a survey paper on the Radio Frequency Identification which is focusing on the security provided in the RFID. However these authors may not be able to provide extra security to the students separately. An innovative idea of implementing notification services, a SOS button and baffle gate security system ensures more security is guaranteed to the students.

III. Proposed Approach

Here we are presenting our proposed approach. The proposed approach has

Block Diagram:

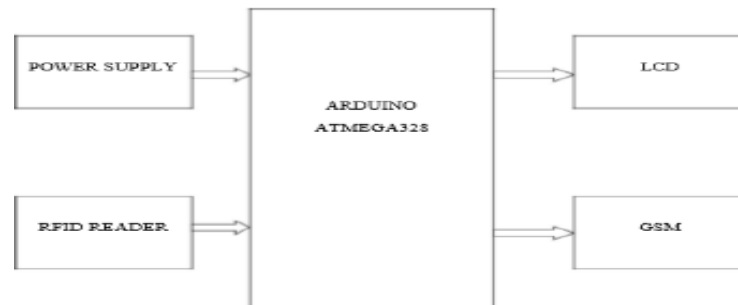


Fig 1. Block Diagram of Arduino

Schematic Diagram:

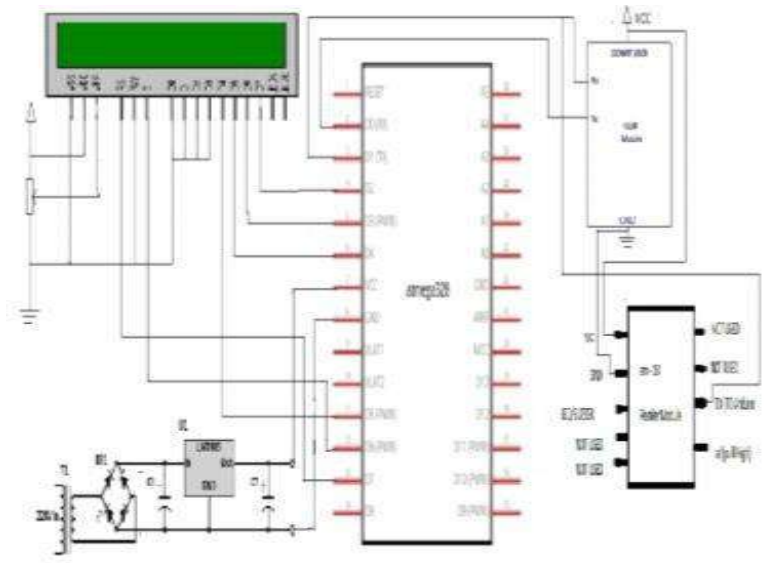


Fig 2. Schematic Diagram

Power Supply

The power supply is designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can be broken down into a series of blocks, each of which performs a particular function. A DC power supply which maintains the output voltage constant irrespective of AC mains fluctuations or load variations is known as Regulated D.C Power Supply. Step down transformer is used to convert high voltage to low voltage, which is given as a fed to the full wave rectifiers. As the wave signals are half cycled the full wave rectifier converts this into a full wave rectifier. The ripple content in the rectified output is high. Such high percentages of ripples are not acceptable for most of the applications. Ripples can be removed by capacitor filters. The output of the filter is give to the Arduino.

Arduino:

Arduino is a component which is used to design and manufacture microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Arduino board designs use a variety of micro-processors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards and other circuits. The boards feature serial

communications interfaces, including USB's.

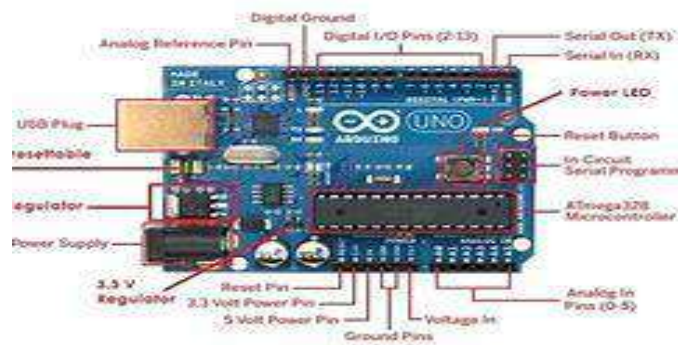


Fig. 3. Arduino Board

The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler tool chains, the Arduino project provides an Integrated Development Environment (IDE) based on the Processing language project. Arduino microcontrollers are pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory.

LCD Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits.

The data pins connected to the port pins take the data or command lines that are given by programming and displays the data that is available on the data lines [6]. It indicates the status of the circuit whether the RFID scanned is matched or not. If the RFID is matched then at the same time the LCD displays the comment. The potentiometer to the VEE pins to adjust the contrast of the LCD.

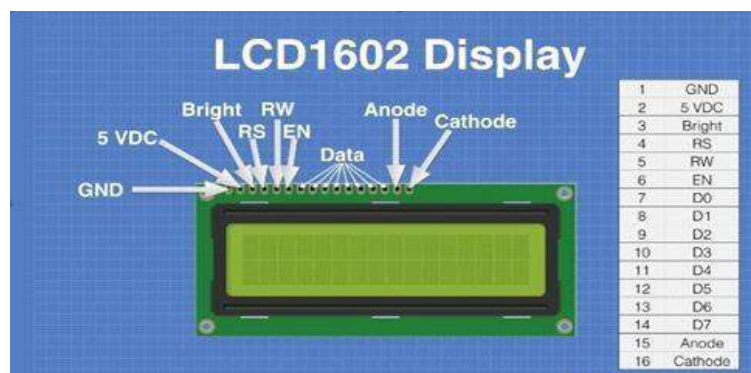


Fig 4. LCD Display Meter

RFID (Radio Frequency Identifier):

Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification using radio waves. Chip-less RFID allows for discrete identification of tags without an integrated circuit, thereby allowing tags to be

printed directly onto assets at a lower cost than traditional tags [2, 3].

RFID Frequencies:

The generic frequencies for RFID are:

➤ 125 - 134 kHz, 13.56 MHz, UHF (400 – 930 MHz), 2.45 GHz, 5.8 GHz

In the UHF band, there are two areas of interest. Several frequencies in the 400 MHz band and then the band 860 – 930 MHz. Each of the frequency bands have advantages and disadvantages for operation. The lower frequencies 125-134 kHz and 13.56 MHz work much better near water or humans than do the higher frequency tags.

GSM:

Global System for Mobile Communications (GSM) modems are specialized types of modems that operate over subscription based wireless networks, similar to a mobile.



Fig 5. GSM Modem

Arduino IDE:

The Arduino project provides the Arduino Integrated Development Environment (IDE), which is a cross-platform application written in the programming language Java. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting. The Arduino IDE supports C and C++ languages using special rules of code structuring.

In the next section of this paper we focus on the related work.

IV. Conclusion:

In this paper we have implemented the real time model that can automatically provide an alert to parents that whether their child is attending college or not. We can install baffle gates in order to restrict one student from scanning multiple tags. This will ensure that no proxy is encouraged. As there is a cause of manipulation in the student's attendance, In order to avoid these we came up with an embedded technology idea. Also integration of a SOS button into this environment will further increase the security.

By implementing this paper we can increase the student attendance in the college and ensure that high-level security is provided. It reduces the manipulation in the attendance system. It also reduces the paper work and makes the students to attend the college regularly.

a. Future Enhancements:

- i. We can add stress monitoring sensors or other pulse sensors to calculate the stress levels of the student.
- ii. IOT Technology can be used to communicate with Database and treat the candidate with utmost secured environment.

- iii. The RFID card restricts over time allocation for the candidates in certain places to ensure sincerity in the premises.

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High Performance, Low Power Architecture of 5-Stage FIR Filter using Wallace Tree

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Abstract:
The main purpose of this Wallace Tree Multiplier is to design a 5-Stage FIR Filter using Low Power. The most area and power consuming arithmetic operation in High-Performance Circuits like Finite Impulse Response (FIR) Filter, multiplication is one. There are different types of multipliers to reduce the cost and effective parameters in FIR Filter design. Among those, Modified Wallace Tree Multiplier is used in this project. The structural adders and delay elements occupy more area and consumes more power, so it was a reason to forward the proposed method. Along with that proposed method, Modified Wallace Multiplier based FIR Filter is designed to make the FIR Filter design suitable to consume Low Power and to attain High Performance.

Keywords: VLSI, FIR filter

1. Introduction

Filter is a frequency selective network. It passes a band of frequencies while attenuating the others. Filters are classified as analog and digital depending on nature of inputs and outputs. Filters are further classified as finite impulse response and infinite impulse response filters depending on impulse response. This chapter gives a brief about the types of filters. Analog filters can be passive or active. Passive filters use only resistors, capacitors, and inductors. Passive designs tend to be used where there is a requirement to pass significant direct current (about 1mA) through low pass or band stop filters. They are also used more in specialized applications, such as in high-frequency filters or where a large dynamic range is needed. (Dynamic range is the difference between the background noise floor and the maximum signal level.) Also, passive filters do not consume any power, which is an advantage in some low-power systems. The main disadvantage of using passive filters containing inductors is that they tend to be bulky. This is particularly true when they are designed to pass high currents, because a large diameter wire has to be used for the windings and the core has to have sufficient volume to cope with the magnetic flux. Very simple analog low pass or high pass filters can be constructed from resistor and capacitor (RC) networks. In the low pass case, a potential divider is formed from a series resistor followed by a shunt capacitor, as illustrated in Figure 1.1. The filter input is at one end of the resistor and the output is at the point where the resistor and capacitor join. The RC filter works because the capacitor reactance reduces as the frequency increases. It should be remembered that the reactance is 90° out of phase with resistance. At low frequencies the reactance of the capacitor is very high and the output voltage is almost equal to the input, with virtually no phase difference. At the cutoff frequency, the resistance and the capacitive reactance are equal and the filter's output is $1/\sqrt{2}$ of the input voltage, or -3 dB. At this frequency the output will not be in phase with the input: it will lag by 45° due to

the influence of the capacitive reactance. At frequencies above the 3 dBattenuation point, the output voltage will reduce further. The rate of attenuation will be 6dBperdoublingoffrequency(peroctave).Asthefrequencyrises,thecapacitivereactance falls and the phaseshift lag approaches90".

2. Literature survey

Active filters have the advantage of being smaller than passive types, and integratedcircuitdesignsallowthemtobeminiaturizedfurther.Activefiltersdohavedisadvantages: op-amps add noise to the signals; the signal's amplitude is limited by theop-amp'soutputsllewrateandthepowersupplyvoltage;andharmonicdistortioncanalso be introduced, particularly at the output stage. Active filters are more suited to designs that are not very demanding, where rapid changes in amplitude occur as thefrequency of the signal is changed. Even in a non-demanding filter design the signalswithin a filter circuit can be many times the applied voltage. For example, a signal mayhave amplitude of, say, one volt, and this may be multiplied typically to perhaps ten voltswithin the filter. Devices within the filter must therefore be able to handle signals withlargeamplitudes at frequencies wellbeyond thepass band required.

Integrated circuit (IC) filters are now quite common because they can be muchsmaller than active filters usingop-ampsand very much smaller than passive filters.Their small size supports the general trend to miniaturize equipment. The IC filters fallinto two categories: continuous time and switched capacitor. Continuous time filters use anumber of op-amp circuits within the IC, and often integrating resistors and capacitorstoo. The filter response is selected by the addition of further resistors or capacitors aroundthe IC. Continuous time filters tend to have a limited frequency range because of theintegratedcomponent values that havebeen provided.

Switched capacitor IC filters use the principle of rapidly charging and discharging a capacitor to replace a resistor, as shown in Figure 1.2. The effective resistor valuedepends on the rate of switching of the charge and discharge cycle. As the switchingspeedis changed,theeffectiveresistanceofthecircuitalsochanges.Thefiltercanthusbetunedbychangingtheswitchclockingfrequency.Thistypeoffiltergeneratessignalsat the switching frequency, and they tend to be generally noisy. Most switched capacitorfiltersarelowpass typesandarelimited intheirfrequencyrangeto below 100kHz.

3. Proposed Method

A high pass response can be obtained by swapping the components. Placing acapacitorinserieswiththeinput, followedbyashuntresistor,givesahighpassfilterwiththe same 3dBfrequency, butwitha45"phase lead.However,asthe frequencyrises,theattenuationandphaseshiftdecrease.LowpassandhighpassRCnetworksareillustratedinFigure1.

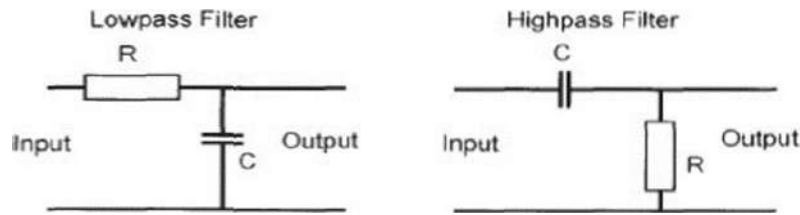


Figure 1.1 Lowpass and Highpass RC Networks

If the series resistor in the low pass filter is now replaced by a series inductor, to form an LC network, the frequency response changes. The reactance of the series element is increasing while that of the shunt element is reducing, so the rate of increase in attenuation is doubled compared to simple resistor-capacitor or resistor-inductor filter. At frequencies significantly above the pass band, the rate of increase in attenuation with frequency is 12dB/octave. Also the phase shift is doubled; it is 90 degrees at the cutoff frequency and rises to a maximum of 180 degrees at very high frequencies. The simple LC network is actually a series tuned circuit. If there were no series source or shunt load resistances present, there would be a magnification of the applied voltage by the inductor's Q factor. The Q of an inductor is given by the ratio of inductive reactance divided by its series resistance. Series source resistance or shunt load resistance is needed to limit the Q and to give a smooth pass band response. Another effect of high Q values is that they would produce ringing at the output if an impulse were applied at the input. As more reactive elements are connected in a ladder of series inductors and shunt capacitors, so the rate of attenuation beyond the pass band increases in proportion. The rate of attenuation will be 6dB/octave, where is the number of reactive components in the ladder and is known as the filter order. The filter order is also equal to the number of poles in the frequency response. Active filters have the advantage of being smaller than passive types, and integrated circuit designs allow them to be miniaturized further. Active filters do have disadvantages: op-amps add noise to the signals; the signal's amplitude is limited by the op-amp's output slew rate and the power supply voltage; and harmonic distortion can also be introduced, particularly at the output stage. Active filters are more suited to designs that are not very demanding, where rapid changes in amplitude occur as the frequency of the signal is changed. Even in a non demanding filter design the signals within a filter circuit can be many times the applied voltage. For example, a signal may have amplitude of, say, one volt, and this may be multiplied typically to perhaps ten volts within the filter. Devices within the filter must therefore be able to handle signals with large amplitudes at frequencies well beyond the pass band required.

4. Results and discussion

The RTL schematic is abbreviated as the register transfer level; it denotes the blueprint of the architecture and is used to verify the designed architecture to the ideal architecture that we are in need of development. The HDL language is used to convert the description or summary of the architecture to the working summary by use of the coding language i.e. Verilog, VHDL. The RTL schematic even specifies the internal connection blocks for better analyzing. The figure represented below shows the RTL schematic diagram of the designed architecture.

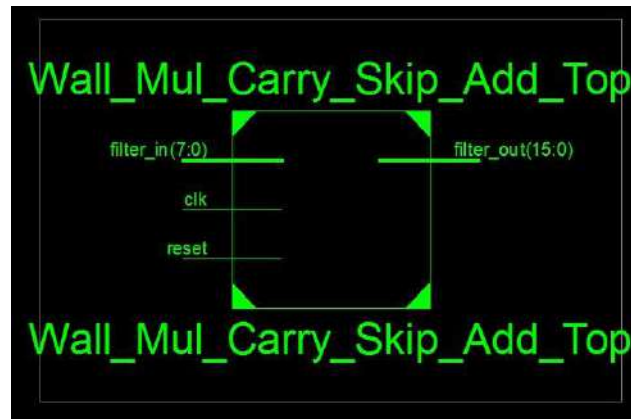


Figure2. RTL schematic of top module

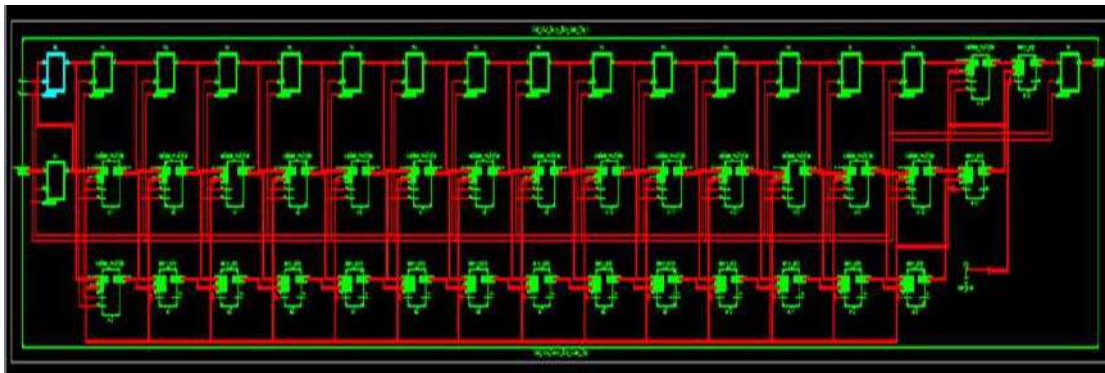


Figure3. RTL schematic

The technology schematic makes the representation of the architecture in the LUT format, where the LUT is considered as the parameter of area that is used in VLSI to estimate the architecture design. The LUT is considered as a square unit; the memory allocation of the code is represented in these LUTs in FIR.

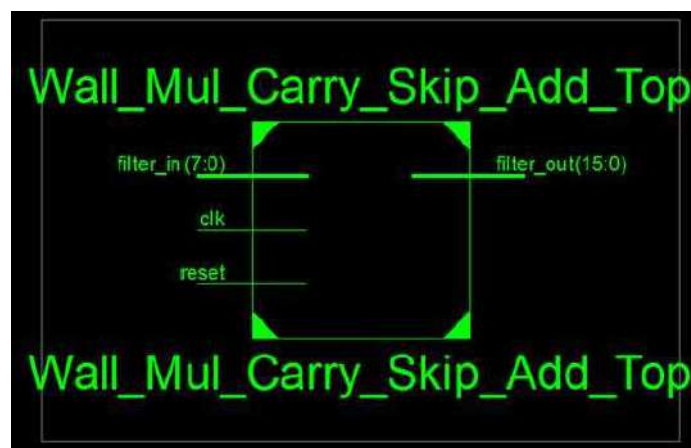


Figure4. Technological schematic

The simulation is the process which is termed as the final verification in respect to its working where as the schematic is the verification of the connections and blocks. This simulation window is launched as shifting from implantation to the simulation on the home screen of the tool, and the simulation window confines the output in the form of the wave forms. Here it has the flexibility of providing the different radix number systems

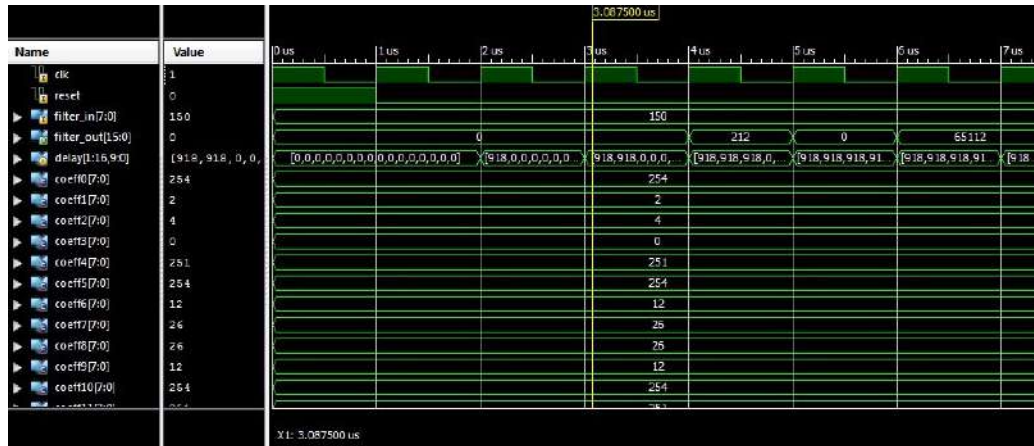


Figure5. Simulation

5. Conclusion

A Modified Wallace tree multiplier has been proposed with less complexity and enhancements in power and area factors. The structural adders and delay elements occupy more area and consumes power, so it was the reason to forward proposed method. Along with the proposed method we use Modified Wallace multiplier. In this modified Wallace Multiplier based FIR filter is designed to make the FIR filter design suitable to consume Low power and to attain High performance.

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MULTI-USER MOCZ FOR MOBILE MACHINE TYPE COMMUNICATION

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ABSTRACT

We introduce multiple access schemes for a novel non-coherent single-carrier (SC) modulation, called modulation on conjugate-reciprocal zeros (MOCZ), to enable a high-spectral efficient and mobile machine-type-communication for up- and downlink transmissions. The modulation can be used for a time-division and frequency-division multiple access (FDMA). To utilize FDMA we will adapt SC-FDMA techniques and demonstrate that a time-overlay of multiple users (MU) can significantly reduce the peak-to-average-ratio (PAPR) in the downlink. Furthermore, we compare the MU-MOCZ schemes to standard modulations in narrow-band-Internet-of-things (NB-IoT) scenarios with smallest transport block size in the LTE bands. To adapt the standard numerology of the transport channel we introduced soft decoding for higher order MOCZ designs. We demonstrate that our proposed scheme outperforms the standardized scheme in highly mobile and frequency-selective fading channels by a slight PAPR reduction in the downlink.

1. INTRODUCTION

As the industry move towards developing 5G, new vertical cellular internet of things (C- IoT) services, such as smart vehicles, smart factories, smart cities, car-to- car/infrastructure communication, and other, types of automation, are becoming more and more important in our daily lives [1]. Consequently, starting from LTE-advance pro, a new narrow-band internet of-things (NB-IoT) standard was introduced by the 3GPP consortium in Release 13 [2] to tackle such machine-type communications (MTC). This demand of C-IoT services massively increased in 5G to hundreds of thousand devices, served by only one single cell in an urban or industrial environment, which pushes existing multiple access schemes to their limits [3]. To handle the massive access, user packets are bundled to the smallest possible size of only 180kHz bandwidth by reducing the packet data size to its minimum [4]. However, since every user will have an independent wireless link to the base-station of its serving cell, the standardized coherent signaling schemes suffer from a huge overhead due to channel estimation, which leads ultimately to pilot-contamination [5]. If additionally, the link is fast time-varying, due to large mobility of the users, pilot overhead will even further increase. Industry, consequently, seeks more efficient signaling schemes. Recently, a novel non-coherent single-carrier (SC) modulation for frequency-selective fading channels in a single-input single-output (SISO) system, called modulation on conjugate reciprocal zeros (MOCZ), we introduce in [6], [7]. Here, the digital information is modulated onto the K zeros (roots) of the z -transform (polynomial) of the $K + 1$ consecutive samples of the time-discrete baseband signal. Since the K zeros can be treated independently, one can introduce an M -ary modulation scheme by allowing M distinct constellations for each transmitted zero to encode $\log M$ bits per zero and hence $K \log M$ bits for a sequence of $K + 1$ time samples, defining the time-discrete baseband signal block. Since a linear-convolution with an unknown time-invariant Channel Impulse Response (CIR) adds only further zeros randomly to the complex plane, an easy separation of data zeros and channel zeros can be obtained almost surely, which solves efficiently and elegantly the channel equalization in the zero-domain without knowledge of the CIR realization at receiver and transmitter. Hence, MOCZ enables a high spectral efficiency without the need of pilot transmissions.

However, a unique separation of channel and user signals is only applicable if different MOCZ symbols from other users are not overlapping in time, which would otherwise result in the addition of polynomials and hence in merging of zeros from other users. We, therefore, propose in this work multiuser schemes which utilize single-carrier FDMA techniques to separate K users on K distributed virtual subcarrier sets generated by the discrete Fourier transform (DFT) of the received baseband samples. This paves the way for MOCZ to utilize time and frequency resources in a more controllable and flexible manner.

2. LITERATURE REVIEW

The future generation of wireless networks faces a diversity of new challenges. Trends on the horizon – such as the emergence of the Internet of Things (IoT) and the tactile Internet – have radically changed our thinking about how to scale the wireless infrastructure. Among the main challenges new emerging technologies have to cope with is the support of a massive number (billions) of devices/machines ranging from powerful smartphones and tablet computers to small and low-cost sensor nodes. These devices come with diverse and even contradictory types of traffic including high-speed cellular links, machine-to-machine (M2M) connections, and wireless links which carrying data in short-packets. Such short messages of sporadic nature [1] will dominate the future communication and the conventional cellular and centrally managed wireless network infrastructure will not be flexible enough to keep pace with these demands. Although intensively discussed in the research community, the most fundamental question here on how we will communicate in the near future under such diverse requirements remains largely unresolved. A key problem is how to acquire, communicate, and process channel information. Conventional channel estimation procedures require a substantial amount of resources and overhead. This overhead can dominate the intended information exchange when the message is short and the traffic sporadic. Noncoherent and blind strategies, provide a potential way out of this dilemma. Classical approaches like blind equalization have been already investigated in the engineering literature [2]-[4], but new blind modulation ideas which explicitly account for the short-message and sporadic type of data are required [5]. In many wireless communication scenarios, the transmitted signals are affected by multipath propagation and the channel becomes frequency-selective if the delay spread exceeds the sample period. [6] Additionally, in mobile and time-varying scenarios one also encounters time-selective fast fading channels. In both cases, channel parameters typically have a random flavor and potentially cause various kinds of interference. From a signal processing perspective, it is therefore necessary to take care of possible signal distortions, at the receiver and potentially also at the transmitter. A well-known approach to deal with such channels is to modulate data on multiple parallel waveforms which are well-suited for the particular channel conditions. [7] One of the most simple and common approaches for frequency-selective channels is orthogonal frequency division multiplexing (OFDM). If the maximal channel delay spread is known, inter-symbol-interference (ISI) can be avoided by a suitable guard interval. Orthogonality of the subcarriers can be achieved by a cyclic prefix preventing inter-carrier-interference. On the other hand, multiple channel paths introduce diversity which should be beneficial from an information theoretical point of view. [8] To exploit diversity in a frequency-selective fading channel data has to be spread over subcarriers. But to coherently demodulate the data symbols at the receiver, the channel impulse response (CIR) has to be known at least at the receiver. To gain knowledge of the CIR, training data (pilots) have to be added to the information data (modulated on the samples) and will lead to a substantial overhead when the number of samples per signal is in the order of the channel taps.[9] If the number of samples is even less than the number of channel taps, it is mathematically impossible to accurately estimate from any pilot data the channel (assuming full support). Hence, one is either forced to increase the signal length by adding more pilots or assume some side-information on the channel. Furthermore, pilot density has to be adapted to mobility and, in particular, OFDM is very sensitive to time varying distortions. Dense CIR updates are therefore required

in mobile scenarios, which may result in complex transceiver designs. There are only a few works on noncoherent OFDM schemes in the literature. The classical approach is given by orthogonal signaling, as for example with pulse-position-modulation (PPM) [6] or special code division multiplexing approaches.

3. EXISTING SYSTEM

The future generation of wireless networks faces a diversity of new challenges. Trends on the horizon – such as the emergence of the Internet of Things (IoT) and the tactile Internet have radically changed our thinking about how to scale the wireless infrastructure. Among the main challenges new emerging technologies have to cope with is the support of a massive number (billions) of devices/machines ranging from powerful smartphones and tablet computers to small and low-cost sensor nodes. These devices come with diverse and even contradictory types of traffic including high-speed cellular links, machine-to-machine (M2M) connections, and wireless links which carrying data in short-packets. Such short messages of sporadic nature will dominate the future communication and the conventional cellular and centrally managed wireless network infrastructure will not be flexible enough to keep pace with these demands. Although intensively discussed in the research community, the most fundamental question here on how we will communicate in the near future under such diverse requirements remains largely unresolved. A key problem is how to acquire, communicate, and process channel information. Conventional channel estimation procedures require a substantial number of resources and overhead. This overhead can dominate the intended information exchange when the message is short and the traffic sporadic. Noncoherent and blind strategies, provide a potential way out of this dilemma. Classical approaches like blind equalization have been already investigated in the engineering literature, but new blind modulation ideas which explicitly account for the short- message and sporadic type of data are required. In many wireless communication scenarios, the transmitted signals are affected by multipath propagation and the channel becomes frequency-selective if the delay spread exceeds the sample period.

4. PROPOSED SYSTEM

Let us consider a frequency band $[f_c - W/2, f_c + W/2]$ with bandwidth $W > 0$ centered at a carrier frequency $f_c > W/2$. In a single-carrier (SC) modulation, a block of K consecutive complex-valued symbols s_n will modulate shifts $p_n(t) = p(t - nT_s)$ of a baseband pulse $p(t)$ of bandwidth W at a sampling which is then up-converted to the carrier-frequency f_c to form the real-valued transmitted passband signal.

$$s(t) = \sum_{n=0}^{N-1} s_n p_n(t),$$

If the convolution of transmitter and receiver pulse (filter) $q(t) = (p * g)(t)$ satisfy the Nyquist criterion, the noise-free received time-samples, in an ideal channel, $r(nT_s) = (s * q)(nT_s)$ will equal the symbols s_n , since $q(mT_s) = 0$ for any integer $m = 0$ and 1 for $m = 0$, see for example [8], [9]. Since a perfect band-limited pulse is not realizable, a time-limited square-root raised cosine (RRC) pulse can be taken as transmit and receive pulse. Using an M -ary modulation for each symbol, allows to encode $\log M$ bits per symbol and hence $N \log M$ bits per block. In a pure SC system, the information is encoded in each symbol independently. If we code the information over multiple symbols in a block, such as in (1), the signal duration will be at least $T > NT_s = N/W$, which is called a spread spectrum system. Note, that each sample occupies the same bandwidth W , hence MOCZ can be seen as a type of spread spectrum modulation.

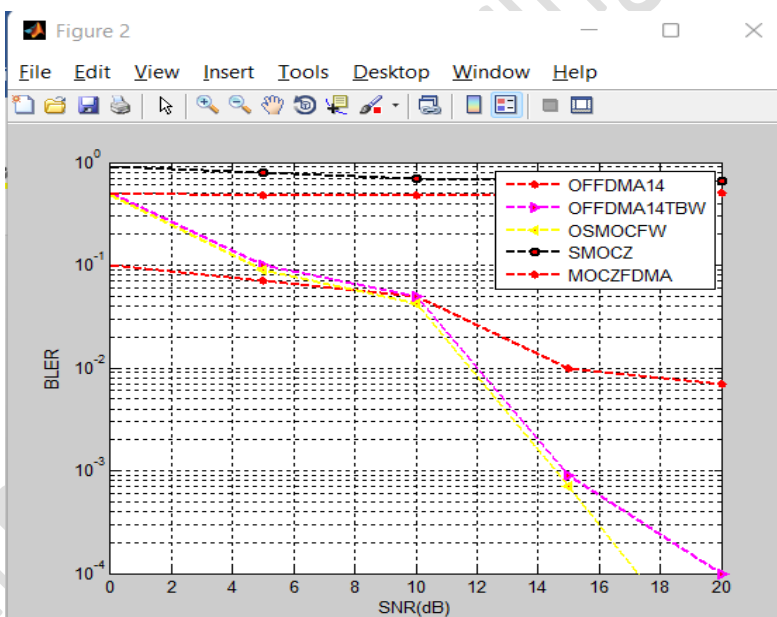
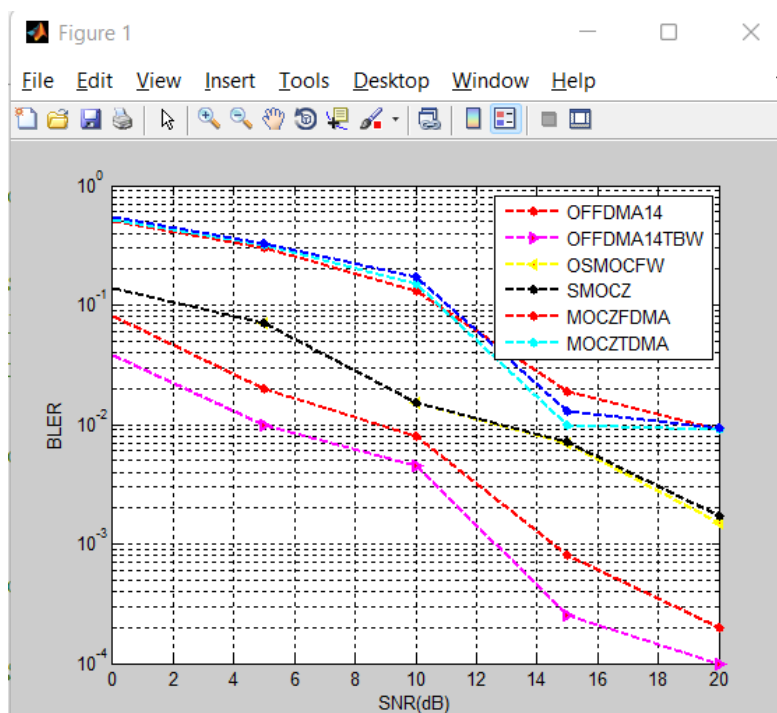


Fig. 2: BLER for EVA channel with maximal Doppler

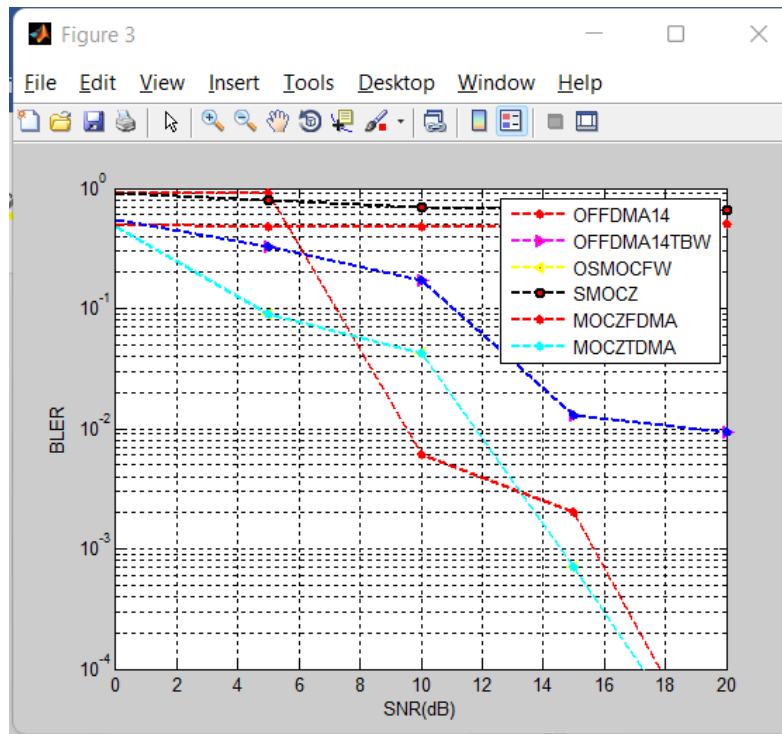


Fig-3 CDF of PAPR in DL for 6UE

5. CONCLUSION

We introduced TDMA and FDMA schemes for the novel non-coherent MOCZ scheme introduced in [6], [13] and compared with NB-IoT for 1MHz bandwidth in frequency selective fading channels. For static channels MOCZ-FDMA achieves similar performance as the standardized OFDMA in high SNR, whereas in time-variant channels with Doppler spreads of 300Hz, representing relative speeds of up to 162km/h at a carrier frequency of 2GHz, MOCZ-TDMA and FDMA are the superior multiple-access scheme and outperforms OFDMA. Hence, for high mobile scenarios, such as car-to-car/infrastructure communication or industry applications with fast-moving machines/robots, MOCZ can be a viable alternative. Moreover, the PAPR of MOCZ-TDMA is the lowest of all multiple-access DL scenarios. The 5G-NR and 6G standardization in the FR2 band (mm Wave) will allow the use of more than 400Mhz bandwidth, which would increase the number of users in our example from 6 to 2400 in only one single TTI. Given the increase of multipath resolution and Doppler at higher frequencies, robust and blind multi-user schemes like our proposed MU-MOCZ schemes, will prove to be even more superior in this regime. Moreover, the SC block transmission MOCZ will profit in a blind-fashion from the frequency diversity of wideband system without causing additional pilot overhead.

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Millimetre Wave MIMO-OFDM with Index Modulation: A Pareto Paradigm on Spectral-Energy Efficiency Trade-off

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ABSTRACT

Multiple-input multiple-output orthogonal frequency division multiplexing with index modulation (MIMO-OFDM-IM) has recently received increased attention, due to the potential advantage to balance the trade-off between spectral efficiency (SE) and energy efficiency (EE). In this paper, we investigate the application of MIMO-OFDM-IM to millimetre wave (mm Wave) communication systems, where a hybrid analog digital (HAD) beamforming architecture is employed. Taking advantage of the Pareto-optimal beam design, we propose a feasible solution to approximately achieve a globally Pareto-optimal trade-off between SE and EE, and the collision constraints of the multi-objective optimization problem (MOP) can be solved efficiently. Correspondingly, the MOP of SE-EE trade-off can be converted into a feasible solution for energy-efficient resource usage, by finding the Pareto-optimal set (POS) towards the Pareto front. This combinatorial-oriented resource allocation approach on the SE-EE relation considers the optimal beam design and power control strategies for downlink multi-user mm Wave transmission. To ease the system performance evaluation, we adopt the Poisson point process (PPP) to model the mobile data traffic, and the evolutionary algorithm is applied to speed up the search efficiency of the Pareto front. Compared with benchmarks, the experimental results collected from extensive simulations demonstrate that the proposed optimization approach is vastly superior to existing algorithms.

Index Terms—MIMO-OFDM, index modulation, spectral efficiency, energy efficiency, Pareto-optimal set, mm Wave communication.

1. INTRODUCTION

In recent years, large-scale wireless networks such as the Internet of things (IoT) and wireless drawback, especially for non-chargeable devices. In addition to a large amount of power consumption for transmission, RF chains also contain some of the most energy hungry components in a transmission system, e.g., digital-to-analog converters (DACs), amplifiers, and frequency synthesizers. These components substantially increase the circuit power dissipation of the BS. In this context, many studies discussed circuits design challenges in implementing energy efficient multi-antenna architectures [10]–[15]. Meanwhile, it has been demonstrated that the energy costs represent a significant portion of the total energy consumption of a network. Seriously, the radio network itself could be the most energy-consuming part, occupying ca. 80% of an operator's entire energy consumption. This results in major economic and technical challenges [16], [17]. Due to these facts, wireless operators resort to green wireless networks, where energy efficiency (EE) and SE are the main

performance metrics for reducing the prohibitive cost and energy consumption. Unfortunately, according to the Shannon-Hartley theorem, conflicts of objects are usually difficult to balance while optimizing both SE and EE simultaneously. For mm Wave MIMO systems with HAD beamforming, spectral- and energy-efficient system-level design is still an imminent challenge. It is mainly because the power consumption is very high owing to a large number of radiating elements, ultra-dense BS sites, and heavy data traffic load, etc [18]. It should be emphasized that a large number of the existing investigations on the general SE-EE relation have been comprehensively conducted. They provided good insights into the joint SE-EE trade-off for different scenarios, e.g., single/multiple cell deployment etc [18]–[22]. To jointly solve the multi-objective optimization problem (MOP) in the wideband regime, there have been some works focusing on energy efficient resource allocation/scheduling with guaranteed quality of service (QoS) [19], [23], and optimal resource allocation policy [19], [24], [25]. For example, a complete analysis of the SE and EE of two hybrid structures was provided in [13], [26]. The relationship between SE and EE with partially-connected HAD architecture was examined for optimal trade-off in [26]–[28]. The work in [27] proposed a successive interference cancellation (SIC)-based HAD beamforming for mm Wave MIMO systems. The authors of [29] formulated a decoupled two stage HAD design to maximize the SE and EE in a mm Wave massive MIMO system. In [30], Ribeiro et al. investigated the EE of quantized hybrid transmitters and proved that the topology of phase-shifting components can offer a better SE-EE trade-off. Similarly, the authors of [31] studied the trade-off between SE and EE in consideration of the impact of nonlinear power amplifiers. Furthermore, the extensive investigations in [32]–[34] showed that the configurable hybrid precoding and energy-efficient beam designs are capable of effectively improving the SE and EE, respectively. In an effort to relax the paradox in the SE-EE trade-off, an alternative way is to decompose the MOP into a number of subproblems and optimize them simultaneously. The prospective study on multi-objective signal processing, revealed some facts, such as the respective scalarized problems, the resource optimization and allocation, as well as algorithmic tools in related fields. The authors of [35] highlighted the fact that the multi-component Pareto-optimization will gradually become the norm. It differs from simply minimizing a single metric of the system, such as the bit error rate (BER), the power consumption or the complexity. In Di Renzo et al. derived an explicit analytical formulation of the SE-EE Pareto front to solve a bi-objective optimization problem, and proved that the Pareto front is constituted by a subset of the SE-EE trade-off. In brief, the use of Pareto property has recently emerged as an attractive solution, showing a connection of an allocation state of resources with Pareto-optimal transmission design. As a novel digital modulation scheme with high SE and EE, index modulation uses the indices of the building blocks of the communication system to implicitly convey additional information bits. These approaches thereby create completely new dimensions for data transmission. Inspired by the concept of subcarrier index modulation (SIM) in OFDM with index modulation (OFDM-IM) has been regarded as a possible candidate for next-generation wireless networks. More specifically, the extensions of OFDM-IM in various formats have been regarded as appealing modulation candidates for mm Wave communications and MIMO-OFDM systems. Among different IM schemes, MIMO-OFDM with index modulation (MIMO-OFDM-IM) provides a beneficial transmission paradigm. The study demonstrated that MIMO-OFDM-IM can offer significantly improved transmission rates for practical systems, as well as a better error performance than conventional

MIMO-OFDM. In the MIMO-OFDM-IM scheme, each parallel stream of information is modulated by both subcarrier indices and M-ary constellation symbols. Therefore, it has the potential to provide a flexible trade-off between SE and EE. For a typical MIMO-OFDM mm Wave system, it is worth noting that with the extremely increasing of bandwidth and frequency at mm Wave frequencies, the escalating energy consumption necessitates a high EE as well as a desirable SE. In this context, MIMO-OFDM-IM has the potential to satisfy the above requirements. Motivated by these facts, we propose an SE-EE maximization IM scheme for multi-user mm Wave MIMO-OFDM systems. Pareto-optimal beam design is taken into account with respect to the energy-efficient resource allocation in beam space. Because the total energy consumption of cellular system is dominated by the BS, we focus on the SE-EE trade off in downlink. The main contributions of this paper can be summarized as follows:

- We propose a MIMO-OFDM-IM scheme for HAD beamforming mm Wave systems, and a maximum likelihood (ML) detector is employed to decode the information bits from each subblock of MIMO-OFDM-IM. To the best of our knowledge, this is the first work that integrates the concept of IM into mm Wave MIMO-OFDM communication systems. Meanwhile, we investigate the energy efficient aspects on designing the HAD precoder and combiner. Interestingly, the proposed scheme integrating MIMO-OFDM-IM can improve the SE-EE and transmission reliability with low complexity. It has the potential to extend the coverage without capacity penalty. This, collaborating with the HAD beamforming architecture, allows more degrees of freedom to achieve realistic SE-EE maximization in mm Wave cellular networks.
- From the perspective of Pareto principle, we propose a Pareto-optimal beam design scheme for energy-efficient resource usage for downlink mm Wave transmissions. By the construction of the Pareto-optimal set (POS), we propose a feasible combinatorial-oriented power control strategy, i.e., resource reallocation scheme, to approximately achieve a Pareto-optimal trade-off between SE and EE. We give a fundamental guideline to tackle the MOP, where Pareto front is constituted by a subset of the SE-EE trade-off.
- In this new paradigm, our approach for solving the SE-EE trade-off is to convert the MOP into an evolutionary search process of POS. We show that there exists a globally optimal solution that maximizes EE, while still maintaining an increased SE. Moreover, we show that the combinatorial-oriented transmit power control strategy is effective to balance the total transmit power, and the globally optimal solution to the SE-EE maximization can be achieved.

To systematically evaluate the performance of multiuser networks, we introduce a Poisson point process (PPP) to model the spatial distribution of users, and the evolutionary algorithm is applied to speed up the search process for approaching the Pareto front asymptotically. The solving process of POSs associated with all users is abstracted as an evolutionary population-based MOP, which is potentially capable of applying to other multiuser communication systems.

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2. LITERATURE SURVEY

Mobile communication has been one of the most successful technology innovations in modern history. The combination of technology breakthroughs and attractive value proposition has made mobile communication an indispensable part of life for 5 billion people. Due to the increasing popularity of smart phones and other mobile data devices such as netbooks and eBook readers, mobile data traffic is experiencing unprecedented growth. Some predictions indicate that mobile data will grow at 108 percent compound annual growth rate (CAGR) [1] with over a thousandfold increase over the next 10 years. In order to meet this exponential growth, improvements in air interface capacity and allocation of new spectrum are of paramount importance. The current fourth-generation (4G) systems including LTE and Mobile WiMAX already use advanced technologies such as orthogonal frequency-division multiplexing (OFDM), multiple input multiple-output (MIMO), multi-user diversity, link adaptation, turbo code, and hybrid automatic repeat request (HARQ) in order to achieve spectral efficiencies close to theoretical limits in terms of bits per second per Hertz per cell [2]. With limited room for further spectral efficiency improvement, another possibility to increase capacity per geographic area is to deploy many smaller cells such as femtocells and heterogeneous networks. However, because capacity can only scale linearly with the number of cells, small cells alone will not be able to meet the capacity required to accommodate orders of magnitude increases in mobile data traffic. As the mobile data demand grows, the sub-3 GHz spectrum is becoming increasingly crowded. On the other hand, a vast amount of spectrum in the 3–300 GHz range remains underutilized. The 3–30 GHz spectrum is generally referred to as the super high frequency (SHF) band, while 30–300 GHz is referred to as the extremely high frequency (EHF) or millimetre-wave band. Since radio waves in the SHF and EHF bands share similar propagation characteristics, we refer to 3–300 GHz spectrum collectively as millimetre-wave bands with wavelengths ranging from 1 to 100 mm. Millimetre-wave communication systems that can achieve multigigabit data rates at a distance of up to a few kilometres already exist for point-to-point communication. However, the component electronics used in these systems, including power amplifiers, low noise amplifiers, mixers, and antennas, are too big in size and consume too much power to be applicable in mobile communication. The availability of the 60 GHz band as unlicensed spectrum has spurred interest in gigabit-per-second short-range wireless communication. Several industrial standards have been developed, such as Wireless HD technology, ECMA-387, IEEE 802.15.3c, and IEEE 802.11ad. Integrated circuit (IC)-based transceivers are also available for some of these technologies. Much of the engineering efforts have been invested in developing more power efficient 60 GHz RFICs [3]. Many of these technologies can be transferred to RFIC design for other millimetre-wave bands. In this article, we explore the 3–300 GHz spectrum and describe a millimetre-wave mobile broadband (MMB) system that utilizes this vast spectrum for mobile communication. We describe the millimetre-wave spectrum and its propagation characteristics. We then discuss the network architecture, followed by the air interface design of the MMB system. After that, we conclude the article with a summary and

brief discussion of future work. Millimeter wave (mm Wave) technology is one of the promising candidates for future generation wireless cellular communication systems to address the current challenge of bandwidth shortage [1]– [3]. The mm Wave signals experience severe path loss, penetration loss and rain fading as compared to signals in current cellular band (3G or LTE) [4]. However, the shorter wavelength at mm Wave frequencies also enables more antennas to be packed in the same physical dimension, which allows for large-scale spatial multiplexing and highly directional beamforming. This leads to the advent of large-scale or massive multiple-input multiple-output (MIMO) concept for mm Wave communications. Although the principles of the beamforming are the same regardless of carrier frequency, it is not practical to use conventional fully digital beamforming schemes [5]–[9] for large-scale antenna arrays. This is because the implementation of fully digital beamforming requires one dedicated radio frequency (RF) chain per antenna element, which is prohibitive from both cost and power consumption perspectives at mm Wave frequencies [10].

To address the difficulty of limited number of RF chains, this paper considers a two-stage hybrid beamforming architecture in which the beamformer is constructed by concatenation of a low-dimensional digital (baseband) beamformer and an RF (analog) beamformer implemented using phase shifters. In the first part of this paper, we show that the number of RF chains in the hybrid beamforming architecture only needs to scale as twice the total number of data streams for it to achieve the exact same performance as that of any fully digital beamforming scheme regardless of the number of antenna elements in the system. The second part of this paper considers the hybrid beamforming design problem when the number of RF chains is less than twice the number of data streams for two specific scenarios:

- The point-to-point multiple-input multiple-output (MIMO) communication scenario with large-scale antenna arrays at both ends;
- The downlink multi-user multiple-input single-output (MU-MISO) communication scenario with large-scale antenna array at the base station (BS), but single antenna at each user. For both scenarios, we propose heuristic algorithms to design the hybrid beamformers for the problem of overall spectral efficiency maximization under total power constraint at the transmitter, assuming perfect and instantaneous channel state information (CSI) at the BS and all user terminals.

The numerical results suggest that hybrid beamforming can achieve spectral efficiency close to that of the fully digital solution with the number of RF chains approximately equal to the number of data streams. Finally, we present a modification of the proposed algorithms for the more practical scenario in which only finite resolution phase shifters are available to construct the RF beamformers. It should be emphasized that the availability of perfect CSI is an idealistic assumption which rarely occurs in practice, especially for systems implementing large-scale antenna arrays. However, the algorithms proposed in the paper are still useful as a reference point for studying the performance of hybrid beamforming architecture in comparison with fully digital beamforming. Moreover, for imperfect CSI scenario, one way to design the hybrid beamformers is to first design the RF beamformers assuming perfect CSI, and then to design the digital beamformers employing robust beamforming techniques [11]– [15] to deal with imperfect CSI. It is therefore still of interest to study the RF beamformer design problem in

perfect CSI. To address the challenge of limited number of RF chains, different architectures are studied extensively in the literature. Analog or RF beamforming schemes implemented using analog circuitry are introduced in [16]–[19]. They typically use analog phase shifters, which impose a constant modulus constraint on the elements of the beamformer.

3. PROPOSED SYSTEM

The transceiver block diagram of MIMO-OFDM-IM for the multi-user mm Wave system is illustrated in Fig. 1, where the conventional configuration of HAD beamforming architecture is adopted. In this paper, we focus on the downlink multiuser transmission and consider a single cell MIMO-OFDM network. A BS with N_t transmit antennas and M_t RF chains serves K active users, each of them using N_r, k receives antennas and M_r, k RF chains, where $k \in \{1, \dots, K\}$. For any user k , we assume that the BS transmits $J_k \leq N_r, k$ data streams with M_t, k RF chains and N_t, k transmit antennas ($\forall k=1 J_k \leq M_t \leq N_t$). The HAD beamforming architecture of BS is constructed by the concatenation of a digital precoder associated with the n th subcarrier.

For such a system incorporating the OFDM-IM transceiver, a total of T_k, J_k incoming bits from the input alphabet are first split into J_k parallel streams. Each T_k -bit stream to the digital precoder $U_{n,k}$ is pre-processed in each branch of the transmitter by the OFDM-IM modulator. Afterwards, the BS applies the baseband digital precoder U_k to modify the obtained OFDM-IM data blocks. Typically, the inverse fast Fourier transform (IFFT) is applied to derive a time-domain signal, and the cyclic prefix (CP) is appended to prevent the OFDM symbol from inter-symbol interference. At the receiver, the mobile station (MS) performs an FFT of the time-domain received signal and removes the CP. At the end, MS applies the digital combiner $V_{n,k}$, and the received signal can be separated and demodulated by the ML or minimum mean square error (MMSE) detector. In our work, the effect of CP on SE and EE could be regarded as a stable impact factor, since the length of CP is conservatively chosen and fixed in most current standards. Within the OFDM-IM modulator, the incoming T_k -bit stream is equally divided into G groups, in which $p = T_k / G$ bits for each group are split into two subgroups, i.e., the index selection and M-ary modulation subgroups. For a feasible frequency bandwidth B_T with total OFDM subcarriers, we assume that N consecutive OFDM subcarriers are assigned for each given subblock g .

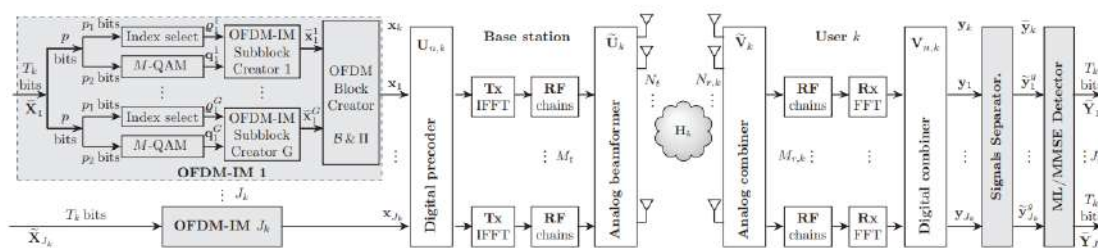


Fig 3.1: Block diagram of the mm Wave MIMO-OFDM-IM

For each subblock g , considering the number of active subcarriers $N_{a,k}$, the corresponding index selection subgroup contains $p_1 = \log_2 C(N, N_{a,k})$ bits for determining the indices of the active subcarriers, where $g \in \{1, \dots, G\}$; The M-ary modulation subgroup contains the remaining $p_2 = N_{a,k} \log_2 M$ bits, which are mapped onto a predefined M-array quadrature

amplitude modulation (M-QAM) signal constellation S to obtain the first-stage modulation subblock from the OFDM-IM subblock creator. For simplicity, we denote N_k as the index pattern of user k .

In practice, the total energy consumption of a cellular system, consisting of both circuit power consumption and transmit power consumption, is dominated by the BS. Generally, the power consumption model at the BS consists of static and dynamic power consumption. The static power consumption model is constructed by the power consumption of all power amplifiers. The transmit power (dynamic) contains all the other circuit power. In this paper, we adopt a linear power consumption model proposed by:

$$P_{\text{sys},k} = P_{t,k} + J_k P_{\text{RF},k} + P_{c,k} + N_{t,k} P_{\text{shift}},$$

It is worth to note that an exact computation of the dissipated power is a very difficult task [28]. Therefore, our work focuses on a generalized power consumption model, whose energy consumption can have a direct impact on energy-efficient optimal beam design.

$$\text{SINR}_{\text{sys}} = \sum_{k=1}^K \omega_k \text{SINR}_k.$$

To guarantee the fairness among users in the multiuser network, the max-min SINR problem is considered, which deals with the sum-rate maximization problem and guarantees the best performance of receivers. It is worth highlighting that the theoretical and algorithmic connection between maximizing the weighted sum rate and the max-min SINR problem was revealed in. Leveraging on this fact, the joint optimization of SE-EE maximization is equivalent to the max-min SINR power control. This transformed problem has already been constructed and the interested readers can refer to a detailed proof in the aforementioned literature. Typically, the max-min SINR problem satisfying the overall transmit power constraint can be formulated as

$$\text{s.t.} \quad P_{t,k} \leq P_{t,k}^{\max}, \quad \forall k, \quad K \leq \sum_{k=1}^K J_k \leq M_t,$$

where $P_{t,k}^{\max}$ is the maximum downlink transmission power of user k . It should be noted that only considers a single-user case, which represents a locally optimal solution, only with respect to feasible solutions close to that point. To find the globally optimal solution, a global coordination is naturally required for every feasible solution of whole users. Equivalently, since each global maximum is also

$$\zeta_k = J_k \left[\mathbb{E} \left(\frac{N_{A,k}}{N} \right) \log_2 \det(\mathbf{I}_{J_k} + \mathbf{W}_{n,k} \mathbf{\Lambda}_{n,k}^{-1} \mathbf{W}_{n,k}^H \mathbf{H}_k \mathbf{F}_{n,k}^H \mathbf{F}_{n,k} \mathbf{H}_k^H) + \frac{1}{N} \log_2 C(N, N_{A,k}) \right],$$

A local maximum, we can determine the overall optimization problem by maximizing the minimum weighted sum of SINR. The objective function in terms of EE is defined as the system capacity (bits/s) divided by the total power consumption. The EE (bits/J) of user k is then defined as

$$\begin{aligned} \max_{\{\mathbf{F}_k, \mathbf{W}_k\}_{k=1}^K} \quad & \eta_k = \frac{B_{T_k} \cdot \zeta_k}{\sum_{n=1}^N \|\mathbf{F}_{n,k}\|^2 + J_k P_{\text{RF},k} + P_{c,k} + N_{t,k} P_{\text{shift}}} \\ \text{s.t.} \quad & \sum_{n=1}^N \|\mathbf{F}_{n,k}\|^2 \leq P_{t,k}^{\max}. \end{aligned}$$

In the following, our goal is to concurrently optimize the SE and EE under the individual SINR constraints. It inevitably brings about conflicts of interest among objective functions and needs a trade-off. According to the classical SE-EE trade-off paradigm, the objective function can be rewritten a

$$\eta_{\text{total}} = \frac{B_T \cdot \zeta_{\text{total}}}{\log_2(\sum_{k=1}^K P_{\text{sys},k})}.$$

4. NUMERICAL RESULTS

Simulation settings:

In the considered simulation scenario, a cellular mm Wave network with the HAD architecture is considered. The azimuth angles are assumed to be uniformly distributed over $[0; \pi]$, and the AoA/AoD elevation angles are uniformly distributed over $[-\pi/2; \pi/2]$. As shown in Section IV-A, the users are independent and uniformly distributed abiding a spatial PPP.

Parameters	Value	Parameters	Value
Carrier frequency	28 GHz	K	8
Bandwidth	200 MHz	Maximum J_k at BS/MS	16/4
Number of subcarriers	32	N_t	256
Symbol duration	3.7 μ s	$N_{r,k}$ with per-user	16
Cell radius	200 m	$P_{k,t}^{\max}$	38 dBm
Modulation	QPSK	$P_{\text{RF},k}$	250 mW [6]
Number of channel paths	4	$P_{c,k}$	200 mW
Receiver Noise	-174 dBm/Hz	P_{shift}	88 mW [28]

TABLE I: System configuration and simulation setting parameters

The population then evolves toward nearby globally optimal SE-EE trade-off, i.e., sorting the best non-dominated solution $\{X_{\text{POS}k}\}_{k=1}^K$, through subsequent iterations, called generations. Finding the optimal solution to toward the Pareto front involves three key steps for the decision-making process. Correspondingly, the user own expected throughput is independently characterized by the PPP intensity λ . To simulate strong users and weak users, the desirable users are chosen from 100 user samples, which are all generated by an independent two-dimensional homogeneous PPP. The performance evaluation is carried out through Monte Carlo simulations, and each result is the average of 100 independent realizations. Finally, the convergence behaviour of the proposed POS searching algorithm is investigated. Table 1 summarizes the simulation parameters and the experimental setup

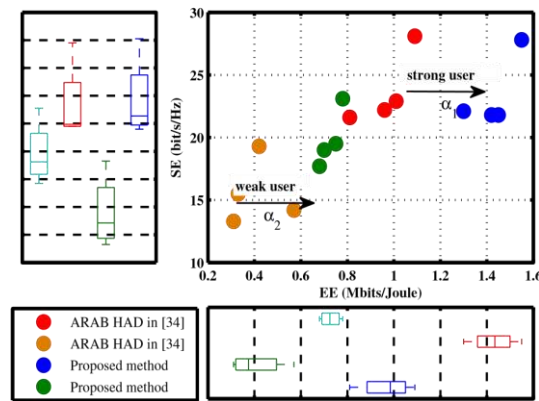
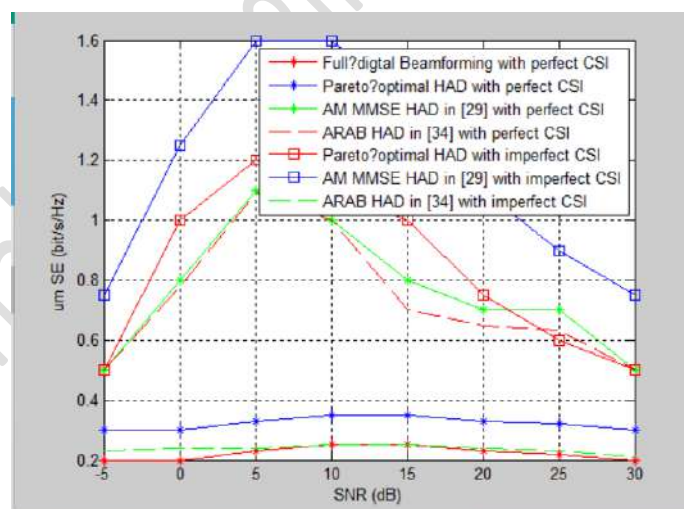
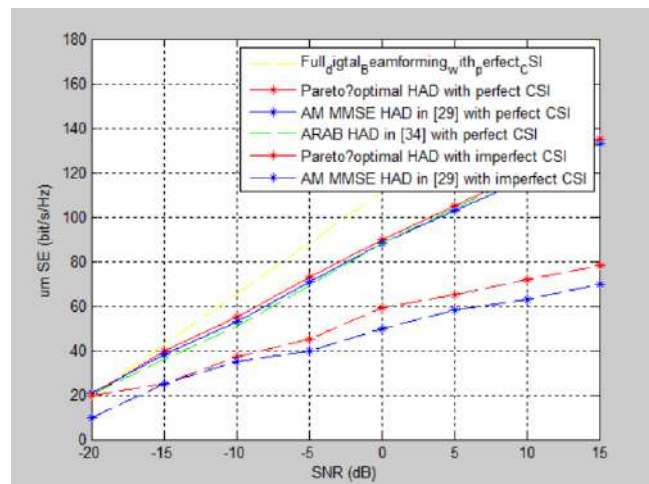


Fig 1: Globally Optimal Trade Off



5. CONCLUSION

An energy-efficient mm Wave MIMO-OFDM-IM system with the HAD beamforming architecture was proposed and investigated. We provided the optimal solution that allows a higher degree of freedom to achieve realistic SE-EE maximization in mm Wave cellular networks. We have given a baseline design to solve the SE-EE trade-off for mm Wave MIMO-OFDM-IM systems. The key finding of this study is that the use of Pareto-optimal beam design can achieve a globally optimal trade-off between SE and EE, and the collision constraints of

MOP can be efficiently released. Also, the flexible power reallocation scheme can significantly extend the coverage for the cell-edge users. It is expected that the density of the BS may have a more significant impact on the network SE and/or spatial SE, as well as EE scales with the user density. In future work, we will consider a wide range of conditions as well as the equivalent form of the SE-EE trade-off, such as combining some fundamental results from random matrix theory

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Lung Cancer Detection and Classification Using Deep CNN

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Abstract:

Lung cancer is one of the most killer diseases in the developing countries and the detection of the cancer at the early stage is a challenge. Analysis and cure of lung malignancy have been one of the greatest difficulties faced by humans over the most recent couple of decades. Early identification of tumor would facilitate in sparing a huge number of lives over the globe consistently. This project presents an approach which utilizes a Convolutional Neural Network (CNN) to classify the tumors found in lung as malignant or benign. The accuracy obtained by means of CNN is 96%, which is more efficient when compared to accuracy obtained by the traditional neural network systems.

Key Words: Lung cancer, Computed Tomography, Chest CT image, Neural Network, Deep Learning, Convolutional Neural Network.

1. Introduction

Lung cancer is one of the most dreadful diseases in the developing countries and its mortality rate is 19.4% [1]. Early detection of lung tumor is done by using many imaging techniques such as Computed Tomography (CT), Sputum Cytology, Chest X-ray and Magnetic Resonance Imaging (MRI). Detection means classifying tumor into two classes (i) Non-cancerous tumor (Benign) and (ii) Cancerous tumor (Malignant) [2]. The chance of survival at the advanced stage is less when compared to the treatment and lifestyle to survive cancer therapy when diagnosed at the early stage of the cancer. Manual analysis and diagnosis system can be greatly improved with the implementation of image processing techniques. A number of researches on the image processing techniques to detect the early-stage cancer detection are available in the literature. But the hit ratio of early-stage detection of cancer is not greatly improved. With the advancement in the machine learning techniques, the early diagnosis of the cancer is attempted by lot of researchers. Neural network plays a key role in the recognition of the cancer cells among the normal tissues, which in turn provides an effective tool for building an assistive AI based cancer detection. The cancer treatment will be effective only when the tumor cells are accurately separated from the normal cells. Classification of the tumor cells and training of the neural network forms the basis for the machine learning based cancer diagnosis [3]. A Convolutional Neural Network (CNN) based technique to classify the lung tumors as malignant or benign.

Computer-Aided Diagnosis (CAD) has become a complementary and promising tool, to helping radiologists and physicians detect diseases accurately [1]. There are various ways that used to Lung cancer detection such as image processing, pattern recognition, and Artificial Neural Network (ANN) to implement the Computer-Aided Diagnosis (CAD). A lung nodule shows a range of abnormalities in lung tissue considered as small, round opacity, roughly spherical, restricted on abnormal lung tissue. To detect lung nodules from lung tissue

radiologists, use chest Computed Tomography (CT) scans imaging modality. Recently, deep learning has attracted much attention in many fields, such as image recognition and biomedical image analysis. Convolutional Neural Network (CNN) is an algorithm that most used and popular model in various research fields. CNN has been successfully applied to various research areas and has achieved state-of-the-art performance in video classification, natural language processing, image recognition and classification [2]. But there is still room for improvement on performance. We believe that enhancing the invariance of image features is a way to improve performance. We have used a convolutional neural network for classification due to the popularity of image and video classification, natural language processing and pattern recognition, etc. A Convolutional neural network can extract and detect importance features from a given data automatically without any expert control. It has a special convolutional and pooling layer that perform parameter sharing operations. This parameter sharing operation makes the convolutional neural network most popular Algorithms. As compared as fully connected ANN, weight sharing in Convolutional Neural Network (CNN) facilitating in learning a feature regardless of its position in the image, along with having the added advantage of reduced computations. After convolution operation the Pooling operation is performed, this pooling operation is used to reduce the dimension and number of parameters used in our model. This makes training time shorten and reduce overfitting.

The pooling layer operation consists of max pooling and means pooling. Mean pooling calculates the average neighborhood within the feature points, and max pooling calculates the neighborhood within a maximum of feature points. The fully connected layers used for classification of the given patient medical CT scan images, whether the patient has cancer or not. And the final layer is dropout layer this layer is mainly used to reduce the overfitting problems. We proposed a 3-dimensional Convolutional neural network that helps to detect the small nodules in the CT scan data and classify whether the patient has cancer or not. If we use the 2D image the important and valuable information about the nodule may be missed out. 3D-CNN model projects feature map onto a 3D map via a 3D filter [3]. The 3D filter produces 3D images with different color channels. In 3D-CNN, 3-Dimensional input images are used. Then several hidden layers comprised of Convolution Layer, Max pooling Layer, fully connected Layers generates different images with different sizes, which are used for learning. Convolution layer is used to extract features from a given image by producing feature maps by applying convolution operation on different sub-region of the image with a learned filter/ kernel. We have used two different datasets (Kaggle data science Bowel 2017 and Lung nodule analysis 2016), that is a help to increase the performance of training of our model. In this project, we are preprocessed and segmented the nodules from a given dataset that will help the future thesis works and our model evaluated by using the accuracy metrics. Hence our lung cancer detection system pipeline consists of preprocessing, lung segmentation, candidate nodule segmentation, nodule detection, and classification.

2. Literature review

As we reviewed, many lungs cancer detection system and diagnosis system have been proposed to the help of radiologist and clinician to detect and classify the disease with the

better result by using different approaches of image processing, machine learning, and deep learning. But the deep learning techniques are the current state-of-art methods for lung cancer detection system. We summarize these systems based on the methods they adopt.

Machine learning is studying methods that give computers the ability to solve problems by learning from experiences. The goal is to create mathematical models that can be trained to produce useful outputs when fed input data. Machine learning models are provided experiences in the form of training data and are tuned to produce accurate predictions for the training data by an optimization algorithm [7]. In recent years Machine learning techniques have played an important role in the medical field like medical image processing, computer-aided diagnosis, image interpretation, image registration, image segmentation, image retrieval, and analysis. These techniques composed of conventional algorithms without learning like Support Vector Machine (SVM), Neural Network (NN), and KNN, etc. Suren Makajua et al. [8] proposed a model that detect the cancerous nodule form CT scan image by using watershed segmentation for detection. In this proposed system Gaussian filter method is implemented in the pre-processing stages and using SVM for classification of the nodule as Malignant or benign. Qing. W et al. [9] proposed a system that detects small cell lung cancer (SCLC) form computed tomography (CT) scan images. The system proposed a novel Neural-Network Based algorithm, refers to an entropy degradation method (EDM) and use the vectorized histogram as training inputs. Machine learning algorithms are limited in processing the natural images in their raw form, time-consuming, based on expert knowledge and requires a lot of time for tuning the features. Due to this limitation machine learning is overwhelming by deep learning techniques. Deep learning is fed with raw data, automatic features learner and fast. These algorithms try to learn multiple levels of abstraction, representation, and information automatically from a large set of images that exhibit the desired behavior of data. Deep learning-based algorithms showed promising performance as well as speed in different domains like speech recognition, text recognition, lips reading, computer-aided diagnosis, face recognition, drug discovery. Now a days deep learning algorithm has got great interest in each and every field and especially in medical image analysis due to the representation of multiple levels of abstraction and extraction of features from large dataset automatically. Winona et al. [10] proposed an Automatic Lung Cancer Detection and Diagnosis Using Handcrafted and Deep Learning Features. The system uses both handcrafted features such as the suspected nodule location, radius of the nodule, spectral signatures, taxonomic diversity and distinctness, and deep learning features were obtained with Inception-v3, a pre-trained network trained on ImageNet, which is currently the state-of-the art Convolutional Neural Network (CNN) architecture. This system was trying to compare the results based on their features including handcrafted features (Bag of frequencies and taxonomic indices), deep learning features and use both of them by concatenating. The result shows the promising results but it needs a room of improvement for both handcrafted features. The Combined results were obtained by concatenating the feature vectors (handcrafted and deep learning), but the extreme disparity in size led to lower accuracy than expected.

4. Proposed system

Lung cancer detection based on chest CT images using CNN. In the first stage, lung regions are extracted from CT image and in that region each slice are segmented to get tumors. The segmented tumor regions are used to train CNN architecture. Then, CNN is used to test the patient images. The main objective of this study is to detect whether the tumor present in a patient's lung is malignant or benign. Figure 6.1 shows the block diagram of the proposed system. As shown in the figure, the trained system will able to detect the cancerous presence in lung CT image.

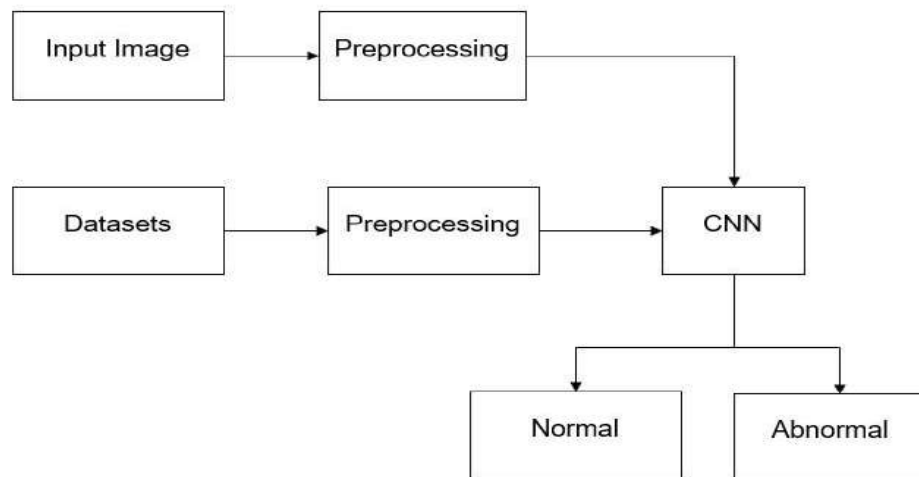


Figure 1. Block diagram of Proposed System

Dataset: Dataset for training is obtained from Lung Image Database Consortium (LIDC) and Image Database Resource Initiative (IDRI). LIDC and IDRI consist of 1000 CT scans of both large and small tumours saved in Digital Imaging and Communications in Medicine (DICOM) format [5]

Preprocessing: In preprocessing stage, the median filter is used to restore the image under test by minimizing the effects of the degradations during acquisition. Various preprocessing and segmentation techniques of lung nodules are discussed in [6]. The median filter simply replaces each pixel value with the median value of its neighbors including itself. Hence, the pixel values which are very different from their neighbors will be eliminated weights in the convolutional layer reducing the memory footprint and increases the performance of the network.

CNN: The important features of CNN lie with the 3D volumes of neurons, local connectivity and shared weights. A feature map is produced by convolution layer through convolution of different sub regions of the input image with a learned kernel. Then, anon-linear activation function is applied through ReLU layer to improve the convergence properties when the error is low. In pooling layer, a region of the image/feature map is chosen and the pixel with maximum value among them or average values is chosen as the representative pixel so that a 2x2 or 3x3 grid will be reduced to a single scalar value. This results a large reduction in the sample size. Sometimes, traditional Fully-Connected (FC) layer will be used in conjunction with the convolutional layers towards the output stage. In CNN architecture, usually convolution layer and pool layer are used in some combination. The pooling layer usually

carries out two types of operations viz. max pooling and means pooling. In mean pooling, the average neighborhood is calculated within the feature points and in max pooling it is calculated within a maximum of feature points. Mean pooling reduces the error caused by the neighborhood size limitation and retains background information. Max pooling reduces the convolution layer parameter estimated error caused by the mean deviation and hence retains more texture information. Figure 2 shows the architecture of CNN.

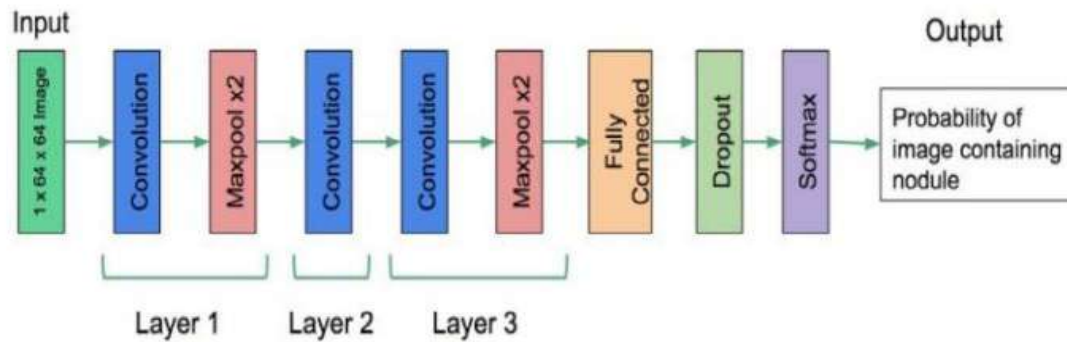


Figure 2. Architecture of DEEP CNN

The input to a convolutional layer is an image of size $m \times m \times r$, where r is the number of channels. There are k filter kernels of size $n \times n \times q$ where $n < m$, $q \leq r$ and may vary for each kernel in convolutional layer, which are convolved with the input image to produce k feature maps. Each map is then subsampled with mean or max pooling over $p \times p$ contiguous regions (p – ranges from 2 to 5) and an additive bias and sigmoidal nonlinearity is applied before or after the subsampling layer. The figure shows the layer of a CNN.

Training: Back-propagation algorithm is used to train the Deep CNN to detect lung tumors in CT image of size $5 \times 20 \times 20$. It consists of two phases. In the first phase, a CNN consists of multiple volumetric convolution, rectified linear units (ReLU) and max pooling layers is used to extract valuable volumetric features from input data. The second phase is the classifier. It has multiple FC and threshold layers, followed by a SoftMax layer to perform the high-level reasoning of the neural network. No scaling was applied to the CT images of the dataset to preserve the original values of the DICOM images as much as possible. During training, the random sub-volumes extracted from the CT images of the training set and are normalized according to an estimate of the normal distribution of the voxel values in the dataset.

4. Results and discussion

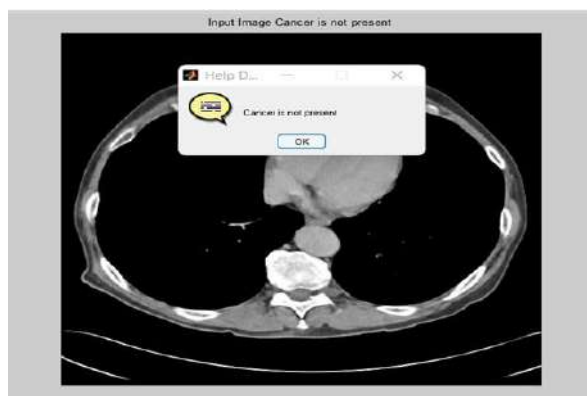


Figure 3. CT scan of lungs having no cancer

Figure 3 shows a computed tomography of lungs having no cancerous tumour present. By comparing with the datasets in the CNN network, the output obtained is non-cancerous, as we did not find any tumor part in the lungs.

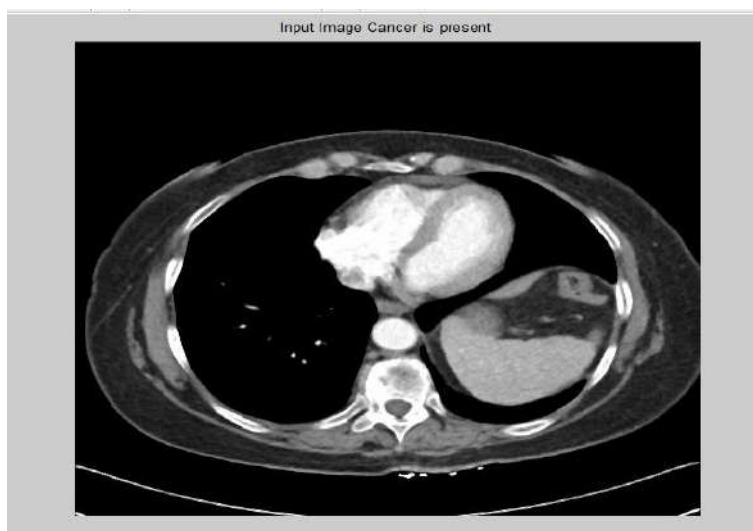


Figure 4. CT scan of lungs having cancerous tumour

Figure 4 shows a computed tomography of lungs having cancerous tumor inside lungs. By comparing with the datasets in the CNN network, the output obtained is cancerous, as we found tumour part in the right lung.

5. Conclusion

A convolutional neural network-based system was implemented to detect the malignancy tissues present in the input lung CT image. Lung image with different shape, size of the cancerous tissues has been fed at the input for training the system. The proposed system is able to detect the presence and absence of cancerous cells with accuracy of about 96%. The accuracy of Lung cancer detection with the proposed convolutional neural network-based method was compared with that obtained by previous works. In addition to deep convolutional network, the same dataset was classified by multilayer perceptron network Backpropagation algorithm with using GLCM features. The results show only 93% accuracy. In this proposed work, the specificity obtained is 100% which shows that there is no false positive detection. Also, the accuracy, sensitivity and specificity of the proposed system is

high when compared to previously available conventional neural network-based systems. In the near future, the system will be trained with large datasets to diagnose the type of cancer with its size and shape. The overall accuracy of the system can be improved using 3D Convolutional Neural Network and also by improving the hidden neurons with deep network.

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Approximate Multiplier Design Using Novel Dual Stage 4:2 Compressor

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ABSTRACT

High speed multimedia applications have paved way for a whole new area in high-speed error-tolerant circuits with approximate computing. These applications deliver high performance at the cost of reduction in accuracy. Furthermore, such implementations reduce the complexity of the system architecture, delay and power consumption. This model explores and proposes the design and analysis of two approximate compressors with reduced area, delay and power with comparable accuracy when compared with the existing architectures. The proposed approximate 4:2 compressor reduced in area, and reduction in delay. The proposed compressors are utilized to 16×16 Dadda multipliers. These multipliers have comparable accuracy when compared with state-of-the-art approximate multipliers.

1. INTRODUCTION

Numerous advanced applications require power proficiency. Also, these applications are implanted and additionally battery worked. Instances of such applications are Internet of Things (IoT) gadgets. These applications, for example, picture preparing, detecting, acknowledgment, and AI, are inalienably blunder lenient. Because of the way that exact outcomes are not generally needed, almost precise results typically get the job done. In this way, rough figuring [1] is one of the promising procedures for such applications to fulfill the need of low force utilization. Utilizing this method, force can be exchanged for exactness.

MULTIPLICATION

Multiplication is an essentially fundamental activity in applications, for example, the ones presented previously. In this way, lessening the expense of duplication benefits the previously mentioned class of utilizations. This venture centers around a rough multiplier. While a few inexact multipliers have been actualized [1, 2, 3, 4, 5], the scope of such applications is restricted in light of the fact that the greater part of the earlier works need exactness adaptability [2, 3]. Thus, dynamic configurability is essential, particularly for the accompanying two reasons.

Multipliers assume a significant part in the present computerized signal preparing and different applications. With progresses in innovation, numerous scientists have attempted and are attempting to plan multipliers which offer both of the accompanying plan targets – fast, low force utilization, consistency of format and henceforth less territory or even mix of them in one multiplier in this way making them reasonable for different high velocity, low force and reduced VLSI execution.

The regular augmentation technique is "add and move" calculation. In equal multipliers number of incomplete items to be added is the principle boundary that decides the exhibition of the multiplier. To diminish the quantity of fractional items to be added, Modified Booth calculation is perhaps the most famous calculations. To accomplish speed enhancements Wallace Tree calculation can be utilized to diminish the quantity of successive adding stages. Further by joining both Modified Booth calculation and Wallace Tree strategy we can see benefit of the two calculations in a single multiplier. Anyway with expanding parallelism, the measure of movements between the halfway items and moderate

entireties to be added will build which may bring about decreased speed, increment in silicon zone because of inconsistency of design and furthermore expanded force utilization because of expansion in interconnect coming about because of complex directing. Then again "sequential equal" multipliers bargain speed to accomplish better execution for territory and force utilization. The determination of an equal or chronic multiplier really relies upon the idea of use. In this talk we present the duplication calculations and design and analyze them as far as speed, territory, force and blend of these measurements.

2. LITERATURE SURVREY

A transistor level XOR-XNOR based low power design for 4 : 2 compressor was proposed by [1]. which is ideal for tree structured fast multipliers. Chang et al. have proposed a 4 : 2 and a novel 5 : 2 compressor that operates on low supply voltage of 0.6 V. [2] have proposed logic level approximation based architectures for 4 : 2 approximate compressor that are optimised for delay and power consumption. A re-configurable architecture for a 4 : 2 approximate compressor is proposed by [18], where the re-configurability is achieved by switching between approximate and accurate operations when required. [19] have proposed a 4: 2 approximate compressor that reduces the error profile of the compressor by introducing a module for error recovery. While performing the multiplication operation, truncation of n^2 columns (starting from right in the complete partial product array) is carried out. Compressors are applied only to the remaining columns. A probability driven approximate compressor is presented by Guo et al. The authors have proposed a top-down structure for an approximate multiplier which dynamically allocates between the 8 : 2, 6 : 2 and 4 : 2 approximate compressors based on the partial product count. As a measure to increase the accuracy of the multiplier, a grouped error recovery scheme is also proposed. [5] have presented an approximate adder based heterogeneous approximate multiplier with reduced MED. This is achieved by utilising the genetic algorithm based approximate adders. Esposito et al. have proposed an XOR-less (AND-OR based) compressor to minimise the average error and error probability. Chang et al. have proposed a 4 : 2 compressor to improve energy quality efficiency in image processing with 25% error rate. Gorantla and Deepa have proposed 4 : 2 and 5 : 2 compressors to reduce delay and power. Reddy et al. have proposed a novel design for 4 : 2 compressor with an error rate of 12.5%. This is achieved by relaxing the constraints on area, delay and power. Due to the considerable reduction in delay using transmission gates when compared to traditional CMOS based logic, optimised design with transmission gates are explored in literature. But, the major disadvantage is the inconsistency in the rise and fall times for different inputs. In this paper, two novel 4 : 2 compressor architectures are presented.

A. Momeni, J. Han, P. Montuschi, and F. Lombardi, "Design and Analysis of Approximate Compressors for Multiplication", Inexact (or approximate) computing is an appealing paradigm

For virtual processing at nanometric scales. Inexact computing is mainly thrilling for laptop mathematics designs. This paper offers with the analysis and design of two new approximate 4-2 compressors for utilization in a multiplier. These designs rely on distinctive functions of compression, such that imprecision in computation (as measured by means of the error charge and the so-known as normalized blunders distance) can meet with appreciate to circuit-based figures of merit of a layout (wide variety of transistors, postpone and power consumption). Four specific schemes for making use of the proposed approximate compressors are proposed and analyzed for a Dadda multiplier. Extensive simulation results are provided and an application of the approximate multipliers to photograph processing is offered. The results display that the proposed designs accomplish large discounts in electricity dissipation, put off and transistor count number in comparison to an precise layout; furthermore, two of the proposed multiplier designs provide exceptional talents for image multiplication with admire to common normalized mistakes distance⁴⁹ and top sign-tonoise ratio (more than 50 dB for

the taken into consideration photo examples).

C. Liu, J. Han, and F. Lombardi, "A Low-Power, High-Performance Approximate Multiplier with Configurable Partial Error Recovery", Proc. Of IEEE Design, Automation & Test in Europe Conference & Exhibition (DATE), [Approximate circuits were considered for errors-tolerant packages which could tolerate some loss of accuracy with improved performance and power performance. Multipliers are key mathematics circuits in many such programs consisting of digital signal processing (DSP). In this paper, a novel approximate multiplier with a decrease electricity intake and a shorter essential direction than traditional multipliers is proposed for high-overall performance DSP packages. This multiplier leverages a newly-designed approximate adder that limits its carry propagation to the closest pals for immediate partial product accumulation. Different ranges of accuracy may be performed thru a configurable errors restoration by way of the use of distinctive numbers of maximum massive bits (MSBs) for errors discount. The approximate multiplier has a low suggest error distance, i.E., most of the errors are not vast in magnitude. Compared to the Wallace multiplier, a 16-bit approximate multiplier implemented in a 28nm CMOS manner suggests a reduction in postpone and power of 20% and up to 69%, respectively. It is proven that with the aid of utilising the suitable mistakes recuperation, the proposed approximate multiplier achieves similar processing accuracy as traditional genuine multipliers however with enormous improvements in electricity and performance.

3. PROPOSED METHOD

APPROXIMATE MULTIPLIER DESIGN USING NOVEL DUAL-STAGE 4: 2 COMPRESSORS:

Approximate multipliers are widely being advocated for energy-efficient computing in applications that exhibit an inherent tolerance to inaccuracy. However, the inclusion of accuracy as a key design parameter, besides the performance, area and power, makes the identification of the most suitable approximate multiplier quite challenging. In this paper, we identify three major decision making factors for the selection of an approximate multipliers circuit: (1) the type of approximate area efficient compressor and dual quality compressor used to construct the multiplier, the architecture, i.e., array or tree, of the multiplier and the placement of sub-modules of approximate and exact multipliers in the main multiplier module. Based on these factors, we explored the design space for circuit level implementations of approximate multipliers. We used circuit level implementations of some of the most widely used compressors.

EXACT 4:2 COMPRESSOR

The general block diagram of an exact 4 : 2 compressor is shown in Figure 1. It comprises of five inputs, three outputs and two cascaded full adders. A1, A2, A3, A4 and CIN are the inputs and COUT, CARRY and SUM are the outputs of the exact 4:2 compressor. COUT, CARRY and SUM are given as

$$COUT = A3(A1 \oplus A2) + A1(A1 \oplus A2) \quad (1)$$

$$CARRY = CIN (A1 \oplus A2 \oplus A3 \oplus A4) + A4(A1 \oplus A2 \oplus A3 \oplus A4) \quad (2)$$

$$SUM = CIN \oplus A1 \oplus A2 \oplus A3 \oplus A4 \quad (3)$$

A compressor chain is shown in Figure 1. CIN represents the input carry from the preceding 4 : 2 compressor that has processed the lower significant bits. CARRY and COUT are the outputs of order '1' with higher significance than the input CIN . Table 1 presents the truth table for the exact compressor.

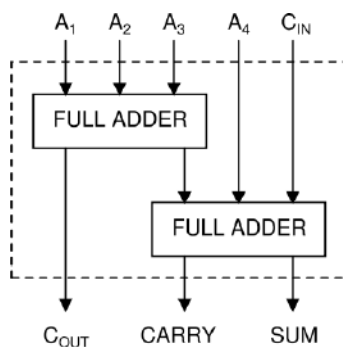


Fig.1: EXACT 4:2 COMPRESSOR.

Table 1. Truth Table For Exact 4:2 Compressor.

A_1	A_2	A_3	A_4	C_{IN}	C_{OUT}	$CARRY$	SUM
0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	1
0	0	0	1	0	0	0	1
0	0	0	1	1	0	1	0
0	0	1	0	0	0	0	1
0	0	1	0	1	0	1	0
0	0	1	1	0	0	1	0
0	0	1	1	1	0	1	1
0	1	0	0	0	0	0	1
0	1	0	0	1	0	1	0
0	1	0	1	0	0	1	0
0	1	0	1	1	0	1	1
0	1	1	0	0	1	0	0
0	1	1	0	1	1	0	1
0	1	1	1	0	1	0	1
0	1	1	1	1	1	1	0
1	0	0	0	0	0	0	1
1	0	0	0	1	0	1	0
1	0	0	1	0	0	1	0
1	0	0	1	1	0	1	1
1	0	1	0	0	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	0	1	0	1
1	0	1	1	1	1	1	0
1	1	0	0	0	1	0	0
1	1	0	0	1	1	0	1
1	1	0	1	0	1	0	1
1	1	0	1	1	1	1	0
1	1	1	0	0	1	0	1
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1	1	1	1	0	1	1	0
1	1	1	1	1	1	1	1

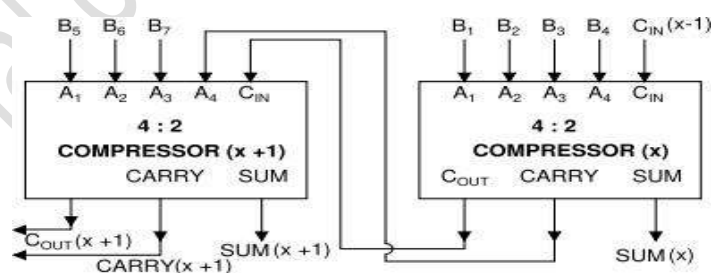


Fig. 2: Compressor chain.

AREA-EFFICIENT APPROXIMATE 4:2 COMPRESSOR

The proposed high speed area-efficient 4:2 approximate compressor is shown in Figure 3. The compressor inputs are A_1, A_2, A_3 and A_4 , outputs are CARRY and SUM. A multiplexer (MUX) based design approach is used to generate SUM. Output of XOR gate acts as the select line for the MUX. When select line goes high, (A_3A_4) is selected and when it goes low, $(A_3 + A_4)$ is selected. By introducing an error with error distance 1 in the truth table of the exact compressor, the proposed 4 : 2 compressor is able to reduce carry generation logic to an OR gate. The logical expressions for realisation of SUM and CARRY are given below.

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$$\text{SUM} = (A_1 \oplus A_2) A_3 A_4 + (A_1 \oplus A_2) (A_3 + A_4) \quad (4)$$

$$\text{CARRY} = A_1 + A_2 \quad (5)$$

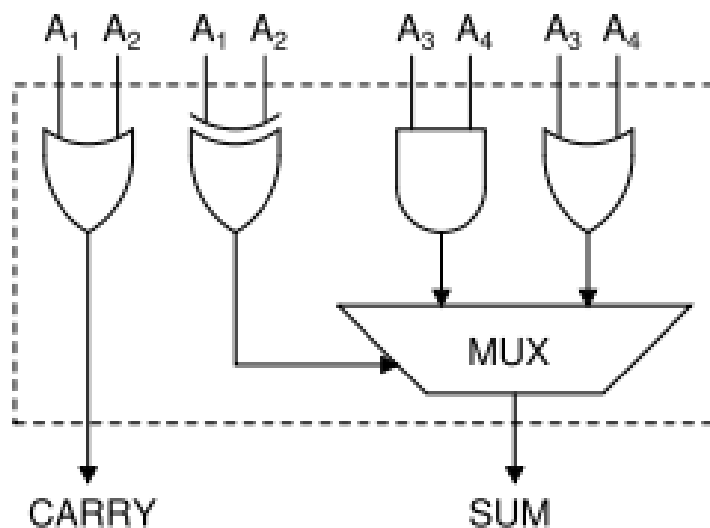


Fig. 3: Area-efficient 4:2 compressor.

From the truth table of proposed 4:2 compressor (Table 2), it can be observed that the error has been introduced for the input values – {0011}, {0100}, {1000} and {1111}, so as to ensure that equal positive and negative deviation with $ED = 1$ (minimum) is obtained.

TABLE 2. Truth table for proposed area efficient 4:2 compressor.

A_1	A_2	A_3	A_4	$CARRY$	SUM
0	0	0	0	0	0
0	0	0	1	0	1
0	0	1	0	0	1
0	0	1	1	0	1
0	1	0	0	1	0
0	1	0	1	1	0
0	1	1	0	1	0
0	1	1	1	1	1
1	0	0	0	1	0
1	0	0	1	1	0
1	0	1	0	1	0
1	0	1	1	1	1
1	1	0	0	1	0
1	1	0	1	1	1
1	1	1	0	1	1
1	1	1	1	1	1

DUAL-STAGE APPROXIMATE 4 : 2 COMPRESSOR

As a measure to optimise the hardware utilisation of the proposed design, this paper proposes an alternate architecture for multipliers with more than three stages of cascaded compressors. In the high speed area-efficient compressor architecture (as shown in Figure 3), apart from the MUX, one XOR, one AND and two OR gates are required. OR and AND gates each need 6 transistors in CMOS logic implementation. In order to reduce the transistor count, this paper proposes an architecture with NAND and NOR gates as shown in Figure 4. Even though the SUM and CARRY generated by the modified architecture is not as same as that of the proposed 4 : 2 compressor architecture, with cascading of the compressor in multiples of 2, the error is nullified. This is explained with the help of Figure 5. Figure 5(a) has a two level cascading of proposed high speed area-efficient 4 : 2 compressors.

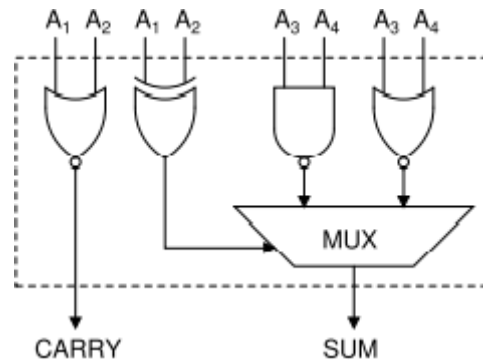


Fig. 4 Basic building block for proposed modified Dual-stage 4:2 compressor.

Figure 4 has a two level cascading of modified dual-stage 4 : 2 compressors. The outputs at the Stage 1 differ for both the architectures, but the occurrence of negation in the order of an integral multiple of two (in Stage 1 and Stage 2) in the modified dual-stage 4 : 2 compressor will ensure that the outputs at Stage 2 are same. The modified dual-stage 4 : 2 compressor reduces area, delay and power dissipation compared to the proposed high speed area-efficient 4 : 2 compressor and other compressors in the literature due to the reduction in transistor count. Table 3 analyses the output of the two proposed architectures at different stages in a 2 stage cascaded structure. Carry0 at Stage 2 output is minimised and is given in equation. $(K3 \oplus K4) \cdot (K2 + K1) + (K3 \oplus K4)(K2K1) = (K3 \oplus K4) \cdot (K2 + K1) + (K3 \oplus K4) \cdot (K2K1) + (K2 + K1)(K2K1)$ Here, it is seen that $(K2 + K1)(K2K1)$ is not an essential prime implicant. Therefore, output expressions of Stage 2 for both the proposed architectures are the same. Similarly, Sum0 generated

G. Zervakis, et al., “Design-Efficient Approximate Multiplication Circuits Through Partial Product Perforation” Approximate computing has acquired significant interest as a promising approach to decrease strength consumption of inherently error tolerant applications. In this paper, we cognizance on hardware-level approximation by introducing the partial product perforation technique for designing approximate multiplication circuits. We prove in a mathematically rigorous manner that during partial product perforation, the imposed mistakes are bounded and predictable, depending only on the input distribution. Through massive experimental evaluation, we observe the partial product perforation approach on special multiplier architectures and disclose the most excellent structure-perforation configuration pairs for distinct mistakes constraints. We show that, as compared with the respective actual design, the partial product perforation grants discounts of as much as 50% in power consumption, 45% in location, and 35% in vital put off. In addition, the product perforation method is as compared with the contemporary approximation techniques, i.E., truncation, voltage overscaling, and logic approximation, displaying that it outperforms them in phrases of strength dissipation and error.

T. Yang, T. Ukezono, and T. Sato “A Low-Power High-Speed Accuracy-Controllable Approximate Multiplier Design”, Multiplication is a key essential function for plenty errors- tolerant programs. Approximate multiplication is taken into consideration to be an green approach for buying and selling off electricity against performance and accuracy. This paper proposes an accuracy-controllable multiplier whose very last product is generated through a convey-maskable adder. The proposed scheme can dynamically pick the period of the convey propagation to meet the accuracy necessities flexibly. The partial product tree of the multiplier is approximated with the aid of the proposed tree compressor. An eight \times 8 multiplier design is implemented by using the convey maskable adder and the compressor. Compared with a traditional Wallace tree multiplier, the proposed multiplier reduced energy consumption by between forty seven.3% and 56.2% and important route delay by way of among 29.9% and 60.5%, relying on the specified accuracy. Its silicon place turned into additionally forty four.6% smaller. In addition, outcomes from an picture processing software demonstrate that the great of the

processed photos may be controlled by using the proposed multiplier layout.

4. RESULTS

RTL SCHEMATIC: The RTL schematic is abbreviated as the register transfer level it denotes the blue print of the architecture and is used to verify the designed architecture to the ideal architecture that we are in need of development. The hdl language is used to convert the description or summary of the architecture to the working summary by use of the coding language i.e., verilog, vhdl. The RTL schematic even specifies the internal connection blocks for better analyzing. The figure represented below shows the RTL schematic diagram of the designed architecture.

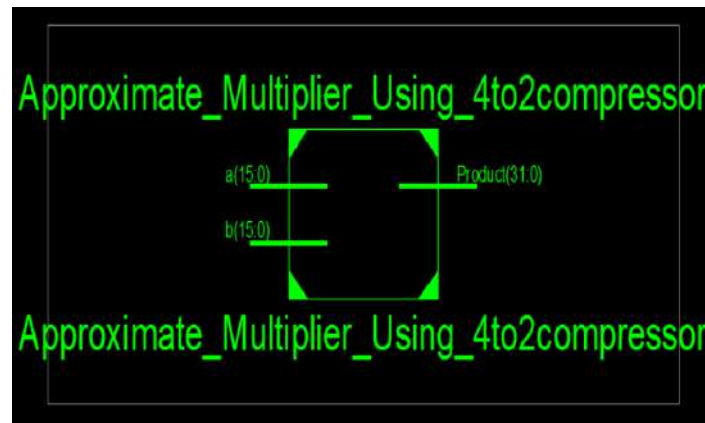


Fig. 5: RTL SCHEMATIC OF THE PROPOSED DESIGN

TECHNOLOGY SCHEMATIC:- The technology schmatic makes the reesentation of the architecture in the LUT format ,where the LUT is consider as the parameter o area that is used in VLSI to estimate the architecture design .the LUT is consider as an squarunit the memory allocation of the code is represented in there LUT s in FPGA

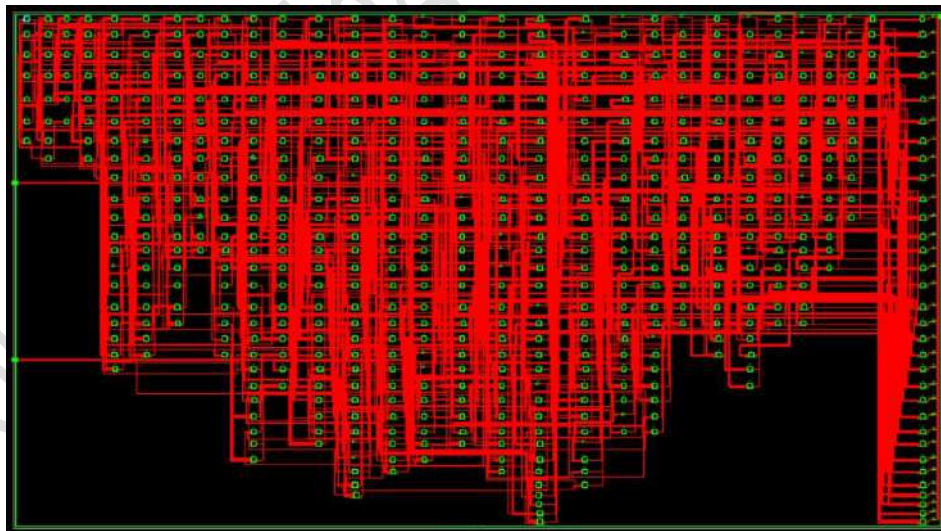


Fig 6 Technology Schematic Of The Proposed Design

SIMULATION: The simulation is the process which is termed as the final verification in respect to its working where as the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implantation to the simulation on the home screen of the tool ,and the simulation window confines the output in the form of the wave forms. Here it has the flexibility of providing the different radix number systems.

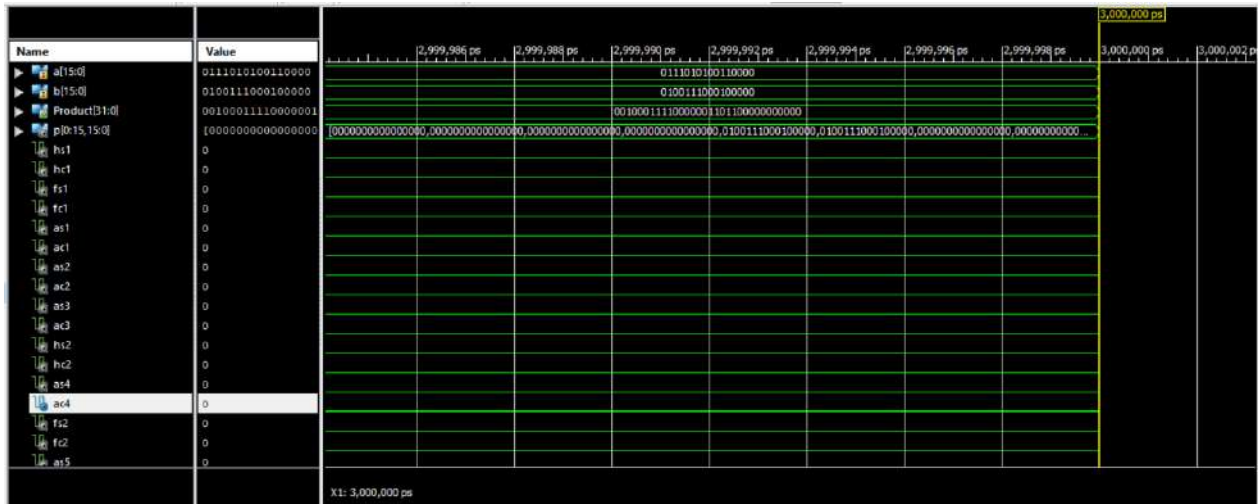


Fig 8: Simulation wave forms of proposed approximate multiplier

Table 3: power analyzer

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Device		On-Chip	Power (W)	Used	Available	Utilization (%)			Supply	Summary	Total	Dynamic	Quiescent
Family	Spartan3e	Logic	0.000	133	1920	7			Source	Voltage	Current (A)	Current (A)	Current (A)
Part	xc3s100e	Signals	0.000	146	---	---			Vccint	1.200	0.008	0.000	0.008
Package	vq100	IOs	0.000	33	66	50			Vccaux	2.500	0.008	0.000	0.008
Temp Grade	Commercial	Leakage	0.034						Vcco25	2.500	0.002	0.000	0.002
Process	Typical	Total	0.034										
Speed Grade	-5												
Environment		Thermal Properties	Effective TJA	Max Ambient	Junction Temp				Supply	Power (W)	Total	Dynamic	Quiescent
Ambient Temp (C)	25.0		(C/W)	(C)	(C)						0.034	0.000	0.034
Use custom TJA?	No												
Custom TJA (C/W)	NA												
Airflow (LFM)	0												
Characterization													
PRODUCTION	v1.2.06-23-09												

Consider in VLSI the parameters treated are area, delay and power, based on these parameters one can judge the one architecture to other. here the consideration of area power and delay also considered the parameter is obtained by using the tool XILINX 14.7 and the HDL language is verilog language.

5. CONCLUSION

This project presents approximate multiplier with novel approach of approximate 4: 2 compressor architectures. Firstly, a high speed area efficient compressor architecture is proposed, which achieved a considerable reduction in area, delay and power when compared to other state-of-the- art compressor designs. The proposed design has comparable accuracy .As a result, the proposed design reduces area power and delay also. In addition to this, the model also proposed a modified dual-stage compressor architecture, which further optimized the area, delay and power without altering the accuracy metrics. The architecture was designed and 16 × 16 Dadda multiplier in image processing applications, like image multiplication and smoothing.

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ASIC Implementation of High-Speed Adaptive Recursive Karatsuba Multiplier with Square root Carry select adder

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Abstract:

Computationintensive

applicationssuchasDSP,imageprocessing,floatingpointprocessorsandcommunication

technologies today require efficient binary multiplication which usually is the most power and time-consuming block. Initially we had general multiplier called Wallace multiplier which is used for Arithmetic Computations But there are few disadvantages using this existing Wallace multiplier or Normal multiplication method, power consumption is more in this multiplier along with this Speed is too low i.e delay is high and not Area Efficient and the number of components or intellectual properties required(for example, adders, 2 bit multipliers, multiplexersetc) for this Wallace multiplier is exceeding the limit because of the that the temperature is going beyond the limit, so to avoid these problems we are coming up with this idea, the objectives of this project is to overcome the disadvantages of Area, Speed(Delay) and Power Consumption. This paper proposes an efficient design for unsigned binary multiplication to reduce delay, area and power consumption. This paper proposes an efficientdesignforunsignedbinarymultiplicationtoreducedelay.A16x16-bitmultiplierhasbeendesignedwhich is based on Vedic Karatsuba algorithm using reversible logic. It is optimized using adaptive and recursive approach combined with square-root-carry-select-adder. The designs have been codedin Verilog, synthesized in Xilinx ise.

Index Terms—Square Root Carry Select Adder, reversible logic, Karatsuba Multiplier, Recursive Adaptive Karatsuba Algorithm.

1. Introduction

Multipliers play an important role in today's digital signal processing and various other applications. With advances in technology, many researchers have tried and are trying to design multipliers which offer either of the following design targets – high speed, low power consumption, regularity of layout and hence less area or even combination of them in one multiplier thus making them suitable for various high speed, low power and compact VLSI implementation. The common multiplication method is “add and shift” algorithm. In parallel multipliers number of partial products to be added is the main parameter that determines the performance of themultiplier. To reduce the number of partial products to be added, vedic multiplier using carry look ahead adder is one of the most popular karastuba method. The basic method of multiplier is explains below. The binary multiplication also happens in same way of digit multiplication as shown in below example here by getting partial products and gates are used and we are using adder (half adder ,full adder)adding the columnsAlthough the method is simple as it can be seen from this example, the addition is done serially as well as in parallel. To improve on the delay and area the CRAs are replaced with Carry Save Adders, in which every carry

and sum signal is passed to the headers of the next stage. Final product is obtained in a final adder by any fast adder (usually carry ripple adder). In array multiplication we need to add, as many partial products as there are multiplier bits.

2. Literature review

Vijay kumarreddy Modified High Speed Vedic Multiplier Design and Implementation The proposed research work specifies the modified version of binary vedic multiplier using vedic sutras of ancient vedic mathematics. It provides modification in preliminarily implemented vedic multiplier. The modified binary vedic multiplier is preferable has shown improvement in the terms of the time delay and also device utilization. The proposed technique was designed and implemented in Verilog HDL. For HDL simulation, modelsim tool is used and for circuit synthesis, Xilinx is used. The simulation has been done for 4 bit, 8 bit, 16 bit, multiplication operation. Only for 16 bit binary vedic multiplier technique the simulation results are shown. This modified multiplication technique is extended for larger sizes. The outcomes of this multiplication technique is compared with existing vedic multiplier techniques.

A. Momeni, J. Han, P. Montuschi, and F. Lombardi, "Design and Analysis of Approximate Compressors for Multiplication", Inexact (or approximate) computing is an attractive paradigm for digital processing at nanometric scales. Inexact computing is particularly interesting for computer arithmetic designs. This paper deals with the analysis and design of two new approximate 4-2 compressors for utilization in a multiplier. These designs rely on different features of compression, such that imprecision in computation (as measured by the error rate and the so-called normalized error distance) can meet with respect to circuit-based figures of merit of a design (number of transistors, delay and power consumption). Four different schemes for utilizing the proposed approximate.

compressors are proposed and analyzed for a Dadda multiplier. Extensive simulation results are provided and an application of the multipliers to image processing is presented. The results show that the proposed designs accomplish significant reductions in power dissipation, delay and transistor count compared to an exact design; moreover, two of the proposed multiplier designs provide excellent capabilities for image multiplication with respect to average normalized error distance and peak signal-to-noise ratio (more than 50 dB for the considered image examples).

C. Liu, J. Han, and F. Lombardi, "A Low-Power, High-Performance Multiplier with Configurable Partial Error Recovery", Proc. of IEEE Design, Automation & Test in Europe Conference & Exhibition (DATE), [Approximate circuits have been considered for error-tolerant applications that can tolerate some loss of accuracy with improved performance and energy efficiency. Multipliers are key arithmetic circuits in many such applications such as digital signal processing (DSP). In this paper, a novel multiplier with a lower power consumption and a shorter critical path than traditional multipliers is proposed for high-performance DSP applications. This multiplier leverages a newly-designed approximate adder that limits its carry propagation to the nearest neighbors for fast partial product accumulation. Different levels of accuracy can be achieved through a configurable error recovery by using different numbers of most significant bits (MSBs) for error reduction. The

multiplier has a low mean error distance, i.e., most of the errors are not significant in magnitude. Compared to the Wallace multiplier, a 16-bit multiplier implemented in a 28nm CMOS process shows a reduction in delay and power of 20% and up to 69%, respectively. It is shown that by utilizing an appropriate error recovery, the proposed multiplier achieves similar processing accuracy as traditional exact multipliers but with significant improvements in power and performance.

3. Proposed method

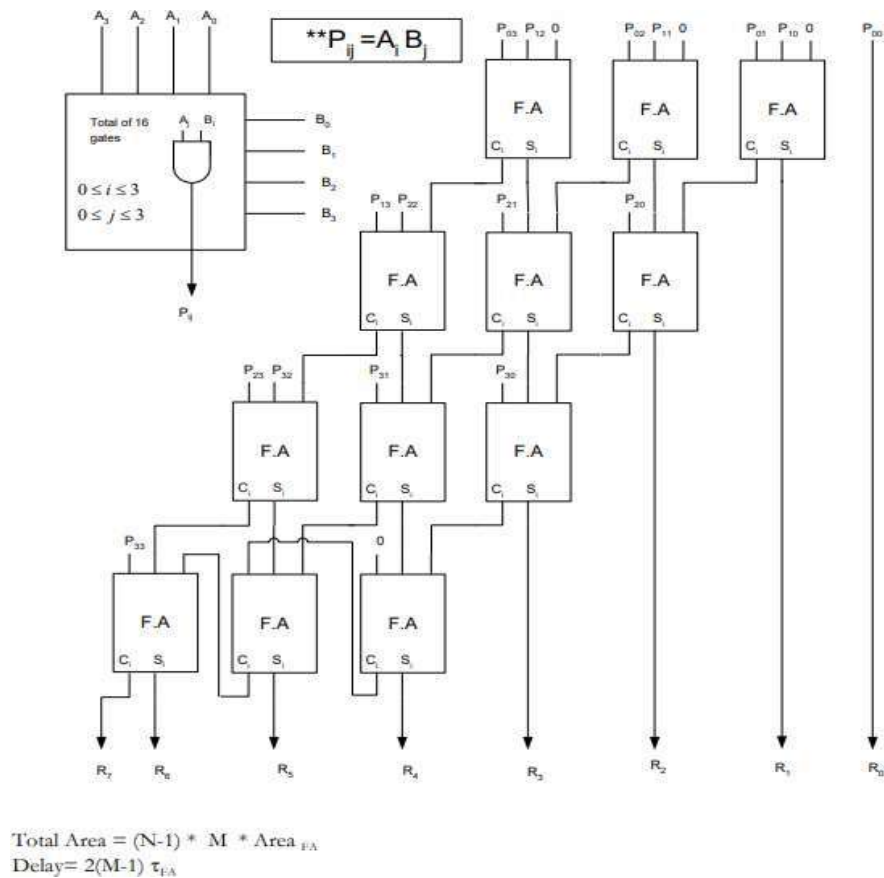


Figure 1. Proposed method

In applications like multimedia signal processing and data mining which can tolerate error, exact computing units are not always necessary. They can be replaced with their approximate counterparts. Research on approximate computing for error tolerant applications is on the rise. Adders and multipliers form the key components in these applications. In, approximate full adders are proposed at transistor level and they are utilized in digital signal processing applications.

The Wallace tree has three steps: Reduce the number of partial products to two by layers of full and half adders. Group the wires in two numbers, and add them with a conventional adder. The second phase works as long as there are three or more wires with the same weight add a following layer: Take any three wires with the same weights and input them into a full adder. The result will be an output wire of the same weight and an output wire with a higher weight for each three input wires. If there are two wires of the same weight left, input them

into a half adder. If there is just one wire left, connect it to the next layer. a) Steps involved in WALLACE TREE multipliers Algorithm: Multiply (that is - AND) each bit of one of the arguments, by each bit of the other, yielding N results. Depending on position of the multiplied bits, the wires carry different weights. Reduce the number of partial products to two layers of full adders. Group the wires in two numbers, and add them with a conventional adder.

4. Results and discussions

The RTL schematic is abbreviated as the register transfer level. It denotes the blueprint of the architecture and is used to verify the designed architecture to the ideal architecture that we are in need of development. The HDL language is used to convert the description or summary of the architecture to the working summary by use of the coding language i.e. Verilog, VHDL. The RTL schematic even specifies the internal connection blocks for better analyzing. The figure represented below shows the RTL schematic diagram of the designed architecture.

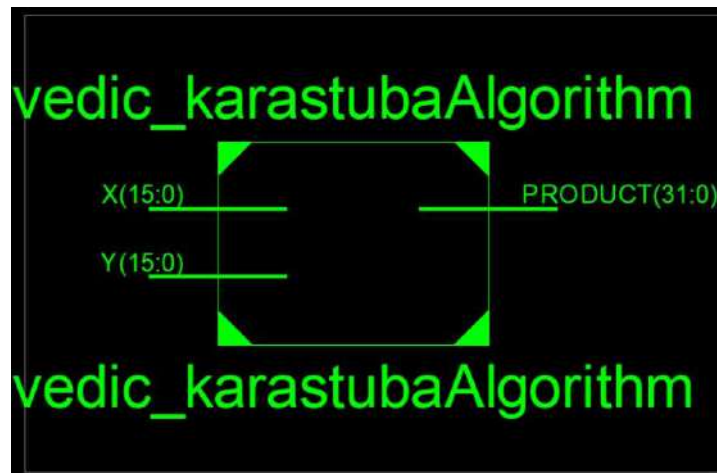


Figure 2: RTL Schematic of existed vedic multiplier

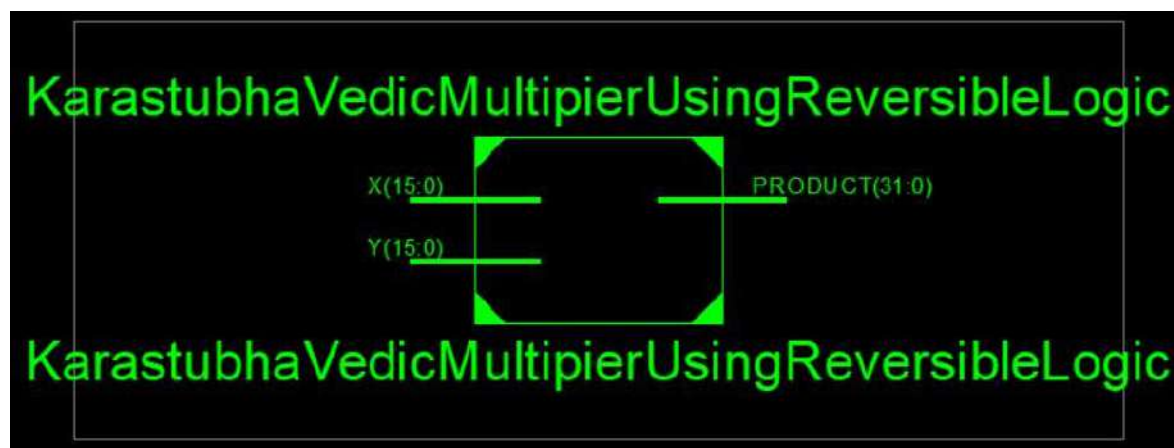


Figure 3: RTL Schematic of Proposed vedic multiplier

The technology schematic makes the representation of the architecture in the LUT format, where the LUT is considered as the parameter of area that is used in VLSI to estimate the architecture.

design. the LUT is consider as an square unit the memory allocation of the code is represented in there LUT s in FPGA.

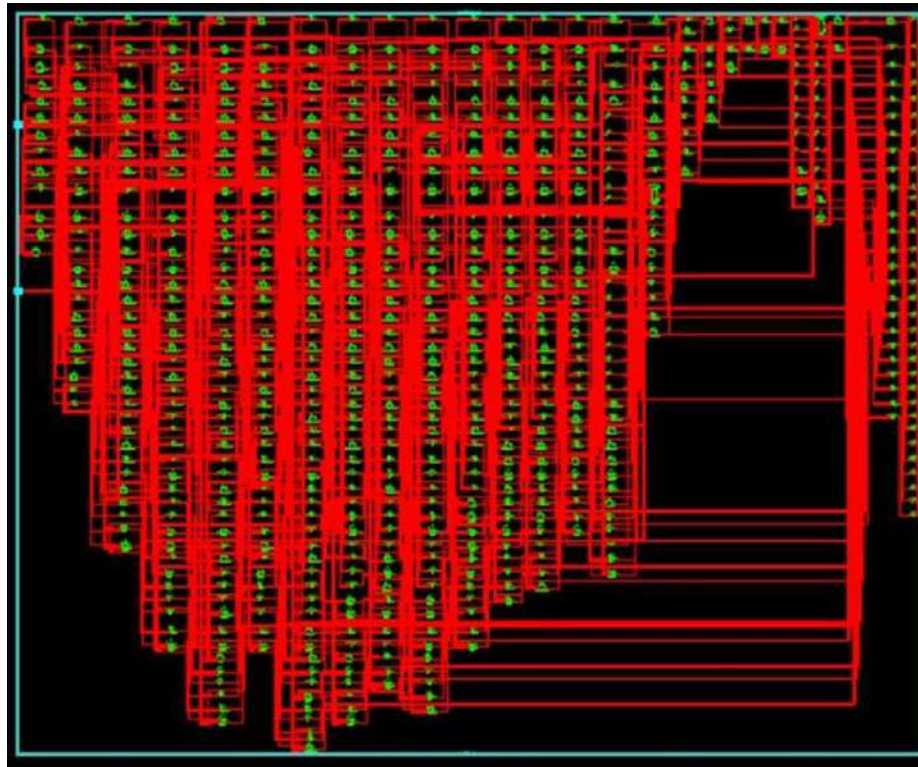


Figure4:View Technology Schematic of proposed vedic multiplier

The simulation is the process which is termed as the final verification in respect to its working where as the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implantation to the simulation on the home screen of the tool ,and the simulation window confines the output in the form of the wave forms. Here it has the flexibility of providing the different radix number system.

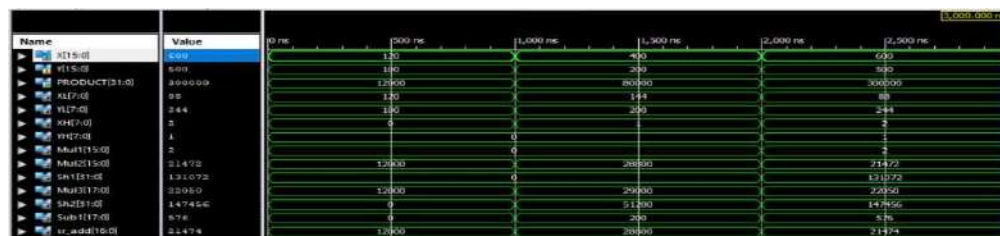


Figure5:Simulated Waveforms of existed vedic multiplier

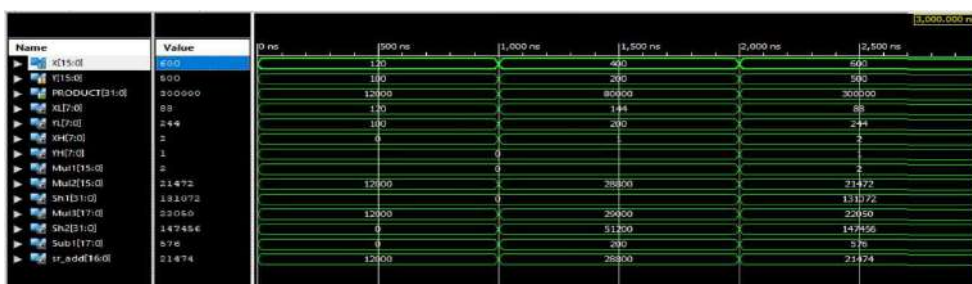


Figure 6: Simulated Waveforms of proposed vedic multiplier

The simulation is the process which is termed as the final verification in respect to its working where as the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implantation to the simulation on the home screen of the tool, and the simulation window confines the output in the form of the wave forms. Here it has the flexibility of providing the different radix number systems.

Device Utilization Summary (estimated values)				
Logic Utilization	Used	Available	Utilization	
Number of Slices	147	5472		2%
Number of 4 input LUTs	274	10944		2%
Number of bonded IOBs	64	240		26%
Number of DSP48s	2	32		6%

Figure 7: device utilization summary of proposed design

Device Utilization Summary (estimated values)				
Logic Utilization	Used	Available	Utilization	
Number of Slices	141	5472		2%
Number of 4 input LUTs	263	10944		2%
Number of bonded IOBs	64	240		26%
Number of DSP48s	2	32		6%

Figure 8. device utilization summary of proposed design

Table 1: parameter comparison

Parameter	Existed multiplier design	Proposed multiplier design
No of LUTs	274	263

5. Conclusion

A16×16-bit multiplier using reversible logic has been proposed and designed to showcase the technique with the primary objective of minimizing the delay so that it can find application in DSP, Image Processing and computation intensive ASIPs. It is based on the Vedic Karatsuba algorithm that generates lesser number of partial product terms. The algorithm is further optimized using adaptive concept for computation of the third product term to yield faster speed. Moreover, the compression speed of the partial product terms is also enhanced by combining the carry save adders with the proposed Square Root Carry Select Adder (SRCSA) adder with reversible logic as discussed in this. The implementation, synthesis and simulation are performed in XILINX- ISE tool in

verilog HDL language. In future the implementation of this multiplier employed which eliminates gate delays and adding the approximation to the architecture can enhance the performance in dsp applications, image processing ,filters and cryptographic applications. Area, power and speed-based applications, it will be used in future.

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Broadcast Gadget for cars using Sensors & GPS Module

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Abstract

The main purpose of this wireless black box project is to develop a vehicle black box system that can be installed into any vehicle all over the world. This paradigm is often designed with minimum range of circuits. Wireless black box is basically a device that will indicate all the parameters of a vehicle crash and will also store and display its parameters at every three seconds such as date, time, temperature, location, vibration, alcohol limit etc. At the time of accident, the message will be sent from the system built inside the car to the registered mobile numbers such as emergency numbers of police stations, hospitals, family members, owner etc. We have used various types of sensors like temperature sensor (DTH11), which is used to measure temperature and humidity. Vibration sensor measures vibrations felt by the car during accident. Alcohol sensors are located on the steering wheel which will indicate whether the driver is drunk. Gyroscopic sensor is used to indicate tilt during the accident. All the parameters sensed by the sensors will send the signal to Arduino Uno. GSM module, SD card module, GPS module are some of the devices used in this project which helps in accomplishing the output.

Keywords: temperature sensor, GPS

1. Introduction

Most of the accidents happened with the motorcycle. Nowadays this problem is still increasing due to poor rider's like speed driving, drunk driving, riding with no helmet protection, riding without sufficient sleep, etc. The numbers of death because of late assistance to people who got the accident. Therefore, the riders from accidental injuries. The good safety device for a motorcycle is difficult to implement and very expensive. Accident detection with a tracking system only. In this project black box using a MEMS accelerometer sensor and GPS location tracking system is developed for accidental monitoring. When the accident will happen at the same time GSM will send the authorized mobile phone. The location of the vehicle sends a short message using a GPS device to a family member. The system consists of an accelerometer sensor, Arduino Uno microcontroller, GPS device and GSM module for sending a short message. An accelerometer sensor is applied X, Y, Z direction fall detection of an accident. The speed of the motorcycle and threshold algorithm is used to decide a fall or accident in real-time. A mobile short message containing position from GPS (latitude, longitude) will be sent when a motorcycle accident is detected. The robust package design is implemented so that it is safe from water's spray and dust in the environment. This system is installed under the motorcycle seat. A high-performance microcontroller is used to process and store real-time signals from an accelerometer sensor. Thus, this device is analogous to a black box in an airplane. The police and insurance

examiner can obtain accident history using a black box to investigate accident situations from data-logger in this device. The device keeps a data log of track and acceleration data for 1 minute before and after an accident. Moreover, this device can be used to track a motor cycle after it was stolen but it can not operate in real-time in this case. In this case, the user can send request command with the alphabet to the device and the device will return the position with some basic information.

2. Existing system

In existing system most of people associate black box with airplanes but they are no longer just key tool in investigation airplane accident. Presently tracking system introduced in vehicle to avoid accident and save the people's life. But this system still installed in some of high-end vehicles only because this system is too expensive for most of the vehicle user. This project introducing detection and alarm system which is expected to save people's life by detecting the accident occurred and provide the help by tracing location of the vehicle user with help of GPS technology. If any accident occurred to the vehicle this system will provide the information of vehicle user to the family members and at the same time it will send message to the nearest hospital for the help.

3. Proposed System

The MCU controls the entire operation of this section. Arduino is the controller that we are using in this ambulance section. The vibration sensors fixed on the vehicle to collect the vibration to the amplifying circuit. The amplifying circuit will amplify the obtaining vibrations and given to the MEMS. A microcontroller is able to store factors such as vibration, and mems value. It is connected with the accelerometer sensor hence if the speed of the vehicle is at a high rate speed it will give a warning alarm (indicator) to the driver. If the driver continues the driving with the same speed and accident occurs, the MEMS can detect whether it is a linear (only x-axis) or nonlinear (x, y, z directions). Also, it can store all the data of the vehicle with the cause of the accident. GPS and GSM are connected to this system.

The communication for GPS and GSM can be done through serial communication. The serial communication is creating an interface through which it convert CMOS to TTL logic. The GPS is used to locate the position (longitude and latitude) of the vehicle.

The GSM in the black box can send a message to the ambulance section and GSM of the family member. The message includes the location, time and other details regarding the accident. This message helps the ambulance section and the family member about the accident and the ambulance section can collect the patient from the accident spot to the hospital. The indicator for warning alarm can be done with the help of a buzzer. This section has a direct power supply for the entire unit will get from the battery fixed in the vehicle. The power supply can be given directly to the microcontroller units since it controls the entire unit.

Design of proposed hardware system:

The process of working of this project is explained as follows. The total equipment of this project is placed inside a vehicle is not visible to others. Here we have MEMS accelerometer

which will sense the movements of the vehicle continuously. When an accident occurs to the vehicle the movement of the vehicle while the incident is occurring will be detected by the MEMS and this information is given to microcontroller. Here we use GPS module to track the location of the vehicle where the accident has occurred. GPS can get the graphical location of the vehicle and these location values are displayed on the LCD (Liquid Crystal Display). The location values are given to microcontroller. Controller gives this information to GSM module. By using GSM we can send the message to family members, emergency medical service and nearest hospital. In this project we have temperature sensor and CO sensor which are interfaced to the micro controller. Temperature sensor through which we can measure amount of Temperature exhausted from the vehicle. CO sensor will sense the amount of CO gas emitted from the vehicle. These values are also displayed on LCD. Whenever the CO gas level exceeds the threshold limit then the motor of the vehicle is stopped. Ultrasonic sensor in the module is used to detect any obstacle in the surroundings of the vehicle and intimates the microcontroller and the controller calculates the distance between the vehicles and if the distance is very less then it will stop the vehicle automatically.

Arm7TDMI: ARM stands for Advanced RISC Machines. An ARM processor is basically any 16/32bit microprocessor designed and licensed by ARM Ltd, a microprocessor design company headquartered in England, founded in 1990 by Herman Hauser. A characteristic feature of ARM processors is their low electric power consumption, which makes them particularly suitable for use in portable devices. It is one of the most used processors currently in the market.

Microcontroller: The microcontroller is the heart of the embedded system. It constantly monitors the digitized parameters of the various sensors and verifies them with the predefined threshold values. It checks if any corrective action is to be taken for the condition at that instant of time. In case such a situation arises, it activates the actuators to perform a controlled operation.

Temperature sensor: Temperature sensor is used to sense the temperature of a medium. Most of the temperature sensors having temperature-dependent properties which can be measured electrically include resistors, semiconductor devices such as diodes, and thermocouples. A resistance thermometer has a sensing resistor having an electrical resistance vary with temperature.

CO2 sensor: They are used in gas leakage detecting equipment in family and industry, are suitable for detecting of LPG, propane, methane, alcohol, Hydrogen, smoke. Gas detection is important for controlling industrial and vehicle emissions, household security and environmental monitoring.

Ultrasonic sensor: The ultrasonic sensor can easily be interfaced to the microcontrollers where the triggering and measurement can be done using two I/O pin. The sensor transmits an ultrasonic wave and produces an output pulse that corresponds to the time required for the burst echo to return to the sensor. By measuring the echo pulse width, the distance to target can easily be calculated.

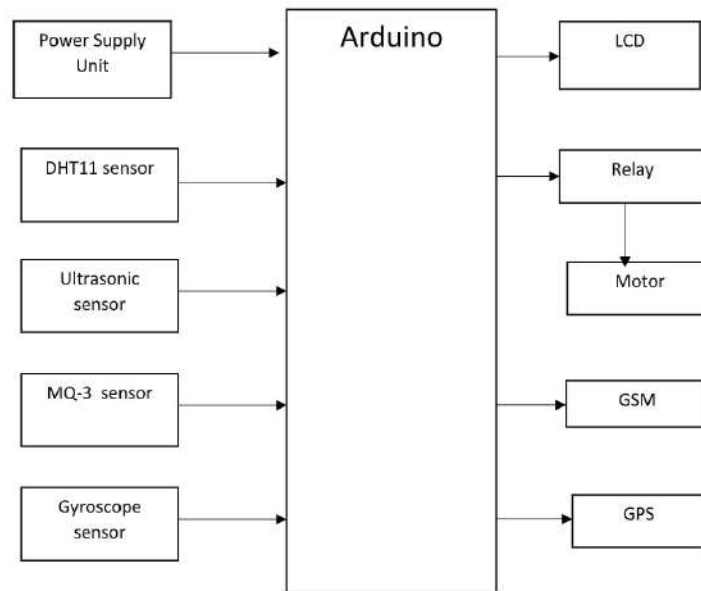
Block Diagram:

Figure 1. Proposed block diagram

MEMS Micro-Electro-Mechanical Systems, or MEMS, is a technology that in its most general form can be defined as miniaturized mechanical and electromechanical elements (i.e., devices and structures) that are made using the techniques of micro fabrication. The critical physical dimensions of MEMS devices can vary from well below one micron on the lower end of the dimensional spectrum, all the way to several millimeters. Likewise, the types of MEMS devices can vary from relatively simple structures having no moving elements, to extremely complex electromechanical systems with multiple moving elements under the control of integrated microelectronics. The one main criterion of MEMS is that there are at least some elements having some sort of mechanical functionality whether or not these elements can move. The term used to define MEMS varies in different parts of the world. In the United States they are predominantly called MEMS, while in some other parts of the world they are called “Microsystems Technology” or “micro machined devices”.

While the functional elements of MEMS are miniaturized structures, sensors, actuators, and microelectronics, the most notable (and perhaps most interesting) elements are the micro sensors and micro actuators. Micro sensors and micro actuators are appropriately categorized as “transducers”, which are defined as devices that convert energy from one form to another. In the case of micro sensors, the device typically converts a measured mechanical signal into an electrical signal. Microelectronic integrated circuits can be thought of as the “brains” of a system and MEMS augments this decision-making capability with “eyes” and “arms”, to allow micro systems to sense and control the environment. Sensors gather information from the environment through measuring mechanical, thermal, biological, chemical, optical, and magnetic phenomena.

The electronics then process the information derived from the sensors and through some

decision making capability direct the actuators to respond by moving, positioning, regulating, pumping, and filtering, thereby controlling the environment for some desired outcome or purpose. Because these devices are manufactured using batch fabrication techniques similar to those used for integrated circuits, unprecedented levels of functionality, reliability, and sophistication can be placed on a small silicon chip at a relatively low cost.

MEMS description: MEMS technology can be implemented by using a number of different materials and manufacturing techniques; the choice of which will depend on the device being created and the market sector in which it has to operate.

GPS: The Global Positioning System (GPS) is a space based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

GSM modem: Global Positioning System (GPS) technology is a TDMA based wireless network technology developed in Europe that is mostly used throughout the world. GSM phones make use of a SIM card to identify the user's account. The use of the SIM card allows GSM network users to quickly move their phone number from one GSM phone to another by simply moving the SIM card. Currently GSM networks operate on the 850MHz, 900MHz, 1800MHz, and 1900MHz frequency bands. Devices that support all four bands are called quad-band, with those that support 3 or 2 bands called tri-band and dual-band, respectively. In the United States, Cingular operates on the 850 and 1900MHz bands, while T-Mobile operates only on the 1900MHz band.

4. Results and discussion

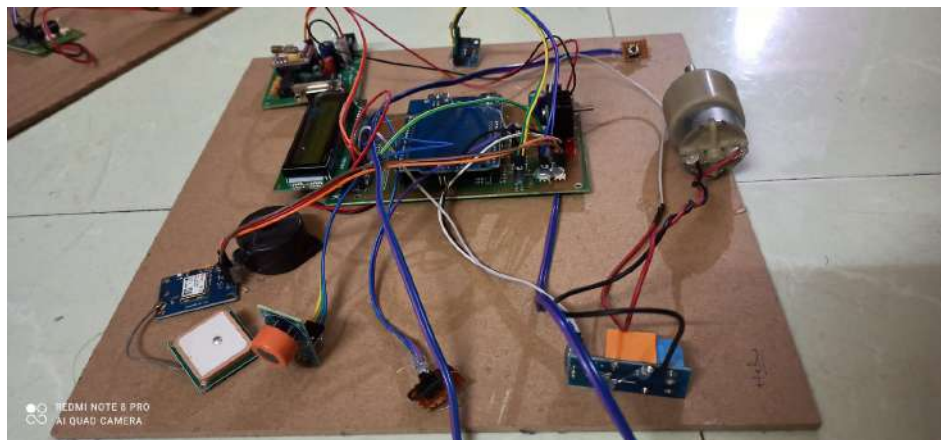


Figure 2. hardware kit

At the time of accident, the message will be sent from the system built inside the car to the registered mobile numbers such as emergency numbers of police stations, hospitals, family members, owner etc. Temperature sensor (DTH11) is used to measure temperature and humidity. Vibration sensor measures vibrations felt by the car during accident. Alcohol

sensors are located on the steering wheel which will indicate whether the driver is drunk. Gyroscopic sensor is used to indicate tilt during the accident.

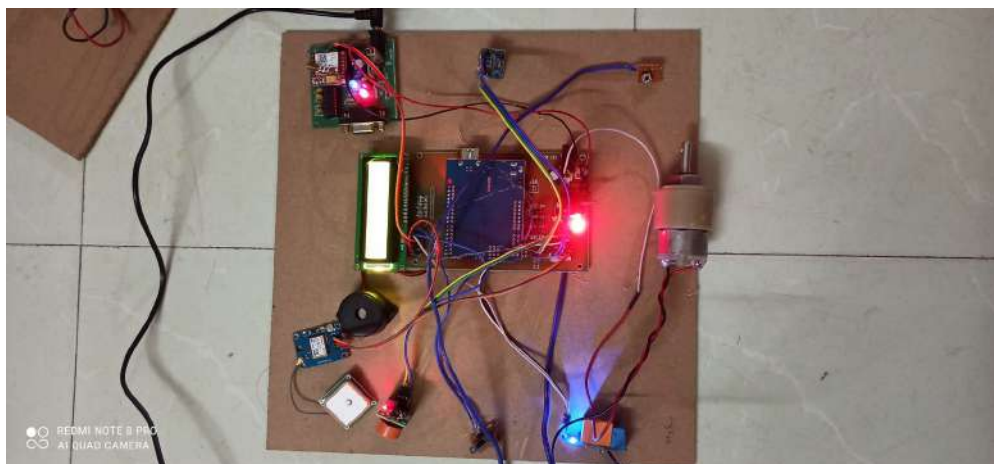


Figure 3. ON condition

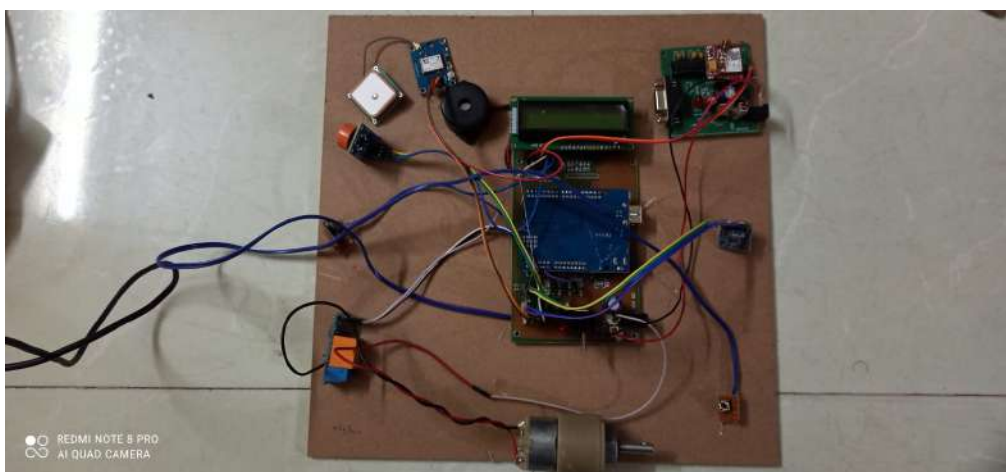


Figure 4. Motor on condition

All the parameters sensed by the sensors will send the signal to Arduino Uno. GSM module, SD card module, GPS module are some of the devices used in this project which helps in accomplishing the output.

5. Conclusion

The system wireless black box using accelerometer and GPS tracking has been developed for motorcycle accidental monitoring. The system can detect the type of accident (linear and nonlinear fall) from accelerometer signal using threshold algorithm, posture after crashing of motorcycle and GPS ground speed. After accident is detected, short alarm message data (alarm message and position of accident) will be sent via GSM network. Sensors work accordingly and gives the respective output.

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Hydroponic Farming Using Nutrient Film Technique

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Abstract

Hydroponic Nutrient Film Technique (NFT) system is a method of cultivating plants with plant roots growing in shallow and circulating hydroponic nutrient layers so that plants can get enough water, nutrients, and oxygen. Plants grow in layers of polyethylene with plant roots submerged in water containing nutrient solutions that are circulated continuously with a pump. Arduino is used as a microcontroller that regulates the composition of solutions containing nutrients to be circulated with a pump by the NFT system Hydroponics. A tool that can regulate the circulation of nutrients for the NFT system automatically. One of the solutions we can choose to end vegetables production quantity problem is by using a hydroponic technique called Nutrient Film Technique (NFT). This method utilizes the nutrient solution, circulating water, and oxygen to hasten plant growth and produce better result. One of the most important parameters to note here is the pH value. We have to maintain the pH value at a stable level. This research discusses the details of an automated pH control system by using multiple linear regression. This control system used Arduino Nano and Node MCU with pH H-101 sensor. The accuracy result of the multiple linear regression tests with several reservoirs and several set points is 94.84%. For the overall system accuracy test, the result was 89.37%. Based on these results, we can confidently say that the multiple linear regression method can be used to control hydroponic acidity (pH). Nutrient Film Technique Hydroponics describes detailed instructions on the set up of an efficient system, including applications for lower budgets, new business ventures, and gives a detailed outline for the construction of an ideal hydroponic system. It also reveals the secrets to turning a hydroponic system into a profitable business by providing the necessary templates for tracking a successful endeavor.

Keywords: Nutrient Film Technique, Internet of things.

1. Introduction

There is an increasing need to recirculate and reuse nutrient solutions in order to reduce environmental and economic costs. However, managing the nutrient solution is one of biggest challenges in hydroponics. Many research scientists dump out nutrient solutions and refill at weekly intervals. Some authors have recommended automated measurement and control of individual nutrients in solution as essential to nutrient control. However, two decades of research in hydroponics has shown us that dumping and replacing solution is unnecessary. Monitoring ions in solution at frequent intervals is extremely expensive and not always necessary; in fact the rapid absorption and consequent depletion of some nutrients often causes people to add toxic amounts of nutrients to the solution. Managing nutrients by mass balance. During the past 18 years, we have managed nutrients in closed hydroponic systems according to the principle of "mass balance," which means that the mass of nutrients is either

in solution or in the plants. We add nutrients to the solution depending on what we want the plant to take up. Plants quickly remove their daily ration of some nutrients while other nutrients accumulate in the solution. This means that the concentrations of nitrogen, phosphorous, and potassium can be at low levels in the solution (0.1 mM or a few ppm) because these nutrients are in the plant, where we want them. Maintaining a high concentration of nutrients in the solution can result in excessive uptake that can lead to nutrient imbalances. For example, the water removed from solution through transpiration must be replaced and it is necessary to have about 0.5 mM phosphorous in the refill solution. If the refill solution was added once each day, the phosphorous would be absorbed by the plant in a few hours and the solution phosphorous concentration would be close to zero. This does not indicate a deficiency; rather it indicates a healthy plant with rapid nutrient uptake. If phosphorous was maintained at 0.5 mM in the recirculating solution, the phosphorous concentration in the plant could increase to 1% of the dry mass, which is 3 times higher than the optimum in most plants. This high phosphorous level can induce iron and zinc deficiency (Chaney and Coulombe, 1982). Feeding plants in this way is like the daily feeding of a pet dog, some dogs would be seriously overweight if their food bowls were kept continuously full.

2. Literature survey

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious. All embedded systems are including computers or microprocessors. Some of these computers are however very simple systems as compared with a personal computer. The very simplest embedded systems are capable of performing only a single function or set of functions to meet a single predetermined purpose. In more complex systems an application program that enables the embedded system to be used for a particular purpose in a specific application determines the functioning of the embedded system. The ability to have programs means that the same embedded system can be used for a variety of different purposes. In some cases, a microprocessor may be designed in such a way that application software for a particular purpose can be added to the basic software in a second process, after which it is not possible to make further changes.

3. Proposed Method

The applications software on such processors is sometimes referred to as firmware. The simplest devices consist of a single microprocessor (often called a "chip"), which may itself be packaged with other chips in a hybrid system or Application Specific Integrated Circuit (ASIC). Its input comes from a detector or sensor and its output goes to a switch or activator which (for example) may start or stop the operation of a machine or, by operating a valve, may control the flow of fuel to an engine. As the embedded system is the combination of both software and hardware.

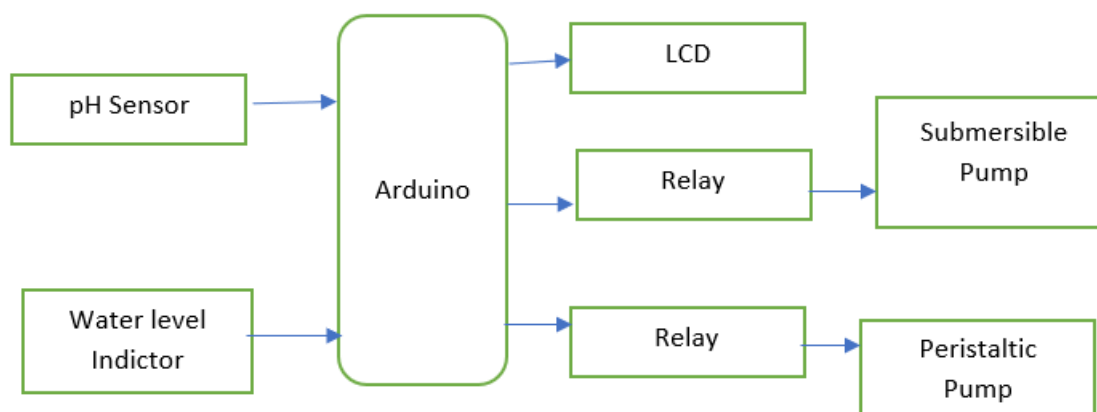


Figure 1. Proposed block diagram

Hydroponics was used on many occasions in the past, let us look at some of them briefly. In the 1930s, hydroponically grown plants were used on Wake Island which serves as a refueling stop for Pan American Airlines. Wake island is a rocky reef having no soil. Thus, it is more of a necessity than a luxury to grow plants hydroponically for passengers landing there. Daniel Arnon, a former U.S. Army major, used his accumulated expertise on plant nutrition to feed his fellow troops on Ponape Island (present-day Pohnpei Island). Pohnpei Island is rocky and barren. Thus, the crops were grown in gravel and nutrient-rich water from 1943-1946. In recent years, NASA considered using hydroponics technique for growing plants on long term missions in space. NASA's horticulture program is called Controlled Ecological Life Support System (CELSS). Hydroponics can prove to be a lifesaver in long term space missions. In the year 2007, an Arizona based farm company sold nearly 200 million pounds of tomatoes which were grown hydroponically. Low water and nutrient consumption. Avoids need to use a lot of growing media. Easy to disinfect roots and setup. Easy to see root quality and health. Consistent flow prevents salt build-up in root area. Recirculating, so minimal groundwater contamination. Very modular and expandable.

4. Results

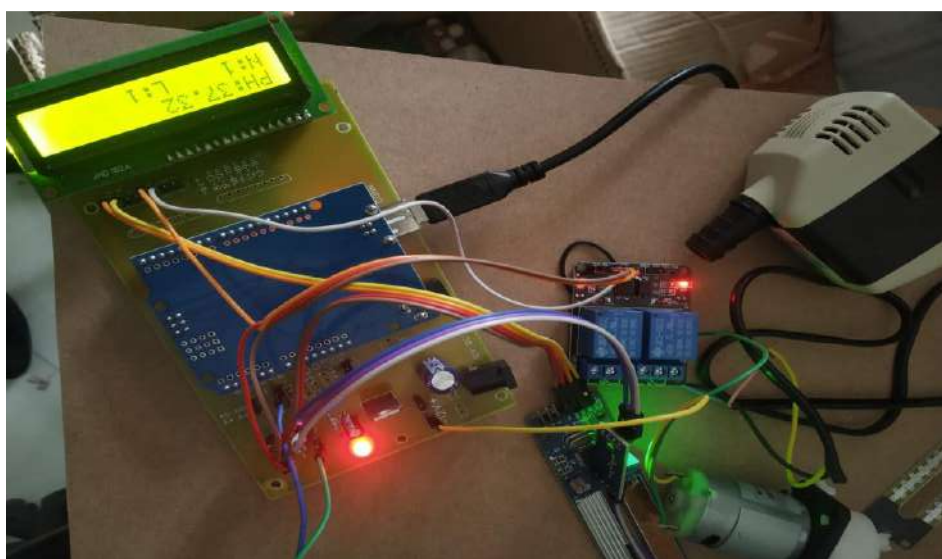


Figure 2. Hardware setup.

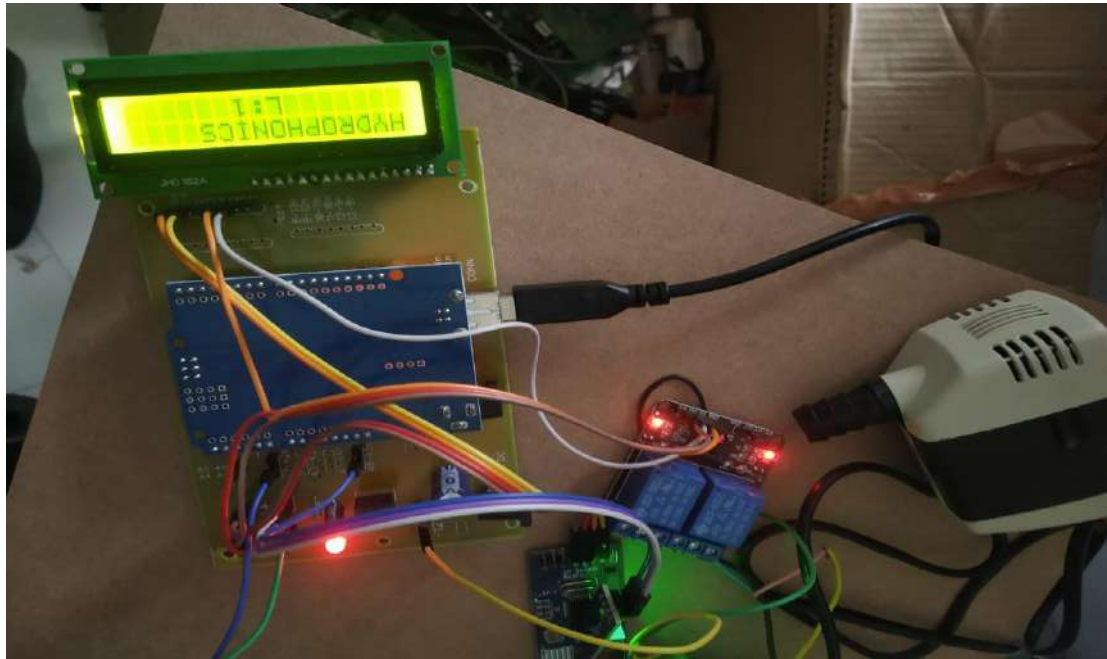


Figure 3. output

5. Conclusion

Hydroponics is the most ideal system recommended for many growers because of the awareness placed on the environment and ecosystem. It is a form of soilless agriculture that presents great advantages when compared to other agricultural practices. In the designing of a functional system, hydroponics is fully adapted to suit the needs and outcomes as required by those investing in it. Proper background education is needed alongside an effective project planner, highlighting the aim, vision, goals, objectives and sources of advantage that will bring about successful production. While it might not have a large market share, hydroponics does have incredible growth making it the fastest growing sector in agriculture. In the future it is projected to dominate all of the world's food production. Hydroponics is likely to thrive as more and more land is devastated by poor farmland management and overuse causing people to turn to newer innovative methods of farm production. Certain countries like Japan have already adopted a proactive approach to these technologies due to its lack of arable land and rising land prices being an island nation. Japan's hydroponics is for the most part done with NFT or sand/gravel techniques. Using bio-technical approaches such as posed by hydroponics, the Japanese have come up with newer and more productive plants for hydroponic rice production. Due to the environment control four harvest can be performed within a single year, compared to the traditional single harvest per year. As the global population becomes more urban, cities like Indianapolis are investing in more local food production systems that offer economic development opportunities and reduce a city's carbon footprint using 90 percent less water than traditional farming methods. Desert climes such as those in Israel have also been the subject of immense agricultural innovation. Due to arid climate and a general lack of water, the country has been using hydroponics to grow berries and bananas in shipping containers. These fruits cannot actually be grown in that climate but still are capable of yielding 1,000 times greater produce. Even certain large businesses have realized the value of hydroponic systems. The large store chain Target began a series of trials

in spring 2017 hydroponic gardens were installed at selected locations. These gardens can provide customers with very fresh vegetables and herbs with minimal water usage.

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Design and Implementation of smart gloves for deaf and tongue-tied disabled

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Abstract:

In communication medium, sharing a conversation dialogue between the normal person and deaf and dumb person is one of the challenging tasks still. The dumb person can practice hand gesture language in their community but not to others. This research article focuses to minimize the difficulty level between these two communities with smart glove devices. Besides, the author believes that result of the proposed model provides a good impact on the dumb community. The smart glove contains input, control, and output module to get, process, and display the data respectively. Our proposed model is used to help these communities to interact with each other continuously without any error. The proposed model is constructed with good specification flex sensors. Little change of resistance in flex sensor is providing changes in their gesture language. So, this orientation direction is calculated well and gives better results over existing methods. The wireless set can be made with Bluetooth technologies here. Here the gestures are assigned based on the alphabet letter. The sign language performs and gives audible output in the display section of the proposed model. It gives good results in our experimental setup. This research work focuses on good recognition rate, accuracy, and efficiency. The good recognition rate shows the continuous conversation between the two persons. Moreover, this research article compares the recognition rate, accuracy, and efficiency of the proposed model with an existing model.

1. Introduction

According to a survey, 2.42M people are deaf and dumb people in India that large amount in the society. Overall, the world is having around 15 – 20 % of the deaf and dumb population. This community is facing communication problems in society and the neighboring area. This communication gap is creating lots of problems and isolation of a particular community. The common person communication constituent is not sufficient for all other communities. The term “Augmentative and Alternative Communication” refers to speech components other than audible type communication. It consists of many symbols, figures, rising tones of synthesized speech, and drawing with sign language. Augmentative model communication comprises various datasets for limited abilities of their speech. Figure 1 shows smart glove pictures with flex sensors, Arduino, battery, conductivity thread, and a transmitter section. This mode of communication is supporting both people in the community. Generally, the alternative model is comprised of the database for their corresponding sign and symbols. No speech persons will interpret their idea, desire, needs to the normal person. The communication systems are customized for many specific situations such as a person visit doctor, a person attends an interview, and

so on. Also, the communication devices are controlled by many central processing units of the computer or laptop.

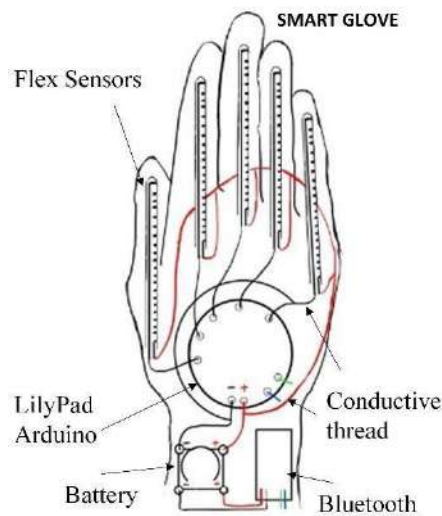


Figure 1: Overview structure of Smart Glove

The communication devices are not easy to carry and handle in all the places where they want. The electronic system should be easy to handle and portable, dedicated for the corresponding person. The dedicated device is used to do communication between the person that speaking by electronic devices. The undedicated devices are including speaking with many sign functions and feature extraction which will function with the central processing unit of the devices. It can provide internet facilities, e-mail services, etc. Our proposed system contains both of the operations lead by electronic devices.

2. Literature survey

According to the analysis done that, one out of every five people is deaf or dumb on this planet is an Indian. In India about more than 1.5 million deaf people utilize Sign Language as a method of correspondence. Normal parents of deaf children or vice versa use gesture based conversation other than deaf population. However, due to this type of complications an automatic Sign-to- Speech/text language interpretation framework could assist to make more details accessible to the hearing impaired. In addition, the framework won't just promote data access; however it can likewise be utilized as an instructive apparatus to become familiar with any communication via gestures. One of the earliest employments of a gesture based communication is from the 5th century BC, in Plato's Cratylus. In 1620, Juan Pablo Bonet proclaimed, Reduction of letters and art for instructing mute individuals to talk which is said to be the 1st present day investigation of communication via gestures vocal, mounting out a strategy for voice training for hard of deaf individuals and a stadard letter set. Thomas Pryor and Navid Azodi are UG understudies who made the Gloves that make an interpretation of communication via gestures into text and speech known as signaloud. They had on Lemelson-MIT understudy cost for this venture. The first Hand oration mittens was constructed by Ryan Patterson in the year 2001. This model had constraints that a PC or a workstation was constantly required for

its working which made it less convenient and less portable.

In 2006, Nguyen Dang Binh et.al proposed "A New Approach Dedicated To Hand Gesture Recognition" utilized Thai communication via gestures acknowledgment with the strategy 14 ultra-data-glove which was fixed with 10 sensors for fingers and rest 4 sensors among the fingers which estimates variations and appropriation respectively. But, he got the 94% outcome set. He utilized another new Pseudo 2-

3. Proposed method

This paper aims to construct the smart glove to convert sign language to the audible speech signal. Our proposed system is implementing for capturing the images from the disabled person and identify the hand gesture him. The standard hand sign from the dumb person is showing in figure 4. The gloves are designing for identifying the motion of the hand gesture. The smart gloves consist of many bend sensors which are used to support convert some electrical signal to data signal as speech. The motion of a hand gesture is given to a smart glove which consists of a microcontroller unit within it for the further process of a model. The gesture signal is transmitting through Bluetooth for communication medium. The recognized gesture is matching with pre- defined data and it is providing to the display unit or speaker unit for voice recognition. Our proposed model has two sections as transmitter and receiver. The process flow of the transmitter section of the proposed method.

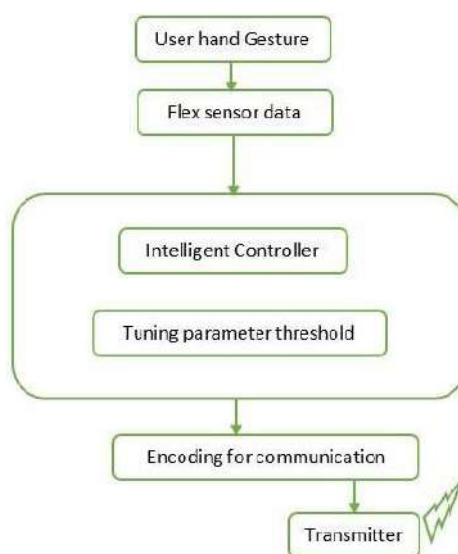


Figure 2. Proposed block diagram

Figure 2 shows the workflow of the receiver section of the proposed method. The additional gesture recognition system provides a better understanding between the people and improving the accuracy, recognition rate, and efficiency of the system compared with existing methods [27].

4. Results discussions

The different resistance values of flex sensor with various degree of sensors position. Based on these flex sensors in our proposed model gives a more appropriate answer for the hand

gesture compared to many bend sensors output. This appropriate answer is making the comfort zone between both the persons in confidently. The confidence level can make a very possible and comfortable life for every person with their community. Also, this is very cheap cost wise to buy, and simple in design to troubleshooting themselves. So, the proposed model is identifying and giving feedback very quickly with recognized words. Also, we obtained a real-time recognition rate of 95.6% with a lot of tests. The smart glove is constructed for sign language to text and speech in further development. Their model consists of a bend sensor, microcontroller, communication medium device. This Augmentative and Alternative Communication (AAC) comprises many limitations for this hand gesture language. The controlling unit is used to control the sensor output and it connects with a smart glove by a microcontroller. The conversion units are incorporated inside the controlling unit. The bend sensor output is converting from voltage to text output for the detection process. Also, there is developed android version devices for communication channel with Bluetooth technology. Here this software application is converting from text into an audible speech signal.

5. Conclusion

Thus, our proposed model has been constructed and tested successfully. Our smart glove is used to make a communication medium between deaf and normal people. Also, it is breaking their barrier between them with normal conversation confidently. This glove can spring confidence, comfort in their community. It makes their life's better and carrier can grow. The recognition percentage is also very high compared to another model with various iteration and locality. Our future works are carrying the following phenomena: Implementing artificial neural network in our proposed model. Training many data set leads to a good accuracy level with various parameters and circumstances. Improving speaker quality and deleting or updating the pre-defining dataset. Increasing the number of hand gesture images in the dataset with a machine learning algorithm.

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Application and Research of Dark Channel Defogging Algorithm

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Abstract

The video logging technology is applied to detect the general condition of the well. Due to the influence of water fog, the contrast of the video logging image is decreased, and the color contrast is distorted. The application and research of the dark channel dehazing algorithm in the video logging image enhancement system is proposed. In this paper, the dark channel defogging algorithm and Retinex defogging algorithm are compared and analyzed respectively, the realization process and application of the two algorithms are described briefly, and the advantages and disadvantages of the two algorithms applied in video logging image enhancement are compared.

Keywords: Image defogging, Image enhancement, Retinex algorithm.

1. Introduction

Visible light imaging logging (or video logging) is an important way of logging oil and gas Wells at present. However, due to the complicated and bad working conditions in oil and gas Wells, the quality of the logging images obtained in the video logging operation of oil and gas Wells is degraded and the color is distorted. Among many influencing factors, the most prominent one is the problem of water fog removal. Due to the existence of water mist, the image captured by the camera is often not clear enough and the details of some areas are not obvious enough. Similarly, in order to solve the problem of defogging when shooting videos of natural scenery and people (the atmosphere contains water vapor), various defogging algorithms have been proposed, such as the dark channel prior defogging algorithm and Retinex defogging algorithm. The clarity and contrast of images processed by these defogging algorithms have been improved. Therefore, it can be considered to apply these defogging algorithms to the video image processing of oil and gas Wells after comparison and modification. Visible light imaging logging (or video logging) with its signal simplification, visualization, easy to understand the advantages and is widely applied in the detection of underground construction effect, the overall situation in the well, etc. , and in the downhole falling object auxiliary salvage, problem detection, casing pipe wall descaling, check the effect of underground work has obtained the successful application. In the case of video logging, the existence of fog will increase the data noise of the image acquisition system, resulting in image quality degradation. Fog is a large number of tiny ice crystal particles or water droplets suspended in the atmospheric space close to the ground. Its essence is a kind of milky white aerosol, whose particle size generally ranges from 1 micron to 60 microns. Fog quality reduction and fog removal technology is mainly through related technologies and methods, as far as possible to eliminate the interference of fog on image clarity, restore more details and effective information in the original image, restore image contrast and clarity, so as to obtain a satisfactory and applicable visual effect. In the field of image dehazing, many effective image processing algorithms⁴ have been derived, such as dark channel dehazing algorithm, histogram equalization algorithm, homomorphic filtering, wavelet transform and so on. Here, the advantages and disadvantages of the dark channel defogging algorithm and Retinex defogging algorithm in video logging image enhancement are analyzed and compared.

2. Literature Survey

The visual quality of images captured outdoors is highly correlated with atmospheric conditions. This correlation is especially significant under fog or haze weather, for example, suspended particles (such

as water droplets and ice forms) growing in turbid air will result in image contrast loss and texture blur. Fog often appears in visual maritime surveillance applications, which has been a critical part of law enforcement and environment protection for littoral nations. Therefore, it will be a challenge to devise a single image defogging method for practical applications of maritime surveillance. Recently, many single image dehazing or defogging methods have been proposed, which can be divided into two categories. One category is contrast enhancing methods, including gray-level remapping, Retinex-based filtering, improved high-boost and so on. Although the contrast of images degraded by fog is enhanced, these methods disregard that the contrast loss of fog images is greatly affected by the depth structure of the hazy images, which is due to atmospheric scattering effects. This ignorance of fog physical properties causes an over-enhancement problem for foggy images. The other category is optical depth (or transmission) estimation methods. Various prior assumptions based on contrast and chromaticity information are proposed to obtain the transmission or depth map from images, such as contrast maximizing, dark channel, feature images fusion, color-lines, color attenuation linear models, multiscale depth fusion, CNN dehazing nets and polynomial regression models. Tan et al. assume that haze-free images have considerably higher contrast than hazy images. Inspired by statistics of haze-free images, He et al. assume that the minimal pixels in most local patches of haze-free images are close to zero. Fatal assumes that pixels in patches form a color line in RGB space. And then combined of chromatic property and contrast property, a learning strategy are presented to estimate the coefficients in the scattering model Zhu et al. assume the color saturation and brightness of each pixel provides an indication of scene depth. In addition, to suppress the halo effects and artifacts, many defogging methods use contextual constraints to keep the estimated depth discontinuity consistent with the image edges. Wang et al. employ the Laplacian Markov random field to fuse the multiscale depth maps. Meng et al. Employ the boundary constraint to preserve the edges of the transmission map. These state-of-the-art methods can achieve superior performance for normal haze images.

The image which acquired under fog conditions is seriously degraded. It suffers from poor contrast, low visibility and faint colors. It reduces the applications value of the image seriously. Image dehazing is an important problem in the field of image processing, and which has been an important researching direction in computer vision. Images acquired in bad weather, such as haze and fog, are blurred and seriously degraded by the scattering of atmosphere, which makes image color gray and drift, reduces the contrast, and makes object features difficult to identify. The bad weather not only leads to the variation of the visual effect of image, but also cause the disadvantage of post processing to image. It is always a hot topic in how to efficiently remove the influence of the haze and fog on optical images, or how to improve image quality and get useful information which users are interested in.

Image Contrast Enhancement Method for Fog Image

The images of outdoor scenes obtained in haze and other weather phenomena are usually have poor contrast and color fidelity. It must be difficult to estimate the objective using these blurred images, and it directly limited outdoor vision systems. Therefore, in order to effectively improve the fog-degraded image quality, reduce the effect of the fog, haze and other weather conditions, there is practical and theoretical meaning of images dehazing and visibility restoration fast and efficiently. Image enhancement methods are to enhance contrast and highlight the features of image, including histogram equalization, logarithmic transform, power law transform, sharpening, wavelet transform and so on. These methods are not removal of fog in the image, but instead of image as a clear processing. Histogram equalization is a method of contrast enhancement, and the contrast of fog image is lower. The histogram equalization can be used to make histogram distribution equilibrium, and the dynamic range of it is enlarged, so the contrast of it is enhanced.

Image Enhancement Based on Wavelet Transform

Wavelet analysis is a newly arisen subject and it has been applied to image processing very well. The application of wavelet and multi-scale analysis for contrast enhancement has made great progress. The details of fog image are equalized by multiple scales and have a good sharpening effect. The decomposition component of image based on wavelet transform is image signal, which is decomposed into layers with different frequency bands. Each layer of wavelet decomposes into four sub bands image, which are LL, LH, HL and HH. The horizontal and vertical direction are all low frequency for LL, the horizontal direction is low frequency and vertical direction is high frequency for LH, the horizontal direction is high frequency and vertical direction is low frequency for HL, the horizontal and vertical direction are all high frequency for HH.

The third level decomposition based on wavelet transform is shown in figure 1, which shows that $LL_i (i=1,2,3)$ is smooth image of original image, maintaining low-frequency part of image, $LH_i (i=1,2,3)$ maintain the vertical edges details of the original image, $HL_i (i=1,2,3)$ maintain the horizontal edge details of original image, and $HH_i (i=1,2,3)$ maintain the diagonal details of original image. After image is decomposed, noise can be eliminated by filtering and then image is reconstructed to achieve the purpose of image enhancement.

3. Existing System

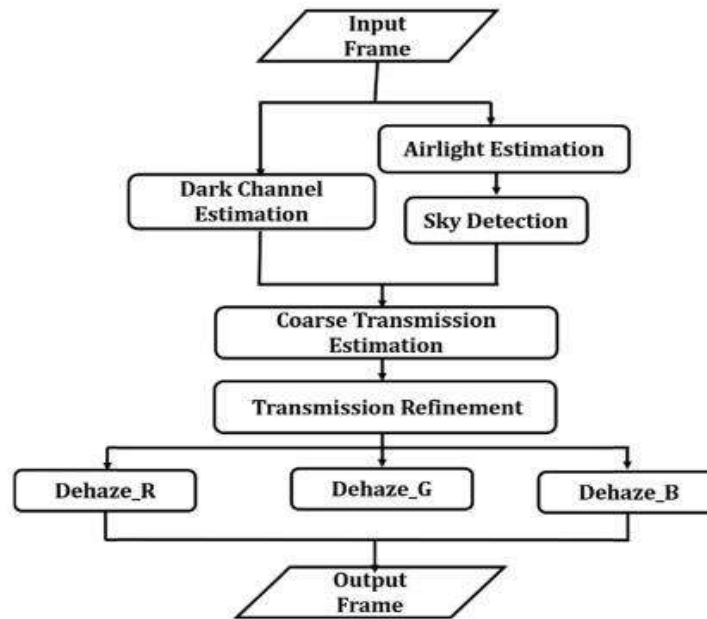
Retinex image enhancement algorithms: Retinex theory was proposed by Land et al. In 1963, according to this theory, the color and brightness of objects perceived by human eyes are the result of the interaction between light and objects, and are determined by the reflection characteristics of the object surface, which has nothing to do with the spectral characteristics reflected in human eyes. The essence of Retinex algorithm is to convert the multiplication operation into the addition operation, which is conducive to separating the important reflected image R and smoothing the image using Gaussian template as the surround function (low-pass filtering, which is used to estimate the corresponding low-frequency part of the irradiated image). Then the logarithmic range of the original image minus the filtering image is the enhanced image.

$$r(x, y) = \log R(x, y) = \log \frac{S(x, y)}{L(x, y)}$$

Retinex algorithm improves the real-time performance of data processing, so it is particularly suitable for computer image data processing. According to Retinex theory, the light image and the reflected image form an image together. Among them, the low-frequency part of the original image represents the light image, which determines the dynamic range of the pixel in the image; The high frequency part in the image represents the reflection image, which depends on the physical characteristics of the original image surface and reflects the characteristic information of the image. Specifically, it can be expressed as:

$$S(x, y) = L(x, y) \times R(x, y)$$

Where, $S(x, y)$ represents the original image; $L(x, y)$ represents the illumination (brightness) image; $R(x, y)$ represents the reflection image. As shown in the figure, the image can be regarded as the incident image and the outgoing image. The incident light irradiates on the emitted object, and through the reflection of the reflected object, the emitted light enters the human eye, which is the image seen by human beings, as shown in Figure 1



4. Proposed System

The image defogging algorithm proposed by He et al, which is based on the dark channel prior theory. The principle of the algorithm is as follows: firstly, the atmospheric light value A and the initial transmittance graph in the original image are estimated with the help of the obtained dark channel graph. Then the image matting algorithm is used to refine the transmittance to realize the foggy image clearness and defog procession. Obtain the dark channel diagram of video logging image $J^c(x)$ through the formula. The mathematical expression of the dark channel fog removal is:

$$J^{dark}(x) = \min_{y \in \Omega(x)} \left(\min_{c \in \{r, g, b\}} (J^c(y)) \right)$$

Get a long image $I(x)$'s atmospheric light value and initial transmittance which are optimized from the dark channel diagram $I(x)$ represents the foggy image obtained from video logging, $J(x)$ represents a fog-free image to be restored, A represents the global atmospheric light value, $t(x)$ is the transmittance of medium, the atmospheric scattering model with fog image is:

$$I(x) = J(x)t(x) + A[1 - t(x)]$$

Assuming that the initial rough transmittance is a constant t in a local window region, (2) is deformed:

$$\frac{I(x)}{A^c} = \frac{J(x)}{A^c} t(x) + (1 - t(x))$$

Get twice the minimum filtering for image equation (3) both sides respectively

$$\min_{y \in \Omega(x)} \left[\min_c \frac{I^c(y)}{A^c} \right] = \min_{y \in \Omega(x)} \left[\min_c \frac{J^c(y)}{A^c} \right] t(x) + (1 - t(x))$$

The dark channel prior theory is that in the vast majority of outdoor fog-free images in non-sky regions, there are always a large number of pixels with a small brightness value on a certain color channel [5],

and this color channel is the dark channel. For clear fog-free image $J(x)$ in non-sky region, the intensity value of its dark channel $j_{\text{dark}}(x)$ is always close to 0.

$$J_{\text{dark}}(x) = 0$$

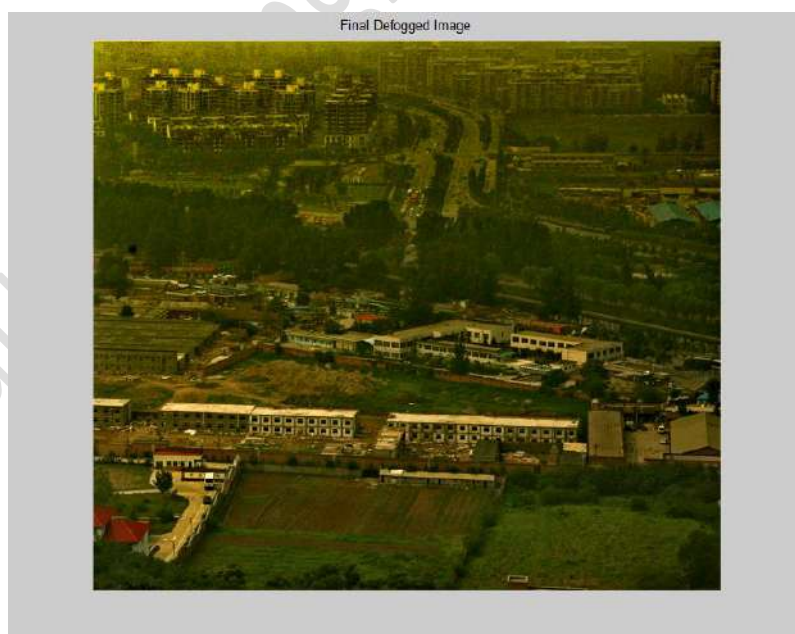
The size of the correction factor introduced represents the degree of fog removal, where $\omega=0.65$ is set, and 1 is complete.

$$\tilde{t} = 1 - \omega \min_{y \in \Omega(x)} \left[\min_c \frac{I^c(y)}{A^c} \right]$$

This algorithm mainly uses the soft matting algorithm to refine the transmittance.

5. Result Analysis





6. Conclusion

The experiment of this paper is a simulation test on the Windows10 operating system Matlab2017B platform. This paper proposes the application and research of the dark channel dehazing algorithm in the video logging image enhancement dehazing algorithm. In this paper, two different algorithms are

used to process the image with fog. The two algorithms have their own characteristics and can be selected according to the specific situation. Among them, the dark channel defogging algorithm can clear defogging the foggy image, so as to restore the original visual effect of the image. The visual effect of Retinex algorithm is bright overall, with abrupt shadows and distorted colors, which is only suitable for images with a small amount of fog. In summary, the dark channel dehazing algorithm is more suitable for processing video logging images with fog.

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Efficient Modular Adder Designs Based on Thermometer and One-Hot Coding

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Abstract

Residue Number Systems (RNSs) are efficient alternatives to positional number systems, providing fast and power-efficient computational systems. The key feature of RNS benefitting modern embedded systems and Internet-of-thing (IoT) edge devices is its energy efficiency. Modular addition is the most important and frequent operation applied on the components of RNS, including arithmetic units in the channels as well as forward and reverse converters. The small and medium dynamic range requirements of low-power embedded and edge devices make the usage of the thermometer and one-hot coding viable, improving the speed of modulo addition in comparison to regular binary representations. Based on these techniques, due to the carry-free internal computations, are also highly performant. The proposed modular adders, based on the thermometer and one-hot coding result in average improvements for delay.

Keywords: VLSI, modulo adders.

1. Introduction

Modern digital signal processing systems require improved energy-efficiency, namely for emerging applications such as deep learning and Internet-of-Things (IoT). Unconventional number systems and arithmetic have been investigated recently to achieve specialized efficient embedded systems for those applications. Residue Number Systems (RNSs), in particular, have been used for digital signal processing (DSP) and cryptography, supporting high-speed, low-power and fault-tolerant computations. Mapping weighted number representations into residues and vice versa, i.e., forward and reverse conversion, are essential but complex inter-modulo operations. However, RNS arithmetic operations, such as additions and multiplications, are performed much more frequently than forward and reverse conversions. Therefore, efficient modular adders are essential to achieve RNS-based high-performance and highly efficient embedded computing systems. One way to increase the efficiency of modular arithmetic units, i.e., modulo adders, subtractors and multipliers, is by using the one-hot coding (OHC). The one-hot residue (OHR) has been considered for designing RNS modular arithmetic circuits based on circular shifting. The OHC circuits based on barrel shifters show a power-delay product (PDP) reduction of up to 85% in comparison to the conventional positional encoding, because they significantly reduce the circuit's activity factor. RNSs based on OHC have also been used in DSP applications due to their highspeed. Alternatively, there are other types of coding, such as the thermometer coding (TC) that can be applied to enhance the performance of RNS modular arithmetic. The thermometer is a unary coding, in which the number of 1's corresponds to the magnitude of the displayed number. This means that the Hamming distance between numbers represented

in TC has a linear relationship to its difference. This type of coding is a subclass of Golomb coding's, used in a variety of applications, including neural networks and data compression. Moreover, the TC together with distributed arithmetic can lead to fast implementations of modular arithmetic circuits.

2. Literature survey

A.S. Molahosseini, L. Sousa and C.H. Chang (Eds.), *Embedded Systems Design with Special Arithmetic and Number Systems*, Springer, Addition is an essential operation in all cryptographic algorithms. Higher levels of security require larger key sizes and this becomes a limiting factor in $GF(p)$ using large integers because of the carry propagation problem. We propose a novel and efficient attribute-based large integer representation scheme suitable for large integers commonly used in cryptography such as the negative NIST primes and the Pierpont primes used in super singular isogeny Diffie Hellman (SIDH) for post-quantum cryptography. Algorithms are proposed for this new representation to implement arithmetic operations such as two's complement, addition/subtraction, comparison, sign detection, and modular reduction. Algorithms are also developed for converting binary numbers to attribute representation and vice versa. The extensive numerical simulations were done to verify the performance of the new number representation. Results show that addition is done faster in our proposed representation when compared with binary and residue number system (RNS)-based additions. Attribute addition outperformed RNS addition for all values of m where $128 > m > 32$ 768 bits for all machine word sizes w where $4 > w > 128$ bits. Attribute-based addition outperforms Kogge Stone binary adders for a wide range of m when w is small. For increasing values of w , the speed advantages are evident only for large values of m . This makes the proposed number representation suitable for implementing cryptographic applications in embedded processors for IoT and consumer electronic devices where w is small.

Y. H. Chen, T. Krishna, J. S. Emer and V. Sze, "Eyeriss: An Energy-Efficient Reconfigurable Accelerator for Deep Convolutional Neural Networks," Convolutional Neural Networks (CNNs) are widely used in many fields. Due to their high throughput and high level of computing characteristics, however, an increasing number of researchers are focusing on how to improve the computational efficiency, hardware utilization, or flexibility of CNN hardware accelerators. Accordingly, this paper proposes a dynamically reconfigurable accelerator architecture that implements a Sparse-Winograd $F(2 \times 2.3 \times 3)$ -based high-parallelism hardware architecture. This approach not only eliminates the pre-calculation complexity associated with the Winograd algorithm, thereby reducing the difficulty of hardware implementation, but also greatly improves the flexibility of the hardware; as a result, the accelerator can realize the calculation of Conventional Convolution, Grouped Convolution (GCONV) or Depth wise Separable Convolution (DSC) using the same hardware architecture. Our experimental results show that the accelerator achieves a 3x–4.14x speedup compared with the designs that do not use the acceleration algorithm on VGG-16 and Mobile Net V1. Moreover, compared with previous designs using the traditional Winograd algorithm, the accelerator design achieves 1.4x–1.8x speedup. At the same time, the efficiency of the multiplier improves by up to 142%.

3. Proposed system

The proposed design for the TCR based modulo adder is illustrated in Fig. 1, for the case when $m=7$. When $A+B \geq m$, the result is stored in SUM1, while for the other case, $A+B < m$, the result is placed in SUM0. As mentioned before, if at least one of the *AND*s' output bits in the first level gets the value 1, the result of the modular addition of A and B is equal to or greater than m . Otherwise, the result is less than m . $L0$ signals are connected to the *NOR* gate with 6 inputs. Based on the output of this gate (*sel*), SUM0 or SUM1 is selected (*sel* is the complement of *cl*). It should be noted that some multi-input gates in Figure 1 can be implemented using tree structures of 2-input gates without impacting the delay. Let us analyse the operation of the circuit to compute SUM0 and SUM1. SUM0 circuit As observed in Fig. 2, B , with the bits in the reverse order, and A are the inputs of the *NOR* and *AND* gates in the first level. When $A+B < m$, the output of all the *AND* gates in the first level becomes 0, and the number of output bits of the *NOR* gates with value '1' is used to identify the number of zeros in SUM0. Therefore, if at least one of the $Z0$ signals becomes one, the number of zeros in the result is also at least one. Since with TC 0s are placed in the bits located on the left side, the value of the left bit of the SUM0 is equal to the $T0$ signal. If at least the output of two *NOR* gates of the first level become one, the number of bits with 0 in the result will be at least two. As it was mentioned before, if the output of more than one *NOR* gate becomes one, these one-bits are located sequentially.

Therefore, the *AND* gates can detect whenever there are two sequential bits with the value 1. The output of the *NOR* gate with 5 inputs ($T1$) specifies the 5th bit of the SUM0. In the same way, if at least 3 signals of $Z0$ become one, this means that there are at least 3 bits of the result with the value 0, etc. Finally, if $T5$, the output of the *NAND* gate, becomes '0', which means that the outputs of all the *NOR* gates in the first level are '1', all the 6 bits of the sum are '0'. SUM1 circuit Whenever $A+B \geq m$, the result of the modular addition of A and B is SUM1. The output of all the *NOR* gates in the first level becomes 0, and the outputs of the *AND* gates in the first level are used to calculate SUM1. If exactly one of the outputs of the *AND* gates become one, the result of $A+B$ is equal to the modulo m and the sum takes the value of zero. As it was mentioned before, if $A+B \geq m$, the difference between the number of bits of the result with the value 1 and the number of *AND* gates with output 1 is one. Hence, if at least two $L0$ signals have the value 1 there is at least one bit of the result with the value '1'. In this situation, the output of the *NOR* gate with 5 inputs ($T1$) takes the value zero. Since in TC, ones are placed sequentially at the right-hand side, the value of the rightmost bit of SUM1 is the complemented value of $T1$. Similarly, having at least three signals of $L0$ with the value '1' results in the least two bits taking the value '1', etc.

Whenever the result of $A+B$ becomes equal to or greater than m , the result has at least one bit with the value zero, placed on the left side. In order to add two modulo m integers A and B , the addition result is in the range 0 to $2m-2$. When $A+B \geq m$ the result of the addition takes the maximum value of $m-2$ and there is at least one zero bit. It should be noted that the six $L0$ signals are used to compute the MUX' selector. If at least one of these signals takes the value of one, the output of the 6-input *NOR* gate, which generates the *sel* signal, becomes 0, selecting SUM1 as the final result. Otherwise, when all six signals are zero, SUM0 will be

outputted. The structure of the proposed TCR adder in Fig. 1 can be easily generalized for a general value of m .

4. Results and discussions

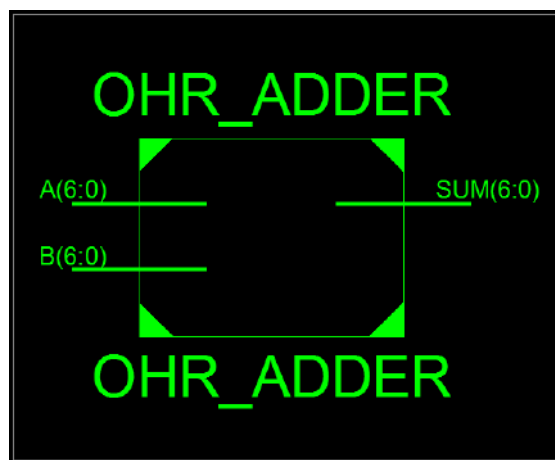


Fig 1: RTL Schematic of OHR adder

RTL Schematic: RTL schematic is described as register transfer logic that means the logic is transferred to registers it is also known as designer view because it is looking like what is the intention of designer.

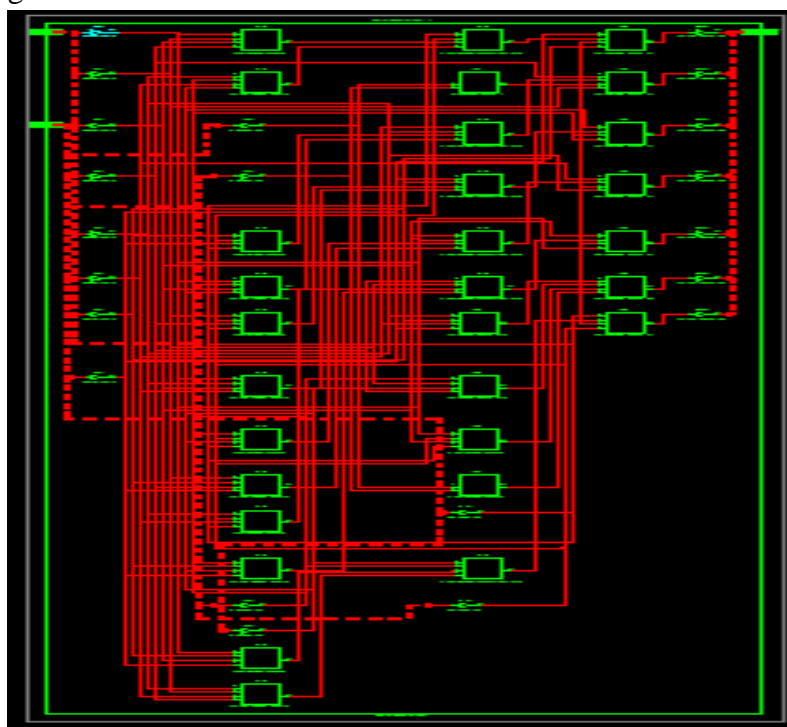


Fig 2: View Technology Schematic of OHR adder

TECHNOLOGY SCHEMATIC: - The technology schematic makes the representation of the architecture in the LUT format, where the LUT is consider as the parameter of area that is used in VLSI to estimate the architecture design. the LUT is the memory allocation of the code is represented in there LUT s in FPGA.

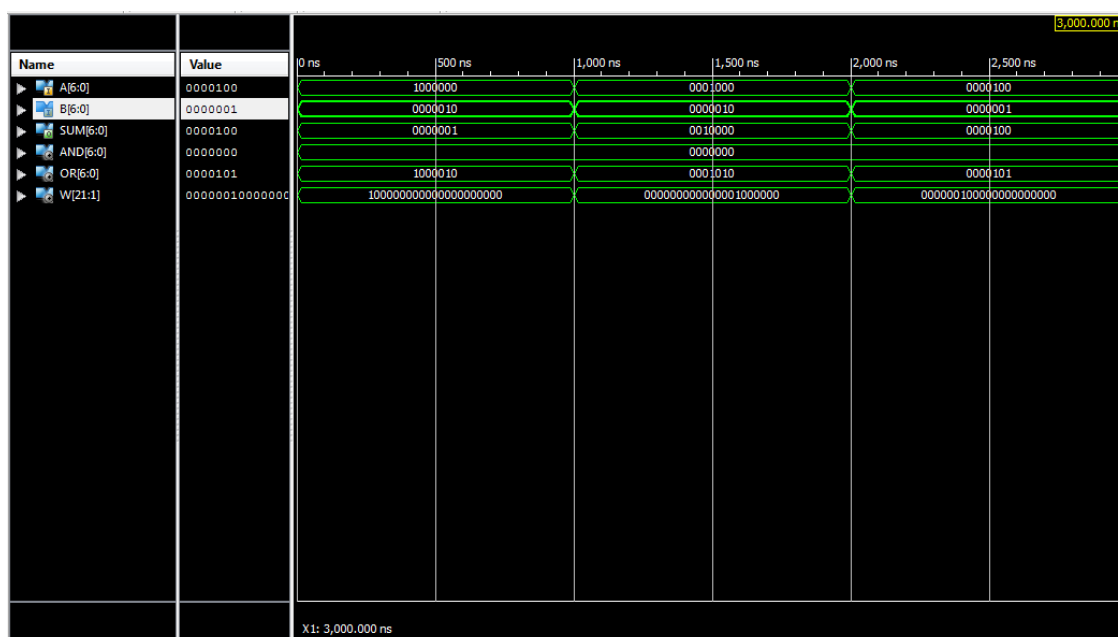


Fig 3. Simulated waveform of OHR adder

The simulation is the process which is termed as the final verification in respect to its working whereas the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implementation to the simulation on the home screen of the tool, and the simulation window confines the output in the form of waveforms output. Here it has the flexibility of providing the different radix number systems.

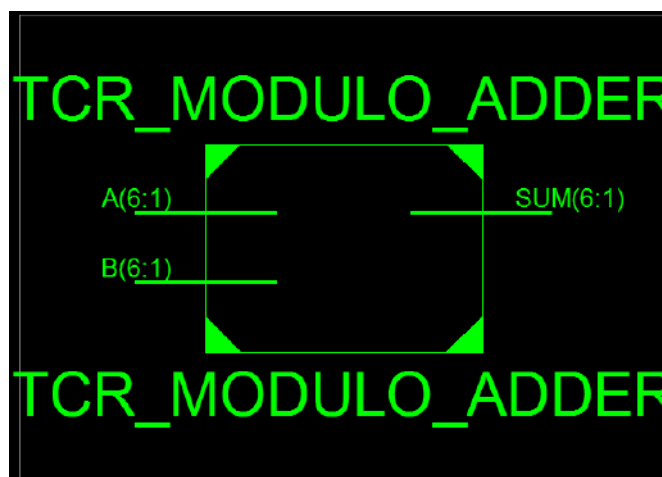


Fig 4: RTL Schematic of TCR adder

RTL Schematic: RTL schematic is described as register transfer logic that means the logic is transferred to registers. It is also known as designer view because of it is looking like what is the intention of designer.

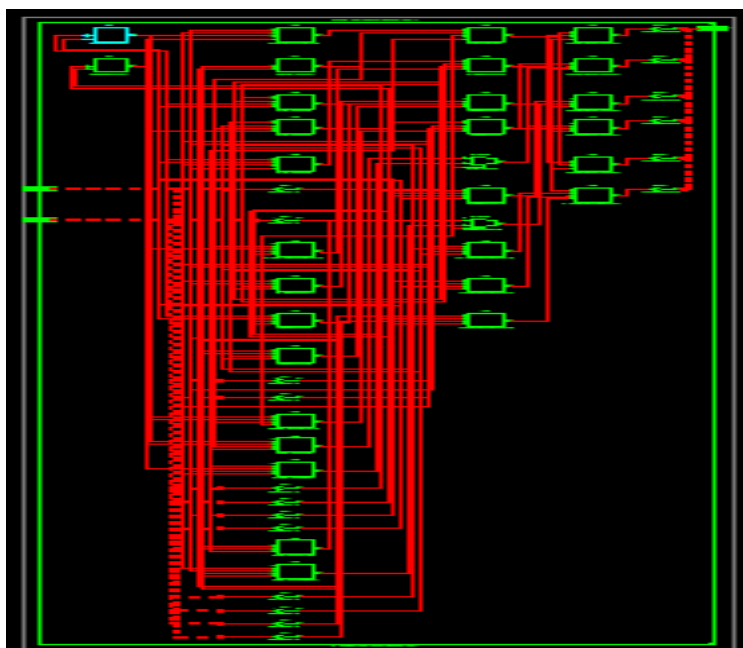


Fig 5: View Technology Schematic of TCR adder

TECHNOLOGY SCHEMATIC: - The technology schematic makes the representation of the architecture in the LUT format, here the LUT is consider as the parameter of area that is used in VLSI to estimate the architecture design .the LUT is consider as an square unit the memory allocation of the code is represented in there LUT s in FPGA.

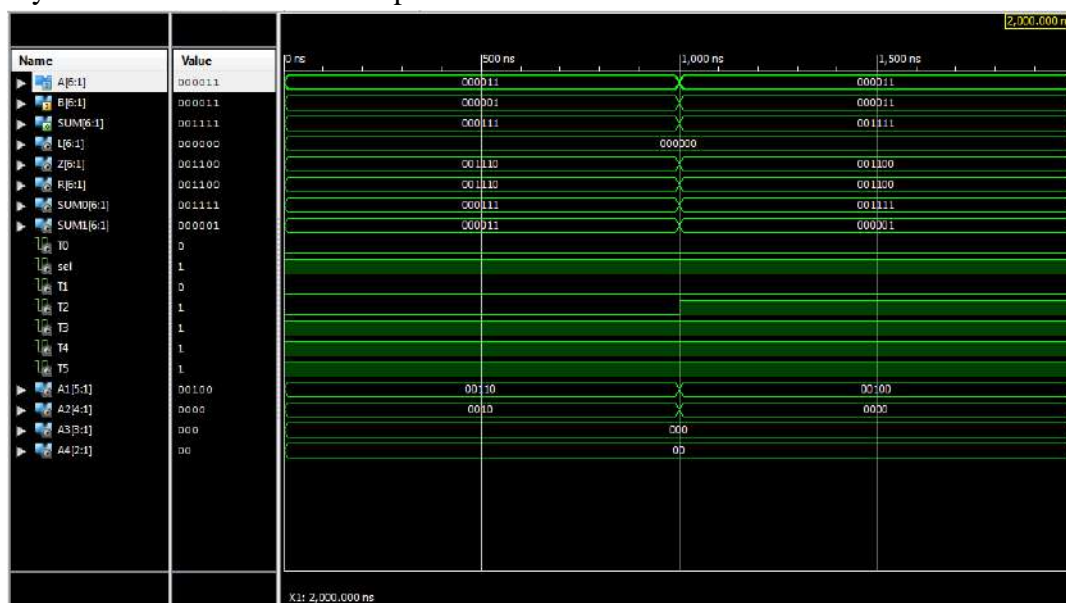


Figure 6. Simulated waveform of TCR adder

The simulation is the process which is termed as the final verification in respect to its working whereas the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implementation to the simulation on the home screen of the tool, and the simulation window confines the output in the form of waveforms output. Here it has the flexibility of providing the different radix number systems.

5. Conclusion

Two new classes of efficient modular adders are proposed, for Thermometer Coding (TC) and One-Hot Coding (OHC). The main advantages of the proposed adders are their high performance and low-cost, making them useful for example for Residue Number Systems (RNSs) based on small moduli sets, used for digital signal processing embedded systems and IoT. For the first time, the conventional multiplexer-based design of OHC and TC adders are proposed. Since TC and OHC modular adders do not require carry propagation, their structures for small moduli become simpler, more efficient and have lower delay than binary modular adders (except for moduli with the shape of 2^n). Performance analyses and experimental results (table 1) have shown the significant impact of these improvements. Moreover, the formulation and architectures introduced in this work are easily extended to design other units for modular arithmetic, such as subtractors. These adders will be used by decomposing in this a large integer into a set of smaller integers, a large calculation can be performed as a series of smaller calculations that can be performed independently and in parallel.

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Modified High Speed 32-bit Vedic Multiplier Design and Implementation

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Abstract:

The proposed work specifies the modified version of binary Vedic multiplier using Vedic sutras of ancient Vedic mathematics. It provides modification in preliminarily implemented Vedic multiplier. The modified binary Vedic multiplier is preferable has shown improvement in the terms of the time delay and also device utilization. The proposed technique was designed and implemented in Verilog HDL. For HDL simulation, Xilinx tool is used and for circuit synthesis, Xilinx is used. The simulation has been done for 4-bit, 8-bit, 16-bit, 32-bit multiplication operation. Only for 32-bit binary Vedic multiplier technique the simulation results are shown. This modified multiplication technique is extended for larger sizes.

Index Terms—Vedic multiplier, Ripple carry adder, Verilog HDL, simulation synthesis.

1. Introduction

Multipliers play an important role in today's digital signal processing and various other applications. With advances in technology, many researchers have tried and are trying to design multipliers which offer either of the following design targets – high speed, low power consumption, regularity of layout and hence less area or even combination of them in one multiplier thus making them suitable for various high speed, low power and compact VLSI implementation. The common multiplication method is “add and shift” algorithm. In parallel multipliers number of partial products to be added is the main parameter that determines the performance of the multiplier. To reduce the number of partial products to be added, Vedic multiplier using carry look ahead adder is one of the most popular Urdhva Tiryakbhayam method. In this lecture we introduce the multiplication algorithms and architecture and compare them in terms of speed, area, power and combination of these metrics. The binary multiplication also happens in same way of digit multiplication as shown in below example here by getting partial products and gates are used and we are using adder (half adder, full adder) adding the columns. Although the method is simple as it can be seen from this example, the addition is done serially as well as in parallel. To improve on the delay and area the CRAs are replaced with Carry Save Adders, in which every carry and sum signal is passed to the adders of the next stage. Final product is obtained in a final adder by any fast adder (usually carry ripple adder). In array multiplication we need to add, as many partial products as there are multiplier bits. In applications like multimedia signal processing and data mining which can tolerate error, exact computing units are not always necessary. They can be replaced with their approximate counterparts. Research on approximate computing for error tolerant applications is on the rise. Adders and multipliers form the key components in these applications. In, approximate full adders are proposed at transistor level and they are utilized in digital signal processing applications.

2. Literature view

Vijay Kumar Reddy Modified High Speed Vedic Multiplier Design and Implementation The proposed research work specifies the modified version of binary Vedic multiplier using Vedic sutras of ancient Vedic mathematics. It provides modification in preliminarily implemented Vedic multiplier. The modified binary Vedic multiplier is preferable has shown improvement in the terms of the time delay and also device utilization. The proposed technique was designed and implemented in Verilog HDL. For HDL simulation, modalism tool is used and for circuit synthesis, Xilinx is used. The simulation has been done for 4bit, 8bit, 16bit, multiplication operation. Only for 16bit binary Vedic multiplier technique the simulation results are shown. This modified multiplication technique is extended for larger sizes. The outcomes of this multiplication technique are compared with existing Vedic multiplier techniques. A. Momeni, J. Han, P. Montuschi, and F. Lombardi, "Design and Analysis of Approximate Compressors for Multiplication", Inexact (or approximate) computing is an attractive paradigm for digital processing at nanometric scales. Inexact computing is particularly interesting for computer arithmetic designs. This paper deals with the analysis and design of two new approximate 4-2 compressors for utilization in a multiplier. These designs rely on different features of compression, such that imprecision in computation (as measured by the error rate and the so-called normalized error distance) can meet with respect to circuit-based figures of merit of a design (number of transistors, delay and power consumption). Four different schemes for utilizing the proposed approximate compressors are proposed and analyzed for a Dadda multiplier. Extensive simulation results are provided and an application of the multipliers to image processing is presented. The results show that the proposed designs accomplish significant reductions in power dissipation, delay and transistor count compared to an exact design; moreover, two of the proposed multiplier designs provide excellent capabilities for image multiplication with respect to average normalized error distance and peak signal-to noise ratio (more than 50 dB for the considered image examples).

3. Proposed Method

Multipliers are key arithmetic circuits in many such applications such as digital signal processing (DSP). In this paper, a novel multiplier with a lower power consumption and a shorter critical path than traditional multipliers are proposed for high-performance DSP applications. This multiplier leverages a newly-designed approximate adder that limits its carry propagation to the nearest neighbors for fast partial product accumulation. Different levels of accuracy can be achieved through a configurable error recovery by using different numbers of most significant bits (MSBs) for error reduction. The multiplier has a low mean error distance, i.e., most of the errors are not significant in magnitude. Compared to the Wallace multiplier, a 16-bit multiplier implemented in a 28nm CMOS process shows a reduction in delay and power of 20% and up to 69%, respectively. It is shown that by utilizing an appropriate error recovery, the proposed multiplier achieves similar processing accuracy as traditional exact multipliers but with significant improvements in power and performance. Approximate computing has received significant attention as a promising strategy to decrease power consumption of inherently error tolerant applications. In this paper, we focus on hardware-level approximation by introducing the partial product

perforation technique for designing approximate multiplication circuits. We prove in a mathematically rigorous manner that in partial product perforation, the imposed errors are bounded and predictable, depending only on the input distribution. Through extensive experimental evaluation, we apply the partial product perforation method on different multiplier architectures and expose the optimal architecture-perforation configuration pairs for different error constraints. We show that, compared with the respective exact design, the partial product perforation delivers reductions of up to 50% in power consumption, 45% in area, and 35% in critical delay. In addition, the product perforation method is compared with the state-of-the-art approximation techniques, i.e., truncation, voltage over scaling, and logic approximation, showing that it outperforms them in terms of power dissipation and error.

Multiplication is a key fundamental function for many error-tolerant applications. Approximate multiplication is considered to be an efficient technique for trading off energy against performance and accuracy. This paper proposes an accuracy-controllable multiplier whose final product is generated by a carry-maskable adder. The proposed scheme can dynamically select the length of the carry propagation to satisfy the accuracy requirements flexibly. The partial product tree of the multiplier is approximated by the proposed tree compressor. An 8×8 multiplier design is implemented by employing the carry maskable adder and the compressor. Compared with a conventional Wallace tree multiplier, the proposed multiplier reduced power consumption by between 47.3% and 56.2% and critical path delay by between 29.9% and 60.5%, depending on the required accuracy. Its silicon area was also 44.6% smaller. In addition, results from an image processing application demonstrate that the quality of the processed images can be controlled by the proposed multiplier design.

4. Results and discussion

The RTL schematic is abbreviated as the register transfer level it denotes the blue print of the architecture and is used to verify the designed architecture to the ideal architecture that we are in need of development. The HDL language is used to convert the description or summery of the architecture to the working summery by use of the coding language i.e., Verilog, VHDL. The RTL schematic even specifies the internal connection blocks for better analysing. The figure represented below shows the RTL schematic diagram of the designed architecture.

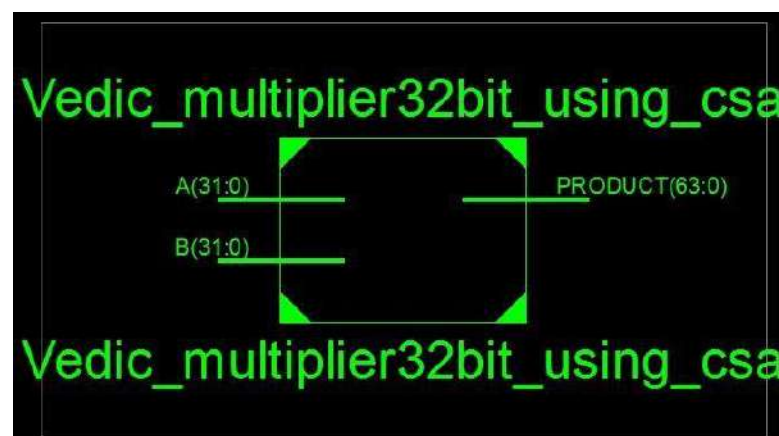


Figure 1: RTL Schematic of Vedic multiplier using carry save adder

The technology schematic makes the representation of the architecture in the LUT format, where the LUT is consider as the parameter of area that is used in VLSI to estimate the architecture design. the LUT is consider as a square unit the memory allocation of the code is represented in there LUT s in FPGA.

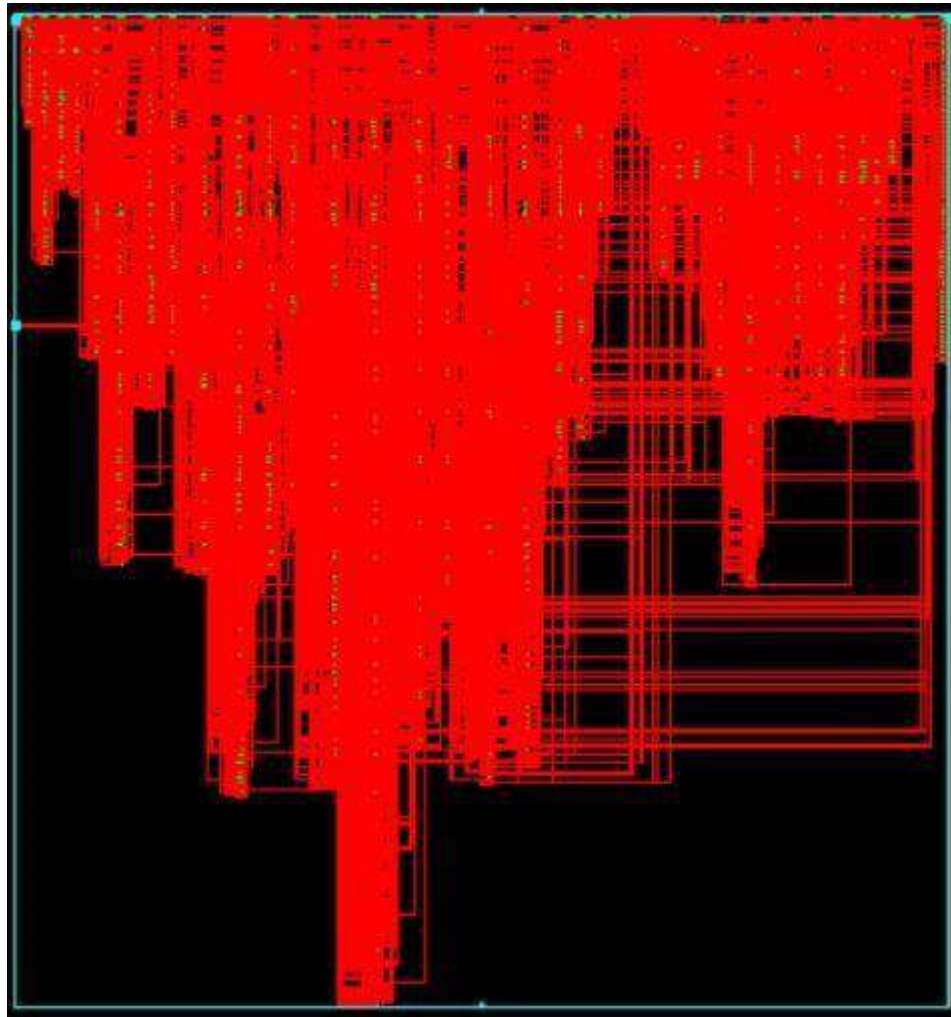


Figure 2: View Technology Schematic of Vedic multiplier using carry save adder

The simulation is the process which is termed as the final verification in respect to its working whereas the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implantation to the simulation on the home screen of the tool, and the simulation window confines the output in the form of the wave forms. Here it has the flexibility of providing the different radix number systems.

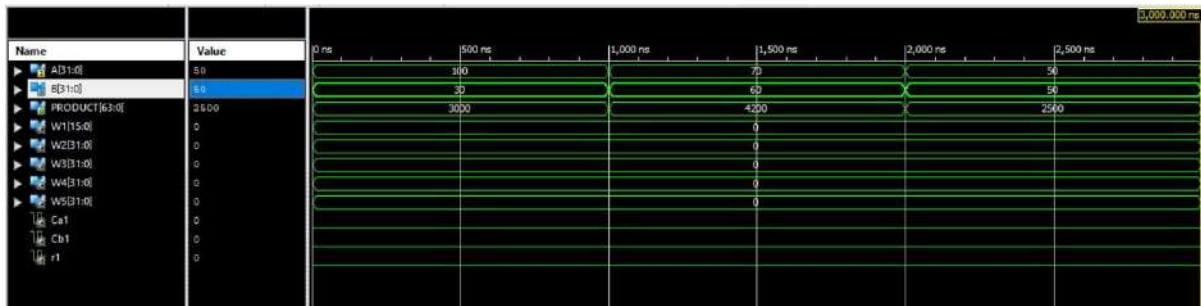


Figure 3: Simulated Waveforms of Vedic multiplier using carry save adder

Consider in VLSI the parameters treated are area, delay and power, based on these parameters one can judge the one architecture to other. here the consideration of delay is considered the parameter is obtained by using the tool XILINX 14.7 and the HDL language is Verilog language.

Table.1: hardware utilization summery

Device Utilization Summary (estimated values)			
Logic Utilization	Used	Available	Utilization
Number of Slice LUTs	2835	46560	6%
Number of fully used LUT-FF pairs	0	2835	0%
Number of bonded IOBs	128	240	53%

5. Conclusion

This project has presented a systematic method for binary multiplier circuits which is based on Vedic mathematics. When it comes to the terms of time delay then the proposed system is more efficient than existing methods. Elongation for a higher bit size can be done with help of proposed technique. Moreover, adders of different architectures can be used in the CSA (Carry Save Adder) design used in the proposed modified Vedic multiplier. Among many techniques modified architecture is used to increase and speed up the multiplication. In this technique hike in area occurred it is a drawback. The proposed Vedic Multiplier and Squaring Architectures has been designed by using Vedic mathematics sutras for DSP application. And Simulated in Vivado tool and Implemented on Zynq board. As the number of bit size increases these architectures offer great improvement in delay. And improves the speed. Future scope of the work is to increase the bits, improvement in delay, analysis of power consumption and area. In order to further reduce the delay and area of multipliers, we can use the fastest adders other than Kogge stone adders.

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IOT BASED MONITORING SYSTEM FOR COMATOSE PATIENTS

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Abstract

Embedded technology has entered almost in all aspects of day-to-day life, and the healthcare field is no exception for that the requirement for fully-equipped hospitals and diagnostic centers growing day by day as people are becoming more unaware of their health problems. Coma is a state of unconsciousness in which patient cannot feel or respond to the pain, light or sound, it does not initiate volunteering any actions. These patients need utmost care and 24*7 observations. Patients in a coma state need to have a continuous update of Blood pressure, temperature, humidity. Doing this manually can become almost impossible to keep updates of multiple patients at the same time. In order to address this situation, our system comes to the rescue. This paper presents a continuous monitoring and recording of patient data without human intervention. If there are any sudden changes occur in the normal range of body parameters such as body temperature falls or rise, blood pressure (B.P) increases or decreases causing high or low B.P. where both are not stable conditions for better health, then it has facility to automatically alert the medical person. Medical person can keep the track of patient using login to the system. This system is powered by the Arduino where we collect the information of patients with the help of sensors. The movement sensor detects the patient movement and also generates an alert message to the medical person. These sensors use WIFI to communicate this information to the internet.

Keywords: Blood pressure, Internet of Things.

1. Introduction

To keep individuals healthy, an effective and readily accessible modern healthcare system is a prerequisite. A modernized healthcare system should provide better healthcare services to people at any time and from anywhere in an economic and patient friendly manner. In traditional method, doctors play an important role in health check-up because this process requires a lot of time for registration, appointment, check-up and then reports are generated later. Due to this lengthy working process people tend to ignore the check-ups or postpone it. Coma is sometimes called persistent vegetative state and is a profound or deep state of unconsciousness, Persistent vegetative state is not brain-death. An individual in a state of coma is alive but unable to move or respond to his or her environment. Coma may occur as a complication of an underlying illness, or as a result of injuries, such as head trauma. Because of expanding work cost, medical institutions would constrain to decrease nursing staff for patients. There are lots of IOT devices these days used to monitor the health of patients over the internet. Health experts are also taking advantage of these smart devices to keep an eye on their patients. In this paper, a secured IOT-based healthcare monitoring system for coma patients is introduced. To achieve system efficiency

simultaneously and robustness of transmission within public IOT-based communication networks, a robust asymmetric cryptograph is used to construct two communication mechanisms for ensuring transmission confidentiality and security which can help patients to be monitored remotely. By this, on the basis of derived data if a patient is in a critical situation, an immediate instruction can be given to the person who is in charge. The system will play a vital role to reduce labour cost, ease of access from anywhere at any time and will be helpful in making effective decision.

2. Literature survey

To keep persons healthy, an efficient and widely available contemporary healthcare system is a requirement. A modernised healthcare system should provide better healthcare services to people at any time and from anywhere in an economic and patient friendly manner in traditional method, doctors play an important role in health check- up because this process requires a lot of time for registration, appointment, check-up and then reports are generated later. Due to this long operating procedure individuals choose to disregard the check-ups or postpone it. Coma is often termed persistent vegetative state and is a severe or deep condition of unconsciousness, Persistent vegetative state is not brain-death. An person in a condition of coma is alive but unable to move or react to his or her surroundings. Coma may arise as a consequence of an underlying disease, or as a result of traumas, such as head trauma. Because of rising job expense, medical institutions would restrain to lower nursing personnel for patients. There are dozens of IOT gadgets these days utilised to monitor the health of patients through the internet. Health specialists are also taking use of these smart gadgets to keep an eye on their patients. In this study, a secured IOT-based healthcare monitoring system for coma patients is described. To achieve system efficiency simultaneously and robustness of transmission within public IOT-based communication networks, a robust asymmetric cryptograph is used to construct two communication mechanisms for ensuring transmission confidentiality and security which can help patients to be monitored remotely. By this, on the basis of derived data if a patient is in a critical condition, an urgent instruction may be issued to the person who is in charge. The system will play a critical function to lower staff cost, convenience of access from anywhere at any time and would be useful in making efficient choice.

3. Proposed Method

Internet of Things (IOT) is the internetworking of physical devices, vehicles (also referred to as “connected devices” and “smart devices”), buildings and other items embedded with electronics, software, sensors, actuators and network connectivity that enable these objects to collect and exchange data. In the recent years use of wireless technology is increasing for the need of upholding various sectors and IoT groped the most of industrial area specially automation and control. Biomedical is one of the recent trends to provide better health care. Not only in hospitals but also the personal health care facilities are opened by the IoT technology. Among the applications that Internet of Things (IoT) facilitated to the world, Healthcare applications are most important. The advanced sensors can be either worn or be embedded into the body of the patients, so as to continuously monitor their health. Various processes of different concepts including data acquisition, data transmission and data analytics enable IOT based system to support smart solutions especially for health care. A microcontroller- based device with appropriate biomedical sensors will be attached to patient to provide constant cloud-based monitoring. The vital signs i.e. temperature and pulse rate of the human body which are major clues to detect any health problem will be sensed by respective sensors supported by Arduino in a Wi-Fi environment and the data will be sent to Thing Speak cloud where the data will be analyzed to look for any irregularity. In other to reduce the rate of death especially in coma patients this system is proposing a model which will monitor patients even when medical personnel are absent. It will also reduce valuable time for doctors and nurses, they don't need to wait for the reports because the sensors are giving real time data. The model would be very effective for hospitals in rural areas which are short-staffed.

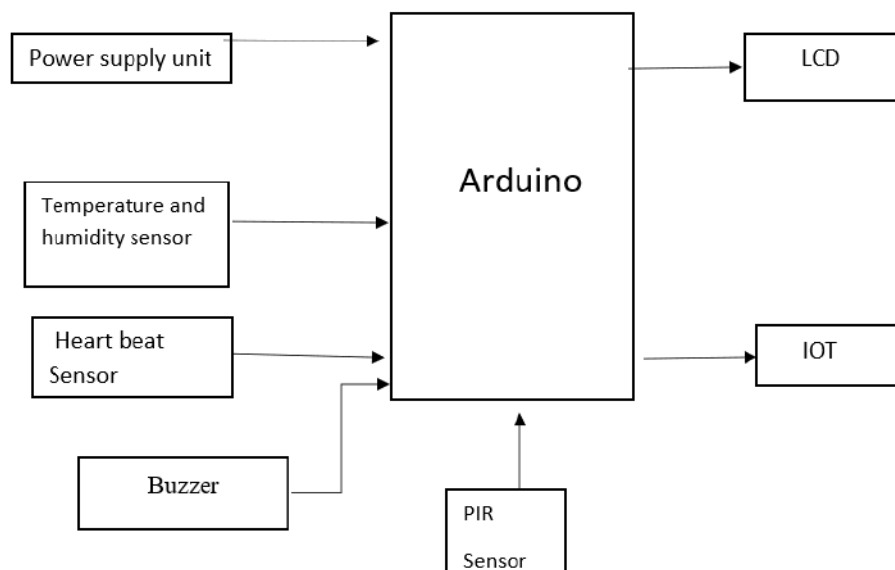


Figure 1. Proposed block diagram

4. Results and discussions

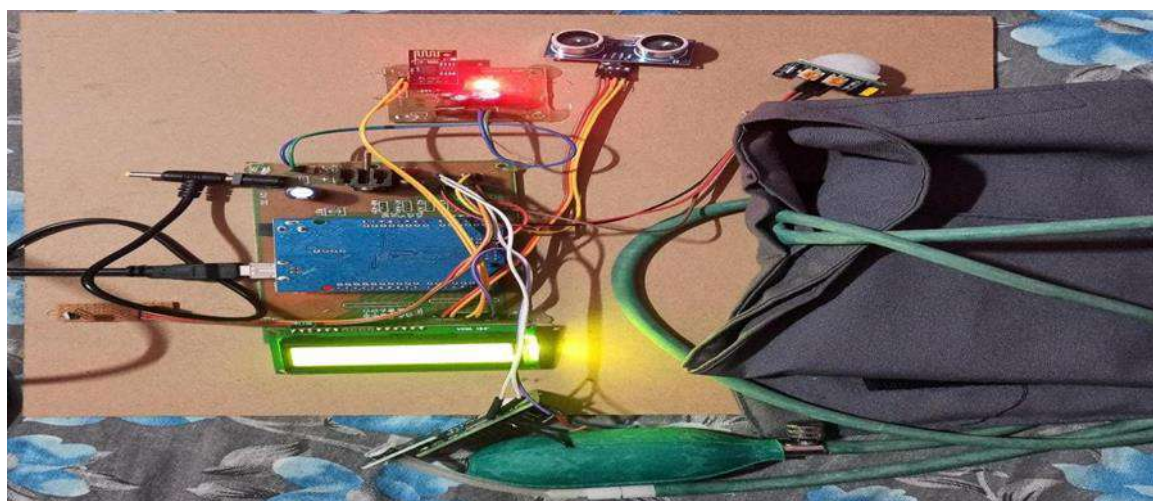


Figure 2. Hardware connections



Figure 3. Initialization



Figure 4. When Temperature is High

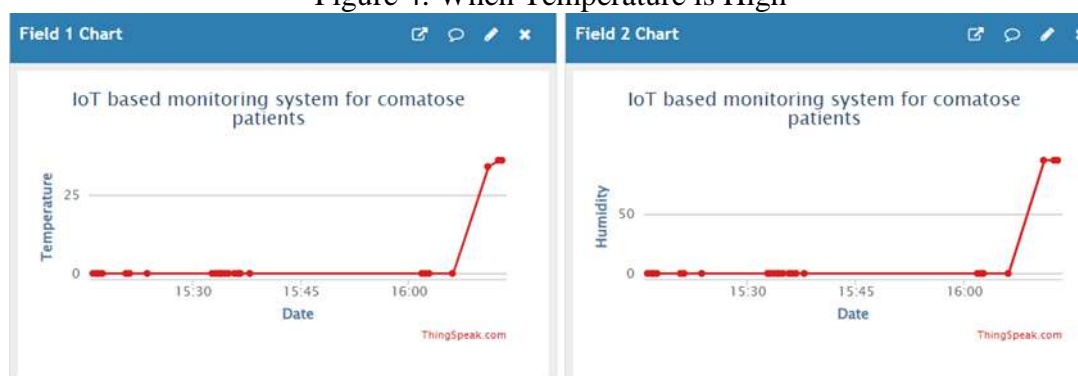


Figure 5. Temperature and humidity

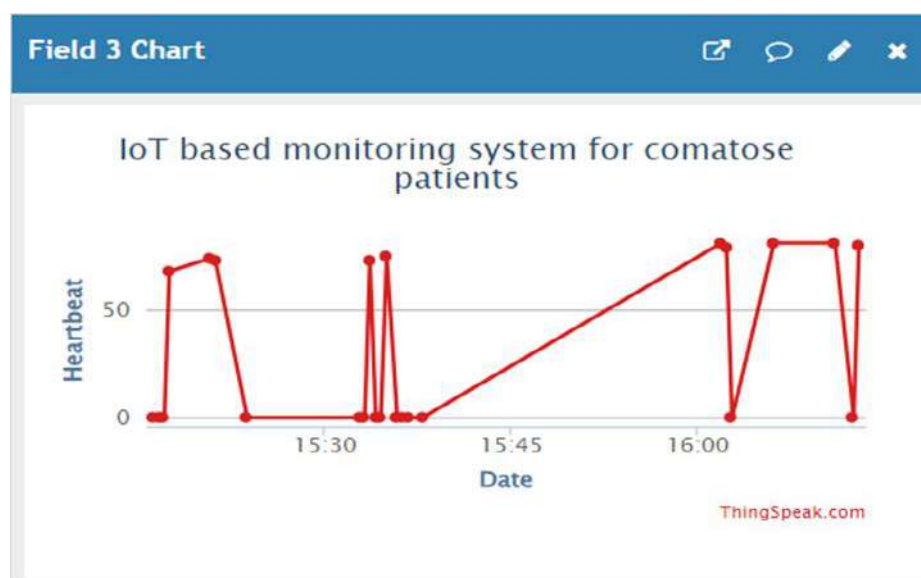


Figure 6. Heart beat

5. Conclusion

The research work “Design and Construct an IOT Based Comatose Patient Monitoring System” has been finally completed, tested and confirmed to be working in line with Aim and Objectives stated earlier. The aim of our proposed system is to build easily accessible design that the patient’s critical information is conveyed quickly to the doctor is achieved. The designed model leads to the better and effective health care service to comatose and the

collected data is networked worldwide with the help of internet and communication which provide a quick response. The system introduced monitoring system for coma patients which monitors the basic important signs of patient. The developed prototype is very simple to design and use. This system will improve current health care system that may protect lots of lives from death. Various steps, including regular monitoring of pulse rate and temperature have been taken to ensure proper treatment. The doctors can view the current readings of the sensors online in real time. This was achieved by using the thing speak cloud technology. The early identification of any health problem can help the patient to take necessary emergency measures, which can potentially save the patient's life.

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LIVE MONITORING OF URBAN AIR QUALITY AND SOUND LEVELS

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Abstract:

Air and noise pollution are a point of concern for any urban dwelling throughout the world. For every urban local body monitoring of air quality and improving is a challenge. The noise pollution coming from various industries and automobiles are needed to be regulated. The project attempted is a console consisting of noise sensor and a gas sensor (MQ2/MQ136). Which is controlled by Arduino UNO microcontroller i.e., connected to an IOT based server such that the sensed value from MQ2 and noise sensor are displayed over the display unit. The statistical obtained on day-to-day basis with air quality and noise levels from for a model of acceptance levels in a specific region. This gives us limits on when to initiate the buzzer. System keeps measuring sound level and reports it to the online server over IOT. The sensors interact with microcontroller which processes this data and transmits it over internet. This allows authorities to monitor air pollution in different areas and take action against it. Also, authorities can keep a watch on the noise pollution near schools, hospitals and no honking areas, and if system detects air quality and noise issues it alerts authorities so they can take measures to control the issue.

Keywords: Arduino UNO microcontroller , air quality.

1. Introducon

Air and sound pollution is a growing issue these days. It is necessary to monitor air quality and keep it under control for a better future and healthy living for all. Here we propose an air quality as well as sound pollution monitoring system that allows us to monitor and check live air quality as well as sound pollution in a particular areas through IOT. System uses air sensors to sense presence of harmful gases/compounds in the air and constantly transmit this data to microcontroller. Also system keeps measuring sound level and reports it to the online server over IOT. The sensors interact with microcontroller which processes this data and transmits it over internet. This allows authorities to monitor air pollution in different areas and take action against it. Also authorities can keep a watch on the noise pollution near schools, hospitals and no honking areas, and if system detects air quality and noise issues it alerts authorities so they can take measures to control the issue. In infrastructure and industrial plants the rapid growth creating environmental issues like pollution (Air, Water, Noise), climate change, malfunctioning and has greatly consequence for the requirement of an, operationally adaptable, efficient, cheap and smart monitoring systems. In this context where combination of many challenges of computer science, wireless communication and electronics; the Smart Sensor Networks are an emerging field of research. In this paper a solution to monitor the air and noise pollution levels in industrial environment or by using wireless embedded computing system a particular area of interest is proposed. The

technology like Internet of Things (IoT) is included in the form of solution which is outcome of merged field of computer science and electronics.

2. Literature survey

For monitoring the fluctuation of parameters like noise and air pollution levels from their normal levels in this case the sensing devices are connected to the embedded computing system. For the requirement of continuous monitoring, controlling and behaviour analysis this model is adaptable and distributive for any infrastructural environment. For two or three parameters like noise, CO and radiation levels the implementation is tested with respect to the normal behaviour levels or given specifications which provide a monitoring over the pollution control to make the environment smart and Eco-friendly. This system is made to fulfill the purpose and need of the society to monitor and check the live air quality and sound pollution in an area through IOT. The system uses air sensors to check the presence of harmful and hazardous gases/ compounds such as Methane, propane, Butane, alcohol, noxious gases, carbon monoxide etc in the air and also uses the sound sensor to keep measuring sound level in the surroundings. MQ2 is the air sensors which are used to collect air pollutants and a sound sensor module mic is used to capture sound. These sensors interact with arduino which processes this data and then transmit it over the mobile application. To send the data over remote location WIFI modem is also installed. And whenever the air pollution is detected, a buzzer immediately beeps and when there is a noise pollution an LED starts blinking continuously. With this system not only the authorities but also the localized people can check the transmitted data through their mobile phone and that too without spending single penny and the people can act against it on their level and try to bring the pollution level under control. This system would contribute as a part in the building of a healthy society.

3. Proposed System

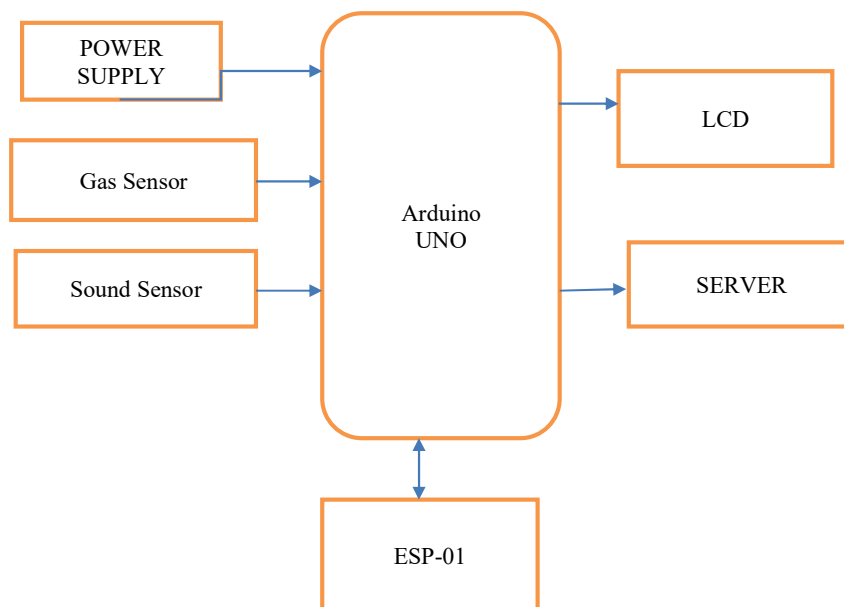


Figure 1. Proposed system

The Air and Sound Pollution Monitoring System consists of the Arduino Uno which is based on ATmega328 microcontroller. Arduino is also known as the mind of the device as everything in this system is controlled by the Arduino. Initially, the Arduino is provided with a 5 V DC supply through port 9600. Now the Air sensor is connected to the analog 0 pin and the sound sensor is connected to the 9th pin. These sensors provide the data to the Arduino that is displayed on the LCD display continuously, LCD Display is connected to 2,3,4,5,11,12 pins in the arduino board and if the air pollution exceeds the set limit then the output is shown in the analog form i.e. if the air pollution is raised above 390ppm then it will be displayed on the output pane , Led 1 will blink and the buzzer (connected to the 7th pin) simultaneously buzz and similarly when the sound pollution exceeds the set limit (90dB in this case) the Led 2 will blink and 1 will be displayed as output on the output plane. Now the data which is retrieved from air and sound sensor will be provided to the wifi module which is connected to the 3.3 V pin on the Arduino board. This wifi module will then provide this data to the android application accessible to all the android phone users and accordingly the local people can take actions on their part.

4. Results and discussion

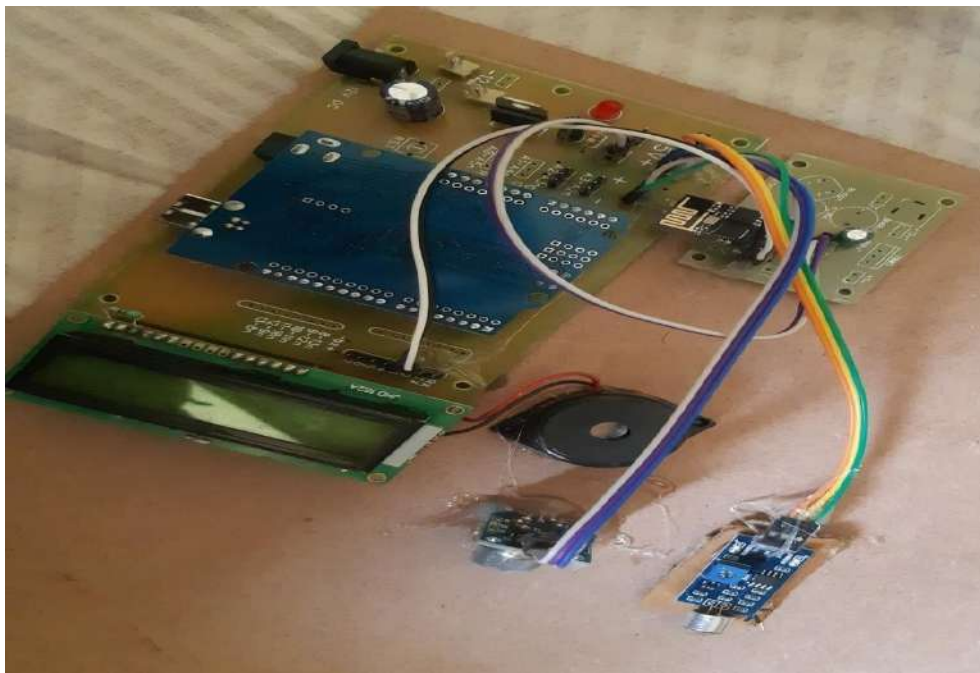


Figure 2. Hardware kit

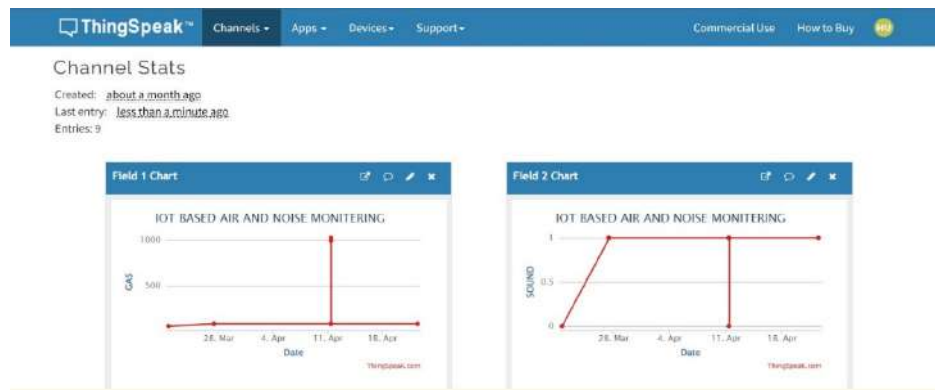


Figure 3. Graph of the output in server

This is the graph where the gas and sound sensors shows the output of the project. Here we observed the values of the gas and sound sensors over a duration of 26 March to 12 April i.e. 15 days. The values are below the given range so no alert was given.

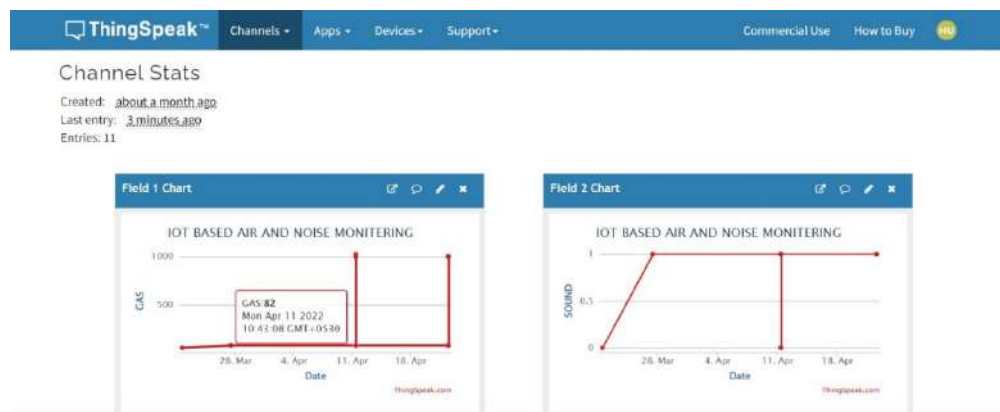


figure 4. Gas sensor observation

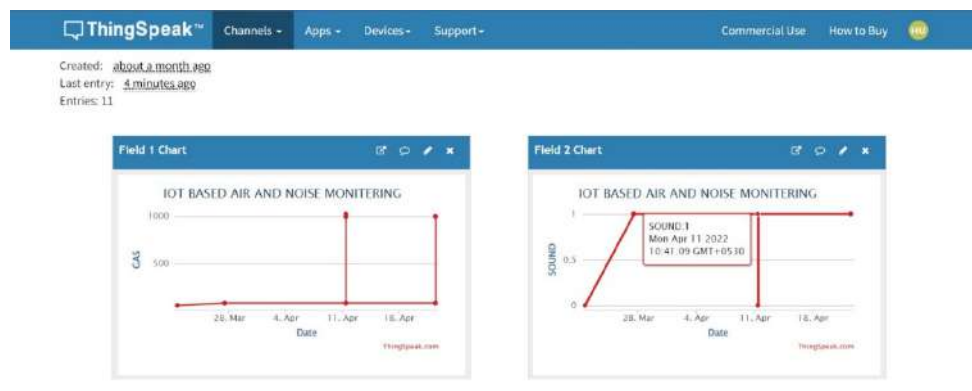


Figure 5. Sound sensor observation

As the project is executed the output will be displayed in the thingspeak server which is created. The graph is displayed with the detection of the gas sensor and the sound sensor values and the time and date of the execution of the project. The output is displayed as shown above.

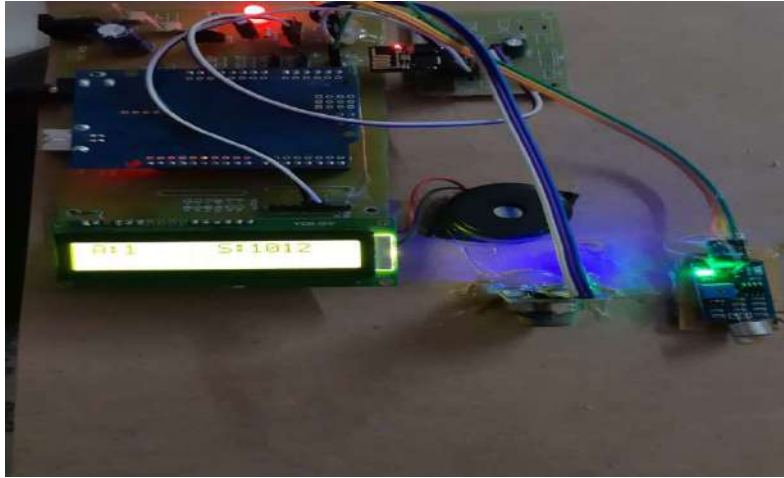


Figure 5: Prototype of the project

5. Conclusion

The developed system is effectively used to control the air and noise pollution which has been the major issue these days in the world especially in the cities. The device can be used in the Industrial areas or in the place where the pollution of air and noise is high. The proposed monitoring system that allows us to monitor and check live air quality as well as sound pollution in a particular area through IOT. Systems uses air sensors to sense presence of harmful gases/compounds in the air and constantly transmit this data to microcontroller. Also, system keeps monitoring sound level and reports it to the online server over IOT. The sensors interact with microcontroller which processes this data and transmits it over the internet. The authorities will get the information where the pollution is high and they can take several actions to control the pollution. Also, the authorities can keep a watch on the pollution by the updates given in the server by the device. If the system detects more than the threshold and if it causes issues in the places near like hospitals, schools etc., the authorities will take measures to control the issue. The design of the air and sound quality monitoring Network basically involves determining the number of stations and their locations, with a view of the objectives, costs and available resources. To assist an industrialist, an expert system must contain some guidance should be developed to fix the exact number and distribution of monitoring locations of a sensor. The expert to energy efficient continuous air and sound pollution monitoring sensor network. By using this project each and every variation we can analyze and inform nearby people in time. We can also analyze data from home using thingspeak. The most important factor of this system is that it is small, cost efficient and portable. Sensors are available easily anywhere. This system fully helpful to save the lives and overcome all the problem related to environment.

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POWER OPTIMIZATION MONITORING AND CONTROLLING SYSTEM OVER IOT

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Abstract

The main and basic intent of our project is to create and develop a system that will render us with a mobile control for our home appliances and would also provide us with security against the mishaps that occur when the house host is not present at home. Our project basically deals with the automated control of Light dimming/dipping based on intensity/need of luminous, which is to control one/more loads to On/Off using by driver potential meter, and scheduling along with time, the appliances that we use at home with the help of the internet and mobile application V-ismart. It is mainly meant to save human energy and the electrical power. Our project has been made with the aid of a controller and a device called ESP-01 and ARDUINO. All the appliances are connected with the micro controller and a sensor is connected using a wireless network. The developed system consists of Arduino UNO, a WiFi module (ESP8266), a relay, a low current sensor breakout (ACS712), and a liquid crystal display (LCD). Arduino UNO is a microcontroller used to program customized coding for executing output at any instant time. The ESP8266 WiFi module is used as the platform. The ESP8266 WiFi module is famous for its IoT applications. Automated system monitors and the power consumption is optimized by varying the intensity of light.

Keywords: Power optimization, wi-fi.

1 Introduction

We are in the midst of an era where the technology has solved most of our problems. With depleting resources there has been a strong urge to save energy and find alternatives. The proposed home automation system allows user to switch ON and OFF the lights, fans etc. From any part of the world since this system is controlled using IOT. The concept behind this is to receive the sent signal string from mobile and then processing it to perform the desired function. This is most useful for people living alone since it allows them to remotely monitor their appliances. Our project is aimed at developing system based on sensors & IOT for the capture the many things. Our aim is to develop a system to provide people a living environment with security, convenience, comfort, environmental protection and intelligence. The main idea is to develop a system for fair dealing and better management. It will also be remotely maintainable. This is the spirit and main driving force behind this proposed system. The root problem of all our homes is safety and security and is the major concern in today's world, and hence an improvement in many sectors is of growing importance. Safety is a huge issue in densely populated urban areas and also power saving and improving overall power efficiency is key aspect. The convenience of physical handicapped people for living in home is another issue.

2. Literature survey

The previous works were done on such systems which was mainly based on the use of telephone line, i.e. using a phone-based system for home automation using a hardware-based remote controller in [2] and [3]. The application was implemented by using personal computer approach in [4]. Shepherd introduced the method of using Bluetooth wireless technology as a replacement of cables, which tells about the wireless connectivity using radio home automation system in [5]. N.Sriskanthan developed an automated system based on Bluetooth wireless technology from which a user can control different appliances that are connected over a Bluetooth network based on a mobile host controller in [6]. A.Z.Akar developed an internet based wireless home automated system for multi functioning devices. This system has flexible and low cost solution to the wireless home automation systems but still has some limitations related to power failure and communication range of the wireless medium as explained in [7]. Jawarkar developed monitoring system through mobile phone using spoken commands. These spoken commands were generated and sent to the control system through a microcontroller that was designed on the basis of text where a particular task was decided, this was explained in [8]. Wael El-Medany developed a GSM based remote sensing to control the system using FPGA. This system worked as a remote sensing device for the electrical appliances to state whether the device was on or off. Similarly, it allowed the user to control the electrical appliances at home based on SMS technique, this was explained. Zhang developed a home automation system based on (PLC) electrical power communication which used the household connection wire for communication and internet control with logging facilities, this is explained. System that used GSM Bluetooth based controller and remote based monitoring system which was scalable and be used by any number of appliances without any changes in its core was developed.

3. Proposed System



Figure 1. Block Diagram

This system is designed for secured wireless communication; our system is based on the WSN system user can access the system from android mobile using IOT module. Project

contain the two section one is transmitter section and another section is receiver. Transmitter section is containing the android mobile and Receiver section is the actual controlling electronic system for home automation which is designed using the Arduino circuit containing the WIFI module for wireless communication. Sensors are used to sense the current environmental status of the home. Actuators are used to perform the appropriate physical operations. Also provide the indication to indicate the abnormal situation acting in home. WIFI module is used to wireless communication between android mobile as well as the circuit. Above architecture represent the working of the proposed system. Proposed system is implemented using the STM32 development board. System is divided into two section First section is the control system which is actual hardware and another section is remote section which is software. Control system is used to monitor the environmental fault parameter of the home. Software section monitor that parameter remotely or control the system remotely. Control system is collection of modules and sensor mounted on single circuit board. Power supply give the sufficient power to the microcontroller & related modules to operate the properly. Relays are the switching device for the home appliances by using this we can remotely ON/OFF the home appliances. Microcontroller get the data from the sensor according to this data the status is send to the remote system by using the wifi which is wireless communication module. The wifi module gets the sensor date & the status information from the microcontroller to the android mobile through the wireless media. This data is display on the android mobile to monitor the system.

4. Advantages of this Project:

- Managing all of our home devices from one place. The convenience factor here is enormous. Being able to keep all of the technology in our home connected through one interface is a massive step forward for technology and home management. Flexibility for new devices and appliances.
- Being able to integrate the new comers seamlessly will make our job as home owner much easier and allow us to keep upgrading the latest life style technology.
- Safety: Automation system are installed carefully and are integrated under one centralized control unit which ultimately secures the people.
- Energy saving: By controlling temperature and lighting based on the programmed schedules, automation system reduces the energy bills considerably.

5. Applications of this Project:

- Lightning control: Smart lightning allows you to control wall switches, blinds and lamp. Also, you are able to schedules the time light should turn on and off and decides level of light should be emitted.
- HVAC regulation: Heating and cooling our homes consumes an average of 50% of energy costs yearly, making daily HVAC regulation progressively. With automated HVAC you are able to reduce heat when room is unoccupied, and increases or decreases it at specific time based on your schedule.
- Lawn Irrigation System: The grass is always greener.

- Security system: There is great deal of scrutiny regarding the level of trust in controlling your home security system via a mobile device, but it begs earnest exploration when weighing the potential benefits.

6. Conclusion

It can be concluded that IoT lab controlling, dimming & dipping using STM32 was a success. This system consists of an STM32 board, a WIFI Module, an Android phone, power sockets, home appliances. It is user friendly and it is cost effective. Also, it can be concluded that the objectives of this project have been successfully met and they are as Constructed a wireless home automation system controlled by a smartphone specifically an android device. Designed and implement cost effective home automation system yet an efficient one. Designed a user friendly and a safe system to control home appliances especially aimed to aid the elders and handicapped.

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Low Light Image Enhancement using CNN

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Abstract

With the rapid development of science and technology, the self-driving car industry is booming, increasing the use of LiDAR, digital cameras and other instruments. This project proposes to use histogram equalization method combined with neural network to specifically enhance image in the low light environment. Using histogram equalization method to achieve image enhancement is quite simple and fast, while neural network has the advantage of high accuracy. Images captured under poor illumination conditions such as low brightness, low contrast, a narrow gray range and color distortion as well as considerable noise, which seriously affect the subjective visual effect on human eyes and greatly limit the performance of various systems, to improve this we use low light image enhancement using CNN technique.

Keywords: CNN, low light image enhancement.

1. Introduction

Image enhancement and adjustment processing is a very important research issue. Many researchers proposed effective insights and methods [1-5]. Yeong-Taeg proposed contrast enhancement using brightness preserving bi-histogram equalization [1]. Pizer addressed adaptive histogram equalization and its variations [2]. However, how to achieve high image resolution and low computational complexity is a very important issue. In this paper, we proposed image enhancement and adjustment based on histogram equalization of profile compression algorithm to overcome above problems. Image is an important way for people to obtain external information. With the development of technology, a variety of cameras have come on the scene. The resolution and exposure time of cameras have been improved greatly. However, in different working environments, the images acquired by cameras always have various problems, which cannot meet people's requirements very well. Therefore, we need to process, analyze and transform the acquired image [1].

General image processing technologies include image compression, image enhancement, image reconstruction and so on. Image enhancement is a very important application in image processing technology. It can improve the visual effect of the image, enhance the contrast and brightness of the image, highlight some information in the image, and meet the requirements of analysis. Airspace method and frequency domain method are two commonly used methods for improving image quality. Airspace method mainly deals with the pixel value of a point in the image directly to achieve the effect; Frequency domain method mainly uses Fourier transform to transform the image into frequency domain, and then uses inverse transform to get the final result. By comparing and analyzing the two methods, we can find that airspace method is simple and effective, and it is a common processing method. Histogram equalization is a kind of spatial method. It uses the different contrast of image histogram to process,

increases the local brightness of the image, and does not affect the contrast of the whole image while increasing the local contrast [2].

2. Literature survey

Classical Histogram produces an equalized image with it fatten histogram. Histogram Equalization is used to enhance the contrast of the image. Histogram Equalization is the simple method for enhancing the contrast of image. Histogram Equalization distributes the pixels of the image on the dynamic range for enhancing the contrast of the image [7]. Basically, this method uniformly distributes the gray level of the image; the range of gray level is 0 to L-1. So, it improves the contrast of the image. But this method also has some disadvantage. While distributing the pixels on the dynamic range, signal gets distorted.

Adaptive Histogram Equalization is also use to enhance the image's contrast. In Adaptive Histogram equalization for improving the contrast of the image we divide the image into different small parts and take the histogram of each part and uses to redistributes the lightness values [8]. So, the output of the adaptive histogram is same as the specified histogram. By using bilinear interpolation, the other neighboring small parts of the image are combined [9]. This method is different from Classical Histogram Equalization. The drawback of this method is that it cannot regain the brightness as the input image. So, to overcome on this drawback we use advance version of adaptive histogram equalization i.e., Contrast Limited Adaptive Histogram Equalization which is also fail to regain the brightness of image.

Image compression continues to be an important subject in many areas such as communication, data storage, computation etc. The existing traditional techniques are based on reducing redundancies in coding, inter-pixel and psycho visual representation [1]. The Performance of any image compression depends on its ability to capture characteristic features of the image, such as sharp edges and fine textures, while reducing the number of parameters used for its modeling [2]. Image compression requires in several aspects of real-life applications such as satellite image data for weather forecast, earth resource applications, X-ray images, image communication and image database. The image(s) having pixel values between 0 to 255 and type gray scale are compressed. There are several techniques for the image compression but the major known techniques are Lossless image compression and Lossy image compression (refer section II of this paper). In this paper the author will use a lossless method of image compression and decompression with the help of bipolar coding technique and artificial neural network with feed forward propagation [3]. This technique is implemented and the better result obtained. In addition to this LM algorithm is also implemented for image compression and it is analyzed that bipolar coding with LM algorithm in ANN serve as a better and suitable technique for image compression [4].

3. Proposed Method

The system architecture is mainly divided into two parts. The first part is the image enhancement algorithm, and the second part is the use of convolutional neural networks to find compression parameters. At the beginning of the process, we adjust the input image size to 320×240, and then individually input it into the color space converter and neural network model. In the first part, the RGB color space of the original image will be converted to the HSI color space. The H and S spaces are left unchanged, and the I space is left for processing. Then, the I space is compressed by the histogram equalization method and the hyperbolic tangent function to achieve image contrast. Then reconvert HSI space into RGB color space, and finally applied the non-local mean method to denoise the image to obtain the final corrected dark image. In the second part, the image will be input into a custom convolutional neural network, the enhancement factor k is determined through the trained model, and the enhancement factor is imported into the hyperbolic tangent function compression to adjust the best brightness to enhance the night image.

When we decompose the HSI color space, we deal with the intensity part. The global histogram equalization method is used here, and the intensity space is regarded as a gray-scale space for calculation. Respectively calculate the rate density function (1) and the cumulative density function (2). Here, L is the number of pixel values. we compare the gray-scale pixel values and choose 256. n_i represents the sum of the number of pixel values I , N is the number of pixels in the picture. After obtaining the cumulative density function, calculate the conversion function to stretch the comparison of the entire image. The formula is shown in equation (3). If user want to modify the average intensity of the image, they can modify the maximum and minimum values. Since this paper focuses on the enhancement of dark image, the full intensity range is stretched.

$$P_i = n_i N, i = 0, \dots, L-1$$

$$C_i = \sum_{j=0}^i P_j, i = 0, \dots, L-1$$

The maximum value is set to 255 and the minimum value is set to 0. After the histogram enhancement, dark images will be redistributed the pixel values to achieve contrast enhancement, but the pixels and noise are generally distributed in the darker areas of the image, and most of the pixels are pulled after the conversion function extending to the right side of the histogram causes the problem of over enhancement of the image. Therefore, we use the hyperbolic function mentioned in the next section to compress the stretching range and correct the overexposure, over darkness and noise amplification after enhancement.

$$f_i(u,v) = \min + (\max - \min) \times C_i(u,v)$$

Hyperbolic Tangent Function Compression In order to suppress the overexposure and noise, we use the hyperbolic tangent function. Different from the original histogram equalization of profile compression algorithm, the main purpose of the contour compression function is to enhance the color. Therefore, the brightness of the image cannot be enhanced, so we modify it. A hyperbolic tangent function is proposed to compress the transfer function. The main formula is as follows, where d is the degree of difference equation (4), which is obtained by subtracting the original I space pixel value and the pixel value of the transfer function, and the h function is the hyperbolic compression function (5), which determines the contrast

enhancement effect. For the contour compression function of histogram equalization of profile compression algorithm, we have added a curvature factor M . Adjust the compression range not to be too large to avoid losing the contrast enhancement effect of the histogram equalization method. The larger the curvature factor M represents the compression under the same enhancement factor k . The stronger the ability, the original image characteristics are preserved. On the contrary, the smaller the M , the less the compression will be, and the more the contrast enhancement characteristics will be preserved. According to the PSNR of 50 images, the median and image observations are taken.

4. Results and discussion



Figure 1. Input image.

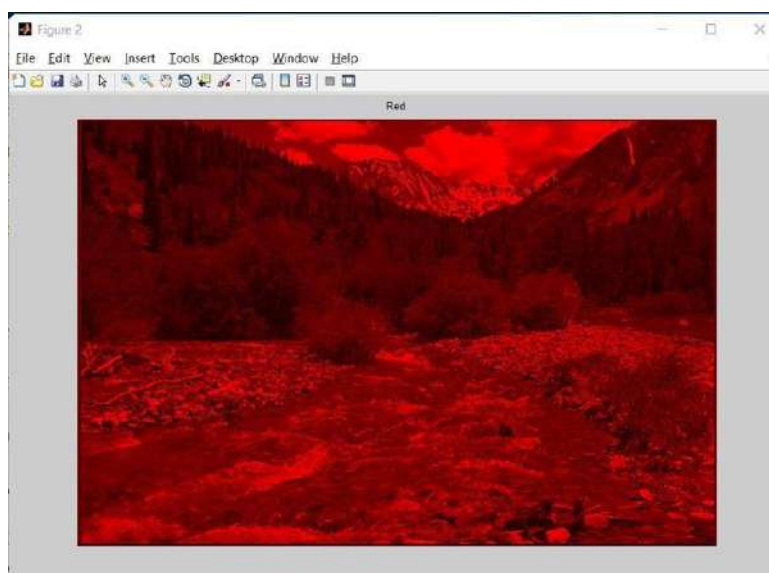


Figure 2. Red colour channel image

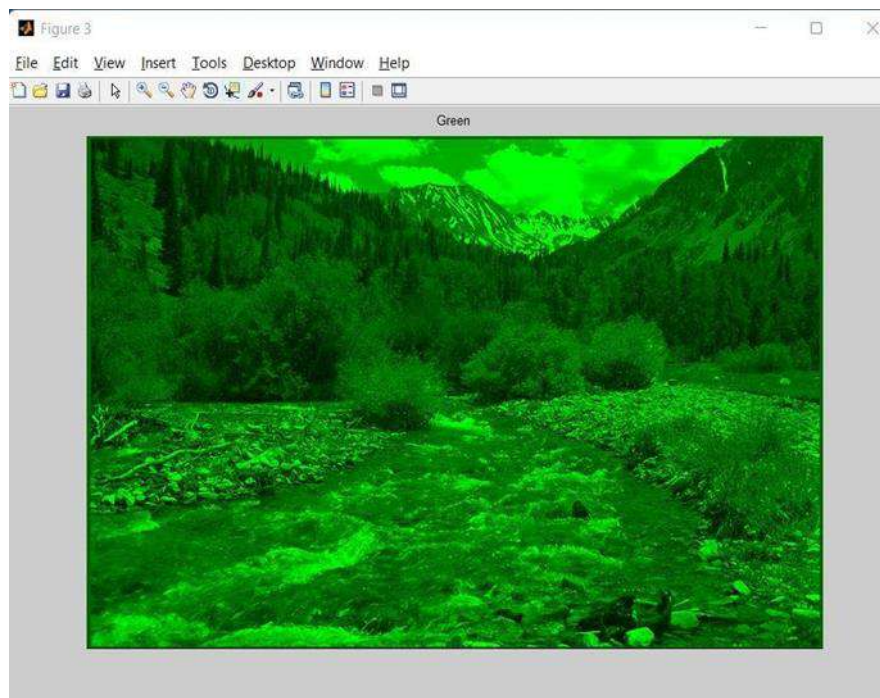


Figure 3. Green colour channel image.

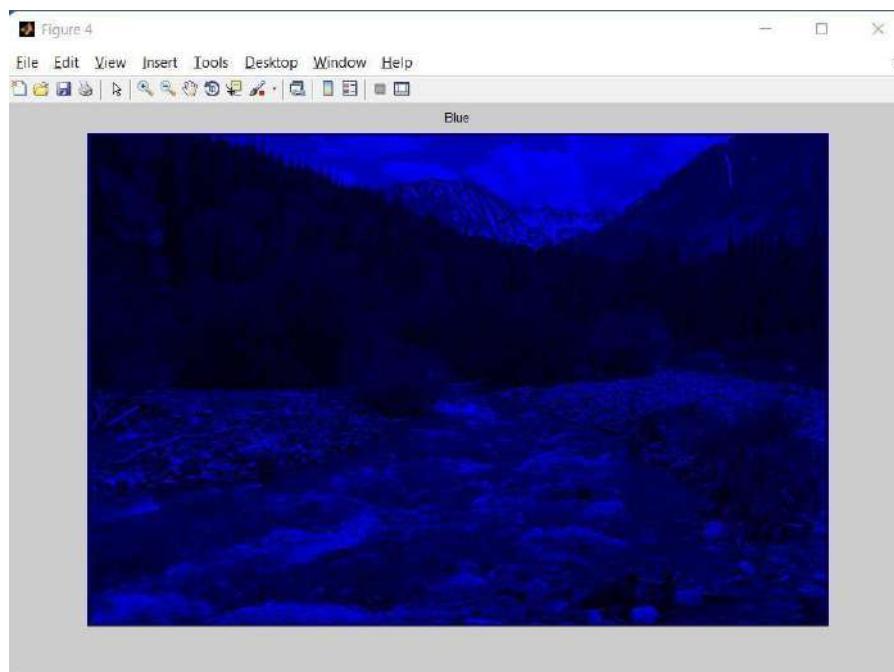


Figure 4. Blue colour channel image.

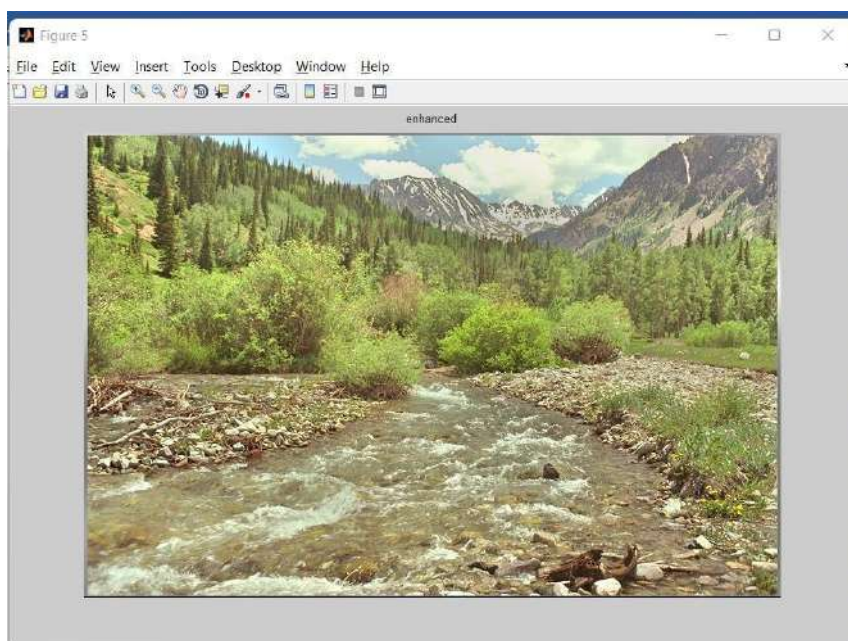


Figure 5. low light enhanced image

5. Conclusion

We mainly implement the software algorithm of low light image enhancement and correction based on the histogram equalization of profile compression algorithm. The algorithm architecture consists of two parts. The first part is the image enhancement of the traditional algorithm, and the second part is the convolutional neural network search. The enhancement factor k of the hyperbolic tangent function, this part of which can use the hardware to accelerate the neural network convolution calculation, and quickly find the optimized enhancement factor, input the value back to the first part to achieve the optimized night image enhancement result. The image produced by our algorithm has good over-dark and over-bright correction effects, and can also suppress noise.

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POWER ALLOCATION ALGORITHMS FOR STABLE SUCCESSIVE INTERFERENCE CANCELLATION IN MILLIMETER WAVE NOMA SYSTEMS

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ABSTRACT

In this project, we investigate power allocation algorithms in a downlink millimeter wave non-orthogonal multiple access (mm Wave-NOMA) system, which consists of one base station (BS) and a group of two-user clusters. Specifically, two optimization problems are formulated to maximize the achievable sum rate (ASR) and energy efficiency (EE), respectively, while satisfying the individual quality of service (QoS) constraints. To ensure the stability of successive interference cancellation (SIC stability), we specially add the power order constraints, which are often neglected in existing works. By dividing each formulated problem into more tractable inter-cluster and intra-cluster subproblems, and deriving the corresponding solutions, we propose the ASR maximization-based power allocation (ASR Max-PA) and EE maximization-based power allocation (EE Max-PA) algorithms. Numerical results show that the proposed ASR Max-PA (EE Max-PA) algorithm is much better than the state-of-the-art schemes in term of ASR (EE), while yields quite good EE (ASR) performance simultaneously. Moreover, both the two proposed algorithms can ensure SIC-stability, which is shown to have a significant impact on the NOMA system performance. Index Terms—Millimeter wave NOMA, power allocation, SIC-stability, achievable sum rate, energy efficiency.

1. INTRODUCTION

Millimeter wave (mm Wave) has emerged as one of the key candidate techniques for the fifth generation (5G) wireless communication and its beyond [1]-4]. The abundant spectrum resource in mm Wave provides significant potentials to meet the diverse demands of low latency, high reliability, massive connectivity, and high throughput services in communications. Due to high path loss, large scale antenna array is usually utilized in mm Wave communications, where beamforming techniques are required to preprocess the signal on each antenna element to increase the spectrum efficiency [5,6]. Among the three commonly used beamforming schemes, fully digital beamforming makes unaffordable hardware cost and energy consumption, analog beamforming yields too low data rate [7,8]. Therefore, hybrid beamforming is the most preferred scheme in mm Wave systems because it can achieve beam gain and interference management simultaneously, while only a small number of radio frequency (RF) chains are required to connect a large number of antennas [9,10]. In mm Wave systems, the application of traditional orthogonal multiple access (OMA) schemes, such as frequency division multiple access (FDMA), time division multiple access (TDMA), code division multiple access (CDMA) and space division multiple access (SDMA) encounter limited number of users simultaneously served by the base station (BS) within each (frequency, time, code or spatial) resource block (RB). To address this problem, non-orthogonal multiple access (NOMA) has been proposed and applied in mm Wave communications to meet the massive connectivity demand in 5G and its beyond [11,12]. On the one hand, the highly directional feature of mm Wave transmission makes it appropriate for applying NOMA. On the other, NOMA can help to increase the number of users, which is always small in mm Wave band because the number of RF chains is limited to avoid high hardware consumption. The main idea of NOMA is to serve multiple users in the same RB and distinguish them in power domain by exploiting the superposition coding at the transmitter (Tx) and successive interference cancellation (SIC) at the receiver (Rx).

There are several prior works on mm Wave NOMA systems. The authors in [17] demonstrated that in mm Wave communications, NOMA can significantly improve the achievable sum rate (ASR) compared with the conventional OMA. In [18] and [19], the joint power allocation and beamforming problems were investigated to maximize the ASR for a 2-user downlink and uplink mm Wave systems, respectively, in which the analog beamforming method was adopted. In [20], the power allocation problem was solved jointly with Tx Rx analog beamforming for a K-user downlink mm Wave communication system to maximize the ASR, where the boundary-compressed particle swarm optimization (BC-PSO) method was used for the beamforming design, resulting in high complexity. On this basis, the authors in [21] further investigated the power allocation scheme in mm Wave NOMA system using hybrid beamforming. In a word, the above works all focus on the system ASR, while considering energy efficiency (EE) is also becoming an important performance measure of a 5G system, and some works have studied mm Wave NOMA with perspective of the EE recently. The authors in

[22] formulated a power allocation problem aiming to maximize the EE under user's quality of service (QoS) requirements and per-cluster power constraint. The optimal power allocation was obtained by using iterative algorithms. In [23], an EE maximization power allocation problem was studied for a downlink mm Wave-NOMA system with hybrid beamforming. In [24], a joint power allocation and beamforming design was proposed to maximize the EE in an uplink mm Wave NOMA system, while only two users are contained in the system. All these aforementioned studies only focus on single performance criteria, and assume ideal SIC with perfect decoding. However, in practice, the power allocated to each user may not strictly follow the predetermined order, decoding errors are therefore inevitable to cause error propagation in SIC and remarkable performance degradation [25], and a well-designed NOMA scheme shall take the power order constraints into account to maintain SIC-stability [26]. Nevertheless, there are few NOMA designs considering the SIC-stability, especially in mm Wave communications. Zhu et al. [27] studied the power allocation algorithms while ensuring the correct order of power in a downlink NOMA scenario. However, in the system model, only two users in one channel without inter cluster interference were taken into account. Motivated by and based on the prior works, in this paper, we investigate power allocation for multiple users in a downlink mm Wave NOMA system, where the users are divided into a group of two-user clusters. Our goal is ensuring SIC-stability under both the ASR and EE criteria. The contributions in this work are summarized as follows:

We consider both the ASR and EE criteria and formulate two corresponding optimization problems under fixed hybrid beamforming scheme. Specially, we add the power order constraints in the formulated problems to guarantee the SIC-stability, which has a significant impact on NOMA systems, but they are always ignored in the existing works. In such a way, the users in each RB can follow the right signal decoding order, so that the error propagation and performance degradation caused by failure SIC can be avoided. Note that different from the work in [27], our system model contains multiple (more than two) users, which is more adapted to the practical situation and makes the established problems more difficult to solve.

We propose the ASR maximization-based power allocation (ASR Max-PA) and EE maximization-based power allocation (EE Max-PA) algorithms to obtain the suboptimal power allocation solutions. Since the two problems are non-convex and difficult to solve, we divided each of them into two sub-problems, i.e., intra-cluster power allocation (intra-CPA) and inter-cluster power allocation (inter-CPA). Then, we derive the closed-form solution in the intra-CPA case and further provide solution for the inter-CPA problem.

We evaluate the performance of the proposed two power allocation algorithms in the mm Wave NOMA system. Simulation results show that the NOMA system using our proposed ASR Max-PA (EE Max-PA) algorithm can guarantee SIC-stability and achieves much better ASR (EE) performance than the existing schemes, while can simultaneously yields quite good performance in both of the EE and ASR.

2. LITERATURE SURVREY

WITH the fast development of electronic devices and computer science, various emerging applications (e.g., virtual reality, augmented reality, big data analytics, artificial intelligence, three-dimensional (3D) media, ultra-high-definition transmission video, etc.) have entered our society and created a significant growth in the data volume of wireless networks. Meanwhile, mobile networks have become indispensable to our society as a key service for personal computing devices. One of the main characteristics of future mobile networks (5G and beyond) is the unprecedented traffic, with huge area spectral efficiency (hundreds of bit/s/Hz/km²) and the very high throughput per device (multiple Gbps). For instance, it is predicted that the world monthly traffic of smartphones will be about 50 petabytes in 2021 [1], which is about 12 times of the traffic in 2016. In order to meet these requirements, the research and deployment for the future mobile networks [2-4] have volumes already been launched. Since 2013, the national-level 5G research organizations and projects (including European Union (EU) 5GPPP/METIS, China IMT-2020 (5G) Promotion Group, Korea 5G Forum, and Japan ARIB) have been set up one after the other to achieve the 2020 technical targets. In 2015, ITU-R officially named 5G systems as IMT-2020, and released recommendation on its framework and overall objectives. Currently, Phase-1 of 5G is being standardized in 3GPP (<http://www.3gpp.org/news-events/3gpp-news>). foundation is to use the millimeter wave (mm Wave) bands from 30 GHz to 300 GHz, and also THz frequency bands. To achieve the magnificent objectives and visions listed above, several key enabling technologies have been identified, such as mm Wave communications, massive multiple-input and multiple-output (MIMO), small cell deployment, full duplex relaying, D2D communications, interference management techniques, dynamic TDD with self-backhauling and novel access technologies. Many of these technologies have complementary benefits and need to be combined to achieve all the key capabilities of 5G. For example, mm Wave communications [4,5,7,9,12,13] is widely considered the most important technologies to achieve 10 Gbit/s peak data rates. This is because there are a large amount of bandwidth available in the mm Wave bands, and expanding the bandwidth is an efficient approach to enhance system capacity. In particular, the channel capacity of an additive white Gaussian noise channel operating over B Hz is

$$C = B \log_2 \left(1 + \frac{P}{N_0 B} \right),$$

where P is the signal power and N₀ is the noise power spectral density [15]. Hence, the capacity increases linearly with the bandwidth B, if we also let P grow proportionally to B. Since P is limited by regulations in practice, mm Wave communication is particularly well-suited for scenarios with good channel conditions, such as short-range small cell access and line-of-sight backhauling in mobile networks [16], [18]– [20]. Self-backhaul, where the same wireless spectrum is shared between access and backhaul [21],

3. PROPOSED METHOD

We focus on a single-cell downlink mm Wave NOMA transmission scenario with one BS and K equally distributed mobile users. The BS is equipped with N_t antennas and N_{RF} RF chains (N_t ≥ N_{RF}), while each user is equipped with single antenna. The fully-connected hybrid beamforming structure [28] is adopted to reduce the hardware cost, in which each RF chain is connected to all the antennas through N_t phase shifters. To make full use of frequency resources, the K users are scheduled into L clusters composed by groups of mutually interfering users. The intra-cluster and inter-cluster interference can be suppressed by the techniques of SIC and beamforming, respectively. Similar to [22-29], we consider the simple case that each cluster has only two users, generally referred to as a strong user (with a higher effective channel gain) and a weak user (with a lower effective channel gain) in the NOMA system. Assuming that the number of clusters and RF chains are the same, i.e., L = N_{RF}, and the perfect channel state information (CSI) is available at the BS, then the received signal at U_{l,i} (the i-th user in the l-th cluster) is expressed as

$$y_{l,i} = \mathbf{h}_{l,i} \sum_{j=1}^L \mathbf{w}_j (\sqrt{p_{j,1}} s_{j,1} + \sqrt{p_{j,2}} s_{j,2}) + n_{l,i},$$

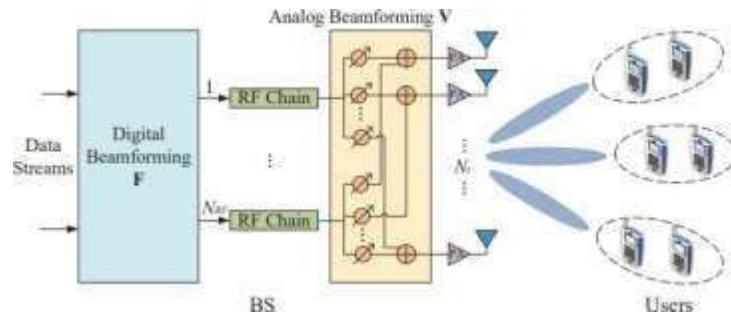


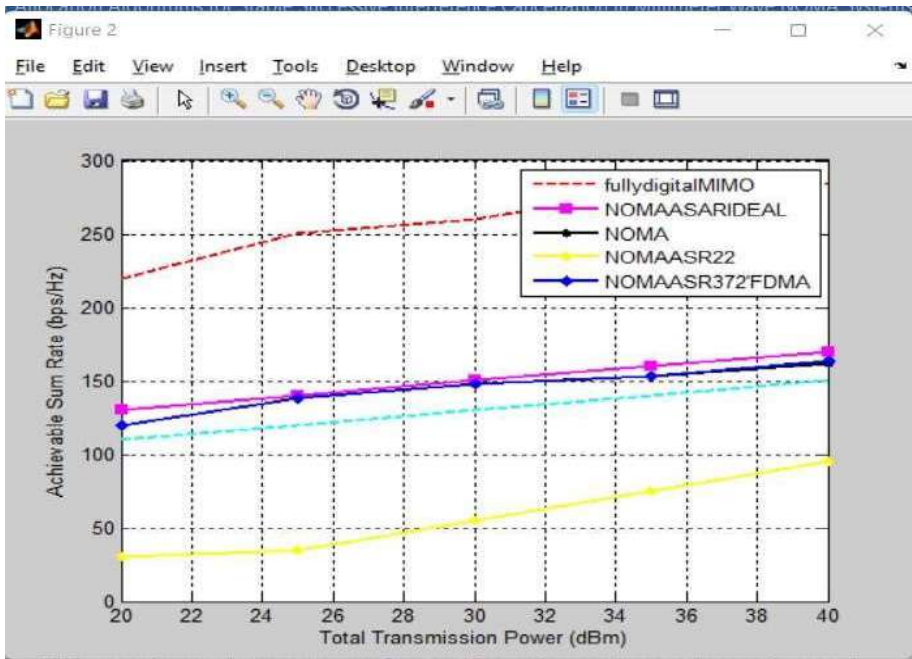
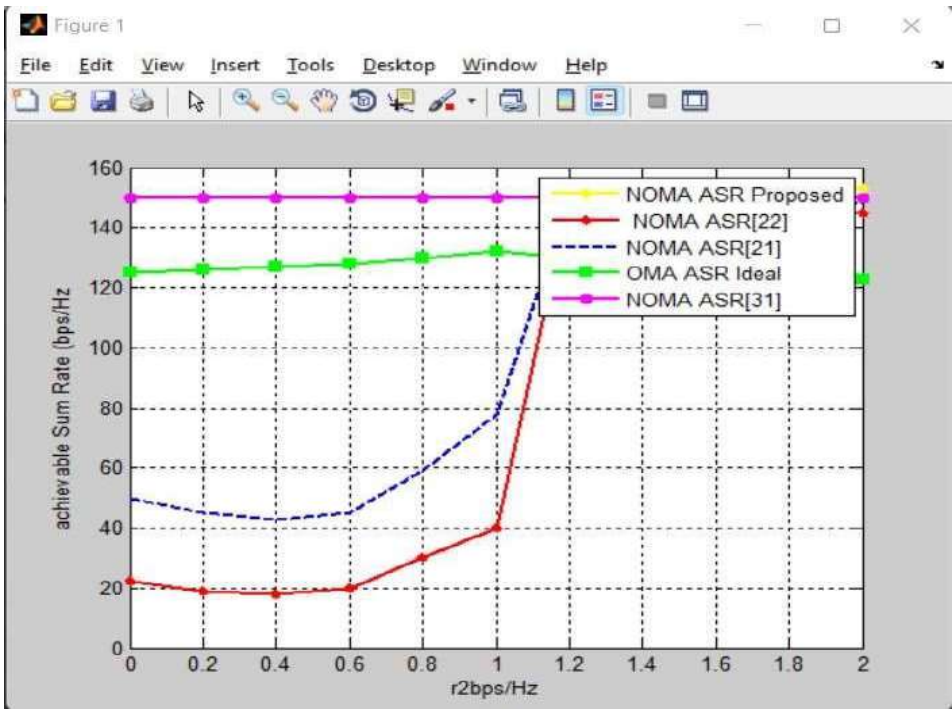
Fig: Single-cell downlink mm Wave NOMA system model.

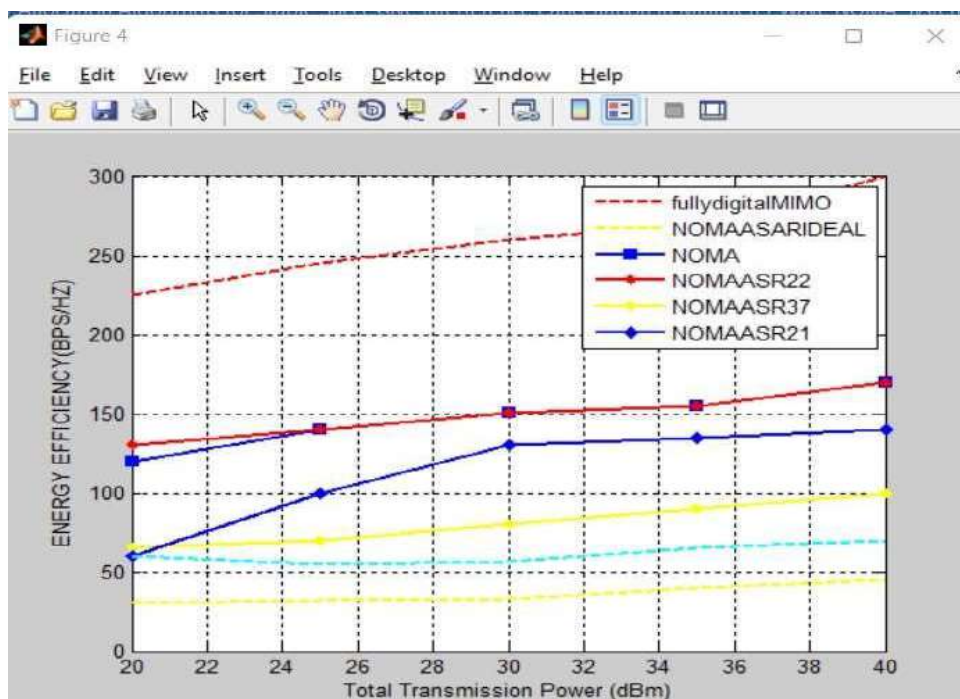
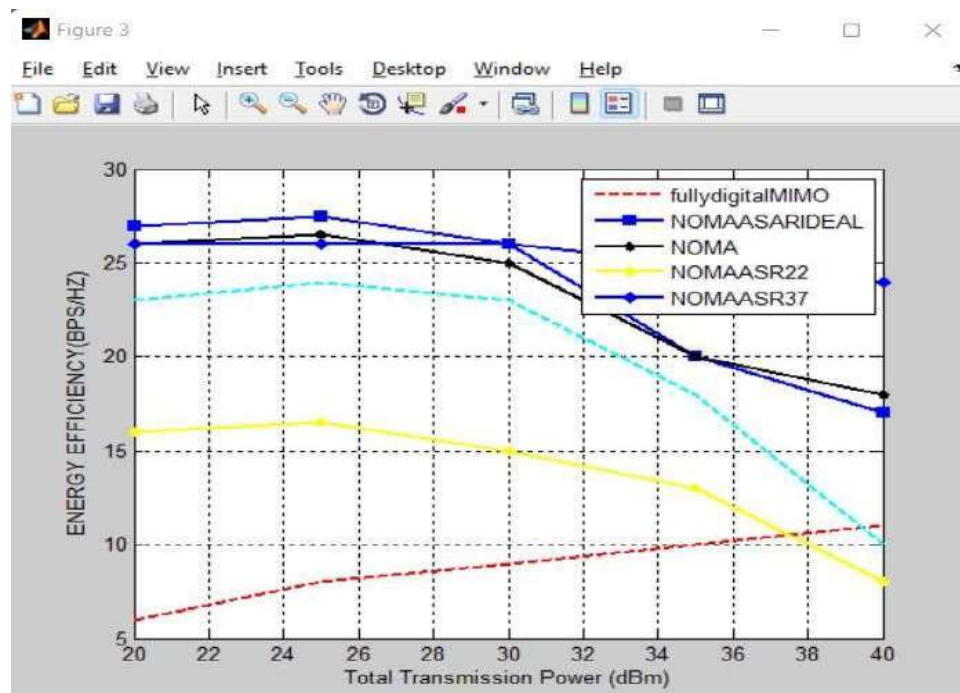
Based on the above analysis, the power allocation for the EE maximization problem with individual QoS constraints is solved. The proposed EEMax-PA algorithm is summarized in Algorithm 2. It should be noted that the solution provided in Algorithm 2 is sub-optimal due to the strict inequality constraint $p_{l,1} < p_{l,2}$ and the existence of inter-cluster interference. However, when $r_2 \geq 1$ bps/Hz, the solution in Algorithm 2 becomes global optimal once the inter-cluster interference is small enough and approaches to zero. The reason is similar to the ASRMax-PA algorithm in Section III

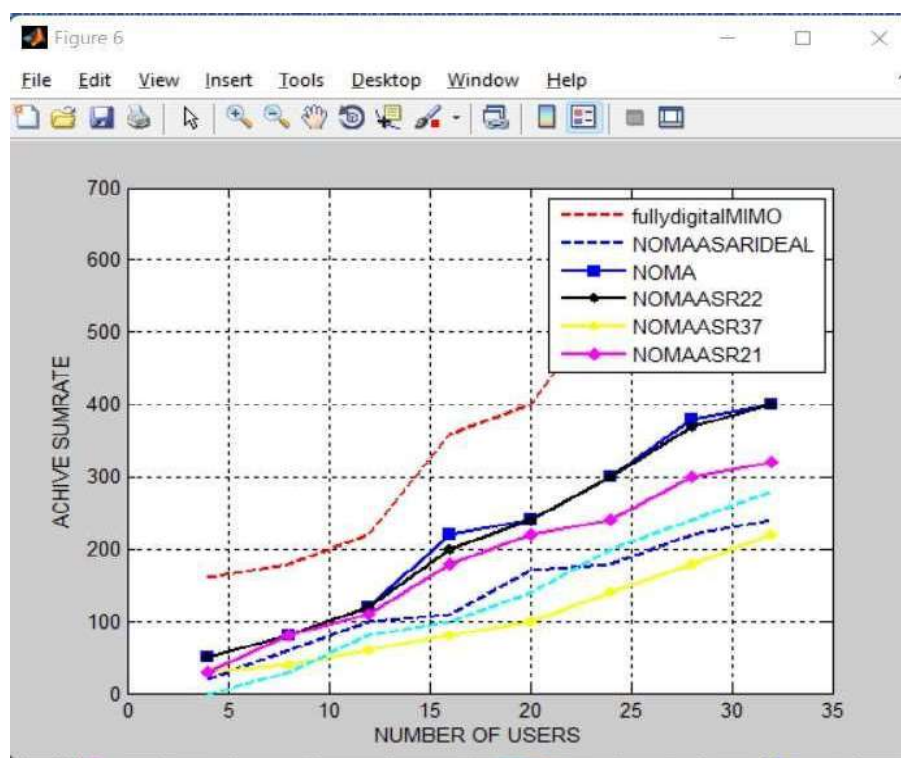
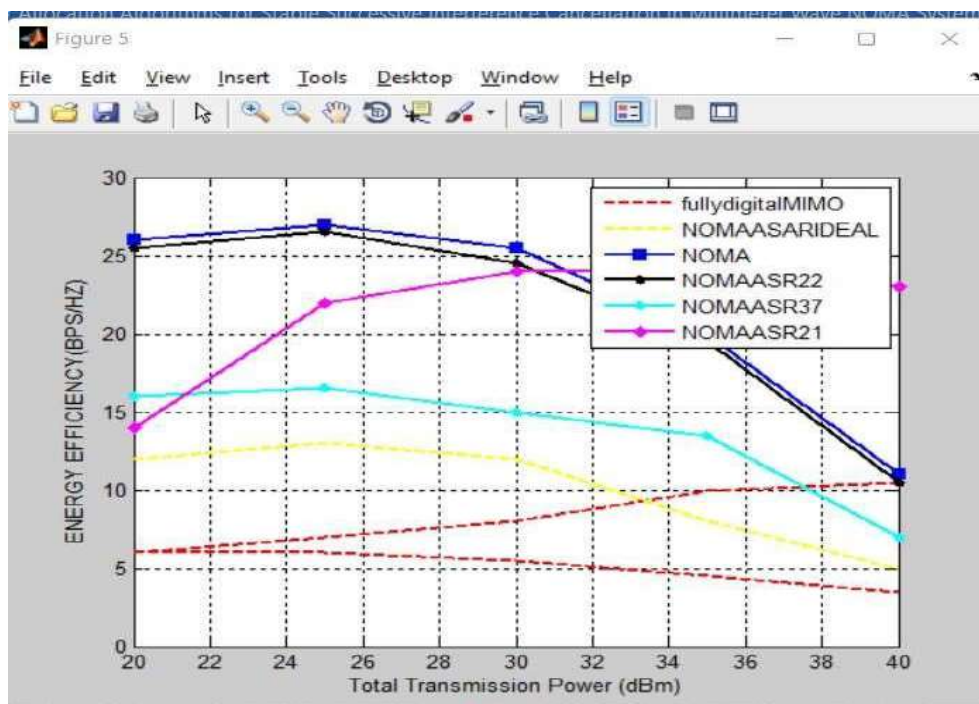
C. Moreover, we will also show in the simulation that the inter-cluster interference is small and has little influence on the system performance regardless of the value of r_2 . As we provide the closed-form power allocation solution for the intra-CPA problem, the computational complexity is mainly caused by the solving process of inter-CPA problem. Denote the number of outer and inner iterations as N_{\max} and T_{\max} , respectively. We first focus on the NOMA scheme using the proposed ASR Max-PA algorithm. For clustering the users, we adopt the approach similar, where the channel correlation is defined as

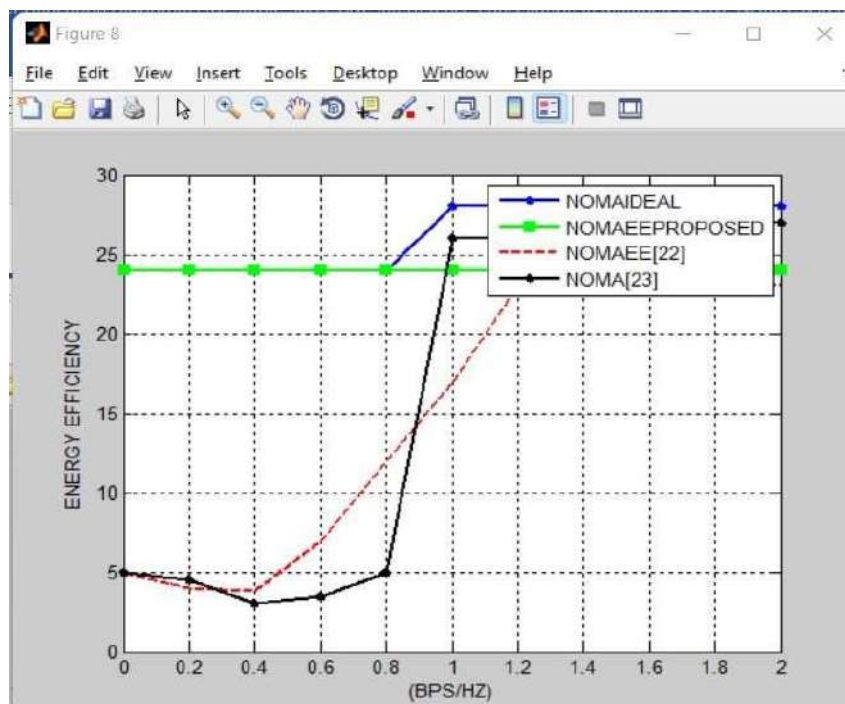
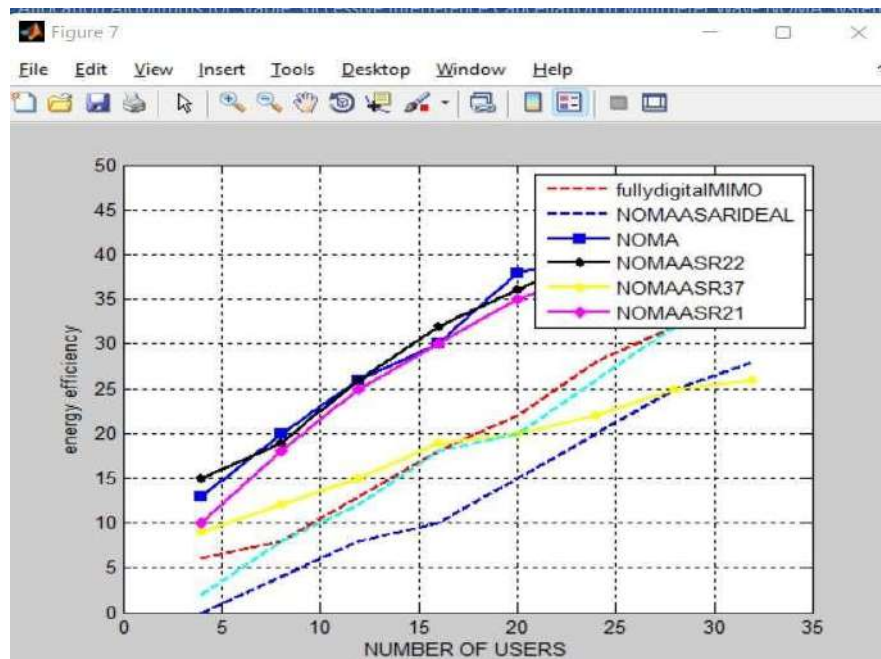
$$\text{Corr}_{(i,j)} = \frac{\|\mathbf{h}_i^H \mathbf{h}_j\|}{\|\mathbf{h}_i\| \|\mathbf{h}_j\|}.$$

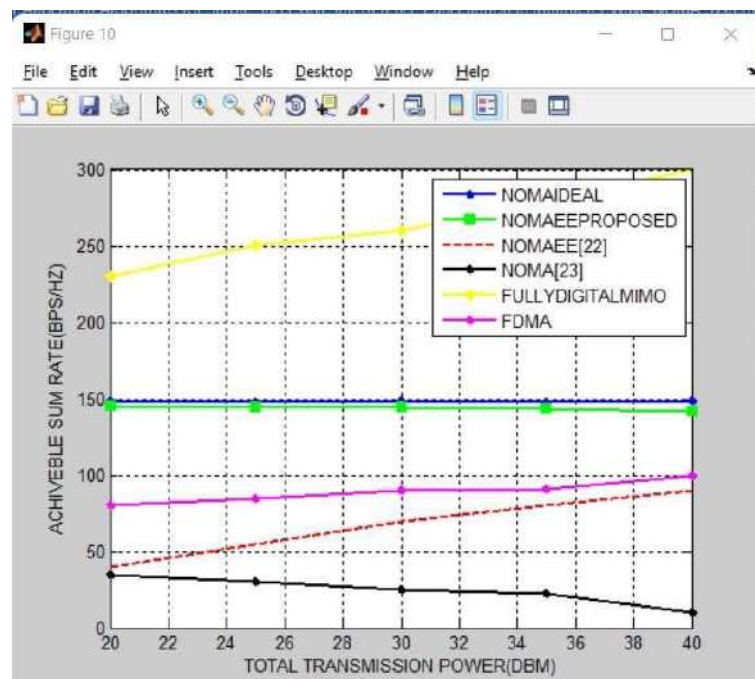
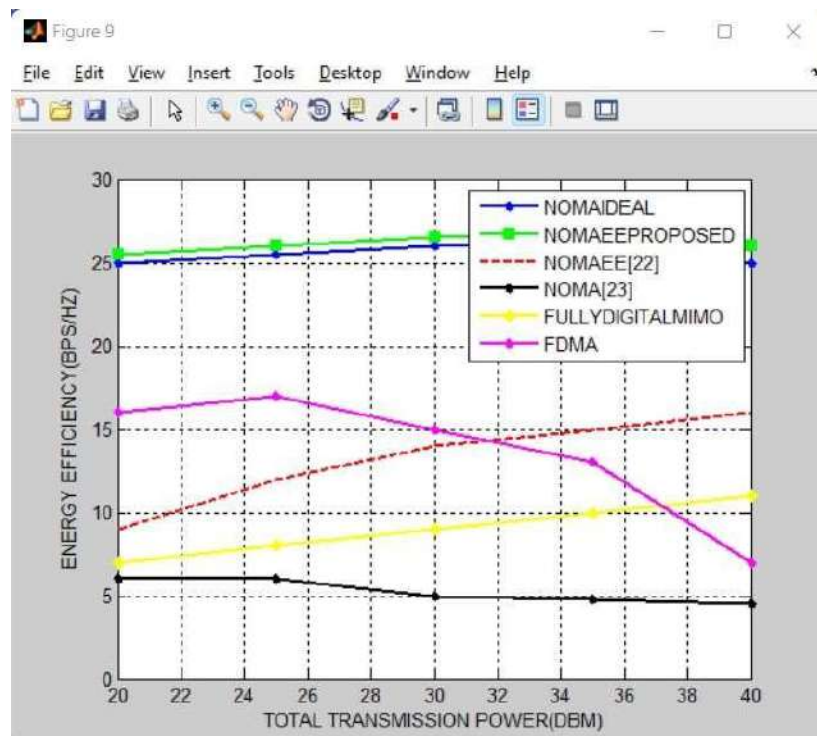
4. RESULTS











5. CONCLUSION

Power allocation issues under different performance criteria for a downlink mm Wave NOMA system is investigated. The ASR and EE maximizations are considered with QoS constraints, and to guarantee the SIC-stability we specially take into account the power order constraint of each user. In order to solve the two formulated problems, the ASR Max-PA and EE Max-PA algorithms are proposed. Firstly, the corresponding problem is divided into intra- and inter cluster sub-problems, and the closed-form power allocation solution for the intra-cluster problem is derived. Then, based on the closed-form results, we reconstruct the inter-cluster problem and provide the solution. Numerical results show that the NOMA system using the proposed ASR Max-PA (EE Max-PA) algorithm achieves much better ASR (EE) than the existing schemes and can yield quite good EE (ASR) performance simultaneously. Specially, the results also show that our proposed scheme can guarantee SIC-stability and avoid severe performance degradation caused by error propagation. For the sake of simplicity, we do not consider the imperfect CSI case, more than two users in one cluster, and joint allocation of multiple resources etc., these are interesting research directions for a mm Wave NOMA system and will be studied as a future work.

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Image quality enhancement algorithm based on game theory model

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ABSTRACT

Image quality enhancement algorithm based on game theory model is designed in this research. The core idea of the algorithm is to enumerate the sequence of sub-pictures obtained from different free parameters, and then perform image fusion according to the image details, saturation, and brightness, and then fuse a higher quality enhanced image. At present, with the development of image processing technology, feature extraction and matching algorithm will be an important research direction in the field of intelligent data. This research work integrates the game theory model to construct the efficient image analytics model. The experiment results are compared with the latest methods to evaluate the proposed framework from the robustness and accuracy perspective.

1. INTRODUCTION

Digital images are easily affected by imaging equipment, dynamic range, lighting conditions and other factors during the acquisition process, which reduces the image quality and even affects the subsequent human-machine image analysis and recognition process. Therefore, in practice, image contrast enhancement is often used to adjust the quality to obtain better human visual perception. Image enhancement has become a very important preprocessing step in image processing, video processing, and face recognition [1-3]. The current image enhancement algorithms based on the spatial domain technology can be divided into global methods and local methods. In order to implement adaptive spatial image enhancement algorithms, the current mainstream spatial image enhancement algorithms can be divided into the two categories, namely histogram methods and the non-histogram methods. Typical representatives of the histogram method include: Literature [2] proposed to use the gray values of the adjacent troughs in the histogram as the endpoints of the piecewise linear transformation, and calculate the slope of the linear transformation within the two ends according to the probability of the general two ends; Literature [3] adaptively calculates the Gamma correction coefficient corresponding to each gray scale value by analyzing the cumulative distribution law of the histogram; Literature [8] divides the histogram through the basic Gaussian mixture model, and divides the intersection of adjacent Gaussian distributions as a segment point, the slope of the linear transformation is then determined according to the mean value and variance of the gray level. Image restoration is the process of using the available information in the degraded image to then establish an image degradation model, restoring and reconstructing to obtain the original clear image estimate. Low-light image enhancement is a very important research content in the field of the image restoration. In the next parts, details will be presented.

Image enhancement is an important technique in the image pre-processing field. In previous research, many enhancement algorithms have been used in various image processing applications. Regrettably, these traditional algorithms tend to only have the ability to solve a single specific problem of degraded images. For instance, histogram equalization can improve an image's contrast by extending the dynamic range of its grey variation, and sharpening can elevate an image's sharpness via compensating contours and emphasizing edges. When a degraded image has more than one problem, traditional algorithms cannot provide a satisfactory resultant image to meet the enhancement demand of applications, even after several of these algorithms have been applied successively. Fortunately, image fusion can help to provide a solution to the aforementioned enhancement difficulty. The objective of image fusion exists in combining multiple source images into a fused image that exhibits

more useful information than the individual source image. For about two decades, image fusion has emerged as a promising

image processing technique in many fields, like remote sensing and medicine. Out of various image fusion techniques, the fusion based on wavelet transform has been proven to be an active research focus in recent years because of its excellent performance [1][2] [3].

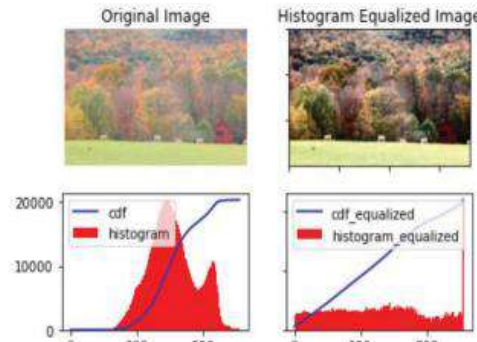


Fig 1.1 Histogram Equalization

2. LITERATURE SURVREY

The Image Quality Enhancement Algorithm Linear contrast stretching stretches the low-gray-level part and compresses the high-gray-level part, so that the image is effectively compensated, but it is easy to then lose details. The above algorithm is suitable for processing images with low overall contrast, but it has poor effect on images with low local contrast, and it is easy to lose detailed information. Local enhancement methods are better than global methods when dealing with images with low local contrast [20-21]. However, it is difficult to the construct local enhancement operators. At the same time, local enhancement operators are usually not universal and easy to add noise. In the formula 7, we denote the estimation standard.

$$SNR_{RMS} = \sqrt{\frac{\sum_{r=0}^{N-1} \sum_{c=0}^{N-1} [g(r,c)]^2}{\sum_{r=0}^{N-1} \sum_{c=0}^{N-1} [g(r,c) - I(r,c)]^2}}$$

The core problem of the image enhancement method is to propose a core global mapping function to directly map the grayscale value. Obviously, this type of the method does not consider the local features of the pixels such as details and textures, but only maps the grayscale value of the original image with the enhanced image one by one, and the quality of the enhanced image needs to be further improved. The Retinex model decomposes the image into illuminance components and reflection components, respectively depicting different aspects of the image. In order to then obtain a better visualization of the image, different functions are used to enhance the illuminance and also reflection components of the image, and then the enhanced illuminance and also reflection components are merged to obtain the final enhanced image. First, construct the saliency feature map of the infrared image, and on this basis, identify the infrared image and segment the area to be enhanced. At the same time, the image to be enhanced is inverted, and the transmission map of the inverted infrared image is estimated based on the dark channel prior. Then, based on the image segmentation result, the estimated transmission image is corrected to then eliminate the overestimated component in the image space. Furthermore, using the corrected transmission image, the enhanced infrared image is directly obtained based on the simplified atmospheric scattering model. The Retinex (retina + cortex) theory

was proposed by Land and McCann [7]. The Retinex is a simplified computational model of the human visual system that explains the color constancy phenomenon, and compensates illumination effects in images. The primary goal of Retinex-based algorithms is to decompose an image into a reflectance image and an illumination image to remove the illumination effect. Several Retinex-based image enhancement approaches have been developed. Literature [7] proposed the model of how the human vision system adjusts the object color and brightness apperceived - Retinex algorithm. It may achieves the balance in the gradation dynamic range compression, the edge enhancement and the color constancy, thus may be used to the automatic enhancement for different kind of images. But the algorithm is based on the experimental data, and has no unitive mathematical model. Many different improved Retinex algorithms appeared, such as SSR (Single Scale Retinex) algorithm [8-9], MSR (Multi scale Retinex) algorithm [10-12], McCannps Retinex algorithm [13-15] and so on, and obtained widespread application. In essence, all these classics Retinex algorithm is to smooth original image through Gauss model with certain parameters and to extract image's background as far as possible accurate through some suitable ways. In this article, considering the relevance of video's adjacent frame images, we propose an improved multiscale global Retinex algorithm.

GAMMA CORRECTION

In general, the enhancement techniques can be divided into two main categories: direct enhancement methods and indirect enhancement methods. In direct enhancement methods, the image contrast can be directly defined by a specific contrast term. Where in indirect enhancement methods attempt to enhance image contrast by redistributing the probability density. In other words, intensity of the image can be redistributed within the dynamic range without defining a specific contrast term. Histogram modification (HM) is the most widely used indirect enhancement techniques due to their easy and fast implementation.[17]

3. PROPOSED METHOD

The Image Feature Extraction Image feature extraction is performed by analyzing global pixels. Determining that some pixels can represent the same feature is the image preprocessing stage, and it is also the basis and prerequisite for image matching and recognition. At present, with the development of image processing technology, feature extraction and matching algorithm will be an important research direction in the field of intelligent data [7-9]. Because the general influence of the real environment is unavoidable, the actual digital image may be interfered by serious noise. Therefore, before the feature extraction, the digital image must be preprocessed by binarization, smoothing, and denoising, and then feature extraction. Moreover, when the digital image is shifted, it will cause the misalignment between corresponding grids, thereby reducing the recognition rate, so before general identifying one by one, normalization processing must be carried out, and their positions and sizes must be normalized to a standard size. The below formula says the process :

$$\sum_{i=1}^n \sum_{j=1}^n a_{i,j}(x) \xi_i \xi_j \geq \varepsilon \sum_{i=1}^n \xi_i^2$$

Digital image processing is a primary preparation stage for image feature extraction, in order to determine whether any pixel can replace an image feature [10-12]. The target image is calculated once. At the same time, several features with independent properties are extracted, so that the acquired features can reflect all the characteristics of the target image as much as possible. This method is also an important technical means for the classification recognition, image understanding and pattern recognition of image targets. In the figure 2, we denote the feature pattern is

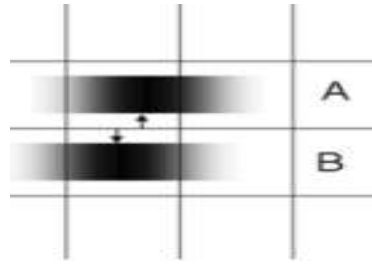


Fig. 1 The Feature Patterns

Incremental feature extraction methods can fuse the new samples or new types of the features, especially when large sample data emerges or new classification targets enter, the incremental method has obvious adaptive advantages. The procedures are explained using below formulae

$$E(\xi^2) + E(\|\bar{D}^M \xi\|_{L_2([0,T])}^2) < +\infty$$

$$k(w) = \left(1 - \frac{i}{2Q(w)} \right) \frac{|w|}{c_r} \left| \frac{w}{w_h} \right|^{-\gamma}$$

When calculating the estimated vector of the high-order feature principal components, the same as PCA, it can ensure the orthogonality between the estimated feature vectors and avoid other complex orthogonalization processing. The PCA mainly aims at all the variables proposed before and saves the original information as much as possible. Principal component analysis is used to then enhance the analysis. After the feature extraction of the gait, the feature variables generated from the acquired data are enhanced to obtain effective data feature indicators, Calculation process is defined as

$$\mathbf{x} = IFFT \left\{ \sum_{i=1}^M b_i \mathbf{X}_i \right\} = \sum_{i=1}^M b_i IFFT \{ \mathbf{X}_i \}$$

The Gaussian filter does not consider the influence of the gray value of neighboring pixels in the filtering process, so it will also filter out some edge information. Obviously, the detail information of the image edge texture filtered by the Gaussian filter.

Because many experimental models at this stage are not completely solved by simple linear functions and because PCA cannot solve the related nonlinear problems. Therefore, based on the traditional PCA method, KPCA is adopted and studied to extract and reduce the dimensionality of the obtained gait energy map. In the image semantic description model based on the attention mechanism, it relies on the encoder and the decoder. At the moment, as based on the hidden state, the decoder will focus on the specific area of the image and the output of the convolutional neural network to calculate, which improves the image scene understanding performance.

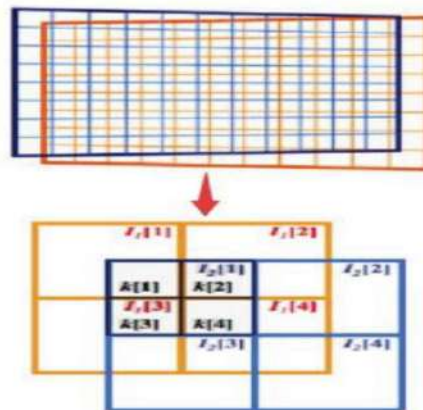


Fig.2 The Designed Image Feature Extraction Pipelines

4. RESULTS

The enhancement algorithm based on image gradient field is derived from high dynamic image processing technology. In this enhancement method, the gradient field function of the image is firstly calculated, then the enhancement function is constructed, and the gradient field is directly enhanced by the enhancement function. Finally, the general enhanced image is reconstructed from the gradient field. Figure 6 presents the data sets and the processed images.

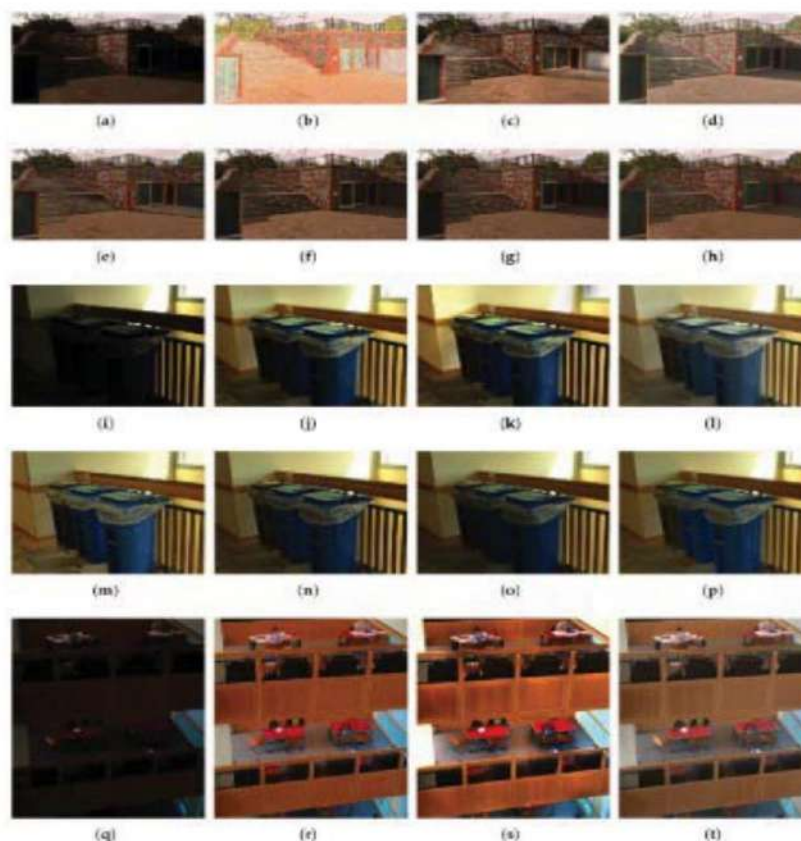


Fig. 3 Outputs using existing and proposed models

Better fitness values are obtained on the images. On the one hand, it shows that the convergence accuracy of the ITLBO algorithm is higher, and the enhanced image that is closer to the optimal solution can be obtained. On the other hand, it shows that the detailed information of the enhanced image obtained by ITLBO is better.

5. CONCLUSION

Image quality enhancement algorithm based on the game theory model is designed in this research. The results of the quantitative evaluation show that our proposed method can effectively use unsupervised learning methods to enhance artificially synthesized low-light images and natural and real low-light images, and restore more vivid, clear, intuitive, and natural high-quality image. In our future study, the robust test will be done to test the feasibility.

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Machine Learning Based Image Retrieval Using Intensity Pixel Algorithm

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ABSTRACT

Learning effective feature representations and similarity measures are crucial to the retrieval performance of an image retrieval (IR) system for Intensity Pixel Algorithm. Despite extensive research efforts for decades, it remains one of the most challenging open problems that considerably hinders the successes of real-world IR systems. The key challenge has been attributed to the issue that exists between low-level image pixels captured by machines and high-level semantic concepts perceived by human. Among various techniques, machine learning has been actively investigated as a possible direction to bridge the semantic gap in the long term. Inspired by recent successes of machine learning techniques for computer vision and other applications, in this paper, we attempt to address an open problem: if machine learning is a hope in IR and how much improvements in IR tasks can be achieved by exploring the state-of-the-art machine learning techniques for learning feature representations and similarity measures. Specifically, we investigate a framework of machine learning with application to IR tasks with an extensive set of empirical studies by examining a state-of-the-art machine learning method for EPA is proposed method. From our empirical studies, we find some encouraging results and summarize some important insights for future research.

1. INTRODUCTION

An image retrieval system is a computer system for browsing, searching and retrieving images from a large database of digital images. Most traditional and common methods of image retrieval utilize some method of adding metadata such as captioning, keywords, or descriptions to the images so that retrieval can be performed over the annotation words. Manual image annotation is time-consuming, laborious and expensive; to address this, there has been a large amount of research done on automatic image annotation. Additionally, the increase in social web applications and the semantic web have inspired the development of several web-based image annotation tools. Image search is a specialized data search used to find images. To search for images, a user may provide query terms such as keyword, image file/link, or click on some image, and the system will return images "similar" to the query. The similarity used for search criteria could be meta tags, color distribution in images, region/shape attributes, etc. Image meta search - search of images based on associated metadata such as keywords, text, etc. Machine learning based image retrieval (IPA) – the application of computer vision to the image retrieval. IPA aims at avoiding the use of textual descriptions and instead retrieves images based on similarities in their contents (textures, colors, shapes etc.) to a user-supplied query image or user-specified image features. List of IPA Engines - list of engines which search for images-based image visual content such as color, texture, shape/object, etc. It is crucial to understand the scope and nature of image data in order to determine the complexity of image search system design. The design is also largely influenced by factors such as the diversity of user-base and expected user traffic for a search system. Along this dimension, search data can be classified into the following categories: Archives - usually contain large volumes of structured or semi-structured homogeneous data pertaining to specific topics. Domain-Specific Collection - this is a homogeneous collection providing access to controlled users with very specific objectives. Examples of such a collection are biomedical and satellite image databases. Enterprise Collection - a heterogeneous collection of images that is accessible to users within an organization's intranet. Pictures may be stored in many different locations. Personal Collection - usually consists of a largely homogeneous collection and is generally small in size, accessible primarily to its owner, and usually stored on a local storage media. Web -

World Wide Web images are accessible to everyone with an Internet connection. These image collections are semi-structured, non-homogeneous and massive in volume, and are usually stored in large disk arrays.

2. LITERATURE SURVEY

Due to exponential increase of size of so-called multimedia files in recent years and because of the substantial increase of affordable memory storage on one hand and the wide spread of World Wide Web (www) on the other hand, the need for the efficient tool to retrieve the images from the large data base becomes crucial. This led to research in the field of image retrieval systems. From the historical perspective, the earlier image retrieval systems were mainly text-based which led to substantial increase of the size of images as well as size of image database and subjective too and thereby, incomplete as the text often fails to convey the rich structure of images. In the early 1990s, the motivation to overcome these difficulties lead the research into what is referred as content-based image retrieval (CBIR) where retrieval is based on the automating matching of feature of query image with that of image database through some images similarity evaluation. Content-based image retrieval (CBIR) is a bottleneck of the access of multimedia databases simply because there still exist vast differences in the perception capacity between a human and a computer. There are two basic problems that remain in the area, which are proving difficult to be resolved. The first one is the problem of efficient and meaningful image segmentation where we break-up a particular image into meaningful parts based on low-level features like color, texture, shape and spatial locations. The second one is the vast gap existing for an image between low-level features mentioned earlier and high-level or semantic expressions contained in the image like the image of a car, a house, a table and so on. To develop efficient indexing techniques for the retrieval of enormous volumes of images there is a need to achieve reasonable solutions to these above mentioned two problems.

3. PROPOSED METHOD

The MIN-MAX PIXEL EXTRACTION described here is used for a series of "second order" texture calculations. First order texture measures are statistics calculated from the original image values, like variance, and do not consider pixel neighbor relationships. Second order measures consider the relationship between groups of two (usually neighboring) pixels in the original image. Third and higher order textures are theoretically possible but not commonly implemented due to calculation time and interpretation difficulty. There has been some recent development of a more efficient way to calculate third-order textures. The INTENSITY PIXEL ALGORITHM is the machine learning based image extraction system. MIN-MAX PIXEL EXTRACTION: GRAY LEVEL CO-OCCURRENCE MATRIX (MIN-MAX PIXEL EXTRACTION): Gray-co-matrix function can be used to create the MIN-MAX PIXEL EXTRACTION (Gray level co-occurrence matrix). Gray co-matrix function calculates how often the relationship between the pixel value i occurs with respect to the pixel value j . The pixel to its immediate right and by default the spatial relationship is defined as the pixel of interest. Even though the spatial relation between the two pixels is verified. Each element in the MIN-MAX PIXEL EXTRACTION is nothing but the sum of the number of times that the pixel value i occurs with relation to the pixel value j in the input image. For the full dynamic range of an image the processing required to calculate a MIN-MAX PIXEL EXTRACTION is prohibitive. The input image was scaled by the gray matrix. By default, to reduce the intensity values from 256 to 8 in Grayscale image gray co-matrix use scaling. Using the num levels and the gray limits parameters of the gray co-matrix function the number of gray levels and the scaling of the intensity values in the MIN-MAX PIXEL EXTRACTION can be controlled. The properties about the spatial distribution of the gray level in the texture image can be revealed by the gray level co-occurrence matrix.

The Algorithm for The Min-Max Method

Step1: divide each image in the database and the target image into 6-equal sized sub-blocks.

Step2: for each sub-block construct cumulative HSV color histogram.

Step3: for each sub-block obtain four statistic features (Energy, Contrast, Entropy and inverse difference) from MIN-MAX PIXEL EXTRACTION.

Step4: construct a combined feature vector for color and texture.

Step5: find the distances between feature vector of query image and the feature vectors of target images using normalized Euclidean distance.

Step6: sort the Euclidean distances.

Step7: retrieve first 20 most similar images with minimum distance

Energy:

$$E = \sum_x \sum_y p(x, y)^2$$

It is a gray scale image texture measure of the homogeneity changing reflecting the distribution of the image gray-scale uniformity of the image and the texture.

Contrast is the main diagonal near the moment of inertia, which measures the value of the matrix is

$$I = \sum_x \sum_y (x - y)^2 p(x, y)$$

distributed and images of local changes in the number, reflecting the image clarity and the texture of the shadow depth if the contrast is large then the texture is deeper.

Entropy:

$$S = - \sum_x \sum_y p(x, y) \log p(x, y)$$

Entropy measures image texture randomness, when the space co-occurrence matrix for all values is equal, it achieved the minimum value; on the other hand, if the value of co- occurrence matrix is very uneven, its value is greater. Therefore, the maximum entropy implied by the image gray distribution is random.

Inverse difference:

$$H = \sum_x \sum_y \frac{1}{1 + (x - y)^2} p(x, y)$$

It measures local changes in image texture number. Its value in large is illustrated that image texture between the different regions of the lack of change and partial very evenly. Here $p(x, y)$ is the gray level value at the coordinate (x, y)

4. RESULTS

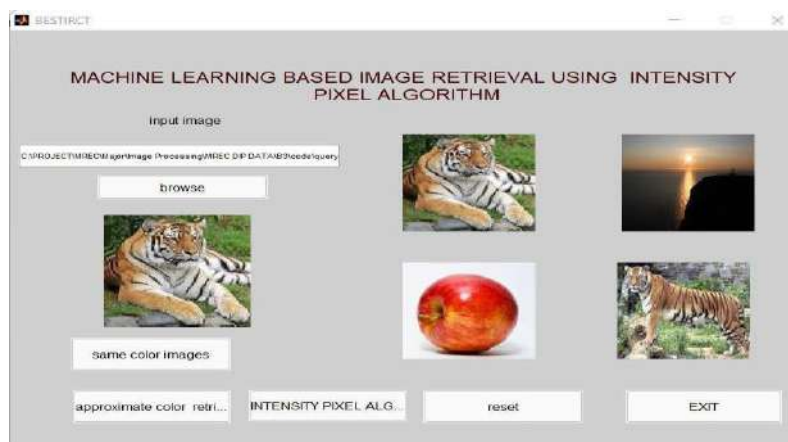


Fig 4.1 Output Images of Same Colour Images model

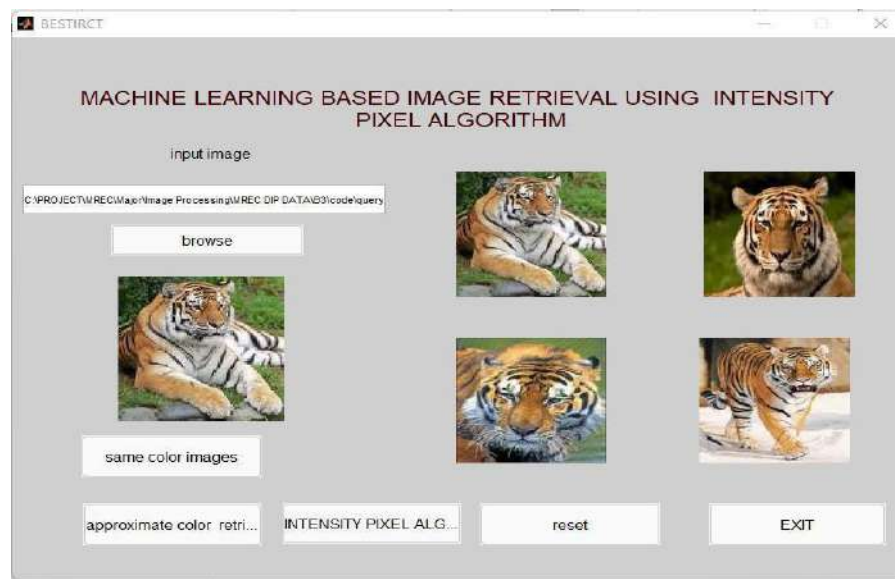


Fig 4.2 Output Images of Approximate Colour Images model

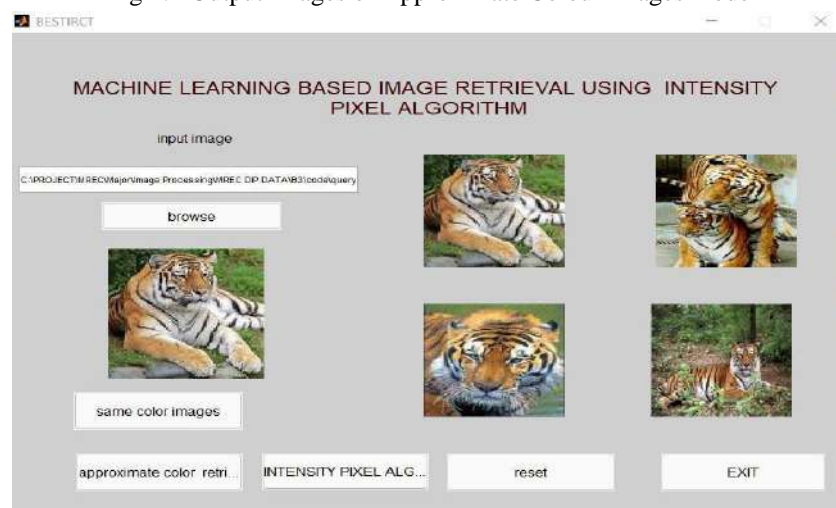


Fig 4.3 Output Images of Intensity Pixel Algorithm

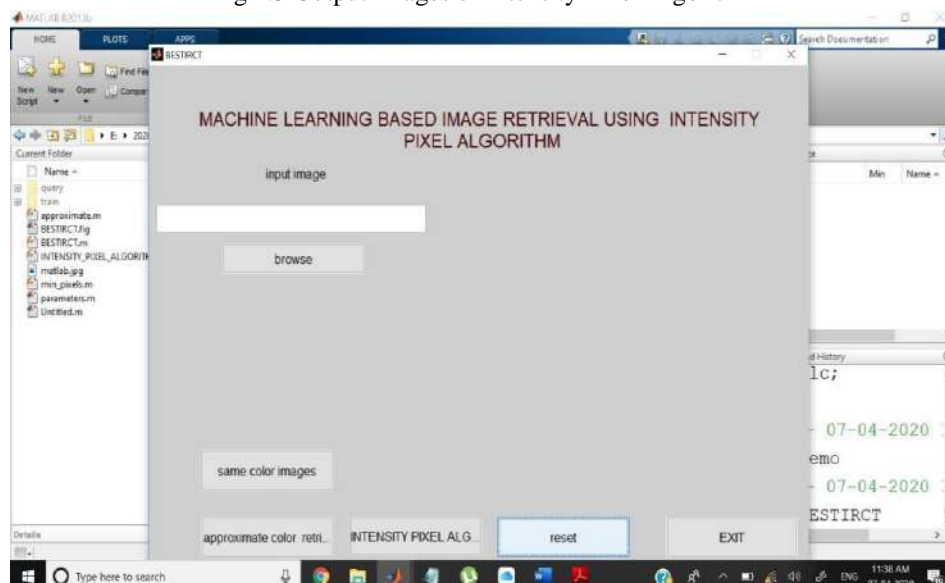


Fig 4.4 User Interface after Reset

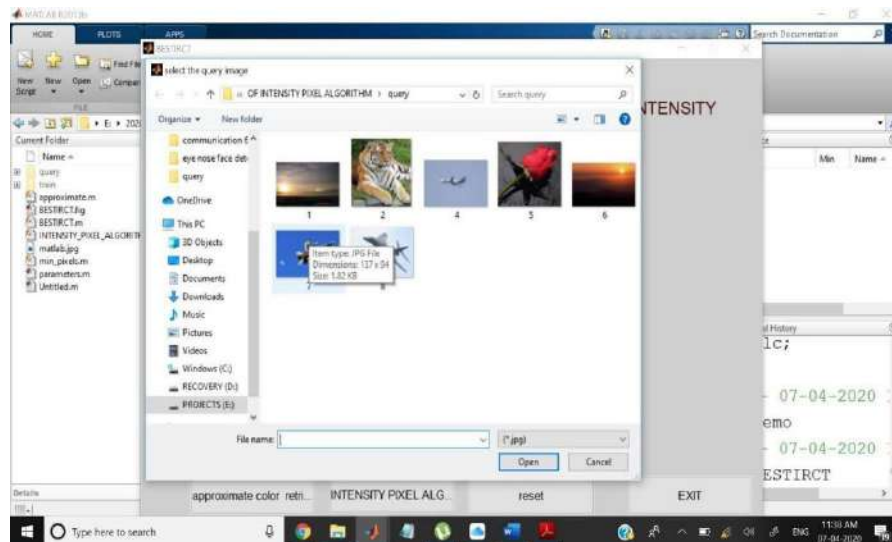


Fig 4.5 Browsing of an Image

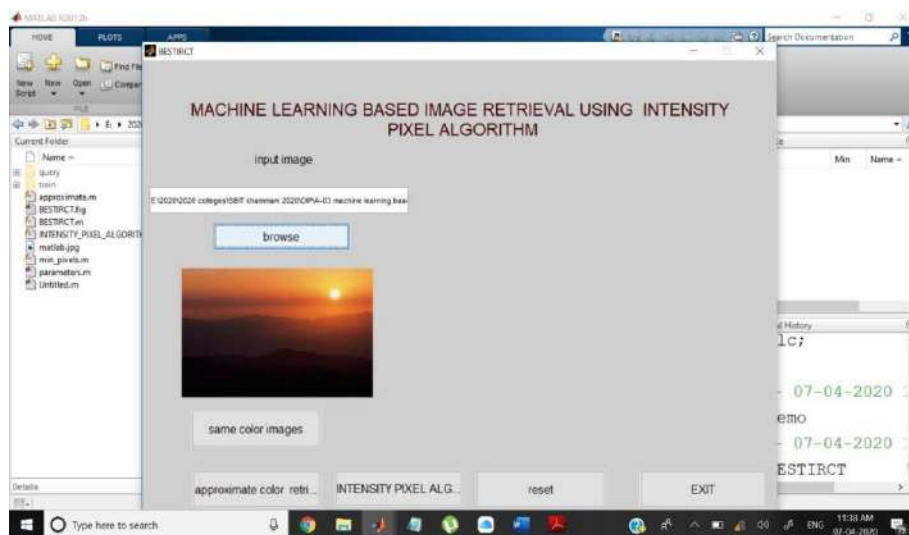


Fig 4.6 The Input Image is Browsed and Uploaded

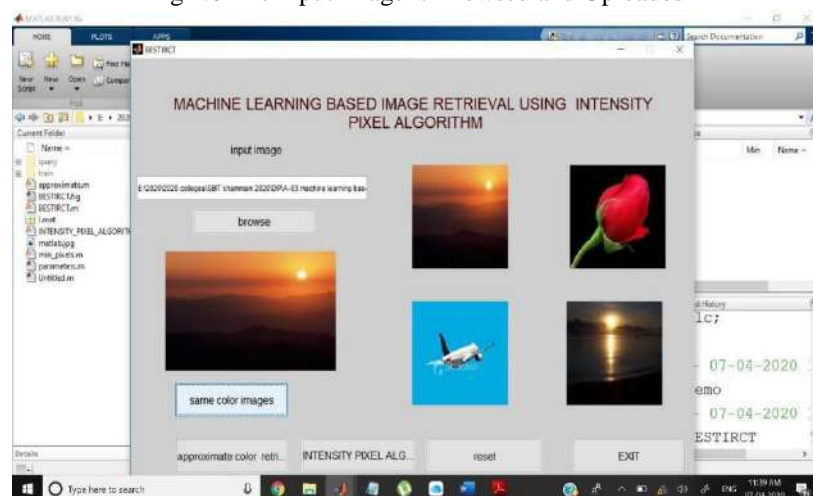


Fig 4.7 Output Images of Same Colour Images model

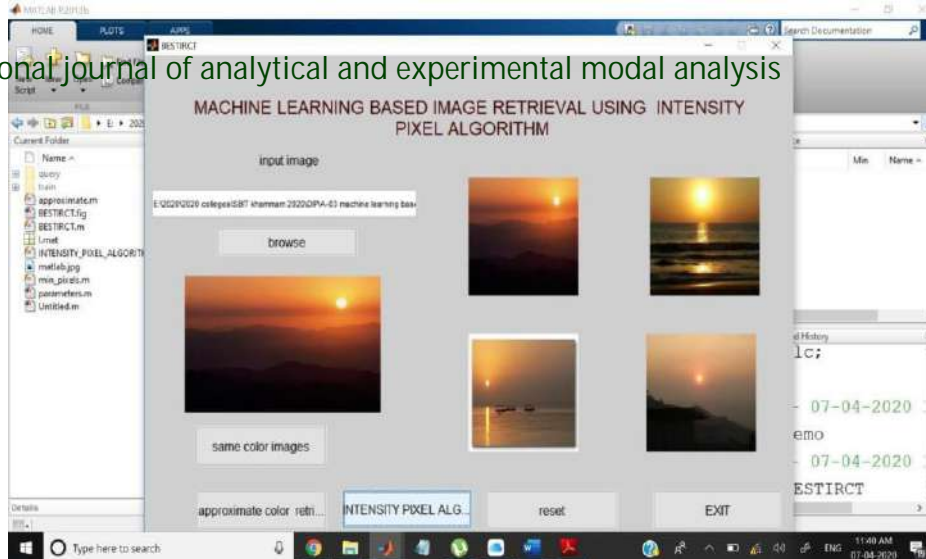


Fig 4.8 Output Images of Approximate Colour Images model

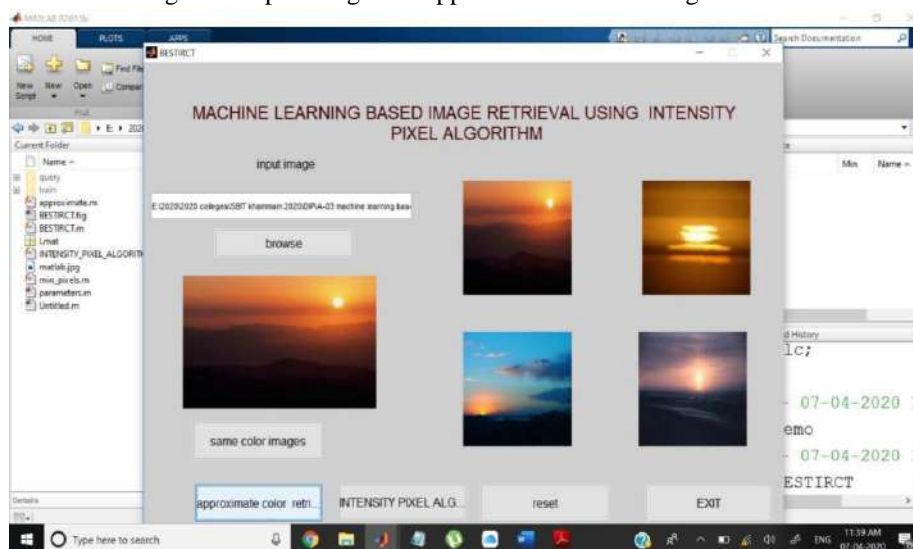


Fig 4.9 Output Images of Intensity Pixel Algorithm

5. CONCLUSION

This project presents an approach based on HSV color space and texture characteristics of the image retrieval. Through the quantification of HSV color space, we combine color features and gray-level co-occurrence matrix as well as CCM separately, using normalized Euclidean distance classifier. Through the image retrieval experiment, indicating that the use of color features and texture characteristics of the image retrieval method is superior to a single-color image retrieval method, and color characteristics combining color texture features for the integrated characteristics of color image retrieval has obvious advantages retrieval. Apart from reflecting the CCM texture features, it also reflects the composition of its color, and improve the performance of image retrieval has important research value.

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LOW LIGHT ENHANCEMENT USING DCE-NET AIDED BY PACK AND UNPACK OPERATIONS

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ABSTRACT

The main objective of Low Light Image enhancement is to process an image so that the result is more suitable for practical application. Images captured in dark circumstances have very low contrast, due to this people can't clearly identify the objects, which increases the difficulty of applied computer vision tasks considerably. Generally, this enhancement is done using image processing techniques like Histogram Equalization and its variants (CLAHE). But recent advances in deep learning enabled us to restore dark images which were hard to enhance with normal techniques. But often these techniques are limited by speed and hardware. Here, we combine the DCE-net, Pack and UnPack algorithms to improve the performance of low light image enhancement, which aim to reduce the runtime.

1. INTRODUCTION

We implemented novel Pack and UnPack operations to do novel downsampling and up sampling with less color misrepresentation. The DCE-Net used to improve the low light image into an enhanced light image. For this it takes a low- quality image as input and produces a pixel wise parameter map as its output which is combined with the input image to produce an enhanced image. We can also use this method in face detector application by lighting up the face in the very dark regions and conserve luminous. Taking photos is one of the most popular and convenient ways to record memorable moments of our life. Images taken in low-light conditions are usually very dim. This makes us difficult to recognize the scene or object. However, often it is inevitable to take photos in low-light conditions. To obtain high- visibility images in the low-light conditions, we can adopt three solutions. 1) To use flash: It is a direct way to solve the problem. However, it is not allowed in some public areas, such as the museum, cinema, and exhibition hall. 2) To increase the ISO (sensitivity of the sensor): This method could increase the visibility of dark areas, but higher ISO will also bring more noise to the image, and the normal-light area will easily face the overexposure problem. 3) To take a photo with longer exposure time: Capturing an image with longer exposures allows more light that enlightens the dark area. Nevertheless, long-time exposure may blur the image if there is camera shake or fast-moving objects. A large number of conventional approaches have been proposed to mitigate the degradation caused by low-light conditions. Histogram Equalization (HE) counts the frequency of the pixel values[9]. By rearranging the pixels to obey uniform distribution, it improves the dynamic range (i.e., better visibility) of the low-light image. Retinex-based methods regard one image as a combination of illumination and reflectance, where the reflectance is an inherent attribute of the scene that is unchangeable in different lighting conditions, and the illumination maps store the differences between the low- and normal-light images. The Retinex-based methods enhance the illumination map of the lowlight image to estimate the corresponding normal-light image. Other methods adopt dehazing theory that decomposes the low- light image to ambient light, refraction, and scene information. Refining the refraction map can also enhance the visibility of low-light images. Convolutional Neural Networks (CNNs) have achieved impressive results in many tasks, such as image classification, semantic segmentation, super-resolution, and object detection. Compared with conventional approaches, the CNNs have better feature representation that benefits from the large dataset and powerful computational ability. For CNNs, the information extracted from the shallow layers has detailed local information (like edge, texture), while deep layers have large receptive fields that can obtain more global features (like complex texture and shape). The CNNs tend to have more convolutional layers and

complex structures to obtain more powerful learning abilities. The low-light enhancement can be regarded as an image restoration task. Image Super-Resolution (SR) is one of the similar topics, which reconstructs a high-resolution (HR) image from a low-resolution (LR) image of different scales.

2. LITERATURE SURVEY

Areas of the image are enhanced and saturated, resulting in the loss of relevant details. To reduce Out of all the five senses, human sight seems to be the most important. Much of the information acquired by humans comes from vision and images are the primary source of visual information. Therefore, retrieving useful information from images remains an essential task in computer vision. However, images captured in low light conditions are often not visually pleasing because most of the information is masked in the low visibility region, resulting in a significant reduction in image quality. As most of the computer vision algorithms require high-quality inputs (medical imaging, tracing, navigation, etc.), the performance is significantly reduced by the low-quality images. Therefore, it is necessary to improve the low light images before it continues to further processing. The main goal of the low-light image enhancement algorithm is to create visually pleasing images and provide more information than input images that are suitable for computer vision applications. Existing methods focus primarily on the contrast enhancement, while others focus on naturalness preservation. Since there is no specific definition of naturalness preservation, it depends on personal preferences. In practice, this naturalness depends on things such as inconsistency of lighting, preservation of colour and fidelity details. Low light images may have slight lightness irregularities, and reversing these irregularities may result in abnormal results. Proper low-light image enhancement techniques should be able to maintain lighting in different locations while collecting data masked in dark areas. Linearly amplifying the pixel intensity values probably is the simplest way to improve the low-light images. This type of operation captures information masked in dark areas. However, the bright saturation, several improvement algorithms have been proposed. These image enhancement techniques attempt to preserve the bright image information while collecting information buried in darker areas. [8]

A threshold selection method from gray-level histograms

Image thresholding is essentially a pixel classification problem. Its basic objective is to classify the pixels of a given image into two classes: those pertaining to an object and those pertaining to the background. While one includes pixels with gray values that are below or equal to a certain threshold, the other includes those with gray values above the threshold. Thresholding is a popular tool for image segmentation. It is widely used in halftone reproduction automatic target recognition, design of visual navigation system for autonomous land vehicles, industrial applications of computer vision, and biomedical image analysis. Over the years many threshold selection techniques have been proposed. For a survey of threshold selection techniques, readers may refer to [9]. In general, threshold selection techniques can be broadly divided into two groups, namely, global and local thresholding. A global technique may be point-dependent or region-dependent. [9]. The thresholding method is point-dependent if the threshold value is determined solely from the pixel gray tone as represented by gray-level histogram and is independent of the gray tone of the neighborhood of a pixel. On the other hand, a method is called region-dependent if the threshold value is determined from the local property within a neighborhood of a pixel [8]. The logarithmic image processing model (LIP) is a robust mathematical framework which, among other benefits, behaves invariantly to illumination changes.

Digital image processing An image may be defined as a two-dimensional function, $f(x, y)$, where x and y are spatial (plane) coordinates, and the amplitude of f at any pair of coordinates (x, y) is called the intensity or gray level of the image at that point. When x , y , and the amplitude values of f are all finite, discrete quantities, we call the image a digital image. The field of digital image processing refers to processing digital images by means of a digital computer. Note that a digital image is composed of a finite number of elements, each of which has a particular location [10]. **X-ray Imaging** X-rays are among the oldest sources of EM radiation used for imaging. The best known use of X-rays is

medical diagnostics, but they also are used extensively in industry and other areas, like astronomy. X-rays for medical and industrial imaging are generated using an X-ray tube, which is a vacuum tube with a cathode and anode. The cathode is heated, causing free electrons to be released. These electrons flow at high speed to the positively charged anode. When the electrons strike a nucleus, energy is released in the form of X-ray radiation. The energy (penetrating power) of the X-rays is controlled by a voltage applied across the anode, and the number of X-rays is controlled by a current applied to the filament in the cathode. shows a familiar chest X-ray generated simply by placing the patient between an X-ray source and a film sensitive to X-ray energy. The intensity of the X-rays is modified by absorption as they pass through the patient, and the resulting energy falling on the film develops it, much in the same way that light develops photographic film. In digital radiography, digital images are obtained by one of two methods: (by digitizing X-ray films; or by having the X-rays that pass through the patient fall directly onto devices (such as a phosphor screen) that convert X-rays to light. The light signal in turn is captured by a light-sensitive digitizing system. No-Reference contrast assessment by image histogram

Digital Image Processing means transforming images into new images treating every pixel independently. It actually refers to the graphical representation of the brightness /colour distribution in an image. The most important task in pre-processing an image is enhancing the contrast and brightness of images. Histogram equalization is one of the most popular methods used for improving the contrast in images. A histogram is an estimate of the probability distribution of a continuous variable and was first introduced by Karl Pearson. Histogram is a graph that shows

3. PROPOSED METHOD

Our proposed method uses pipelines the LLPackNet [12] where RDN is replaced with DCE-net [8]. This provides us with a lighter CNN, with fewer parameters, which make it easier to train and run.

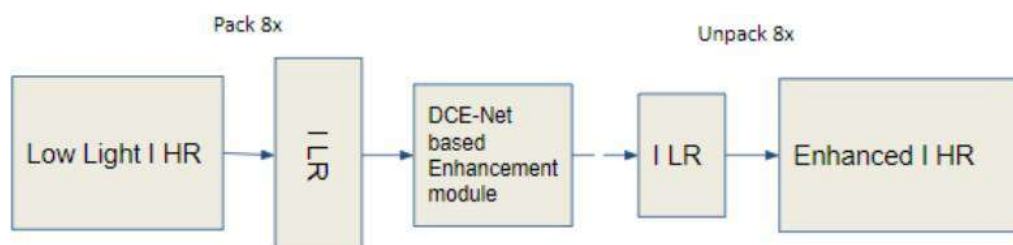


Figure 1 Architectural Diagram of our proposed system

The most operations are performed in LR space for that we down sampled the image without losing any information. To down sample an image we use pack algorithm which is proposed in [12]. In this algorithm, first we perform the Pack8X operation on red, green and blue color components of the amplified image. By doing this the dimensions of the input image are reduced by a factor of 8 and the number of channels is increased. The result is given to DCE-Net: Deep Curve Estimation Network proposed in [8]. The DCE based enhancement module is not a single pass module, DCE net only provides parameter map for image input, but this parameter map is be combined with the image to produce an enhanced image. However, it's not single pass and this is repeated several times. Finally, the output of the DCE-net is unsampled. To perform this, we use UnPack 8X operation, which is the inverse of Pack 8X.

4. RESULTS

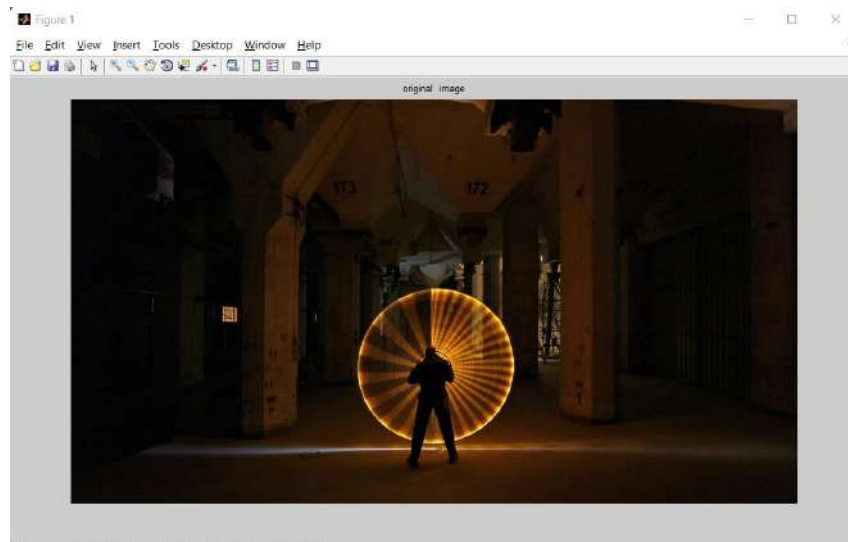


Figure.1 Original image

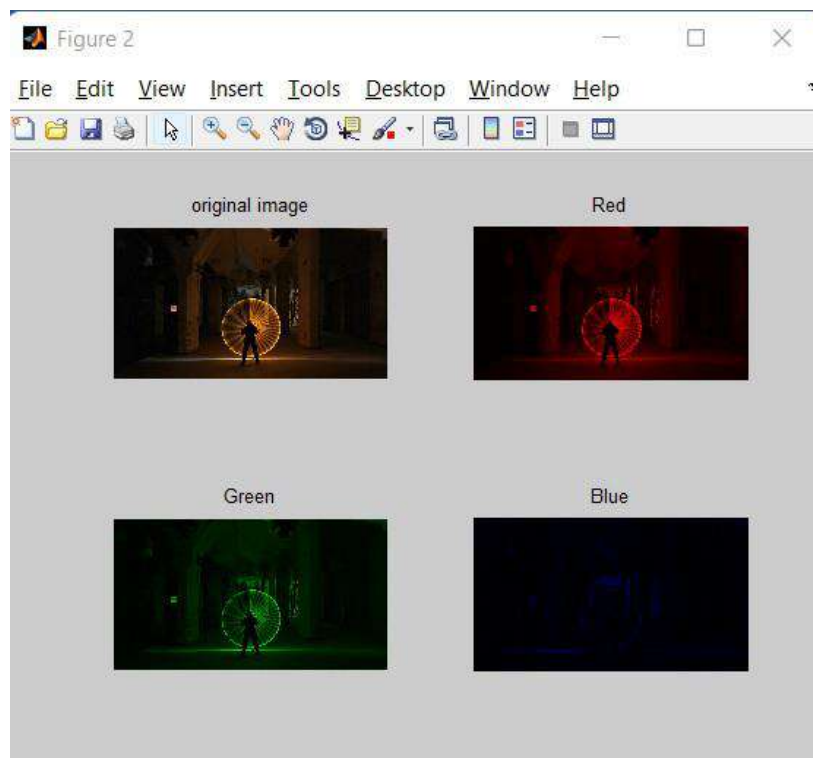
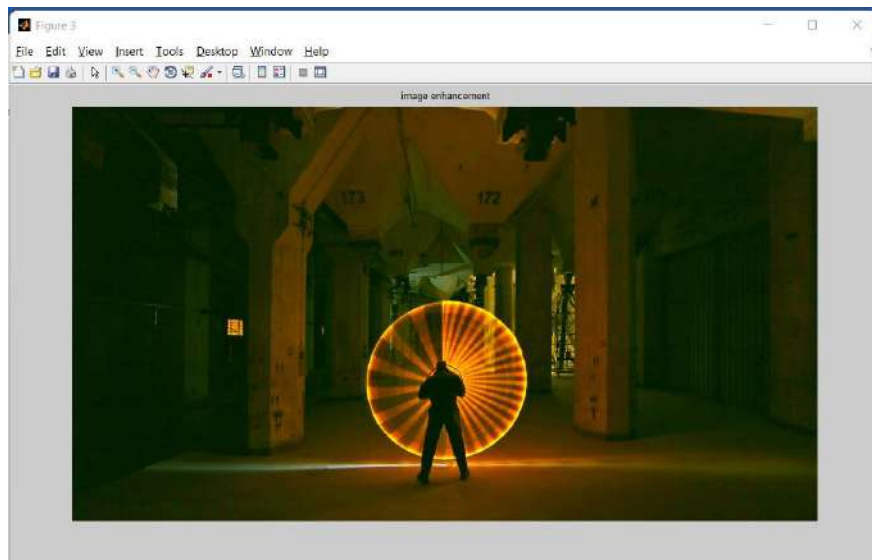
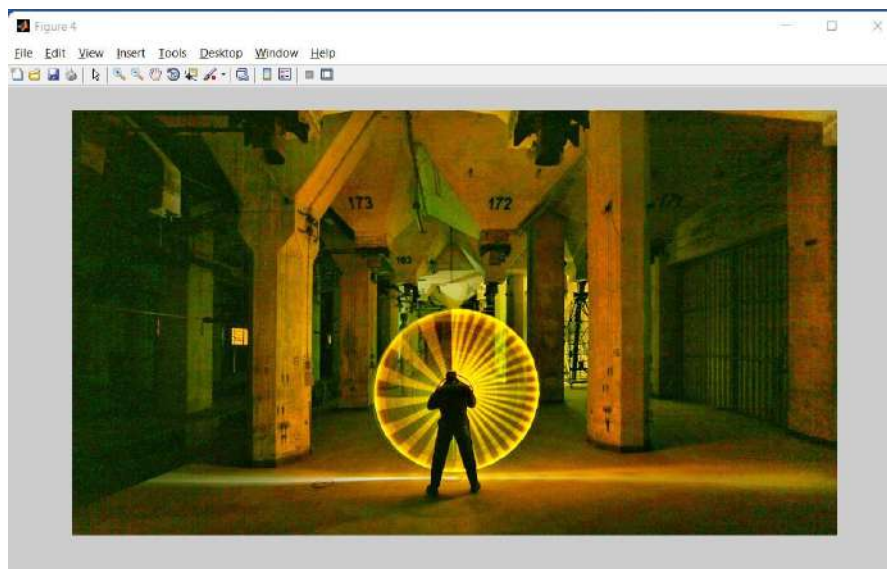


Figure. 2 Image processing



a) Original image



b) Enhanced image

5. CONCLUSION

We developed a technique to enhance low light images using Pack, Unpack and DCE-Net methodologies, the proposed method is very fast and is suitable for running on low power devices, and we believe that its enhancement qualities can certainly be improved using deeper networks. There are many approaches to solve this problem, some are designed to run on hardware specific platforms like GPUs while others have less constraints and can be run on CPUs. The performance also differs based on the type of input (such as color model low light environment). Here, we implanted low light image enhancement using DCE-net and Pack and UnPack algorithms which is simpler than state-of-the-art

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Dual CNN based Channel Estimation for MIMO-OFDM Systems

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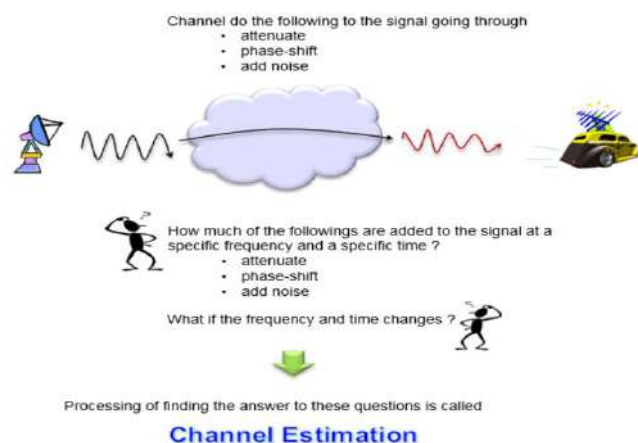
ABSTRACT

Recently, convolutional neural network (CNN)- based channel estimation (CE) for massive multiple-input multiple-output communication systems has achieved remarkable success. However, complexity even needs to be reduced, and robustness can even be improved. Meanwhile, existing methods do not accurately explain which channel features help the denoising of CNNs. In this , we first compare the strengths and weaknesses of CNN-based CE in different domains. When complexity is limited, the channel sparsity in the angle-delay domain improves denoising and robustness whereas large noise power and pilot contamination are handled well in the spatial frequency domain. Thus, we develop a novel network, called dual CNN, to exploit the advantages in the two domains. Furthermore, we introduce an extra neural network, called HyperNet, which learns to detect scenario changes from the same input as the dual CNN. HyperNet updates several parameters adaptively and combines the existing dual CNNs to improve robustness. Experimental results show improved estimation performance for the time-varying scenarios. To further exploit the correlation in the time domain, a recurrent neural network framework is developed, and training strategies are provided to ensure robustness to the changing of temporal correlation. This design improves channel estimation performance but its complexity is still low.

Index Terms—Deep learning, CNN, RNN, MIMO, channel estimation, robustness.

1.INTRODUCTION

All communication the signal goes through a medium (called channel) and the signal gets distorted or various noise is added to the signal while the signal goes through the channel. To properly decode the received signal without much errors are to remove the distortion and noise applied by the channel from the received signal. To do this, the first step is to figure out the characteristics of the channel that the signal has gone through. The technique/process to characterize the channel is called 'channel estimation'. This process would be illustrated as below.



Channel Estimation is the process of finding correlation between the array of complex numbers on the left and the array of complex numbers on the right.

Types of Channel Estimation Techniques Used in MIMO-OFDM

ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING(OFDM)

In OFDM the large data stream to be transmitted is divided into parallel data streams. These data streams are fed to the orthogonal carriers at lower rate. Each subcarrier is modulated by using any one of the digital modulation schemes such as Binary Phase Shift Keying (BPSK), Quadrature Phase Shift Keying (QPSK) and Quadrature Amplitude Modulation (QAM). The data rate for each channel is low compared to the conventional data rate for a single-carrier modulation. However, the overall data rate is superior or comparable to the single-carrier modulation. Hence this scheme finds its applications in most of the modern wireless broadcasting systems namely 802.11n (WIFI), WiMAX, LTE and Ultra-Wide Band (UWB) systems. In MIMO systems multiple antennas are used at both ends of the transmitter and receiver. Usage of MIMO-OFDM systems in modern wireless communication systems provides increased system capacity and coverage with robustness against multipath fading. Because of the unique properties of the MIMO and OFDM systems, these systems are used in high-speed wireless communication systems. MIMO can be subdivided into three main parts pre-coding, spatial multiplexing and diversity coding respectively. Precoding is one of the multi-stream beamforming techniques employed at the transmitter. In this method same type of signals are transmitted with weighted gains from each of the transmitting antennas in order to maximize the input signal power received at the receiver. It also reduces the multipath fading effect but, it requires CSI at the transmitter. Spatial multiplexing requires antenna configuration of the MIMO system. In this, a high data rate signal is split into a number of low data rate signals and each stream is transmitted using different antennas operating at the same frequency. At the receiver these signals arrive with different spatial signatures and it can easily separate these data stream into parallel channel.

3. PROPOSED METHOD

After introducing the multiuser MIMO-OFDM system and conventional CE methods, we present the existing AI-aided channel estimators, including DNN- and CNN-based CE in this section. Besides, we analyze the complexity of the current methods and introduce some techniques to improve robustness. We consider a BS with M antennas serving N_{ue} users, each with a single antenna. OFDM modulation with K subcarriers is used. The length of the transmit pilot sequence is P . The received signal at the K^{th} subcarrier of the BS is

$$\mathbf{Y}_k = \sum_{n=1}^{N_{ue}} \sqrt{\rho_{n,k}} \mathbf{h}_{n,k} \otimes \mathbf{x}_{n,k}^* + \mathbf{Z},$$

where the channel between the BS and the n^{th} user, $\mathbf{h}_{n,k} \in \mathbb{C}^{M \times 1}$, is constant over P time slots by virtue of block fading, $\mathbf{x}_{n,k} \in \mathbb{C}^{P \times 1}$ is the transmit pilot, $\rho_{n,k}$ is the transmit power, \otimes and $(\cdot)^*$ represent Kronecker product and Hermitian transpose and $\mathbf{Z} \in \mathbb{C}^{M \times P}$ denotes the white Gaussian noise. To estimate the channel, the pilot sequence is orthogonal among different users from the same BS, yielding

$$\mathbf{x}_{n_1,k}^* \mathbf{x}_{n_2,k} = \begin{cases} P, & n_1 = n_2 \\ 0, & n_1 \neq n_2 \end{cases}.$$

Then, LS-CE can be expressed as

$$\hat{\mathbf{h}}_{n,k,LS} = \frac{1}{\sqrt{\rho_{n,k}}P} \mathbf{Y}_k \mathbf{x}_{n,k},$$

In the subsequent discussion, we denote the true and the estimated channels of the n^{th} user at all subcarriers as

$$\hat{\mathbf{H}}_{n,LS} \in \mathbb{C}^{M \times K}$$

However, the pilot sequences of the users from different BSs are not orthogonal, which leads to pilot contamination. LS estimation exploits no channel statistics. It has low complexity but poor performance. MMSE-CE improves performance by using the channel correlation in time, frequency, and antennas. Here, we assume that the channel is static within an OFDM block. For convenience, the $M \times K$ matrix is converted into an $MK \times 1$ channel vector by concatenating the columns, yielding

$$\underline{\hat{\mathbf{h}}}_{n,LS} = \text{vec} \left(\hat{\mathbf{H}}_{n,LS} \right),$$

The linear MMSE (LMMSE) estimation of the channel vector is

$$\underline{\hat{\mathbf{h}}}_{n,LMMSE} = \mathbf{R} \left(\mathbf{R} + \sigma^2 \mathbf{I}_{MK} \right)^{-1} \underline{\hat{\mathbf{h}}}_{n,LS} = \mathbf{W}_{LMMSE} \underline{\hat{\mathbf{h}}}_{n,LS},$$

The robust LMMSE estimation is expressed as

$$\begin{aligned} \underline{\hat{\mathbf{h}}}_{n,m,RLMMSE} &= \mathbf{R}_f \left(\mathbf{R}_f + \sigma^2 \mathbf{I}_K \right)^{-1} \underline{\hat{\mathbf{h}}}_{n,m,LS} \\ &= \mathbf{W}_{RLMMSE} \underline{\hat{\mathbf{h}}}_{n,m,LS}. \end{aligned}$$

As a result, the complexity of the robust LMMSE estimation for each user is reduced to $O(MK \log K)$. In the following, it is denoted as RLMMSE. Compared with LMMSE, RLMMSE is less complicated but performs worse because RLMMSE does not exploit the spatial correlation and assumes that the power in the delay domain distributes uniformly

The estimated channel using the classic fully connected DNN can be written as

$$\underline{\hat{\mathbf{h}}}_{n,DNN} = \mathbf{W}_L \cdots \beta \left(\mathbf{W}_2 \beta \left(\mathbf{W}_1 \underline{\hat{\mathbf{h}}}_{n,LS} + \mathbf{b}_1 \right) + \mathbf{b}_2 \right) \cdots + \mathbf{b}_L,$$

where \mathbf{W}_i and \mathbf{b}_i denote the real multiplicative parameter matrix and the additive parameter vector for the i^{th} hidden layer, and $\beta(\cdot)$ is a nonlinear activation function. For fully connected DNN-based CE, the sizes of \mathbf{W}_i and \mathbf{b}_i increase with the numbers of antennas and subcarriers. The complexity of this architecture is larger than $O((MK)^2)$. The DL-based receiver reveals its superiority for extreme scenarios, such as insufficient pilots and nonlinear interference. However, complexity is the key restriction to many applications of DL in wireless communications. Thus, CNN-based receivers are used to simplify the architecture. In Fig. 1(b), the CE module is usually designed as a CNN-based denoiser, where the channels are regarded as two-dimensional pictures with frequency and antennas as height and width, the complexity is

$$O\left(\sum_{i=1}^L (cMK N_{i-1} N_i)\right)$$

where N_i denotes the number of filters in the i^{th} layer, the filter size is c . The input of the i^{th} layer is (M, K, N_{i-1}) , which means this input matrix has three dimensions with the sizes M , K , N_{i-1} , respectively. Transfer learning is a common method for adapting the trained network to a new environment. According , we can either reduce trainable parameters or exploit novel training strategies to save pilot resources online. Some architectures can adjust themselves without online transfer learning. The SNR feedback is utilized in while an extra DNN, called hyper-net, to adjust all the trainable

The channels are converted to a vector, and the correlation is fully utilized. (b) CNN-based CE. The channels are considered images, and the correlation of adjacent elements is more important. weights in. We take the DNN-based CE as an example to describe the architecture of hyper-net. For convenience, the process of a neural network is denoted as a function $f(a; b)$ in the following, where a is the input of the network and b contains all the trainable parameters of the network. Thus, Eq. (8) is rewritten as

$$\hat{\mathbf{h}}_{n,DNN} = f_{DNN}(\hat{\mathbf{h}}_{n,LS}; \mathbf{W}),$$

where \mathbf{W} denotes $[\mathbf{W}_1, \dots, \mathbf{W}_L; \mathbf{b}_1, \dots, \mathbf{b}_L]$, $f_{DNN}(\cdot; \cdot)$ is the process of the DNN-based CE. Then, a hyper-net is used to generate \mathbf{W} with some key parameters as an input. The process is expressed as

$$\mathbf{W} = f_{\text{hyper-net}}(l_{max}, \sigma^2, \dots; \mathbf{W}'),$$

where \mathbf{W}_0 denotes the trainable parameters in hyper-net.

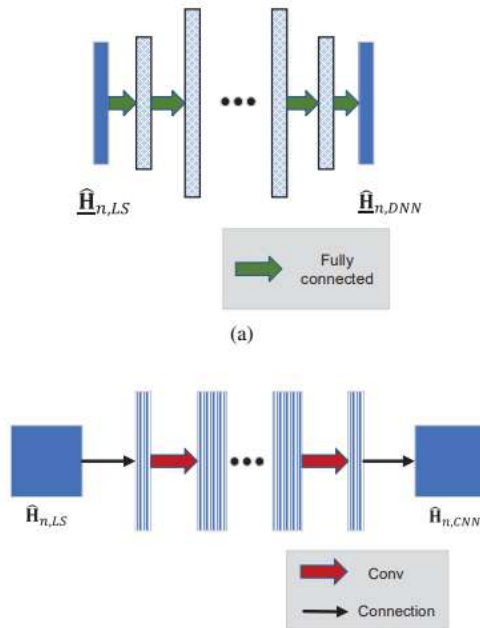


Fig. 1. (a) DNN-based CE

Thus, the entire process is

$$\hat{\mathbf{h}}_{n,DNN} = f_{DNN}(\hat{\mathbf{h}}_{n,LS}; f_{\text{hyper-net}}(l_{max}, \sigma^2, \dots; \mathbf{W}')).$$

After \mathbf{W}_0 is trained, the original trainable parameters, \mathbf{W} , are controlled by the key parameters, such as l_{max} and σ^2 . These key parameters are provided by the user, which is more convenient compared with retraining \mathbf{W} online.

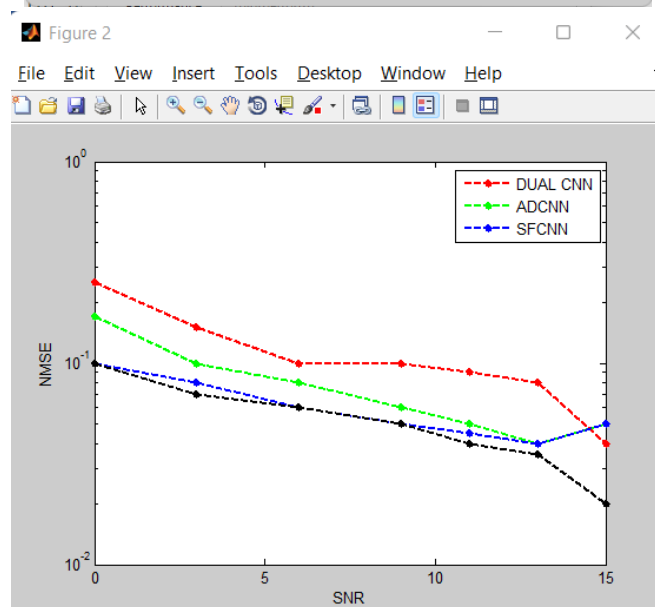
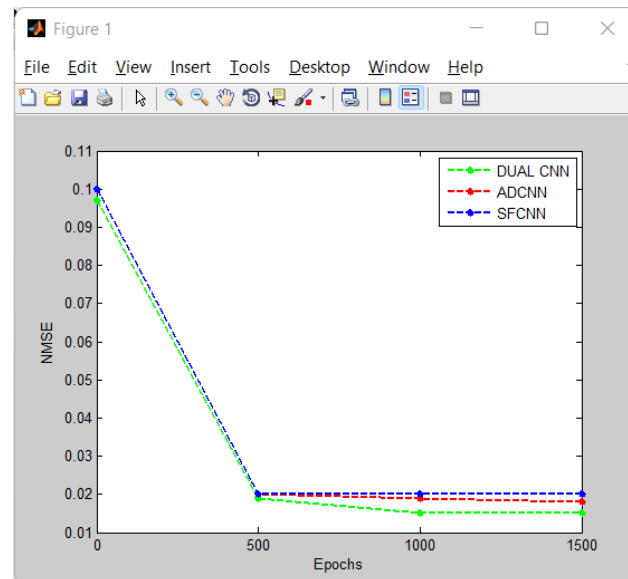
3. RESULTS

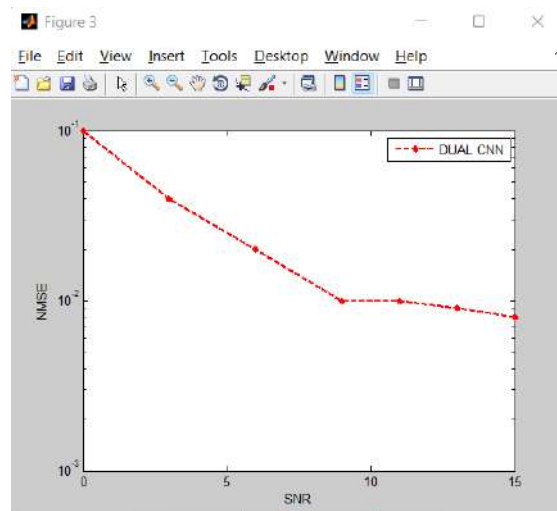
In the following, the low-complexity dual CNN is studied further. As shown in above result the dual CNN is compared with the SFCNN and the ADCNN. Although they have the same number of hidden layers and filters, the dual CNN converges faster because the dual CNN has a smaller network size in each domain. Meanwhile, the domain transform modules exploit the expert knowledge to help the dual CNN learn features quickly. The ADCNN converges as fast as thickened when training epochs < 200 but the ADCNN can reach better NMSE performance under the training SNR, i.e., 10 dB.

To investigate the denoising performance of different methods, the power distribution in the AD domain is displayed using gray images, and the sparsity of the channel power in the above result helps explain the noise power distribution after networks. In this simulation, SNR is set as 10 dB; thus, SFCNN is worse than ADCNN, whereas dual CNN is the best. The noise after SFCNN is still has power in the green circle, where the delay is larger than six. This result means that SFCNN has no global insight because the max delay is the most critical feature exploited by RLMMSE.

We train the three networks under SNR=5 dB. Dual CNN still outperforms the other two methods and is better than LMMSE when $\text{SNR} \leq 7$ dB. SFCNN is also nearly 3 dB better than RLMMSE when the

SNR is 0 dB. This result demonstrates that DL-based methods can outperform conventional methods under interference. ADCNN is better than SFCNN when SNR is low and the gap becomes smaller with the increase in SNR. This phenomenon means that ADCNN mistakenly takes the channel power as noise when trained under low SNR.





5. CONCLUSION

We first developed a CNN-based CE called dual CNN to take advantage of in the SF and AD domains. The channel's sparsity in the AD domain enables the CNN to handle most of the white noise, whereas the channel correlation in the SF domain helps ease interference. The SF domain's correlation also reduces the noise power so that the ADCNN has less possibility to be confused when distinguishing the channel and noise. Thus, the dual CNN has better performance and robustness than estimation in a single domain. We also introduced HyperNet, which does not require online training but performs better than the dual CNN and RLMMSE under the trained and untrained scenarios. We proposed an RNN framework to improve the CE performance by exploiting the temporal correlation of adjacent OFDM blocks. This framework is initiated with a trained dual CNN and learns to perform better than dual CNN. The robust design in this framework stabilizes its performance as long as the temporal correlation is larger than the assumption in the training set.

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VISUAL OBJECT TRACKING USING DEEPREINFORCEMENT LEARNING

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ABSTRACT

Object tracking in a video, or a moving object is difficult as the object will not be a stationary state. Some important difficulties in object tracking include smaller object sizes to be tracked, different orientations and viewing angles yielding different texture and features to be observed and the objects will not be stationary. Therefore, new algorithms are needed for the object tracking. In this project, we introduce a deep reinforcement learning (RL) based single object tracker that tracks an object of interest in a video or motion film by estimating a series of actions to find the location of the object in the next frame. This is the first work introducing a single object tracker using a deep RL-based technique for drone images. Our proposed solution introduces a novel reward function that aims to reduce the total number of actions taken to estimate the object's location in the next frame and also introduces a different backbone network to be used on low resolution images. Additionally, we introduce a set of new actions into the action library to better deal with the above-mentioned complexities. We compare our proposed solutions to a state of the art tracking algorithm from the recent literature and demonstrate up to 3.87% improvement in precision and 3.6% improvement in IoU values on the VisDrone2019 dataset. We also provide additional results on OTB-100 data set and show up to 3.15% improvement in precision on the OTB100 data set when compared to the same previous state of the art algorithm. Lastly, we analyze the ability to handle some of the challenges faced during tracking, including but not limited to occlusion, deformation, and scale variation for our proposed solutions. Index Terms—Object Tracking, Visual Object Tracking, Deep Reinforcement Learning, Aerial Images, UAV videos.

1. INTRODUCTION

The growing numbers of applications in many domains such as entertainment, aerial photography, meteorology, maintenance or delivery, and the widespread use of cameras on drones increased the demand and interest on computer vision-based solutions. Tracking an object of interest visually in drone videos is a common and an essential problem in computer vision and an emerging component in many drone applications. While tracking an object in standard (ground taken) videos has been widely studied, it has been only a recent interest in some videos due to the lack of available large drone data sets until recently. The introduction of recent data sets is aimed to solve the data-related issues of visual object tracking in images. In general, the problem of tracking a single object is widely known as “single object tracking” or “visual object tracking” in the relevant literature and this problem has been widely studied on standard videos including VOT and OTB data sets. However, visual tracking is a recent topic in drone (aerial) images and many of the main challenges are yet to be addressed. Consequently, there are only a limited number of relevant papers available on the subject. While there have been various techniques proposed for visual object tracking in computer vision, a common and a recent research focus has been on developing RL based solutions as in due to their potential on learning meaningful actions to define how to move a bounding box of an object of interest from the current frame to the next one in the exploratory manner of the RL framework.

Many RL-based trackers, as in, focus on providing a reward to the RL algorithm after collecting all the action sequences in each video clip. In that approach, the algorithm must first obtain all the action sequences for all the frames in the clip and creates a batch of those (action) sequences. That batch of

action sequences is, then, used to reward the algorithm. However, we propose rewarding the algorithm after obtaining each action sequence individually, i.e., as soon as the action sequence reaches to the terminal action (end of the sequence) for a frame.

2. PROPOSED METHOD

In our action-sequence-based RL tracker, we use ADNet as the base network. In this paper, we introduce four different models and we name them:

Model-A, Model-B, Model-C and Model-D. Below, we explain each of those models in details.

Model-A

Our first model focuses on utilizing and choosing proper action sets for the drone domain. For that task, we utilized and tested different setups. However, we report only the best working action set for us here. We noticed that utilizing the action set as shown in Figure 2(b) showed best for us. There, we have 12 actions representing the directional movements, two actions for scale changes and one action representing the terminal action (stop), yielding total of 15 actions. B. Model-B Our base network (ADNet) uses a pre-trained network to extract the visual features. In particular, the ADNet architecture uses the first three convolutional layers of VGG-M [4] for initialization of the filters, biases and weights. In order to analyze the effect of backbone network on model performance, our second model.

Model-B

We choose the first two convolutional layers of VGG-F so that the filter size does not exceed the input dimensions through convolutional layers. Figure 3 displays the detailed network structure of Model-B. The first convolutional layer of VGG-F consists of 64 filters of size 11x11, with stride 4. It is followed by ReLu and batch normalization layers. Then, a max-pooling operation is applied. Training of an action-sequence-based RL trackers consists of three individual training stages: (i) supervised learning, (ii) reinforcement learning and (iii) online adaptation in tracking. Supervised learning trains the network to learn and predict action labels with respect to the patch positions. In the reinforcement learning stage, the network that resulted from supervised learning is updated by training sequences with tracking simulation. The main goal of reinforcement learning is to utilize and improve action dynamics. Finally, while tracking the test sequences.

Table I presents the precision, IoU and frames-per-second (F P S) values of the corresponding models on OTB-100 and VisDrone2019 data sets. The results show the precision averaged across all test samples with a center location error threshold of 20 pixels. Figure 4 displays the precision against location error threshold for each of our trackers. The additional directions in action set in Model-A seem to improve performance slightly for OTB-100 and VisDrone2019. Furthermore, Model-B can achieve faster performance in terms of F P S value when VGG-F is used as backbone network. Model-B appears to perform faster than ADNet while maintaining the precision, even though there is a negligible decrease in its value. Therefore, Model-B seems to be practical in cases where speed is an important parameter.

Model-C

In an attempt to increase the performance of reinforcement learning stage, we introduce Model-C by making alterations on two areas of the reinforcement learning algorithm of our base-network: reward function and RL algorithm. First of all, we introduce a hybrid reward function in the reinforcement learning stage, where the length of action set and the overlap ratio are both included during the rewarding process. It is important to recognize that Model-C generates rewards in the terminal patches, which indicates that the sequence of actions is rewarded, rather than individual actions. Thus, the new reward function lets the model utilize the amount of actions required to reach the target state. Moreover, the overlap ratio, $\text{IoU}(b_T, G)$, is included so that the reward is also proportional to the success of the tracking sequence. Secondly, our base model updates the network parameters, WRL, after the calculation of tracking scores on all the frames in each video clip sampled from test videos. In contrast, we

successively calculate target values and rewards, then update the network parameters. Hence, we let reinforcement learning algorithm give reward to the set of actions each time the tracking is applied on a sample video clip to update the model (Algorithm 1). In this way, the rewards and punishments are given right after the tracking operation of each sample video clip is terminated in order to obtain robustness and increase the performance during reinforcement learning.

3. RESULTS



4. CONCLUSION

One of the most common vision tasks is object tracking, when applied on images, it still suffers due to additional challenges such as smaller target size, significant change in orientation & scale and the movements of both camera and targets. In this project, we introduce a set of action-sequence-based deep reinforcement learning trackers for visual object tracking in videos and demonstrate how RL based tracker can be adopted on object tracking. We tested our trackers on both ground-taken videos (OTB-100). In our trackers, we discuss the action types, backbone network structure, and reward function in RL stage. We compare our proposed solutions to a recent model and demonstrate improvements in both precision and IoU values. Our Model-D demonstrates an improvement on precision up to 3.15% on OTB-100 dataset.

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Contactless Robot for Virus Attacked Hospitalized People

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ABSTRACT

Very important and initial challenge in the epidemic of Covid-19 is to identify more probable patients out of crowd of people. Once identified, probable patients may be sent for more Covid-19 test for identification. This initial challenge is tickled by using thermal imaging with the use of thermal cameras over the entire world. It requires the manual operation for scanning of people. It is so risky for human being that handles the whole operation of scanning. Humanoid robot is designed for instructing, alerting and scanning of entering peoples for the sake of more prevention from Corona virus. Low-cost humanoid robot is designed using plastic body. All the corresponding motions are modelled for particular action for scanning of person in front of it. Activation of data capturing and scanning schedule is initiated once entry of person is identified using PIR proximity sensor. Temperature data recorded is analysed and decision is taken place by opening and non-opening. Buzzer, voice indication with SMS alert is given by robot for further action if scanned data is found abnormal. Whole Robot system is implemented and is tested for real time operation. It is found working satisfactorily.

1. INTRODUCTION

COVID-19 is a major epidemic that was spread over the entire World. Automation and less human assisting systems are required for controlling the viral effect of this disease. Manual assistance required for scanning is needed to be avoided. Thermo-graphic scanning is a proven technology based on infrared imaging used in a wide range of applications like monitoring, diagnosis of industrial machines and products and diagnosis of health. Many thermal cameras like ARBOR SENSOR SYSTEM [3], FLIR [4], SATIR [5], FLUKE [6], etc are available in market having different resolutions, features. Some thermal cameras are having the facility of data communication using Ethernet port [3] and some models of FLIR [4] like FLIR E5 [7] and FLIR E8 [7] are having wi-fi facility for capturing and getting the information. Since 1985, thermal imaging devices are used for fever detection by Walter T. Hughes [8]. He stated that the most accurate readings were got along the area near eye and E spot- area below the ear lobes. Later based on many clinical studies[9-12] recommendation through different publications of ISO[13], IEC[14] and the reviews of CDC[15], the best area to scan a person's body temperature is the inner portion closest to the nose where your tear ducts called eye's Lacrimal Caruncle area and the hole of ear. Some of the researchers also recommended to average the temperatures over large area of face or along forehead. Some major companies like Amazon and Walmart are scanning temperatures of their employee with handheld thermometer. Scanner must be close enough to the people for checking that may lead to infection [16]. With a thermal camera, thermal scan is possible automatically.

2. PROPOSED METHOD

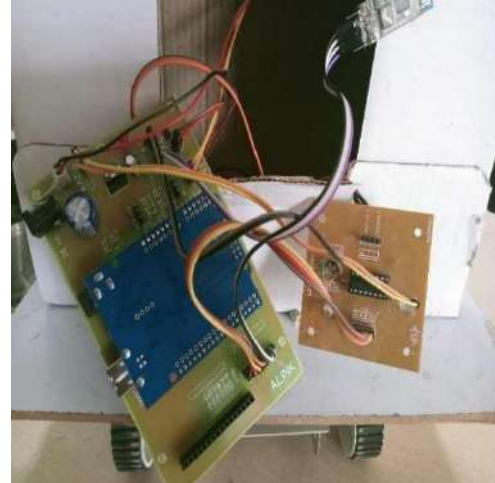
The proposed system may solve the defined problem in most of the extent. Proposed system includes Humanoid Robot System having major three capabilities as movement capability distance measurement and temperature calculation. System also includes Temperature sensing System that is designed for sensing by three ways as sensing of the object availability, detecting the object.

Data is sent from System to Humanoid Robot System through Bluetooth connectivity using HC-05 module, number of ultrasonic transmitter and receiver pairs for head position detection, System is processed by ARDUINO controller and then sent to Robot System for further operations. A novel

approach of Data Analysis with Motion Modelling is proposed for the specific operation of Humanoid Robot System that controls the motion of robot for exact positioning and for distance thermo-graphic measurement. High resolution thermal scanner having data accessing facility is used for thermo-graphic measurements. After proper moving/positioning of robot hand (having attached scanner) by robot, it captures thermo-graphic image and also records the temperature of the target person. It is exactly positioning and focusing on forehead of the entered person. If motion found is excides it limit then the whole process from getting positional information until the scanning is repeated. Main controller used for Robot System is low cost Arduino Uno that can handle all the operation of Robot System like motion control, initialization of scanning and instructing & alerting like operations. Data is sent from System to Humanoid Robot System through Bluetooth connectivity using HC-05 module, number of ultrasonic transmitter and receiver pairs for head position detection, System is processed by ARDUINO controller and then sent to Robot System for further operations. A no vel approach of Data Analysis with Motion Modelling is proposed for the specific operation of Humanoid Robot System that controls the motion of robot for exact positioning and for distance thermo-graphic measurement. High resolution thermal scanner having data accessing facility is used for thermo-graphic measurements. After proper moving/positioning of robot hand (having attached scanner) by robot, it captures thermo-graphic image and also records the temperature of the target person. It is exactly positioning and focusing on forehead of the entered person. If motion found is excides it limit then the whole process from getting positional information until the scanning is repeated. Main controller used for Robot System is low cost Arduino Uno that can handle all the operation of Robot System like motion control, initialization of scanning and instructing & alerting like operations.

3. RESULTS

Step 1: Circuit diagram of the Contactless Robot for Virus Attacked Hospitalized People.



Step 2: Working of Circuit.



Step 3: Output of the Project.

4. CONCLUSION

During the epidemic of Covid-19, it is necessary to identify the probable patient during un- lockdown condition. Thermal scanner is the best option to identify the fever of any person from distance manner to avoid the infection to other people. In this work, we proposed autonomous humanoid robotic controlled system that identifies the his/her position, and his/her distance. It scans the forehead of person for temperature measurement using thermal scanner. Recorded temperature is analysed and Corresponding instruction and alert is provided by the robotic system. Implemented system is working properly and useful to check the persons for the identification of their health conditions.

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IoT BASED UNMANNED TOLLBOOTH MONITORING SYSTEM

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ABSTRACT

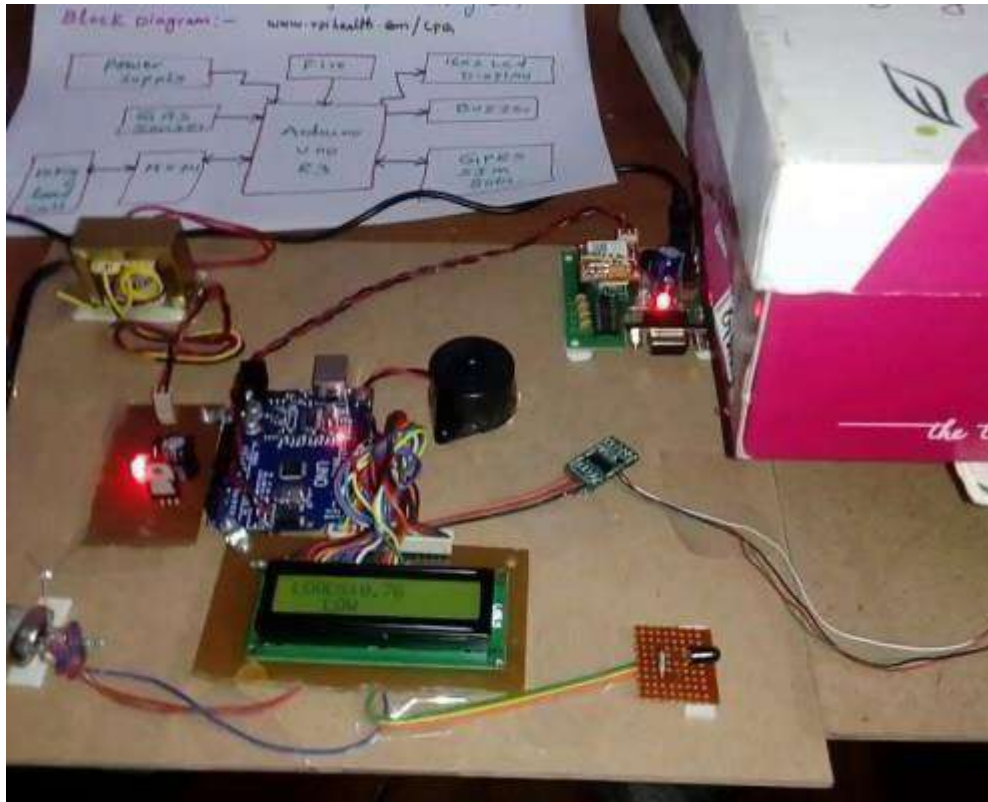
Managing multiple toll booths is a very complicated task. We here propose a smart card based tollbooth system that is monitored over IoT. The Internet server maintains all the data of user accounts and also their balance. All vehicle owners would possess an RFID based card that stores their account number. Our system at toll booths will monitor the cards scanned when a car arrives at the toll booth. The system now connects to the online server to check if the card is valid and if valid what is the balance. If user balance is sufficient, the user balance is deducted online and web system sends signal back to the card scanner system that the user has been billed. On receiving this signal the system operates a motor to open the toll gate for that car. The system is controlled by a microcontroller to achieve this purpose. The microcontroller uses WIFI connection to connect to the internet through which system interacts with web server to perform the online verification process. Also system allows to store data of all the vehicles passed at particular time intervals for later reference and surveillance. This system thus automates the entire toll booth collection and monitoring process with ease using RFID plus IOT based system.

1. INTRODUCTION

With the growth in the number of vehicles the need for expansive roads catering to thousands of vehicles moving across India has become inevitable. However, considering the present situation the current toll system has several drawbacks. Due to the limited number of toll booths and slow collection process, the average waiting time per vehicle is 10 minutes. This results in losses worth thousands of crores of Rupees in terms of fuel wastage. This long wait time often results in drivers getting irritated resulting in verbal spats and physical fights among people and the toll attendants. Several such incidents have been reported in the press with some of these fights even resulting in the death of the toll plaza attendants. In addition, there are numerous cases of toll plaza accidents which happen due to the sudden lane changing by drivers for faster clearance. The major reason behind this is that, the security at the tolls is insufficient and it is beyond the traffic police control to manage the vast number of vehicles. We keep hearing of many such incidents at toll plazas which mostly occur due to negligence either on the people's side or due to lack of control from the government agencies including the police. In case of events, where lives are lost, such losses are a life shattering experience. As is well known, in such a scenario, the general public is a little hesitant in taking responsibilities of any such incident. Hence the government has to come up with an effective plan which bridges the gap between the toll management and the public expectation of the service that they experience. Introduction of an elective toll plaza operation plan by the government, its strict implementation and monitoring which would result in a more efficient and a more responsive and efficient system could be a good option for easing the challenges associated with the existing tolling process. The requirements for new web applications supporting different types of devices and purposes are continuously growing. The main advantages of web application development as well as popular development features covering integration with different technologies are considered. Integration and possibilities of application of cloud based web applications in real scenarios with different embedded Internet of Things (IoT) devices are considered and described. The design and implementation of a cloud-based web application supporting vehicle toll payment system using IoT device is presented and described. The development framework as well as featured and popular technologies used to realize a vehicle toll payment by IoT

device are described. The concept of vehicle toll payment over an online payment system is also described. Processing, monitoring and control in the cloud-based web application of such payments using IoT devices are described and presented. Also, system allows to store data of all the vehicles passed at particular time intervals for later reference and surveillance. This system thus automates the entire toll booth collection and monitoring process with ease using RFID plus IoT based system.

2. RESULTS



In the design of the proposed Electronic toll collection (ETC) system, real time toll collection and anti-theft solution system have been designed. This reduces the manual labour and delays that often occur on roads. This system of collecting tolls is eco friendly and also results in increased toll lane capacity. Also an anti-theft solution system module which prevents passing of any defaulter vehicle is implemented, thus assuring security on the roadways.

3. CONCLUSION

The Electronic Toll Collection system in expressway based on RFID, a design scheme was put forward. It is low cost, high security, far communication and efficiency, etc. It not only improves the passage ability of expressway but also improves the technology level of charge. Electronic toll collection system using RFID is an effective measure to reduce management costs and fees, at the same time, greatly reduce noise and pollutant emission of toll station.



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Pruning the Pilots: Deep Learning-Based Pilot Design and Channel Estimation for MIMO-OFDM Systems

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ABSTRACT

With the large number of antennas and subcarriers the overhead due to pilot transmission for channel estimation can be prohibitive in wideband massive multiple-input multiple output (MIMO) systems. This can degrade the overall spectral efficiency significantly, and as a result, curtail the potential benefits of massive MIMO. In this paper, we propose a neural network (NN)-based joint pilot design and downlink channel estimation scheme for frequency division duplex (FDD) MIMO orthogonal frequency division multiplex (OFDM) systems. The proposed NN architecture uses fully connected layers for frequency-aware pilot design, and outperforms linear minimum mean square error (LMMSE) estimation by exploiting inherent correlations in MIMO channel matrices utilizing convolutional NN layers. Our proposed NN architecture uses a non-local attention module to learn longer range correlations in the channel matrix to further improve the channel estimation performance. We also propose an effective pilot reduction technique by gradually pruning less significant neurons from the dense NN layers during training. This constitutes a novel application of NN pruning to reduce the pilot transmission overhead. Our pruning-based pilot reduction technique reduces the overhead by allocating pilots across subcarriers non-uniformly and exploiting the inter-frequency and inter-antenna correlations in the channel matrix efficiently through convolutional layers and attention module. Index Terms— Deep learning (DL), neural network (NN) pruning, multiple-input multiple-output (MIMO)-orthogonal frequency division multiplex (OFDM), channel estimation, pilot allocation.

1. INTRODUCTION

MASSIVE multiple-input multiple-output (MIMO) systems are considered as the main enabler of 5G and future wireless networks thanks to their ability to serve a large number of users simultaneously, achieving impressive levels of spectral efficiency. A base station (BS) with a massive number of antennas relies on accurate downlink channel state information (CSI) to achieve the promised performance gains. Therefore, massive MIMO systems are more amenable to time division duplex (TDD) operation, which, thanks to the reciprocity of the uplink and downlink channels, does not require downlink channel estimation at the users. FDD operation is more desirable due to its improved coverage and reduced interference; however, channel reciprocity does not hold in FDD. In FDD MIMO, the BS broadcasts downlink pilot signals, the users estimate the channel from the received pilots and transmit the CSI feedback to the BS. The resulting overhead becomes significant due to the large number of antennas and users; and hence, efficient pilot design and channel estimation are crucial to reduce the overhead. In massive MIMO systems where the pilot length is typically much smaller than the number of antennas, channel estimation becomes severely underdetermined. Hence, simple least squares (LS) or linear minimum mean square error (LMMSE) channel estimation and orthogonal FFT pilots perform poorly. To estimate the channel more efficiently and reduce the pilot overhead, many previous works take a model-based estimation approach assuming sparse [1]–[5] or low-rank [6], [7] models on the channel matrix and utilize compressive sensing (CS)-based reconstruction techniques to estimate the channel or design improved pilot sequences. CS-based approaches rely on sparse or low-rank properties of the channel, and do not take into account the inherent statistical correlations and structures beyond sparse or low-rank patterns. Moreover, CS-based reconstruction techniques employ computationally demanding iterative algorithms, which imposes an additional burden on the use. More recently, deep learning (DL)-based approaches have been for massive MIMO CSI acquisition and showed significant improvements in comparison their counterparts based on sparsity and compressive sensing.

In these works, neural network (NN) architectures are trained over large CSI datasets to learn complex

distributions, structures, and correlations, and exploit them for data-driven pilot design [10], channel estimation [11]–[15], compression [16]–[21] and feedback [22],[23]. Many of these works focus on a single task and propose a NN architecture to achieve optimized performance for it.

While designing a single NN architecture to simultaneously handle all or several of these tasks is desirable for an end-to-end optimized performance, the resulting NN may be more complex, and require a longer training process. In this paper, we consider joint pilot design and channel estimation for downlink FDD massive MIMO systems. In [11], [24], the authors proposed a convolutional neural network (CNN)-based structure for massive MIMO channel estimation. Their proposed architecture outperforms non-ideal LMMSE-based channel estimation (where the required covariance matrices are estimated from a coarse initial estimate of the channel at the receiver) and approach ideal LMMSE (with perfect knowledge of the covariance matrices assumed at the receiver). In [10], the authors use dense layers (which represent the pilots) followed by subsequent convolutional layers for joint pilot design and channel estimation.

2. LITERATURE SURVEY

MASSIVE MULTIPLE-INPUT MULTIPLE-OUTPUT (MIMO) can greatly enhance the wireless communication capacity due to the increased degrees of freedom [1], and there is intense research interest in the applications of massive MIMO in next generation wireless systems [2]. To fully utilize the spatial multiplexing gains and the array gains of massive MIMO [3], [4], knowledge of channel state information at the transmitter (CSIT) is essential. In time-division duplexing (TDD) massive MIMO systems, the CSIT can be obtained by exploiting the channel reciprocity using uplink pilots [5] and hence, lots of works today [2], [6] have considered massive MIMO of TDD systems.

On the other hand, as frequency-division duplexing (FDD) is generally considered to be more effective for systems with symmetric traffic and delay-sensitive applications [7] and the most cellular systems today employ FDD, it is therefore of great interest to explore effective approaches for obtaining CSIT for massive MIMO with FDD [8]. To obtain CSIT at the base station (BS) of FDD systems, the BS first transmits downlink pilot symbols so that the user can estimate the downlink CSI locally. The estimated CSI are then fed back to the BS via uplink signaling channels [9]. Conventional methods to estimate the downlink CSI at the users include least square (LS)

[10] and minimum mean square error (MMSE) [11]. However, using these conventional CSI estimation techniques, the number of independent pilot symbols required at the BS has to scale linearly with the number of transmit antennas at the BS (i.e. N). For massive MIMO, as N becomes very large, the pilot training overhead (downlink) as well as the CSI feedback overhead (uplink) would be prohibitively large. In addition, the number of independent pilot symbols available is limited by the channel coherence time and coherence bandwidth [2], as illustrated in Fig. 1. Obviously, as N increases in FDD massive MIMO systems, we do not have sufficient pilots to support CSIT estimation despite the overhead issues. Hence, a new CSIT estimation and feedback design will be needed to support FDD massive MIMO systems. There is one important observation for massive MIMO systems, which can help to address the above issues. From many experimental studies of massive MIMO channels [12]–[16], as N increases, the user channel matrices tend to be sparse due to the limited local scatterers at the BS. Hence, it is very inefficient to estimate the entire CSI matrices using long pilot training symbols at the BS. Instead, we should exploit the hidden sparsity in the CSIT estimation and feedback process and compressive sensing (CS) is an attractive framework for this purpose [17]. In fact, the CS techniques have already been used in the literature to enhance the channel estimation performance. For instance, in [6], a CS-based low-rank approximation algorithm is proposed to enhance the channel estimation performance for TDD massive MIMO systems but the technique cannot be applied for FDD systems. In [18], a CS-based channel estimation method is proposed to exploit the per-link sparse multipath channels in time, frequency as well as spatial domains in MIMO systems. By exploiting the spatial sparsity using CS in massive MIMO systems, it is shown that only training 1 overhead [18] is needed and this represents a substantial

reduction of the CSIT estimation overhead compared with the conventional LS approach. To extend existing CS-based CSIT estimation techniques to multi-user massive MIMO of FDD systems, we need to address several first order technical challenges:

How to exploit the joint channel sparsity among different users distributively. As has been observed in many experimental studies [13]–[16], the user channel matrices of a multi-user massive MIMO system may be jointly correlated due to the shared common local scattering clusters [19]. Therefore, it is highly desirable to exploit not only the per-link channel sparsity but also the joint sparsity structure to further reduce the CSIT estimation and feedback overhead. Directly applying existing CS-based CSIT estimation for point to point links [17], [18], [20] may exploit the per-link channel sparsity, but it fails to exploit the joint sparsity in the user channel matrices. In [21], the authors consider a distributed CS recovery framework based on three simple joint sparsity models. A set of jointly sparse signal ensembles are measured distributively and recovered jointly. However, the joint sparsity structure in our multi-user massive MIMO scenario is much more complicated and is not covered by these existing models [21] and hence, the associated recovery algorithms cannot be extended to our scenario. Tradeoff analysis between the CSIT estimation quality and the joint channel sparsity. Besides the algorithm development challenge above, it is also desirable to obtain design insights into how the joint channel sparsity can affect the CSIT estimation performance. However, in general, the performance analysis of the joint CS recovery algorithms is very difficult [22]. In [23], [24], the authors analyze the support recovery probability of the simultaneous orthogonal matching pursuit algorithm proposed for multiple measurement vector problems [22], and demonstrate the performance benefits of exploiting the shared sparsity support. However, the analytical approach cannot be easily extended to our scenario as the recovery performance analysis is usually algorithm-specific. Feedback these compressed measurements to the BS. CSIT reconstruction is performed at the BS using a joint recovery algorithm based on the feedback compressed measurements. Specifically, we propose, in Section III, a joint orthogonal matching pursuit algorithm to exploit the joint channel sparsity in the CSIT recovery at the BS. We analyze the normalized mean absolute error of the estimated CSI in Section IV, and from the closed-form results, we obtain important insights regarding the role of individual and distributed joint channel sparsity in multi-user massive MIMO systems. Numerical results in Section V demonstrate that the proposed CSIT recovery algorithm can achieve substantial performance gains over conventional LS-based [10], [11] or existing CS-based per-link CSIT estimation solutions.

3. PROPOSED METHOD

We consider an FDD massive MIMO system, where a BS with N antennas serves a single-antenna user utilizing orthogonal frequency division multiplexing (OFDM) over M subcarriers. We denote the downlink channel by $\mathbf{H} = [\mathbf{h}_1, \mathbf{h}_2, \dots, \mathbf{h}_M] \in \mathbb{C}^{N \times M}$, where \mathbf{h}_m

$\in \mathbb{C}^N$ is the channel gain vector over subcarrier m , for $m = 1, \dots, M$. We assume that the BS is equipped with a uniform linear array (ULA) with response vector:

$$\mathbf{a}(\phi) = \frac{1}{\sqrt{N}} [1, e^{-j\frac{2\pi d}{\lambda} \sin \phi}, \dots, e^{-j\frac{2\pi d}{\lambda} (N-1) \sin \phi}]^T,$$

where ϕ is the angle of departure (AoD), and d and λ denote the distance between adjacent antennas and carrier wavelength, respectively. The channel gain is a summation of multipath components [25] given by

$$\mathbf{h}_m = \sqrt{\frac{N}{P}} \sum_{p=1}^P \alpha_p e^{-j2\pi \tau_p f_s \frac{m}{M}} \mathbf{a}(\phi),$$

where P is the number of multipath components, f_s is the sampling rate, τ_p is the delay, and α_p is the propagation gain of the p th path. According to Eq. (1), entries of the channel matrix H are correlated for nearby sub-carriers and antennas due to similar propagation paths, gains, and AoDs/AoAs. There also exist inherent characteristics in MIMO environments due to specific user distributions, scattering parameters, geometry, etc., that cause common structures among MIMO channel matrices. Fig. 1 depicts the time-frequency resource grid structure, where we use a pilot block of size $L \times M$ (denoted by the black slots in Fig. 1) to estimate the channel over a time-frequency grid of size $T \times M$ and $L \leq T$. The coherence time of the channel is assumed much larger than T such that the channel. There also exist inherent characteristics in MIMO environments due to specific user distributions, scattering parameters, geometry, etc., that cause common structures among MIMO channel matrices. There also exist inherent characteristics in MIMO environments due to specific user distributions, scattering parameters, geometry, etc., that cause common structures among MIMO channel matrices.

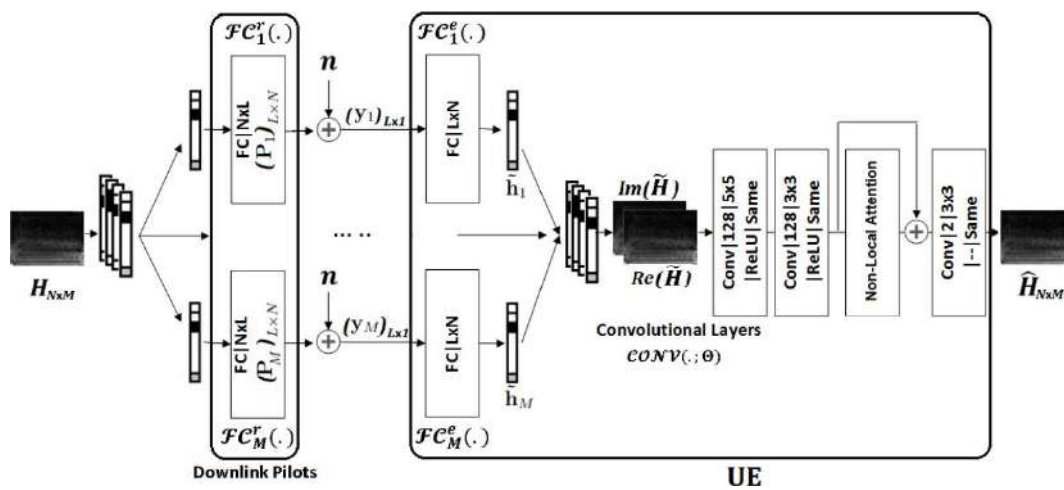


Figure: Block diagram of the proposed scheme.

4. RESULTS

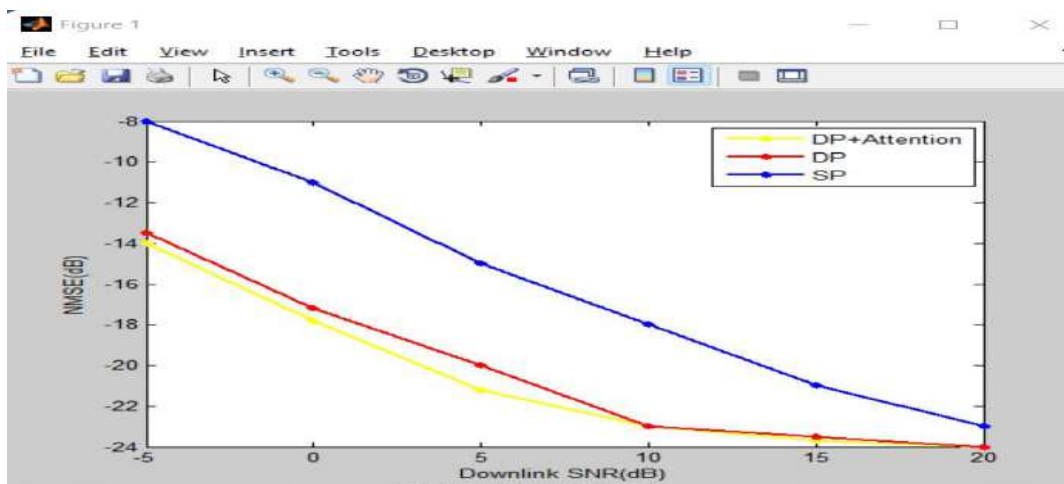


Figure: Actual Downlink SNR(dB)

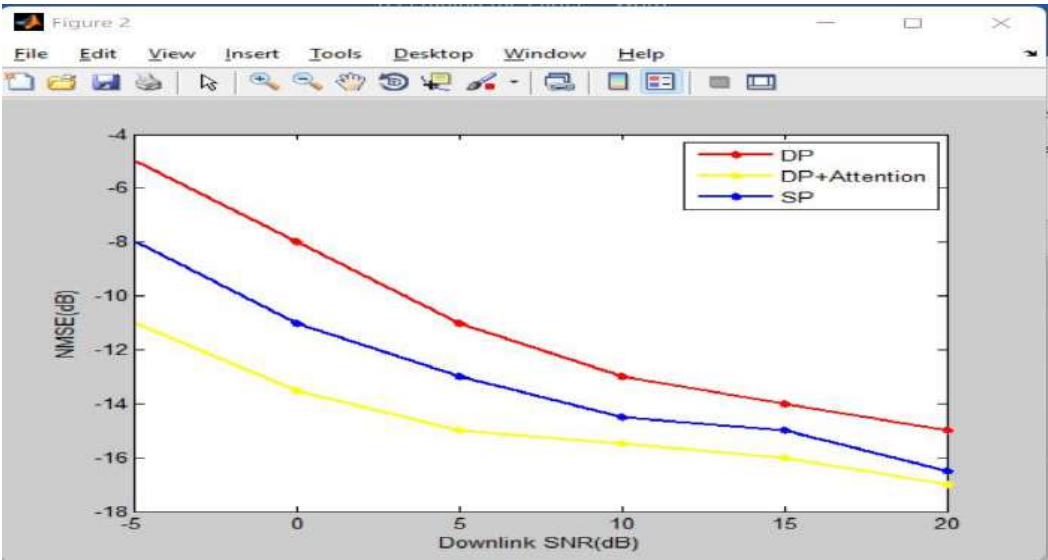


Figure.: Proposed Downlink SNR (dB)

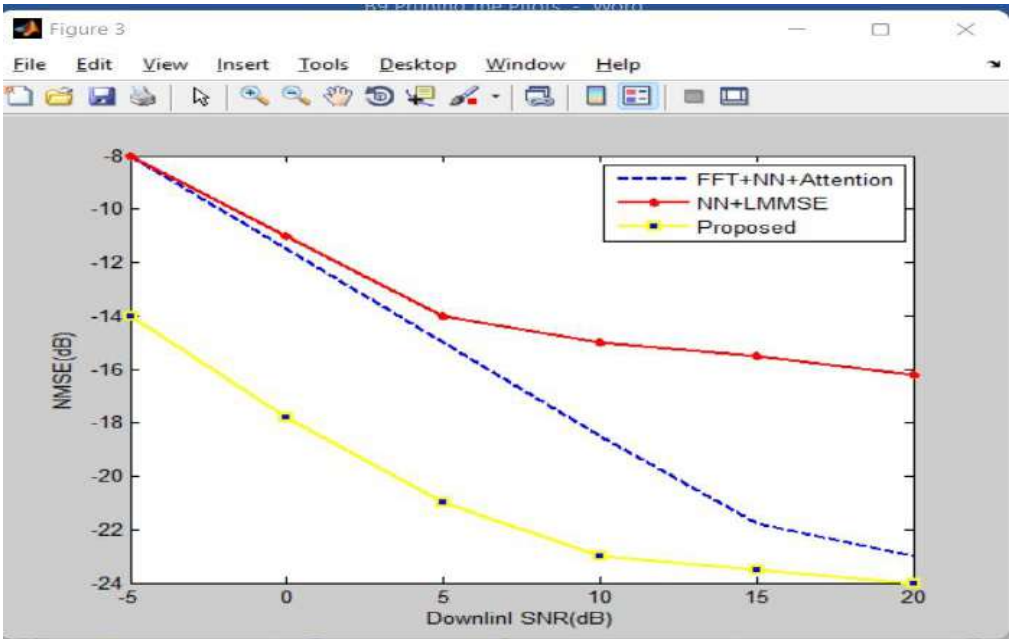


Figure Downlink SNR (dB)

5. CONCLUSION

We have proposed a NN-based joint downlink pilot design and channel estimation scheme for FDD massive MIMO-OFDM systems. Our proposed network utilizes dense layers to design pilot signals in a frequency-aware structure followed by convolutional layers which utilize inherent correlations in the channel matrix to provide an accurate channel estimate in an efficient manner. We have also employed an attention module to exploit long-range correlations in the channel matrix, which cannot be inferred by the conventional convolutional layers. We also proposed an effective pilot reduction technique by gradually pruning less significant neurons from the dense layers to reduce the pilot overhead and to save time-frequency resources for data transmission. Our proposed NN-based pilot design and channel estimation scheme outperforms LMMSE estimation. Moreover, our pruning-based pilot reduction technique effectively reduces the pilot overhead by allocating pilots across subcarriers non-uniformly; allowing fewer pilot transmissions on subcarriers that can be satisfactorily reconstructed by the subsequent convolutional layers exploiting inter-frequency correlations.

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AUTOMATIC RAIN SENSING UMBRELLA FOR HARVEST PROTECTION

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ABSTRACT

This project presents the development of a smart umbrella system using IOT, which can measure rainfall and predict the weather condition with the notion in your smartphone. It's about the real-time weather condition. In this we are going to learn about how to make a smart umbrella using IOT that connected to Wi-Fi. It can notify you before about the climate by giving audio output of the weather conditions. Which is being implemented using the smart sensor like Rain sensor, temperature sensor, Light sensor. During monsoon, sellers with an open shop, neighbours drying clothes outside and many similar situations cause inconveniences in our life. In case of street vegetable sellers, they need to protect the vegetables, fruits and customers from rains in monsoon season. Even the tarpaulins don't prove to be of any use during torrential rains accompanied by a thunderstorm. To overcome such problems and help us live with the inconvenience raining system. this auto rain-sensing umbrella system comes up with a solution. This system can detect the rain and opens up the umbrella. In this system, we have a raindrop sensing system, which gives a reading proportional to the amount of rain pouring on it. The system consisting of a rack and pinion, the rack is fixed to umbrella such that when a sensor senses the exceeding value of raindrops, it gives a signal to the pinion attached to a motor. Then the motor starts rotating and the umbrella opens. A webpage is made where all the weather conditions will be updated and can be used or connected to any device to know the status of that area

1. INTRODUCTION

Natural resource elements are associated with day-to-day activities such as rainfall and sun light which is having both positive as well as negative impact on our lives and property. Rainfall also having its very negative impact and such as destruction and damage of nursery, skin disorder in humans and increase in mortality of living stocks etc. The problem associated with the proper design of the umbrella which can be possibly be made portable and easy to use is also there and other components with that which are to be protected from the extreme weather conditions. The design proposed for many systems uses retractable roof of wooden which can possibly be damaged by rain so proper material selection has to be done for longer life. These two weather elements have both positive and negative impacts in our life.To avoid the complete isolation of sunlight and rainfall a system is developed which will economical and give space reuse whenever the threshold value exceeds then roof automatically gets open up. An Algorithm is developed to facilitate the automatic working of the roof whenever the intensity of these two weather elements exceeds the present value. In this system author has used an LDR sensor to detect to intensity of sunlight and ultrasonic and rain sensor for detection of rainfall intensity and pressure which will be helping in smart decision making. This system has a programmable device Arduino which will help in controlling of stepper motor for opening and closing of roof and two switches aiding for better control in all direction. 'Smart Automation System Using Arduino and Rain Drop Sensor' illustrated in this project that during rainy season the crops gets affected due to unexpected rainfall or even with hailstorm sometime in order to eliminate such things we developed a system to protect it from heavy rainfall. The basic idea behind this research is to protect or to save the crops along with the rain water harvesting system. The rain sensing device along with the soil moisture sensing device is used in this system which will help in opening and closing of the automated roof. The Purpose of this research is choosen to improve the design of the pre-existing umbrellas. Often times when rainfalls a person must constantly adjust the

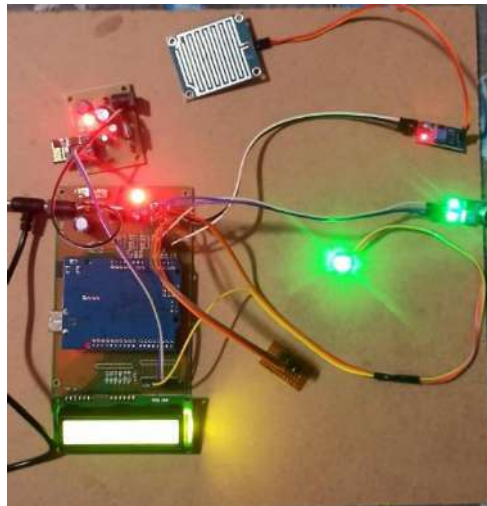
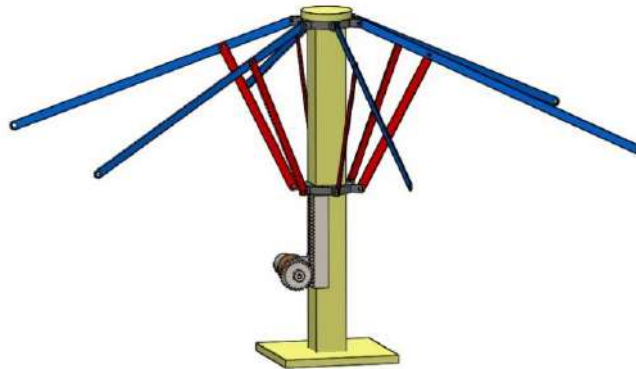
head of the umbrella to block the rain as it falls at different angles due to the wind. Our idea intends design a smart umbrella to be an extension to current umbrellas that will automatically adjust the head of the umbrella to block the maximum amount of rain according to the wind direction and speed.

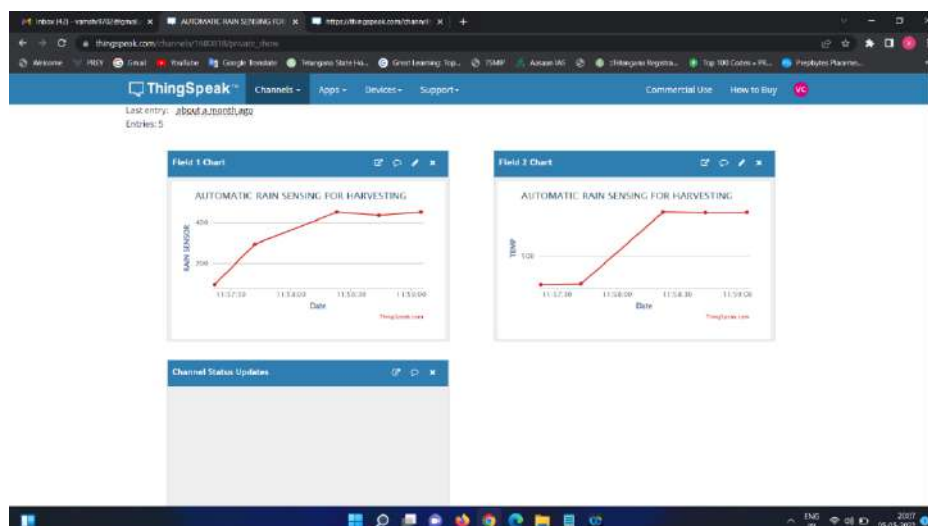
2. LITERATURE SURVREY

An automated umbrella means that it works flawlessly. In 1928, Hans Haupt invented the pocket umbrella. In Vienna, Hans Haupt was a student studying sculpture she developed a prototype for an improved compact foldable umbrella in September 1929. At the US University of central Florida students worked on automated umbrella. They designed an automated umbrella that worked with the help of a control system. The umbrella canopies of the 1600's were woven out of silk, which provided limited water resistance when compared to today' s rain umbrellas, but the distinct canopy shape was unchanged from the earliest documented designs. One of the most important discoveries came the idea of using "U" molded metal rods on the ribs and stretcher to make a simple, stronger frame. Current rain umbrellas are made of fabrics (nylon, most commonly) that are resistant to rain that draws, dries quickly, folds easily and is available in a variety of colors and designs outdoor applications. Temperature absorption is related to color. The darker the color the more the heat will absorb the umbrella so we will choose the right color depending on the intensity of the sun. An environmental sensor device is electrically connected to a power source and installed in the shading system for detecting environmental changes .The device has a natural sensor and basically controls the awning frame, where the active controller receives the command signal from a natural sensing device, the awning frame is adjusted accordingly regulate the area of its shadow. The functional controller comprises an electric servo which is electrically linked to the power source and is operatively controlled by the functional controller to automatically and selectively actuate the awning frame between an unfolded position that the sun shelter is expanded to maximize the shading area and a folded position that the sun shelter is folded up to minimize the shading area. As a result, the electric servo is electrically connected to the wind detector and the motion detector so that the awning frame is capable of timely responding to the environmental change surrounding the intelligent outdoor Sun shading device. An acoustic sensor is used to measure the environment and converts this information into a digital signal. The sensor can transfer information records to a web server and can trigger a SMS caution when rainfall information surpasses security limits. It is the main object of the present invention to provide an automatic umbrella control mechanism. Which enables the user to open and close the umbrella automatically by switching on a button. A temperature sensor is installed to the circuit which senses the atmospheric temperature and sends signal in the form of waves to the control box. Control box is controlled by Arduino which further send signal to the motor coupled to the shaft of the umbrella. Motor transfers its motion to the coupled shaft so that shaft may rotate. One end of the umbrella sheet is attached with slider and slider moves with rope which is passing through the drum and pulley. As the drum rotates anticlockwise, rope moves in forward direction with slider and umbrella sheet opens. For closing of umbrella, drums rotate clockwise then rope starts to move backward direction and hence umbrella closes. The clockwise and anticlockwise directions of motor are controlled by Arduino. The pulley and rope. Second design was using pulleys and rope mechanism for transmission purpose which was light weighted and cost effective but eventually after some practical implementation that the prescribed system cannot bear the environmental conditions of the region at all. There were some serious issues regarding bending of umbrella sheet during transmission. Our methodology must be more convenient and simpler that a feasible and low-cost umbrella can be made. A uniform distributed load in form umbrella sheet will apply on the beam so all the design calculations will be made according to the nature of the beam and the applied load. A suitable sheet will be selected according to the weather conditions of the region. A temperature sensor will use to operate the motor and it will also control the motor movement When temperature will

exceed from 35 the sensor will operate the motor and umbrella will open.

3. RESULTS





5. CONCLUSION

After completing the present work with all the process involved in designing the automated umbrella which can be of reasonable cost analysis and effective way to providing the shelter and safety to the object and goods with high intensity of power and this type of umbrella should be used in the various place in village to protect crops and the vehicles, etc. It can be applying at large scale area for reduced human work. It included the rack and pinion gear which changes the motion rotation into reciprocating. It also used in future after some of modification algorithm can be developed to coordinate Working system of rain to identify weather condition based on set value. The designed system prototype can be used along with the renewable source of energy. The designed model is not only smart but also intelligent as it will take decision about folding and unfolding of umbrella. The system can be control by Arduino and dc motor used for folding the roof with two or more switch fix along with the knowledge of next future direction.

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High-Capacity Reversible Data Hiding scheme using prediction tuning model

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ABSTRACT

With the growing importance of data security and information hiding, techniques of data hiding in images have become widespread. Existing reversible data hiding techniques face the problem of errors due to inaccurate results of prediction models as well as the scope of improvement in terms of embedding capacity, which decreases the efficiency of security of sensitive data. Here, we propose a hyperparameter β for combining two regression models trained with different data. The first regression model is trained over the entire image and the second regression model with a limited block of surrounding pixels in neighboring regions of pixels in the image. For optimal results, parameters are tuned using Particle Swarm Optimization (PSO), and we have validated our results on standard test images. This technique outperforms the past techniques by improving data hiding in terms of parameters like embedding capacity (embedding rate), eliminating the errors from wrong predictions while keeping the visual quality of images preserved.

1. INTRODUCTION

Data hiding has been a broadly researched area of study for the security of data from unwanted access. Data hiding is a process in which the sender hides the critical data into a media preventing it from attackers. The key requirements of data hiding are the high capacity of hiding the secret data, reversibility of the media and multiple data insertions into an image. Image-based data hiding is mainly categorized into three parts: Digital watermarking, Steganography and Reversible data hiding (RDH). Digital Watermarking [1] places digital data into a digital cover file that accepts the file's copyright information. Steganography [2] changes the cover media in a way that only the sender and the receiver can detect the hidden sensitive data in an image. Digital Watermarking and steganography do not consider how to recover the original image after data extraction from the image. Importance of Reversible Data Hiding (RDH), also known as lossless data hiding in this field of hiding sensitive data in images, is imperative as it aims to achieve recovery of images with minimized errors. Various techniques have been utilized to develop efficient models for better outcomes in terms of embedding capacity and errors during recovery. In the process of reversible data hiding, the sender hides the critical information into an image such that the receiver can recover the original image after the data extraction. Recovery of the original image after data extraction is an important aspect because in many scenarios like medical image processing, remote sensing and military application where little changes in the original image can cause serious consequences. Therefore, it requires full recovery of the original image after data extraction. Through this paper, we have tried to explore the possibility of using a novel RDH technique which aims to improve the embedding rate, i.e. the maximum amount of data can be embedded in an image. Our technique also focusses on minimum degradation of quality after embedding the secret data, i.e. maintaining the visual quality of an image. We have evaluated the performance of our study in terms of bits per pixel (bpp) which is a measure of Embedding capacity, prediction errors which is a count of errors in the prediction model and

Peak Signal to Noise Ratio (PSNR) value for measuring the visual

2. LITERATURE SURVEY

There are many conventional information hiding methods, including Least Significant Bit (LSB) insertion, Histogram Shifting (HS) and Difference Expansion (DE), to name a few. These techniques are studied extensively and many of their variants are proposed [1, 2, 3] to achieve a balance trade-off among embedding capacity, image quality, robustness against attacks, etc. However, these techniques are not widely adopted into the usual operations performed by the users, and often they are implemented as an additional step after the image is processed. In most cases, the user has to explicitly install or develop the data embedding algorithm to enable data embedding into the image of interest. Therefore, in this paper, we design an information hiding method as part of the image enhancement process. In other words, data can be inserted into the image while executing the image enhancement steps. As a proof of concept, the proposed method is demonstrated by using the Median Filter. Reversible data hiding (RDH) aims to embed secret message into a cover image by slightly modifying its pixels, and more importantly, the original image as well as the embedded message should be completely restored from the marked image. In the last decade, RDH has received much attention from the information hiding community and this technique has also been applied in some applications, such as image authentication, medical image processing multimedia archive management, image trans-coding, and data coloring in the cloud, etc. In general, RDH is a fragile technique and the marked image cannot undergo any degradation. In this light, a RDH method is usually evaluated by its capacity-distortion performance, i.e., for a given embedding capacity (EC), one expects to minimize the embedding distortion measured by PSNR of the marked image versus the original one. Early RDH methods are mainly based on lossless compression. The idea behind these methods is to losslessly compress a feature set of cover image and utilize the saved space for reversible embedding. In Fridrich et al. proposed to compress a proper bit-plane with the minimum redundancy. In, Celik et al. proposed a generalized least significant bit (LSB) compression method to improve the compression efficiency by using unaltered bit-planes as side information. However, the lossless compression-based methods cannot yield satisfactory performance, since the correlation within a bit-plane is too weak to provide a high EC. As EC increases, one needs to compress more bit-planes, thus the distortion increases dramatically. Later on, more efficient RDH methods based on histogram modification and expansion technique have been devised. The histogram-modification-based method is firstly proposed by Ni et al. This method focuses on high visual quality with quite limited EC, in which the peak point of image histogram is utilized for data embedding. In this method, each pixel value is modified at most by 1, and thus the marked image quality is well guaranteed. Ni et al.'s method is improved by Lee et al. by using the histogram of difference image. The spatial correlation of natural images is exploited in by considering the difference of adjacent pixels. Thus, a regular-shaped histogram is utilized in Lee et al.'s method. This histogram is centered at origin and has rapid two-sided decay which is more suitable for RDH. The expansion technique is firstly proposed by Tian. This method is performed on pixel pairs, and one data bit is embedded into each selected pixel pair by expanding its difference. Compared with the lossless-compression based RDH, Tian's difference expansion (DE) based method can provide a higher EC with an improved PSNR. The DE approach has attracted considerable

attention and it makes an important progress in RDH. Afterwards, the expansion technique has been widely investigated and developed, mainly in the aspects of integer-to-integer such as image authentication, medical image processing, multimedia archive management, image trans-coding [9], and data coloring in the cloud, etc. In general, RDH is a fragile technique and the marked image cannot undergo any degradation. In this light, a RDH method is usually evaluated by its capacity-distortion performance, i.e., for a given embedding capacity (EC), one expects to minimize the embedding distortion measured by PSNR of the marked image versus the original one. Early RDH methods are mainly based on lossless compression. The idea behind these methods is to losslessly compress a feature set of cover image and utilize the saved space for reversible embedding. In, Fridrich et al. proposed to compress a proper bit-plane with the minimum redundancy. In, Celik et al. proposed a generalized least significant bit (LSB) compression method to improve the compression efficiency by using unaltered bit-planes as side information. However, the lossless compression-based methods cannot yield satisfactory performance, since the correlation within a bit-plane is too weak to provide a high EC. As EC increases, one needs to compress more bit-planes, thus the distortion increases dramatically. Later on, more efficient RDH methods based on histogram modification and expansion technique have been devised. The histogram-modification-based method is firstly proposed by Ni et al. This method focuses on high visual quality with quite limited EC, in which the peak point of image histogram is utilized for data embedding. In this method, each pixel value is modified at most by 1, and thus the marked image quality is well guaranteed. Ni et al.'s method is improved by Lee et al. by using the histogram of difference image. The spatial correlation of natural images is exploited in by considering the difference of adjacent pixels. Thus, a regular-shaped histogram is utilized in Lee et al.'s method. This histogram is centered at origin and has rapid two-sided decay which is more suitable for RDH. The expansion technique is firstly proposed by Tian. This method is performed on pixel pairs, and one data bit is embedded into each selected pixel pair by expanding its difference. Compared with the lossless-compression based RDH, Tian's difference expansion (DE) based method can provide a higher EC with an improved PSNR. The DE approach has attracted considerable attention and it makes an important progress in RDH. Afterwards, the expansion technique has been widely investigated and developed, mainly in the aspects of integer-to-integer transformation, location map reduction, and prediction-error expansion (PEE). Besides the histogram modification and the expansion technique, the analysis about theoretical capacity limit subjected to admissible distortion has also been studied in some recent works. Nowadays, the most effective and extensively exploited RDH technique is the PEE technique which is firstly proposed by Thodi and Rodriguez. Instead of the difference value in DE, the prediction-error is utilized in PEE for expansion embedding. Thus, unlike DE where only the correlation of two adjacent pixels is considered, the local correlation of a larger neighborhood is exploited in PEE. As a result, compared with DE, better performance can be derived by PEE. Following Thodi and Rodriguez's work, many RDH techniques related to PEE have been proposed in recent years, for example, double-layered embedding adaptive embedding, context modification, optimal expansion bins selection and two-dimensional histogram modification etc.

3. PROPOSED METHOD

In this section, we discuss the details of the flow of our proposed RDH scheme. Initially, we introduce the tuned prediction model, which comprises of the predictions of two regression models with different training data to predict the original pixel values of the image. In the next part, we discuss the concept and significance of the error map for complete reversibility. We then describe the process of embedding of secret data in the image by the sender. Lastly, the secret data is extracted, and the image recovery can be achieved by the receiver. For recovery of the image, the receiver needs to predict the original value of pixels which contains the hidden data. This recovery would be possible due to the presence of regularities in images like spatially correlated neighbouring pixels. This property is used to predict the original value of the pixels. An example of a simple grayscale image of size $H \times W$ is illustrated to show how the sender can hide secret data in an image. In the image, each pixel is made up of 8 bits either containing 0 or 1. An image is just a matrix of these pixels, and it is easy to imagine an image as a stack of eight single bit matrices or planes called bit planes, shown in Fig. 1. A single bit plane is just a matrix of 0 and 1. Sender then chooses a particular bit plane to hide the secret data, here hiding means simply overwriting the hidden data over the bit plane. There is a tradeoff between image distortion and pixel value prediction. Choosing a bit plane near Least significant bit (LSB) will provide the least distorted image, but the prediction would be difficult. Bit plane near Most significant bit (MSB) will provide accurate prediction, but its distortion is very high. For this reason, we have taken 3rd, 4th, 5th and 4th bit planes for validation of our results.

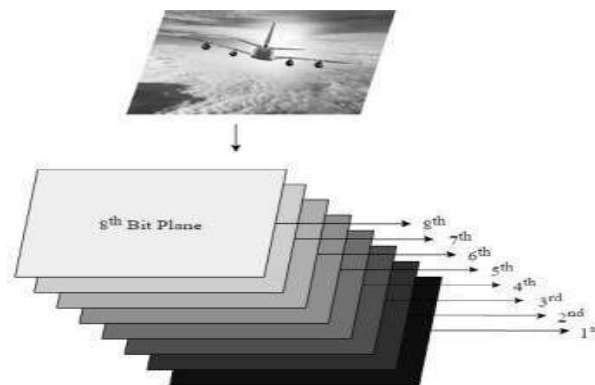


Fig : Bit Planes of an image

Sender trains a linear regression model over the image so that the value of the pixel can be predicted using neighbouring pixels, and this model can be called a Full image regression model. To predict the pixel, say $y_{i,j}$ value, model picks the three most neighbouring pixels one from top $y_{i-1,j}$, one from left $y_{i,j-1}$ and one from top left $y_{i-1,j-1}$ and $y_{i,j}$ can be calculated as:

$$y_{i,j} = \alpha_0 + \alpha_1 * y_{i-1,j-1} + \alpha_2 * y_{i-1,j} + \alpha_3 * y_{i,j-1}$$

Where α_0 , α_1 , α_2 , and α_3 are the training parameters for this regression model and these parameters can be obtained as:

$$\alpha = (X^T X)^{-1} X^T Y$$

Where X represents the matrix of input pixels, Y represents the vector of output labels, and α represents the vector of training parameters, as shown below:

$$X = \begin{bmatrix} 1 & y_{1,1} & y_{1,2} & y_{2,1} \\ 1 & y_{1,2} & y_{1,3} & y_{2,2} \\ \dots & \dots & \dots & \dots \\ 1 & y_{H-1,W-1} & y_{H-1,W} & y_{H,W-1} \end{bmatrix}$$

This model does not include predicting the pixels present in the first row and the first column of the image as they do not have the neighbours specified above and therefore, these pixels are not considered for the data hiding. Naturally, an image is not regular entirely, there are many regions in the image where a drastic change in the pixel values can be seen, or the neighbouring pixels have quite different values, and these regions are named as complex regions. To improve this full image linear regression model's predictability, the sender selects pixels only from regular regions, since pixels in these regions are easy to predict. The pixels from the complex regions have quite different values and only contribute to error. To filter out the pixels from complex regions, the model calculates the regularity value $R_{i,j}$ of a pixel $y_{i,j}$ as follows:

$$R_{i,j} = |y_{i,j} - y_{i-1,j-1}| + |y_{i,j} - y_{i-1,j}| + |y_{i,j} - y_{i,j-1}|$$

Only those pixels are included in training data for which regularity value is less than a threshold R_{th} ($R_{i,j} \leq R_{th}$). Through this process, all complex pixels can be removed, and this full image regression model can be trained over the regular regions, which will provide high accuracy. Along with the full image regression model, the sender trains a new Neighbour specific regression model. This new regression model is trained for every prediction over 8 neighbouring data points enclosed in 4×4 block

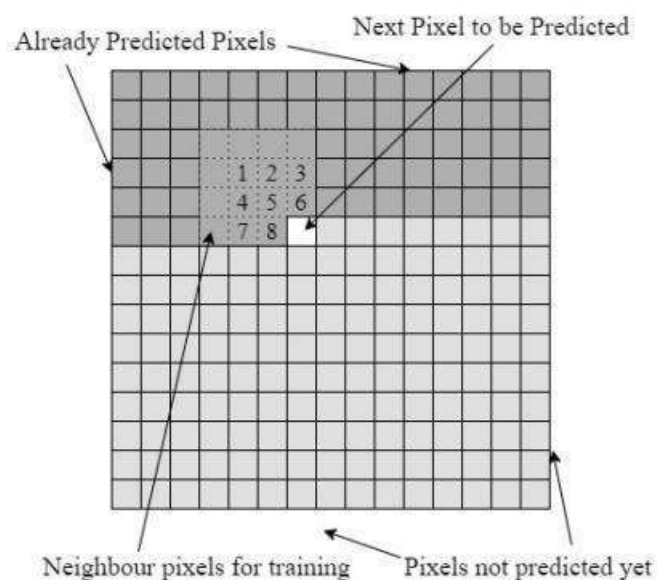


Fig: Process of prediction with neighbour specific model

Predicting the pixel value by using the neighbour specific regression model using surrounding pixels as its training data. The predicted value with this method can be called as $Pf2$. After getting two predicted values $Pf1$ and $Pf2$ for the pixel, the proposed scheme obtains final tuned prediction Pf from the full image as well as neighbour specific model using β (Beta) as shown in the equation:

$$Pf = \beta * Pf1 + (1-\beta) * Pf2$$

Here β is a hyperparameter such that $0 \leq \beta \leq 1$. This parameter defines the proportions utilized of the predictions of the two different regression models in order to get optimized results as the final prediction of our combined model as:

If $\beta = 1$, then the prediction is only based on the full image regression model. No proportion the prediction of the neighbour specific model will be present.

If $\beta = 0$, then the prediction is only based on a neighbour specific regression model.

If $0 < \beta < 1$, proportions of both the predictions are present. The proposed scheme uses an optimal value of β as well as regularity threshold (R_{th}) which is obtained using Particle Swarm Optimization (PSO) technique [9] such that the number of inaccurate predictions is as small as possible. Since evidently, the neighbour specific model does not include the predictions of first three rows and first

three columns, the predictions of the pixels present in these rows and columns is taken from the full image regression model.

4. RESULTS



5. CONCLUSION

Through this study, we introduced an efficient lossless data hiding scheme which makes use of error map and tuned linear regression models to achieve reversibility and data hiding in images. We also addressed the problems with the existing techniques and provided the analysis and comparison of the proposed method with the previous methods in terms of embedding rate in table

V. The accuracy of the model for each of the bit planes for different images as well as the dataset has been depicted in table I-IV which shows the prediction errors and size of the error map has significantly reduced through our technique. It is observed that auxiliary information often decreases the embedding capacity in data hiding schemes. Therefore, we have used Huffman Coding, which is a

lossless compression technique for compressing the size of error map so that the capacity increases for hiding secret data. For best results through our model, we have tuned the parameter β and regularity threshold using Particle Swarm Optimization (PSO) technique. Hence, we can conclude that this paper significantly increases the embedding capacity and provides more accurate results when compared to existing techniques maintaining the visual quality through keeping the low distortion of the images. In future, we will aim to work on better complexity of the algorithm and computational time of the process.

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Dual Axis Intensity Based Solar Tracking System

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ABSTRACT

The goal of this thesis was to develop a laboratory prototype of a solar tracking system, which is able to enhance the performance of the photovoltaic modules in a solar energy system. The operating principle of the device is to keep the photovoltaic modules constantly aligned with the sunbeams, which maximises the exposure of solar panel to the Sun's radiation. As a result, more output power can be produced by the solar panel. The work of the project included hardware design and implementation, together with software programming for the microcontroller unit of the solar tracker. The system utilised an ATmega328P microcontroller to control motion of two servo motors, which rotate solar panel in two axes. The amount of rotation was determined by the microcontroller, based on inputs retrieved from four photo sensors located next to solar panel. At the end of the project, a functional solar tracking system was designed and implemented. It was able to keep the solar panel aligned with the sun, or any light source repetitively. Design of the solar tracker from this project is also a reference and a starting point for the development of more advanced systems in the future

1. INTRODUCTION

With the unavoidable shortage of fossil fuel sources in the future, renewable types of energy have become a topic of interest for researchers, technicians, investors and decision makers all around the world. New types of energy that are getting attention include hydroelectricity, bioenergy, solar, wind and geothermal energy, tidal power and wave power.

Because of their renewability, they are considered as favourable replacements for fossil fuel sources. Among those types of energy, solar photovoltaic (PV) energy is one of the most available resources. This technology has been adopted more widely for residential use nowadays, thanks to research and development activities to improve solar cells' performance and lower the cost. According to International Energy Agency (IEA), worldwide PV capacity has grown at 49% per year on average since early 2000s. Solar PV energy is highly expected to become a major source of power in the future.

However, despite the advantages, solar PV energy is still far from replacing traditional sources on the market. It is still a challenge to maximise power output of PV systems in areas that don't receive a large amount of solar radiation. We still need more advanced technologies from manufacturers to improve the capability of PV materials, but improvement of system design and module construction is a feasible approach to make solar PV power more efficient, thus being a reliable choice for customers. Aiming for that purpose, this project had been carried out to support the development of such promising technology. One of the main methods of increasing efficiency is to maximise the duration of exposure to the Sun. Tracking systems help achieve this by keeping PV solar panels aligned at the appropriate angle with the sun rays at any time. The goal of this project is to build a prototype of light tracking system at smaller scale, but the design can be applied for any solar energy system in practice. It is also expected from this project a quantitative measurement of how well tracking system performs compared to system with fixed mounting method.

2. LITERATURE SURVEY

Hossein Mousazadeh et Al., [(2011), Journal of Solar Energy Engineering, Vol.133] studied and investigated maximization of collected energy from an on-board PV array, on a solar assist plug-in

hybrid electric tractor (SAPHT). Using four light dependent resistive sensors a sun-tracking system on a mobile structure was constructed and evaluated. The experimental tests using the sun-tracking system showed that 30% more energy was collected in comparison to that of the horizontally fixed mode. Four LDR sensors were used to sense the direct beams of sun. Each pair of LDRs was separated by an obstruction as a shading device. A microcontroller based electronic drive board was used as an interface between the hardware and the software. For driving of each motor, a power MOSFET was used to control the actuators. The experimental results indicated that the designed system was very robust and effective.

K.S. Madhu et al., (2012) International Journal of Scientific & Engineering Research vol. 3, 2229–5518, states that a single axis tracker tracks the sun east to west, and a two-axis tracker tracks the daily east to west movement of the sun and the seasonal declination movement of the sun. Concentrates solar power systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. PV converts light into electric current using the photoelectric effect. Solar power is the conversion of sunlight into electricity. Test results indicate that the increase in power efficiency of tracking solar plate in normal days is 26 to 38% compared to fixed plate. And during cloudy or rainy days it's varies at any level.

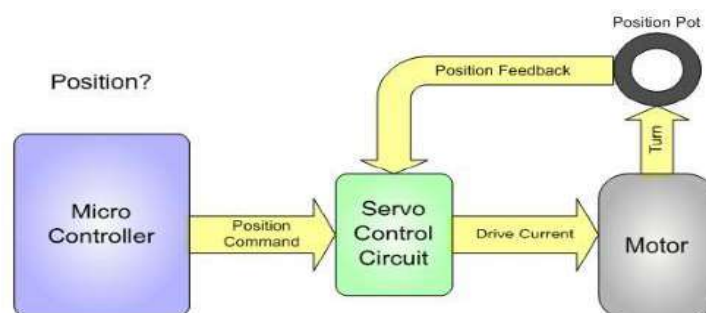
3.PROPOSED METHOD

Resistance of LDR depends on intensity of the light and it varies according to it. The higher is the intensity of light, lower will be the LDR resistance and due to this the output voltage lowers and when the light intensity is low, higher will be the LDR resistance and thus higher output voltage is obtained. A potential divider circuit is used to get the output voltage from the sensors (LDRs). The circuit is shown here. The LDR senses the analog input in voltages between 0 to 5 volts and provides a digital number at the output which generally ranges from 0 to 1023.

Now this will give feedback to the microcontroller using the Arduino software(IDE).

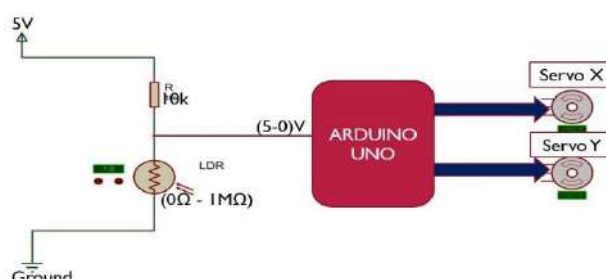
The servo motor position can be controlled by this mechanism which is discussed later in the hardware model.

BLOCK DIAGRAM



The tracker finally adjusts its position sensing the maximum intensity of light falling perpendicular to it and stays there till it notices any further change.

The sensitivity of the LDR depends on point source of light. It hardly shows any effect on diffuse lighting condition.



4. RESULTS

In this Dual Axis Solar Tracker, when source light falls on the panel, the panel adjusts its position according to maximum intensity of light falling perpendicular to it.

The objective of the project is completed. This was achieved through using light sensors that are able to detect the amount of sunlight that reaches the solar panel. The values obtained by the LDRs are compared and if there is any significant difference, there is actuation of the panel using a servo motor to the point where it is almost perpendicular to the rays of the sun.

This was achieved using a system with three stages or subsystems. Each stage has its own role.

The stages were;

- An input stage that was responsible for converting incident light to a voltage.
- A control stage that was responsible for controlling actuation and decision making.
- A driver stage with the servo motor. It was responsible for actual movement of the panel.

The input stage is designed with a voltage divider circuit so that it gives desired range of illumination for bright illumination conditions or when there is dim lighting. The potentiometer was adjusted to cater for such changes. The LDRs were found to be most suitable for this project because their resistance varies with light. They are readily available and are cost effective. Temperature sensors for instance would be costly. The control stage has a microcontroller that receives voltages from the LDRs and determines the action to be performed. The microcontroller is programmed to ensure it sends a signal to the servo motor that moves in accordance with the generated error. The final stage was the driving circuitry that consisted mainly of the servo motor. The servo motor had enough torque to drive the panel. Servo motors are noise free and are affordable, making them the best choice for the project.

Test Performance of Solar Panel without Tracking System

The Solar panel is kept in the fixed position and the performance of the solar panel is tested from morning to evening. The rating of the solar panel is 12 volts, 5 watts. A rheostat load of 30 ohm is connected across the solar panel, the voltage and current are measured using voltmeter and ammeter respectively. The readings of voltage and current are noted every one hour.

Test Performance of Solar Panel with Tracking System

The Solar panel is placed outdoor along with the tracking system and the performance of the solar panel is tested from morning till evening. The rating of the solar panel is 12 volts, 5 watts. A rheostat load of 30 ohm is connected across the solar panel, the voltage and current are measured using voltmeter and ammeter respectively. The readings of voltage and current are noted every one hour and tabulated.

The comparative results of the performance of solar panel with and without tracking system are shown in Table below. Table 12.1

Time (Hrs)	Without Tracking			With Tracking		
	Voltage (V)	Current (A)	Power (W)	Voltage (V)	Current (A)	Power (W)
9 am	5.5	0.11	0.605	12.2	0.23	2.8
10 am	9	0.19	1.71	13.5	0.25	3.4
11 am	10.5	0.2	2.1	14	0.28	3.92
12 pm	12.5	0.28	3.5	14	0.3	4.2

1 pm	14	0.32	4.49	15	0.3	4.5
2 pm	13.5	0.3	4.05	15	0.3	4.2
3 pm	11	0.26	2.86	13	0.26	3.38
4 pm	8	0.16	1.28	10	0.25	2.5
5 pm	6	0.12	0.72	7	0.2	1.4
6 pm	2.5	0.05	0.125	5	0.1	0.5

Average power obtained from solar panel without tracking is 2.144 watts; Average power obtained from solar panel with tracking is 3.08 watts. The improved efficiency is 43.65% neglecting the power consumption of DC motor. It is observed that the proposed dual axis tracking system presents an efficient system to harness solar energy which ensures more energy conversion than the existing fixed orientation of solar module system

5. CONCLUSION

In this 21st century, as we build up our technology, population & growth, the energy consumption per capita increases exponentially, as well as our energy resources (e.g., fossils fuels) decrease rapidly. So, for sustainable development, we have to think alternative methods (utilization of renewable energy sources) in order to fulfil our energy demand. In this project, Dual Axis Solar Tracker, we've developed a demo model of solar tracker to track the maximum intensity point of light source so that the voltage given at that point by the solar panel is maximum. After a lot of trial and errors we've successfully completed our project and we are proud to invest some effort for our society. Now, like every other experiment, this project has couple of imperfections. Our panel senses the light in a sensing zone, beyond which it fails to respond. If multiple sources of light (i.e., diffused light source) appear on panel, it calculates the vector sum of light sources & moves the panel in that point. This project was implemented with minimal resources. The circuitry was kept simple, understandable and user friendly.

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High Speed Area-Efficient VLSI Architecture of Three-Operand Binary Adder

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ABSTRACT

Three-operand binary adder is the basic functional unit to perform the modular arithmetic in various cryptography and pseudorandom bit generator (PRBG) algorithms. Square root carry select adder used for three-operand addition that significantly reduces the critical path delay at the cost of additional hardware. Hence, a new high-speed and area-efficient adder architecture is proposed RCA logics to perform the three-operand binary addition that consumes substantially less area, low power and drastically reduces the adder delay. The proposed architecture is implemented on the FPGA device for functional validation and also synthesized with the commercially available 32nm CMOS technology library. Moreover, it has a lesser area and lower power dissipation. Also, the proposed adder achieves less area than the existing three-operand adder techniques.

Index Terms— Three-operand adder, square root carry select adder, modular arithmetic.

1. INTRODUCTION

An adder is a digital circuit that performs addition of numbers. In many computers and other kinds of processors adders are used in the arithmetic logic units or ALU. They are also used in other parts of the processor, where they are used to calculate addresses, table indices, increment and decrement operators, and similar operations. Although adders can be constructed for many number representations, such as binary-coded decimal or excess-3, the most common adders operate on binary numbers. In cases where two's complement or ones' complement is being used to represent negative numbers, it is trivial to modify an adder into an adder-subtractor. Other signed number representations require more logic around the basic adder. Another common and very useful combinational logic circuit which can be constructed using just a few basic logic gates allowing it to add together two or more binary numbers is the Binary Adder. A basic Binary Adder circuit can be made from standard AND and Ex-OR gates allowing us to “add” together two single bit binary numbers, A and B. The addition of these two digits produces an output called the SUM of the addition and a second output called the CARRY or Carry-out, (C_{OUT}) bit according to the rules for binary addition. One of the main uses for the Binary Adder is in arithmetic and counting circuits. Consider the simple addition of the two denary (base 10) numbers below. From our maths lessons at school, we learnt that each number column is added together starting from the right hand side and that each digit has a weighted value depending upon its position within the columns. When each column is added together a carry is generated if the result is greater or equal to 10, the base number. This carry is then added to the result of the addition of the next column to the left and so on, simple school math's addition, add the numbers and carry. The adding of binary numbers is exactly the same idea as that for adding together decimal numbers but this time a carry is only generated when the result in any column is greater or equal to “2”, the base number of binary. In other words $1 + 1$ creates a carry.

2. LITERATURE SURVEY

P. L. Montgomery, “Modular multiplication without trial division,” Math. Compute. We present a method for multiplying two integers (called *N-residues*) modulo *N* while avoiding division by *N*. *N-residues* are represented in a nonstandard way, so this method is useful only if several computations are done modulo one *N*. The addition and subtraction algorithms are unchanged. S.-R. Kuang, K.-Y. Wu, and R.-Y. Lu, “Low-cost high-performance VLSI architecture for montgomery modular multiplication,” The paper proposes a Montgomery Modular Multiplier (MMM) using a simple and

efficient Montgomery multiplication algorithm. Here a modification in the form of using hybrid full adders in the Carry Save adder is proposed. The hybrid full adder is designed using a conventional Complementary Metal Oxide Semiconductor and transmission gate logic. There is about 54% and 55% reduction of area (no. of components) in Radix 2 MMM and Semi-Carry-Save (SCS) based MMM with hybrid full adders. There is significant reduction in the power dissipation of 52% for Radix 2 MMM and 46% of SCS based MMM when hybrid adders are used instead of C-CMOS Full-Adders. The delay is also reduced by 47% in SCS based MMM as compared to that of Radix 2 MMM. The software used are Xilinx ISE 14.2 and Mentor Graphics Pyxis Schematic in 180-nm technology. S.-R. Kuang, J.-P. Wang, K.-C. Chang, and H.-W. Hsu, "Energy-efficient high-throughput montgomery modular multipliers for RSA cryptosystems," For future internet services and data communication systems, it is identified that security matters become questionable and problematical. Cryptographic algorithms are a convenient tool for achieving security in those systems. So, realization of cryptographic systems in hardware is more advantageous. Of the two-broad category of cryptographic systems as public key cryptosystems and secret key cryptosystems, public key cryptosystems are widely used. In many public key cryptosystems, the key operation is modular multiplication with large input operands. The trial division in modular multiplication is time consuming. So, well-known algorithm called Montgomery modular multiplication algorithm is introduced by avoiding the trial division. Shifting modular additions are used instead of complicated division operations. Different modifications to conventional Montgomery modular multiplications are proposed to reduce the delay associated with the long carry propagation in the computation of intermediate result. This paper explores a comparison between two modification algorithms to conventional Montgomery MM algorithms. S. S. Erdem, T. Yanik, and A. Celebi, "A general digit-serial architecture for montgomery modular multiplication," Multiplication is a key operation to perform the processing speed of digital processor. Montgomery multiplication is a strategy for performing quick modular multiplication. This paper presents an outline on execution of Montgomery measured duplication estimation utilizing VLSI design. The Montgomery figuring is a fast particular increase procedure as regularly as conceivable used in cryptographic applications, in which the capability of cryptosystem depends upon the speed of secluded duplication. This audit gives the assessment between different adjustments done in Montgomery particular augmentation. K. Panda and K. C. Ray, "Modified dual-CLCG method and its VLSI architecture for pseudorandom bit generation," The dual coupled-LCG (dual-CLCG) is a secure pseudorandom bit generator (PRBG) method amongst various LFSR, LCG and chaotic based PRBG methods for generating a pseudorandom bit sequence. The hardware implementation of this method has a bottleneck due to the involvement of inequality equations. Initially, a direct architectural mapping of the dual-CLCG method is performed. Since two inequality equations are involved for coupling, it generates pseudorandom bit at unequal interval of time that leads to large variation in output latency. Besides, it consumes a large area and fails to achieve the maximal period. Hence, to overcome the aforesaid drawbacks, a new efficient PRBG method, i.e., "coupled variable input LCG (CVLCG)" and its architecture are proposed. The novelty of the proposed method is the coupling of two newly formed variable input LCGs that generates pseudorandom bit at every uniform clock rate, In order to increase the performance of the adders, there are two methods which are being considered for this project: Boolean Simplification and Transistor Sizing. Boolean Simplification is a method of simplification of Boolean equations to the simplest equation form which use less inputs in the equation. Transistor sizing is one of the existing performance optimization techniques which IC designers have usually relied on in order to improve the switching speed of CMOS VLSI circuits. Transistor sizing is a very effective technique in order to optimize a circuit in terms of power as well as speed. K. S. Pandey, D. K. B. N. Goel, and H. Shrimali, "An ultra-fast parallel prefix adder," in Proc. IEEE 26th Symp. Comput. Arithmetic (ARITH), To overcome this disadvantage, we need a new area efficient and high-speed adder architecture to be proposed using pre

compute bitwise addition followed by carry prefix computation logic to perform three operand binary adder which reduces delay and area efficiently. This method is the proposed method and implemented on the FPGA device. A newly designed three operand binary adder is shown and is implemented in MDCLCG. The results of 16 bit and 32-bit three operand adder will be shown and this proposed method is applied on Modified Dual CLCG. The Carry-Save-Adder architecture used in 32-bit MDCLCG is replaced by the proposed architecture. The design is prototyped on a commercially available FPGA platform to validate the design on silicon chip.

3. RESULTS

The RTL schematic is abbreviated as the register transfer level it denotes the blue print of the architecture and is used to verify the designed architecture to the ideal architecture that we are in need of development. The hdl language is used to convert the description or summary of the architecture to the working summary by use of the coding language i.e verilog ,vhdl. The RTL schematic even specifies the internal connection blocks for better analyzing. The figure represented below shows the RTL schematic diagram of the designed architecture.

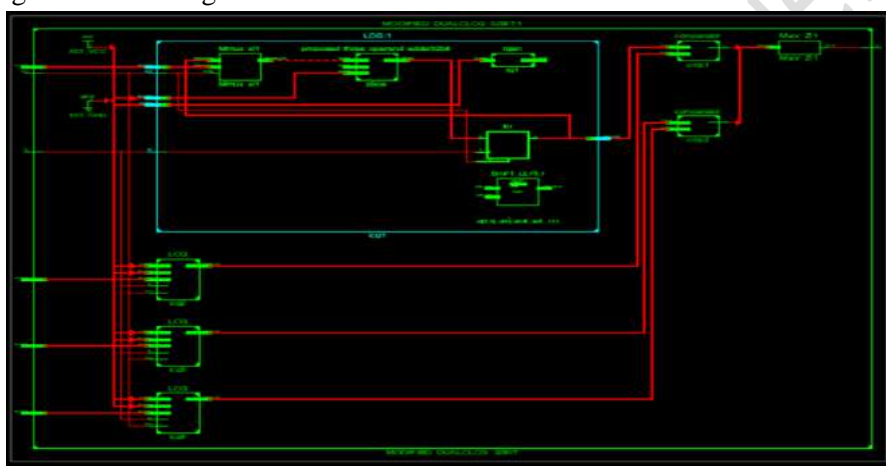


Fig.1 RTL Schematic of existed MDCLCG.

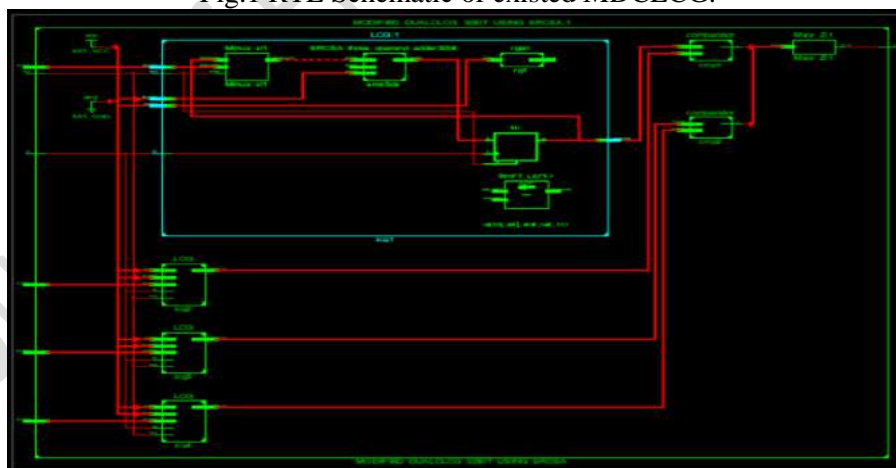


Fig. 2 RTL Schematic of Proposed MDCLCG

TECHNOLOGY SCHEMATIC: The technology schematic makes the representation of the architecture in the LUT format, where the LUT is consider as the parameter of area that is used in VLSI to estimate the architecture design. The LUT is consider as an square unit the memory allocation of the code is represented in there LUT s in FPGA.

SIMULATION:

The simulation is the process which is termed as the final verification in respect to its working where

as the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implantation to the simulation on the home screen of the tool ,and the simulation window confines the output in the form of the wave forms. Here it has the flexibility of providing the different radix number systems.

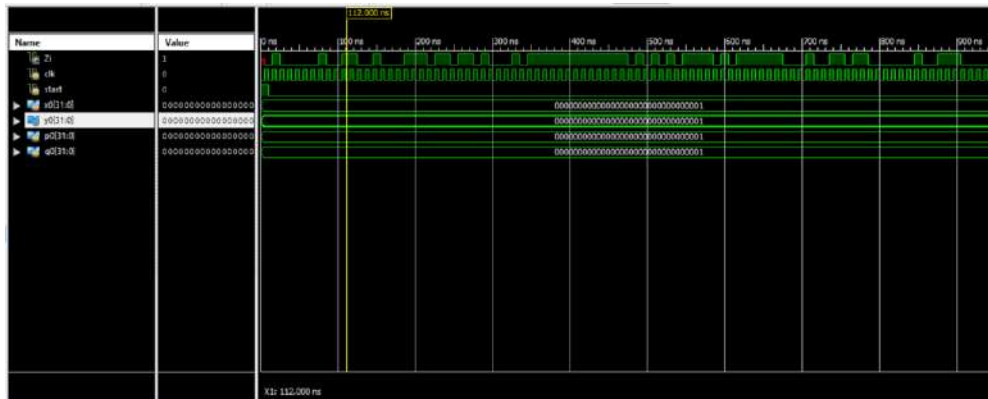


Fig. 3 Simulated Waveforms of existed MDCLCG

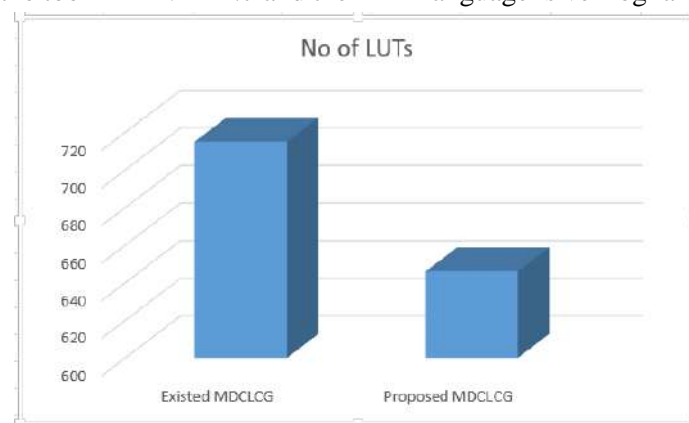


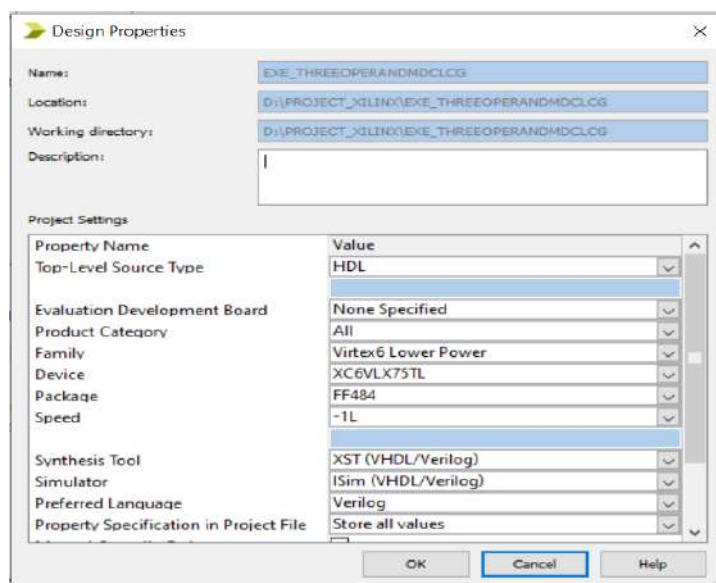
Fig. 4 Simulated Waveforms of proposed MDCLCG

The simulation is the process which is termed as the final verification in respect to its working where as the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implantation to the simulation on the home screen of the tool, and the simulation window confines the output in the form of the wave forms. Here it has the flexibility of providing the different radix number systems.

PARAMETERS:

Consider in VLSI the parameters treated are area, delay and power, based on these parameters one can judge the one architecture to other. here the consideration of delay is considered the parameter is obtained by using the tool XILINX 14.7 and the HDL language is verilog language.





5. CONCLUSION

Modified Dual-CLCG method involves dual coupling of four LCGs that makes it more secure than LCG based PRBGs. However, it is reported that this method has the drawback of generating pseudorandom bit at large area and more delay. proposed architecture of the new modified dual- CLCG method using square root carry select adder is significantly reduced the area of the design.

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Conservatory Monitoring and Control System using IoT

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ABSTRACT

Greenhouses are climate-controlled structures with walls and roof specially designed for offseason growing of plants. Most greenhouse systems use manual systems for monitoring the temperature and humidity which can cause discomfort to the worker as they are bound to visit the greenhouse every day and manually control them. Also, a lot of problems can occur as it affects the production rate because the temperature and humidity must be constantly monitored to ensure the good yield of the plants. Internet of Things is one of the latest advances in Information and Communication Technologies, providing global connectivity and management of sensors, devices, users with information. So, the combination of IoT and embedded technology has helped in bringing solutions to many of the existing practical problems over the years. The sensors require here are moisture sensor, LDR and DHT11 (Temperature & Humidity sensor). From the data's received, Arduino automatically controls Moisture, Temperature, Humidity efficiently inside the greenhouse by actuating an irrigating pipe, cooling fan and LED respectively according to the required conditions of the crops to achieve maximum growth and yield.

1. INTRODUCTION

Conservatory is climate-controlled structures with walls and roof specially designed for offseason growing of plants. Most greenhouse systems use manual systems for monitoring the temperature and humidity which can cause discomfort to the worker as they are bound to visit the greenhouse every day and manually control them. Also, a lot of problems can occur as it affects the production rate because the temperature and humidity must be constantly monitored to ensure the good yield of the plants. Internet of Things is one of the latest advances in Information and Communication Technologies, providing global connectivity and management of sensors, devices, users with information. So, the combination of IoT and embedded technology has helped in bringing solutions to many of the existing practical problems over the years. The sensors require here are moisture sensor, LDR and DHT11 (Temperature & Humidity sensor). From the data's received, Arduino automatically controls Moisture, Temperature, Humidity efficiently inside the greenhouse by actuating an irrigating pipe, cooling fan and LED respectively according to the required conditions of the crops to achieve maximum growth and yield.

A green house is where plants such as flowers and vegetables are grown. Greenhouse's warm-up during the day when sun-rays penetrates through it, which heats the plant, soil and structure. Greenhouses help to protect crops from many diseases, particularly those that are soil borne and splash onto plants in the rain. Greenhouse effect is a natural phenomenon and beneficial to human being. Numerous farmers fail to get good profits from the greenhouse crops for the reason that they can't manage two essential factors, which determines plant growth as well as productivity. Green house temperature should not go below a certain degree; High humidity can result to crop transpiration, condensation of water vapor on various greenhouse surfaces, and water

evaporation from the humid soil. To overcome such challenges, this greenhouse monitoring and control system comes to the rescue. This project demonstrates the design and implementation of various sensors for greenhouse environment monitoring and controlling.

This greenhouse control system is powered by Atmega328 microcontroller. It consists of temperature sensor, light sensor, soil moisture sensor, LDR sensor, LCD display module, 12V DC fan/Bulb and pump. Temperature sensor senses the level of temperature. If it goes high, DC fans get on and when the temperature goes low, the fan gets off. Soil moisture sensor senses the water level as the level decreases, the pumps get on. There is continuous increase in demand for food production technology. Sudan is a country where the economy is dependent on agricultural produce. Sudan weather conditions are characterized by having predominantly long and hot summers and short and mild winters. Such climatic conditions put a great strain on the types of crops that could be successfully grown. This is very much true with most horticultural vegetables with medium thermal requirements (tomato, pepper, cucumber, watermelon, marrow, green bean, eggplant). Agricultural means can satisfy the food production demand. But due to isotropic climatic conditions, this ultimately affects the plant growth. Pests and diseases, and extremes of heat, humidity, light and temperature and irrigation is necessary to provide water. The farmers have been using different irrigation techniques for increasing production. These techniques were done by human intervention. But due to this, sometimes either the plants consume more water or the water reaches late up to the plants. In other words, a greenhouse is a structure that provides protection and a controlled environment for raising plants indoors. The primary issue of greenhouse-based horticulture is to manage the greenhouse environment optimally in order to comply with the economic and environmental requirements. We can use an automatic or manual microcontroller (Arduino) based system. For automatic monitor and control for greenhouse, we are developing an embedded system which will record the temperature, moisture and other parameters that will control the environmental conditions in the plant field. Moreover, for effective control, an interface application is used along with the embedded system. Secondly, transmitter and the receiver need to be tested for its functionality. It can be done by sending a bit of data from the transmitter to the receiver. The push button and the LED can be used as the representation of data sending and receiving. Or displaying the transition frame in a virtual terminal. Finally, the software of the system, for that there are two parts which have to be considered. They are the software for the programming and the Visual Studio C# programming for GUI application. The Visual Basic studio software is used to make a connection to the remote monitoring using GUI application. Hyper terminal is used to record data that have been received through the serial connection. The last part in order to achieve the objective is to test the output of the system. The driver circuits which consist of relay and transistor are needed to be tested so that the cooling fan and the irrigation valve are functional. To test the relay is by giving appropriate power supply to its coil.

2. LITERATURE SURVEY

Today agriculture is changing in response to the requirements of modern society, where ensuring food supply through practices such as water conservation, reduction of agrochemicals and the required planted surface, which guarantees high quality crops are in demand. As it is well known that greenhouse is a building or complex in which plants are grown. These structures range in size from small sheds to industrialized buildings. Greenhouses are often

used for growing flowers, vegetables and fruits. Greenhouses are very useful for they provide an optimal growing season, allowing you to sow plants earlier and harvest plants later and allows economic crops such as tomatoes, cucumbers, melons and aborigines to crop more successfully. Basic factors affecting plant growth such as sunlight, water Content in soil, air humidity, temperature, CO₂ concentration. These physical factors are hard to control manually inside a greenhouse and there is a need for automated design arises. One of the benefits of growing crops in a greenhouse is the ability to control all effective elements of the production that important to be monitored because it is directly related to the growth and development of plants. Different crop species have different optimum growing temperatures and these optimum temperatures can be different for the root and the shoot environment and for the different growth stages during the life of the crop. Since we are usually interested in rapid crop growth and development, we need to provide these optimum temperatures throughout the entire cropping cycle. If a greenhouse were like a residential or commercial building, controlling the temperature would be much easier since these buildings are insulated so that the impact of outside conditions is significantly reduced. Water vapor inside the greenhouse is one of the most significant variables affecting the crop growth. Humidity is important to plants because it partly controls the moisture loss from the plant. The leaves of plants have tiny pores, CO₂ enters the plants through these pores, and oxygen and water leave through them. Transpiration rates decrease proportionally to the amount of humidity in the air. This is because water diffuses from areas of higher concentration to areas of lower concentration. Due to this phenomenon, plants growing in a dry room will most likely lose its moisture overtime. The damage can be even more severe when the difference in humidity is large. The humidity control is complex because if temperature changes then relative humidity changes inversely. Temperature and humidity are controlled by the same actuators. The main priority is for temperature control because it is the primary factor in the crop growth. Based on the inside relative humidity value the temperature set-point can be adjusted to control the humidity within a determined range. Hence to control the required humidity is very complex task. For proper control of humidity internal air can be exchanged with outside air by properly controlling ventilations of the greenhouse. All things need energy to grow, human and animals get energy from food. Plants, on the other hand, get energy from the sun light through a process called photosynthesis. This is how light affects the growth of a plant. Without light, a plant would not be able to produce the energy it needs to grow. Aside from its effect through photosynthesis, light influences the growth of individual organs or of the entire plant in less direct ways. The most striking effect can be seen between a plant grown in normal light and the same kind of plant grown in total darkness. The plant grown in the dark will have a tall and spindling stem, small leaves, and both leaves and stem, lacking chlorophyll, are pale yellow. Plants grown in shade instead of darkness show a different response. Moderate shading tends to reduce transpiration more than it does photosynthesis. Hence, shaded plants may be taller and have larger leaves because the water supply within the growing tissues is better. With heavier shading, photosynthesis is reduced to an ever-greater degree and, weak plants result. Soil water also affects the crop growth. Therefore, the monitor & control of soil condition has a specific interest, because good condition of a soil may produce the proper yield. The proper irrigations and fertilizations of the crops are varying as per the type, age, phase and climate. The pH value, moisture contains, electric conductivity and the temp of a soil are some key parameters. The pH values and other

parameters will help to monitor the soil condition. The temperature and the moisture can be controlled by the irrigation techniques like drift and sprinkles system in a greenhouse. The temperature of the soil and the inside temperature of the greenhouse are interrelated parameters, which can be, control by proper setting of ventilation. Since the temperature control is depends on direct sun radiation and the screen material used, the proper set point can adjust to control soil temperature. The temperature set-point value depends on actual temperature of the inside and outside of the greenhouse.

3.PROPOSED METHOD

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious. The very simplest embedded systems are capable of performing only a single function or set of functions to meet a single predetermined purpose. In more complex systems an application program that enables the embedded system to be used for a particular purpose in a specific application determines the functioning of the embedded system. The ability to have programs means that the same embedded system can be used for a variety of different purposes. In some cases, a microprocessor may be designed in such a way that application software for a particular purpose can be added to the basic software in a second process, after which it is not possible to make further changes. The simplest devices consist of a single microprocessor (often called a "chip").

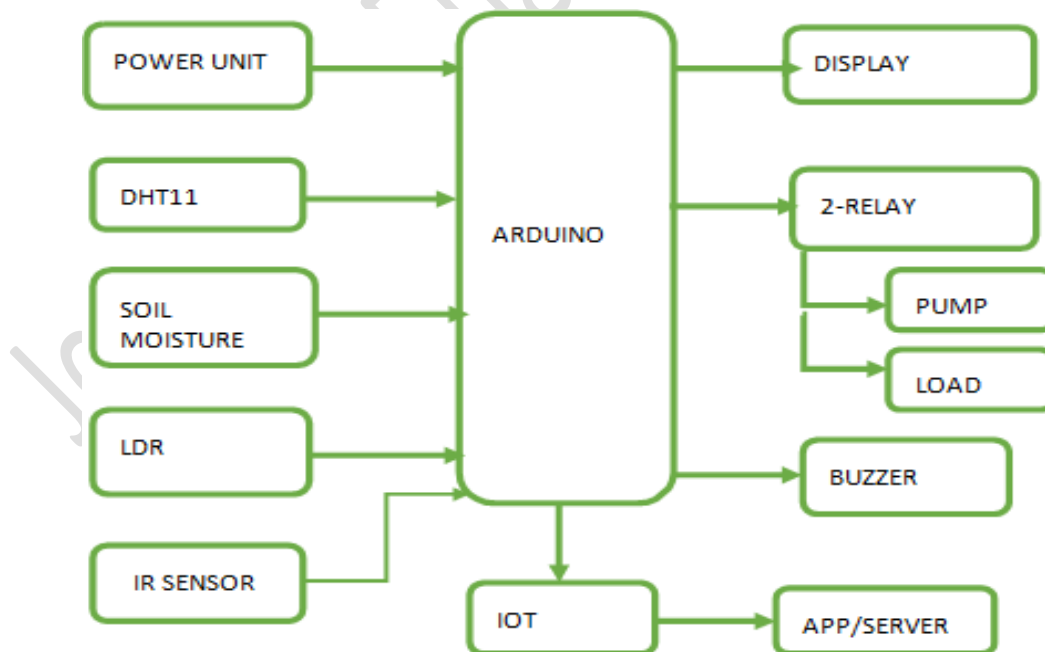
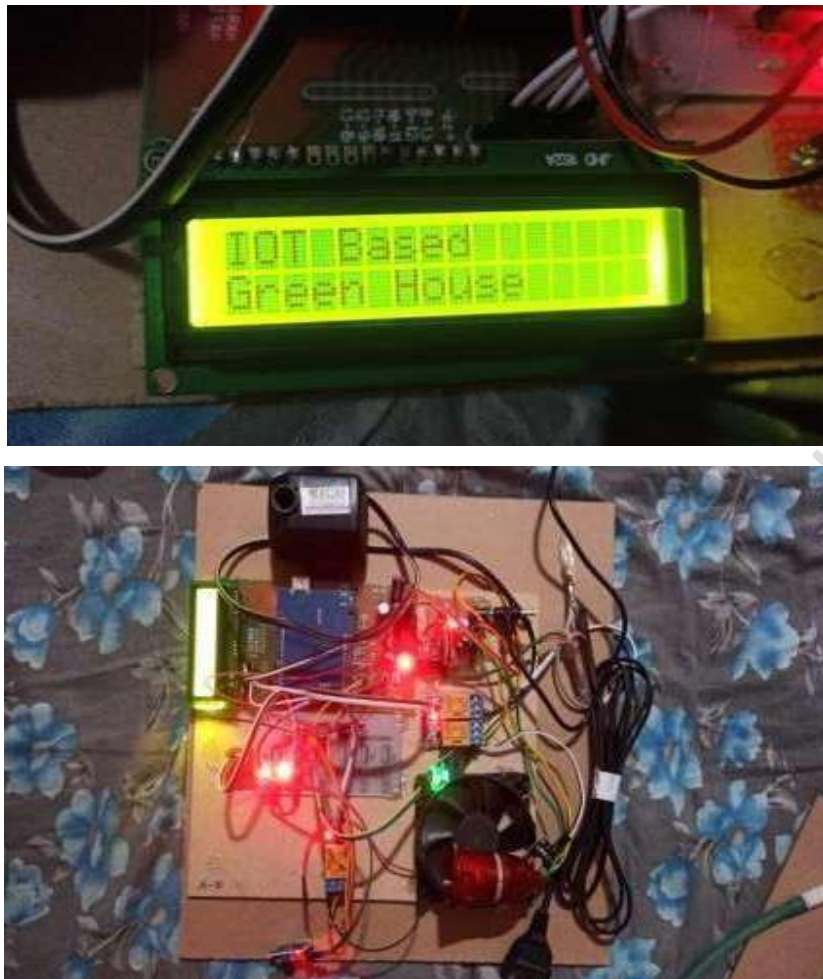


Figure 3.1: Block diagram of embedded system

4. RESULTS



5. CONCLUSION

It is our great pleasure that we have successfully completed our project that presents a design of a simple and low-cost monitoring and control greenhouse system based on an Arduino technology. A temperature, humidity and light sensors were integrated with fan, heater and pump to figure out the sensing and responding unit. Arduino mega and serial interface were utilized to be the processing and communication units respectively. The proposed displaying and controlling via GUI promising solution lower running costs, and increase flexibility and reliability in a greenhouse management system. Compatibility, compactness, portability and low power consumption is some of important key elements in our design. Therefore, a carefully selection of sensing devices and circuitry components is also very important especially when interfaced to the microcontroller. The management scenario of the entire environment of the greenhouse has a crucial importance in utilizing the attached responding elements, where the logical relation between them should be studies firstly. In conclusion, greenhouse climate monitoring and controlling is one attractive application field to create GUI system for monitoring and controlling.

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Identification of Stuck-at-faults of full adder using BIST as testing device

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ABSTRACT

Advanced CMOS devices are a critical issue due to the shrinking process of the size of the transistor. The number of transistors packed in an IC increases with the latest technology. Manufacturing defects in the chip happen due to the interconnection of wires. This leads to unexpected outputs. The process of testing confirms that the chip is fault free. This work discusses the number of test vectors needed to find the faults present in a full adder. An adder circuit is realized in this project. Test vectors are also implemented in LFSR which is fed as inputs to the full adder. Thus generated outputs are tested with the expected outputs to identify the faulty position(s) in the full adder. Spartan3e xc3s500e-5fg320 chip was used to realize the testing.

1. INTRODUCTION

Now a days verification very important for VLSI designs. Manufacturing defects in the chip happen due to the interconnection of wires. This leads to unexpected outputs. The process of testing confirms that the chip is fault free. before manufacturing we need to test the design so we need to apply test patterns for circuit under test. Basically, LCG and LFSR (linear feedback shift register) are used for test pattern generation, in this project we are selected LCG (Linear congruential generator) In computing, a linear-feedback shift register (LFSR) is a shift register whose input bit is a linear function of its previous state. The most commonly used linear function of single bits is exclusive-or (XOR). Thus, an LFSR is most often a shift register whose input bit is driven by the XOR of some bits of the overall shift register value. The initial value of the LFSR is called the seed, and because the operation of the register is deterministic, the stream of values produced by the register is completely determined by its current (or previous) state. Likewise, because the register has a finite number of possible states, it must eventually enter a repeating cycle. However, an LFSR with a well-chosen feedback function can produce a sequence of bits that appears random and has a very long cycle. Applications of LFSRs include generating pseudo-random numbers, pseudo-noise sequences, fast digital counters, and whitening sequences. Both hardware and software implementations of LFSRs are common. The mathematics of a cyclic redundancy check, used to provide a quick check against transmission errors, are closely related to those of an LFSR. LFSRs can be implemented in hardware, and this makes them useful in applications that require very fast generation of a pseudo-random sequence, such as direct-sequence spread spectrum radio. LFSRs have also been used for generating an approximation of white noise in various programmable sound generators. The repeating sequence of states of an LFSR allows it to be used as a clock divider or as a counter when a non-binary sequence is acceptable, as is often the case where computer index or framing locations need to be machine-readable.[7] LFSR counters have simpler feedback logic than natural binary counters or Gray-code counters, and therefore can operate at higher clock rates. However, it is necessary to ensure that the LFSR never enters an all-zeros state, for example by presetting it at start-up to any other state in the sequence. The table of primitive polynomials show how LFSRs can be arranged in Fibonacci or Galois form to give maximal periods. One can obtain any other period by adding to an LFSR that has a longer period some logic that shortens the sequence by skipping some states. LFSRs have long been used as pseudo-random number generators for use in stream ciphers (especially in military cryptography), due to the ease of construction from simple electromechanical or electronic circuits, long periods, and very uniformly distributed output streams. However, an LFSR is a linear system, leading to fairly easy cryptanalysis. For example, given

a stretch of known plaintext and corresponding cipher text, an attacker can intercept and recover a stretch of LFSR output stream used in the system described, and from that stretch of the output stream can construct an LFSR of minimal size that simulates the intended receiver by using the Bredekamp-Massey algorithm. This LFSR can then be fed the intercepted stretch of output stream to recover the remaining plaintext. LFSRs are used in circuit testing for test-pattern generation (for exhaustive testing, pseudo-random testing or pseudo-exhaustive testing) and for signature analysis. Complete LFSR are commonly used as pattern generators for exhaustive testing, since they cover all possible inputs for an n-input circuit. Maximal-length LFSRs and weighted LFSRs are widely used as pseudo-random test-pattern generators for pseudo-random test applications. Signature analysis In built-in self-test (BIST) techniques, storing all the circuit outputs on chip is not possible, but the circuit output can be compressed to form a signature that will later be compared to the golden signature (of the good circuit) to detect faults. Since this compression is lossy, there is always a possibility that a faulty output also generates the same signature as the golden signature and the faults cannot be detected. This condition is called error masking or aliasing. BIST is accomplished with a multiple-input signature register (MISR or MSR), which is a type of LFSR. A standard LFSR has a single XOR or XNOR gate, where the input of the gate is connected to several "taps" and the output is connected to the input of the first flip-flop. A MISR has the same structure, but the input to every flip-flop is fed through an XOR/XNOR gate. For example, a 4-bit MISR has a 4-bit parallel output and a 4-bit parallel input. The input of the first flip-flop is XOR/XNOR'd with parallel input bit zero and the "taps". Every other flip-flop input is XOR/XNOR'd with the preceding flip-flop output and the corresponding parallel input bit. Consequently, the next state of the MISR depends on the last several states opposed to just the current state. Therefore, a MISR will always generate the same golden signature given that the input sequence is the same every time. To prevent short repeating sequences (e.g., runs of 0s or 1s) from forming spectral lines that may complicate symbol tracking at the receiver or interfere with other transmissions, the databit sequence is combined with the output of a linear-feedback register before modulation and transmission. This scrambling is removed at the receiver after demodulation. When the LFSR runs at the same bit rate as the transmitted symbol stream, this technique is referred to as scrambling. When the LFSR runs considerably faster than the symbol stream, the LFSR-generated bit sequence is called chipping code. The chipping code is combined with the data using exclusive or before transmitting using binary phase-shift keying or a similar modulation method. The resulting signal has a higher bandwidth than the data, and therefore this is a method of spread-spectrum communication. When used only for the spread-spectrum property, this technique is called direct-sequence spread spectrum; when used to distinguish several signals transmitted in the same channel at the same time and frequency, it is called code division multiple access.

2. RESULTS

RTL SCHEMATIC: - The RTL schematic is abbreviated as the register transfer level it denotes the blue print of the architecture and is used to verify the designed architecture to the ideal architecture that we are in need of development. The Verilog language is used to convert the description or summary of the architecture to the working summary by use of the coding language i.e., Verilog, VHDL. The RTL schematic even specifies the internal connection blocks for better analyzing. The figure represented below shows the RTL schematic diagram of the designed architecture.

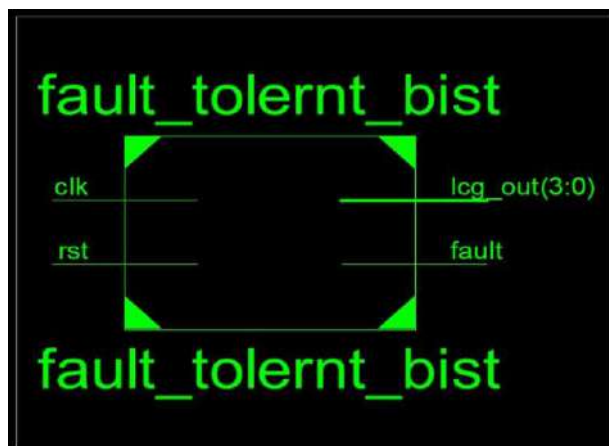


Fig. 2.1 RTL Schematic of Full adder with Fault tolerant best.

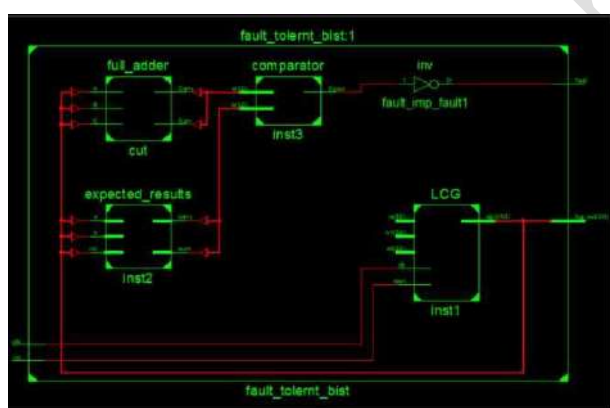


Fig. 2.2 internal structure of RTL Schematic of Full adder with Fault tolerant BIST

TECHNOLOGY SCHEMATIC: - The technology schematic makes the representation of the architecture in the LUT format, where the LUT is consider as the parameter of area that is used in VLSI to estimate the architecture design, the LUT is consider as a square unit the memory allocation of the code is represented in there LUT s in FPGA.

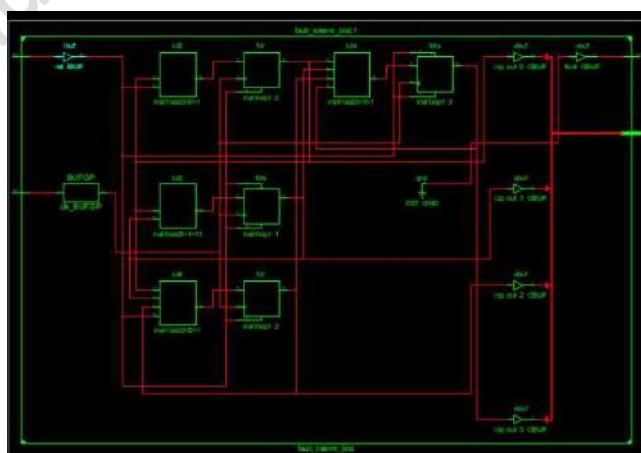


Fig.2.3 View Technology Schematic of Full adder with Fault tolerant bist.

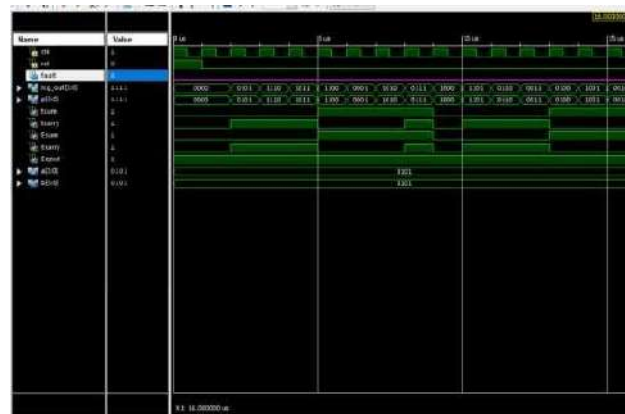


Fig. 2.4 simulated of Full adder with Fault free bist.



Fig. 2.5 simulated of Full adder with Faulty Bist.

The simulation is the process which is termed as the final verification in respect to its working whereas the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implementation to the simulation on the home screen of the tool, and the simulation window confines the output in the form of wave forms output. Here it has the flexibility of providing the different radix number systems.

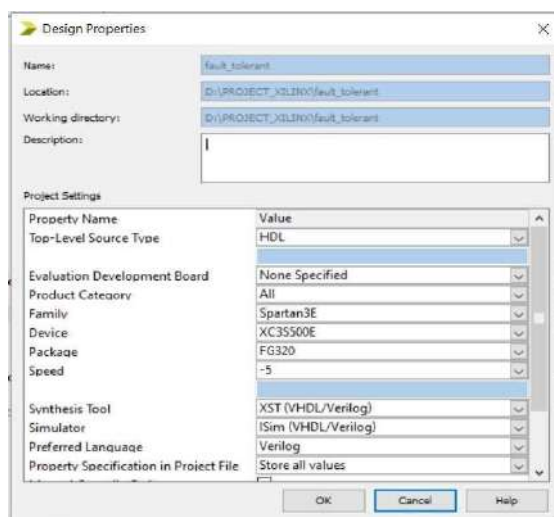


Fig 2.6: family used for synthesis

Device Utilization Summary (estimated values)				
Logic Utilization	Used	Available	Utilization	
Number of Slices	3	4656		0%
Number of Slice Flip Flops	4	9312		0%
Number of 4 input LUTs	5	9312		0%
Number of bonded IOBs	7	232		3%
Number of BCLKs	1	24		4%

Table 2.1 device utilization summery

Minimum period: 2.084ns (Maximum Frequency: 479.835MHz)minimum input arrival time before clock: 2.781ns

Maximum output required time after clock: 5.342nsDelay 5.342ns

Power :0. 0434m.Watt

3. CONCLUSION

The method for reducing test vectors and performing testing at speed testing is discussed in this paper. A circuit can be simulated in the presence of faults. The fault may be stuck-at-0 or stuck at 1 simulates at a functional level. The simulator is used for design verification and verifying its timing analysis. The process to find test vectors for single stuck at fault using path sensitization method and for multiple stuck-at faults using the Boolean difference method through forming a fault table. The number of test vectors can be minimized to find each line of fault in the circuit. Test vector becomes a major issue for the power consumption of the circuit. The methods for reducing test vector are designed and implemented by Hardware Description Language (HDL limitation tools).

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Admin Room Device Control Using IOT

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ABSTRACT

The main and basic intent of our project is to create and develop a system that will render us with a mobile control for our home applications and would also provide us with security against the mishaps that occur when the house host is not present at home. Our project basically deals with the automated control of One_Plus_One_Duo switch which is to control one load to on/off and fan to on/off along with the fan speed dimmer, the applications that we use at home with the help of the internet and the mobile application V-ismart. It is mainly meant to save human energy and the electrical power. Our project has been made with the aid of a controller and a device called ESP-01 and Arduino. All the applications are connected with the microcontroller and a sensor is connected using a wireless network.

1. INTRODUCTION

In today's world we all are surrounded by many smart devices and gadgets. We can use them in solving many day-to-day problems. Also if you are bit electronics savvy then you can create your own customized IoT devices. IoT based Timer Switch using V-ismart and STM32 with notification feature. If you have any appliance or device which needs to be switched on daily for a particular interval of time then this device will help you to automate it. This will not only switch it on and off but also it will send you a status notification. India is experiencing an unprecedented increase in electricity consumption. Electricity has become one of the basic needs of the people irrespective of their jobs or status. Their daily activities, their daily routine, all depends on electricity one way or another. Thus, a proper system is required to provide an uninterrupted supply of electricity. It is necessary to make sure that there are low chances for the occurrences of fault, and in case a fault occurs there is an immediate response system for its recovery. Like all services the use of electricity also has cost. Which is required for proper maintenance and functioning of the service provider. Through our project we aim at addressing these following basic functions and we suggest a better solution for implementing the same: -

- 1) Load shedding
- 2) Fault detection
- 3) Cost awareness

2. LITERATURE SURVEY

This paper presents a step-by-step procedure of a smart home automation controller. It uses IOT to convert home appliances to smart and intelligent devices, with the help of design control. An energy efficient system is designed that accesses the smart home remotely using IOT connectivity. The proposed system mainly requires, Node MCU as the microcontroller unit, IFTTT to interpret voice commands, Adafruit a library that supports MQTT acts as an MQTT broker and Arduino IDE to code the microcontroller. This multimodal system uses Google Assistant along with a web-based application to control the smart home. The smart home is implemented with main controller unit that is connected with the 24-hour available Wi-Fi network. To ensure, that the Wi-Fi connection do not turn off, the main controller is programmed to establish automatic connection with the available network and connected to the auto power backup. This paper focuses on a system that provides features of Home Automation relying on IOT to operate easily, in addition to that it includes a camera module and provides home security. The android application basically converts Smartphone into a remote for all home appliances. Security is achieved with motion sensors if movement is sensed at the entrance of the house; a notification is sent that contains a photo of house entrance in real time. This notification will

be received by the owner of the house via internet such that app can trigger a notification. So owner can raise an alarm in case of any intrusion or he/she can toggle the appliances like opening the door if the person is a guest. The system uses Raspberry Pi, a small sized computer which acts as server for the system. The smart home consist two modules. Home automation that consists; fan light and door controller, and security module that consists; smoke sensor motion sensor and camera modul

3. RESULTS

It is evident from this project work that an individual control home automation system can be cheaply made from low-cost locally available components and can be used to control multifarious home appliances ranging from the security lamps, the television to the air conditioning system and even the entire house lighting system. And better still, the components required are so small and few that they can be packaged into a small inconspicuous container. The designed home automation system was tested a number of times and certified to control different home appliances used in the lighting system, air conditioning system, home entertainment system and many more . Hence, this system is scalable and flexible.

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Energy-efficient resource allocation for 5G cognitive radio NOMA using game theoryK.Mounika¹, L.Asriitha¹, R.Likith¹, T.Sampath¹, N. Pandu Ranga Reddy¹¹Department of Electronics and Communication Engineering, Malla Reddy Engineering College (A), Secunderabad, Telangana, India**ABSTRACT**

Cognitive radio non-orthogonal multiple access (CRNOMA) networks promise improved spectrum utilization and capacity in 5G networks. In this work, we aim to investigate efficient power allocation for the secondary users (SUs) in underlay CR-NOMA networks using a game-theoretic approach. We present a novel power allocation to CR-NOMA network from a game-theoretic perspective. First, we specify the utility function of the primary users (PUs) and SUs, and formulate the game as a non-cooperative game. Then, the existence and uniqueness of the Nash equilibrium (NE) are investigated. Finally, the sum utilities of SUs is maximized by optimal power allocation at the NE point. Simulation results provided that the proposed scheme outperforms the conventional method, providing up to 37.5% increase in sum utilities of the SUs.

1. INTRODUCTION

Increasing user requirements such as capacity and data rates have been the driving force behind evolving communication technologies. Cognitive radio (CR) and non-orthogonal multiple access (NOMA) are two promising intended to improve spectral efficiency and consequently, system capacity [1], [2] in 5G communication. CR-NOMA networks are seen as a specific case of power-domain NOMA applied in CR, wherein the requirements of the secondary users (SUs) and primary users (PUs) are strictly met, resulting in improved system performance [3]. However, there are many critical challenges due to the severe interference caused by NOMA in CR networks, which are related to resource allocation (RA) and interference management. Various efforts have been made to investigate and facilitate these challenges [3], [4]. RA and optimization aim for efficiently utilizing the resources in terms of different objectives like spectral and energy efficiency [5]. For example, the authors in [6] showed that the energy efficiency of underlay CR-NOMA can be higher than that of cognitive radio networks (CRNs) with orthogonal multiple access (OMA) using sequential convex approximation method. In [7], the authors proposed a novel power allocation algorithm for CR-NOMA, where the characteristics of the NOMA-based system had totally exploited for designing the RA algorithm. RA in CRNOMA studied also in the literature for simultaneous wireless information and power transfer (SWIPT) scheme. For example in [8], time sensing studied as a critical constraint in the optimization problem. In [9], the authors proposed a non-linear energy harvesting (EH) model to minimize the overall system power consumption. In [10], the multi-objective optimization problem based on EH and the quality of service (QoS) of the users in CR-NOMA considered. One of the biggest issues in CR-NOMA networks is the design of an optimal RA scheme, considering different (and often competing) objectives such as spectral efficiency, energy efficiency, and interference management [11]. Although the multi-objective optimization can be exploited to achieve suboptimal solutions, the complexity of the designed algorithms may be very high. To cope with this complexity, we propose using game theory (GT) to design efficient RA in the

proposed network. To the best of our knowledge, this is the first work to study RA in CR-NOMA using GT approach. In this paper, the power allocation of an underlying CRNOMA network using the GT approach is investigated which introduces the GT to the RA in candidate 5G networks. More specifically, in this work, the game is represented as competition between the k th SU which is trying to predict the other players' strategies to maximize his payoff and at the last find the Nash equilibrium (NE) of the game at the SU base station. As a result, the resource management mechanism of the proposed CR-NOMA-based GT approach will achieve high net utilities for all the SUs while maximizing the energy and spectrum efficiency by achieving their satisfactions. Our contributions are summarized as follows:

- A novel non-cooperative power control framework for the CR-NOMA network is presented, where each SU selfishly optimizes its power allocation over the allocated resources to maximize its utility function. Moreover, we prove the existence, and provide the conditions for the uniqueness of the NE. The performance of the proposed approach is compared with OMA-based conventional non-cooperative GT power control.
- Since the interference level to the PU is usually modeled as strict constraints for resource allocation optimization in the literature of CRNs. In this work, the interference to the PU is taken into the consideration by introducing the PUs as a part of the game where the number of PUs and their utilities are conducting in the overall system model. A novel algorithm is proposed to reach the NE-point as an iterative algorithm. NE-point is the optimal response of all users in the game such that no player gains more utility by unilaterally deviating or changing his strategy, under the assumption that other player(s) strategies remain unchanged.

In the fourth generation mobile communication systems such as long-term evolution (LTE) and LTE-Advanced [1], orthogonal frequency division multiple access (OFDMA) has been widely adopted to achieve higher data rate.

2. LITERATURE SURVREY

In the fourth generation mobile communication systems such as long-term evolution (LTE) and LTE-Advanced [1], orthogonal frequency division multiple access (OFDMA) has been widely adopted to achieve higher data rate. The demand for mobile traffic data volume is expected to be 500-1,000 times larger in 2020 than that in 2010 [2]. To further meet overwhelming requirement of data rates, various new techniques have been proposed in recent years, and these techniques include massive multiple-input multiple output (MIMO) [3], millimeter wave communications [4], LTE-U [5], C-RAN [6], SON [7] and non-orthogonal multiple access (NOMA) [8]. Among them, NOMA takes advantage of spectrum efficiency by allowing multiple users to occupy the same subchannel, which is different from the resource allocation in OFDM systems [9]–[11]. By applying successive interference cancellation (SIC) in NOMA systems, superposition coded signal can be correctly decoded and demodulated at the receiver [12]–[15]. Therefore, NOMA has been well considered as a promising candidate for the next generation mobile communication systems.

Since the basic concept of NOMA was introduced and the cell-edge user throughput performance improvement was presented in [16], NOMA has attracted much research attention. The NOMA system has also been envisioned as a key technology in the fifth generation mobile communication systems [17]. In [18], the author discussed an application of combining NOMA with MIMO technologies. Various aspects of resource

allocation have been investigated in NOMA systems [19]– [22]. By using fractional transmit power allocation (FTPA) among users and equal power allocation across subchannels, the authors in [19] compared system-level performance of the NOMA system with the OFDMA system and showed that the overall cell throughput, cell-edge user throughput, and the degree of proportional fairness of NOMA are all superior to those of OFDMA scheme. In [20], the same authors also showed that NOMA still achieves higher gains than OFDMA scheme even with the error propagation in SIC. Though it is simple to implement, FTPA fails to optimally allocate power among multiplexed users on each subchannel. In [21], a new power allocation scheme based on water filling was proposed to achieve high spectral efficiency. The authors in [22] proposed cooperative relay system based on NOMA and showed the improvement of the spectral efficiency. A greedy subchannel and power allocation algorithm was proposed for the NOMA system in [23], and a cooperative NOMA transmission scheme, where some users have prior information of the other users' message, was proposed to improve spectrum efficiency in [24]. The multiple-input and multiple-output (MIMO) NOMA design for small packet transmission and the multi-user detection for uplink grant-free NOMA systems were investigated in [25] and [26], respectively. The energy-efficient power allocation was investigated for NOMA systems in [27], [28]. In [27], using statistical channel state information at the transmitter, the authors proposed a near optimal power allocation scheme to maximize the system energy efficiency. [28] is conference version of this paper. In [28], the authors only discussed the user scheduling for NOMA system to maximize the energy efficiency. In this paper, we also investigated power allocation scheme to further increase the system energy efficiency. Although several recent works have been considered for subchannel and power allocation in NOMA systems [16], [19], [20], these papers mainly focused on sum rate maximization. However, with the exponential growth of wireless data traffic, energy consumption of wireless networks has been rapidly increasing. Therefore, saving transmit energy for a block of bits is an important and practical consideration. To the best of the authors' knowledge, the resource allocation problem that maximizes the system energy efficiency has not been well studied for the NOMA systems. NON-orthogonal multiple access (NOMA) has been considered as a promising technology to improve spectrum efficiency, provide massive connectivity and reduce latency[1-2]. It has been considered as the most promising key technology for the coming fifth generation (5G) networks. Difference from the traditional orthogonal multiple access (OMA), NOMA services multiple users with the same radio resource, in which users are distinguished by different power, which can be achieved by applying the successive interference cancellation (SIC) at the receiver [3], [4]. Cognitive radio (CR), as another technology to improve spectrum utilization, has also received extensive attention. Specifically, CR enables the secondary users (SUs) to exploit the frequency bands of the primary users (PUs) provided that the interference imposed on the PUs from the SUs is below a certain level. Integrating the NOMA technology into CR networks will have great potential to improve spectrum efficiency and increase the number of users[6]. Recently, some authors have shown that the CR-NOMA system can significantly improve spectral efficiency compared to CR or NOMA technology [7-8]. However, the interference constraint in CR-NOMA can severely limit the transmission rate achievable of the SUs and reduce spectrum utilization. Cooperative relay as an attractive solution to circumvent this challenge [9]. It has demonstrated whether the outage

performance or throughput of cooperative cognitive radio are strictly better than the direct link with no relay [10]. In order to improve the quality of service (QoS) of the SUs in the CR network, [11] proposed the relay cooperative transmission, compared to the non-cooperative relay the outage performance significantly improved. The authors of [12] used the best SU as joint relay to assist PUs and SUs transmission. In order to enhance the fairness of SU, a two-stage cooperative strategy was proposed by selecting a certain SU to perform NOMA transmission. In [13], a new cooperative relay and antenna selection strategy was proposed to maximize the signal-to noise ratio (SNR) of the SUs. The asymptotic closed-form expression of outage performance was derived. In [14], in order to improve the signal-to-interference-plus-noise ratio (SINR) of SUs in the underlay cognitive radio network, the cooperative relay combined with spatial diversity was proposed. Note that all the aforementioned works focus on the OWR cooperative transmission, which can improve the rate of SUs. But the relay can only send or receive information from the same direction in the same time. If two-way-relay (TWR) communication between SUs is considered, higher spectrum efficiency can be achieved [15]. Different from the traditional OWR, which uses orthogonal time-frequency resources to transmit and receive signal and takes four time slots to complete the information interaction. The TWR only needs two time slots to complete the information exchange between two users [16].

3. PROPOSED METHOD

The uplink scenario for CR-NOMA networks is considered where the network consists of a set of PUs and SUs with different base stations (BSs). The sets of SUs and PUs are denoted as $xP = \{1, 2, \dots, N\}$ and $xS = \{1, 2, \dots, K\}$, respectively, where N and K are the total numbers of PUs and SUs, respectively. Hence, multiple SUs can be served by one or more PUs, and all the users are equipped with a single antenna. In CR-NOMA, the network design is based on the scheduling scheme that facilitates simultaneous access of SUs and PU using the entire system bandwidth to transmit data with the help of superposition coding (SC) and successive interference cancellation (SIC) decoding techniques. User multiplexing is executed in the power domain, subject to the constraint PU power budget $Q_{\max n}$ and SU total power $p_{\max k}$, respectively. In the uplink, SIC is at base stations, therefore users need not be aware of the modulation and coding schemes employed by the other users. Furthermore, base stations have enough processing power to perform SIC. NOMA can also allow users to transmit in uplink in a grant-free manner which reduces latency significantly [12]. Hence, $Q_{\max n}$ and $p_{\max k}$ represent the maximum transmission power for PU and SU, respectively. The channel gain between the secondary BS and k th SU, and between the n th PU-BS and SU-BS are represented as h_{sk} , and h_{ns} , respectively. In this work, NOMA is applied only for SUs, whereas for PU its optional to apply NOMA. So, SUs channels can be sorted in the SU-BS as $0 < |h_{s1}|^2 \leq |h_{s2}|^2 \leq \dots \leq |h_{sK}|^2$

Secondary User Perspective Analysis

The power allocated to the k th SU is p_k such that $p_1 < p_2 < \dots < p_K$, and the data rate achievable of the k th SU can be represented as

$$\mathcal{R}_k^s = \mathcal{B} \log_2 \left(1 + \gamma_k^{(s)} \right),$$

where B is the system bandwidth and γ_k is the signal to interference plus noise ratio (SINR) for the k th SU, that represented as

$$\gamma_k^{(s)} = \frac{h_{sk}^2 \rho_k}{\sum_{\substack{j=1 \\ j \neq k}}^K h_{sj}^2 \rho_j + \sum_m^N h_{sm}^2 \rho_m + \sigma^2},$$

where ρ_k is the transmission power of the k th SU and σ^2 is the variance of the additive Gaussian white noise (AWGN). u_k is a novel utility function for the k th SUs that, shows the aims of k th SU to maximize its data rate with minimum transmission power. Based on the above aforementioned, the SU who has a minimum power will have maximum utility. u_k represented as

$$u_k = \frac{\mathcal{R}_k^s}{\rho_k}.$$

Primary User Perspective Analysis

The target SINR of the n th PU is defined as $\bar{\gamma}_n = \frac{h_{ns}^2 \rho_n}{Q_N + \sigma^2}$ where Q_N represents the maximum possible interference caused by the SUs and other PUs at the n th PU that can be tolerated, $\bar{\gamma}_n$ represents the least acceptable transmission quality of the n th PU (i.e., the least acceptable SINR of the n th PU), and ρ_n is the n th PU transmission power. In order to benefit from dynamic spectrum sharing, the PU is rewarded for allowing the SUs to use its spectrum. However, the transmission quality of the PU must always be satisfied, therefore $\gamma_n - \bar{\gamma}_n \geq 0$. The γ_n is the SINR of the n th PU and, it implies that the QoS requirement for the n th PU is satisfied. As defined in [13], u_n is the utility function of the n th PU given by

$$u_n = Q_N - \mu_1 (Q_N - I_n - I_k)^2 u[Q_N - I_n - I_k] - \mu_2 \left[e^{(I_n + I_k - Q_N)} \right] u[I_n + I_k - Q_N],$$

. From the utility of the PU, we can conclude that when the instantaneous SINR of the n th PU is less than the target SINR of the PU, the n th PU is significantly penalized because it does not achieve its target transmission quality. As well, the n th PU can be penalized if its instantaneous SINR is greater than its target SINR since this can cause unnecessary interference to the other users. III.

4. RESULTS

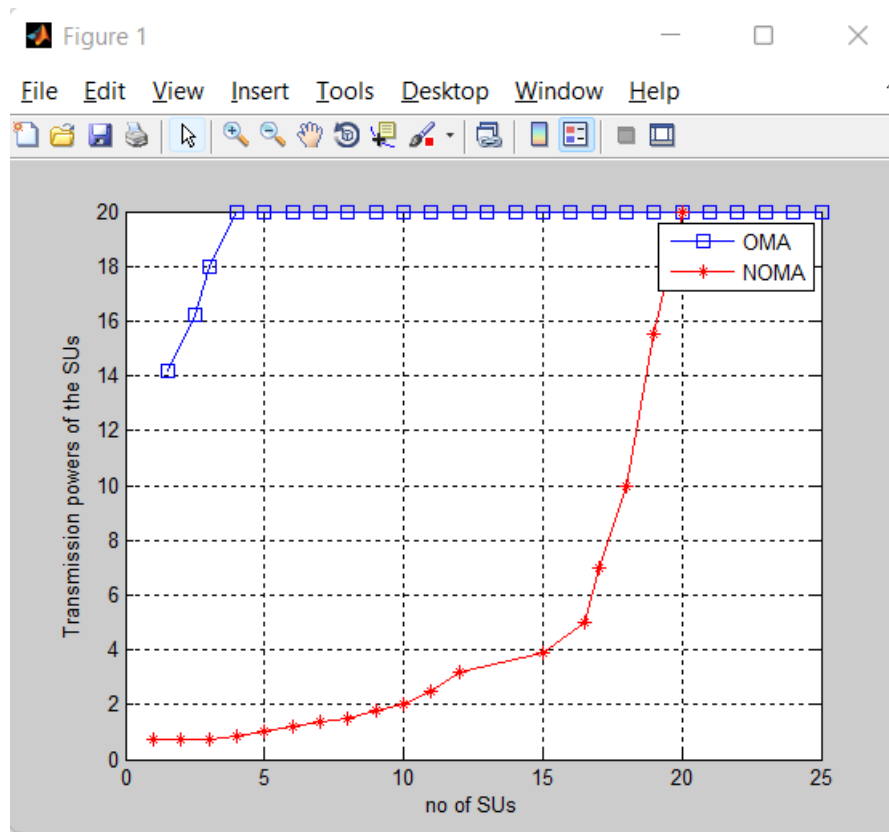


FIG 4 : SIMULATION RESULT 1

- In the above graph, the graph is between number of secondary users and the transmission power of the secondary users.
- As the transmission power increases the signal to the number of secondary users also gets increases accordingly.
- In the graph NOMA differentiate the signals based on power levels.

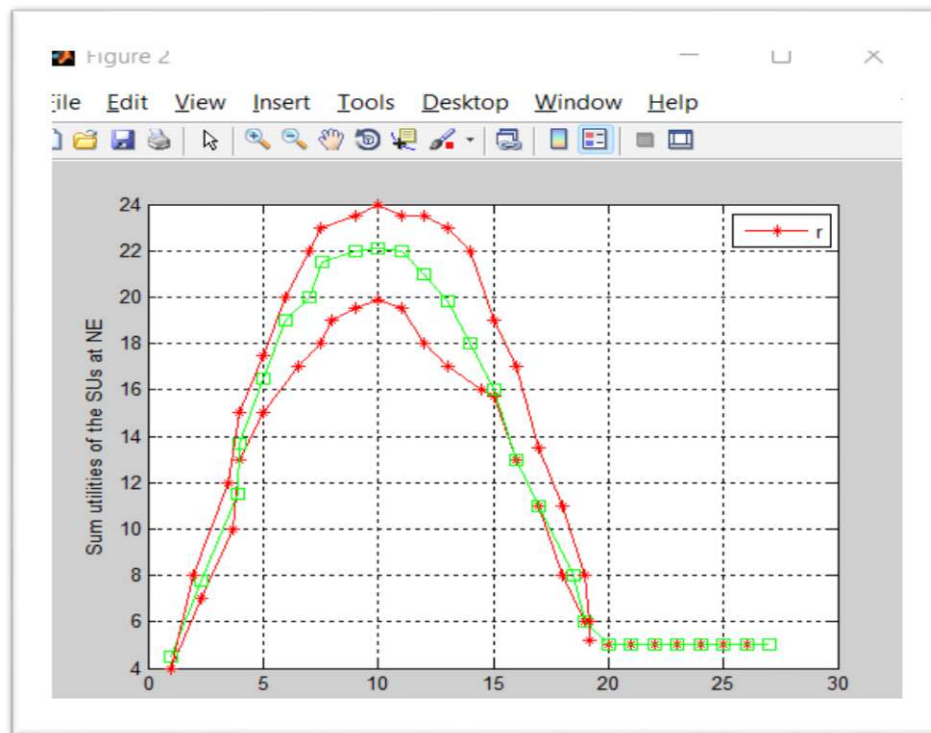
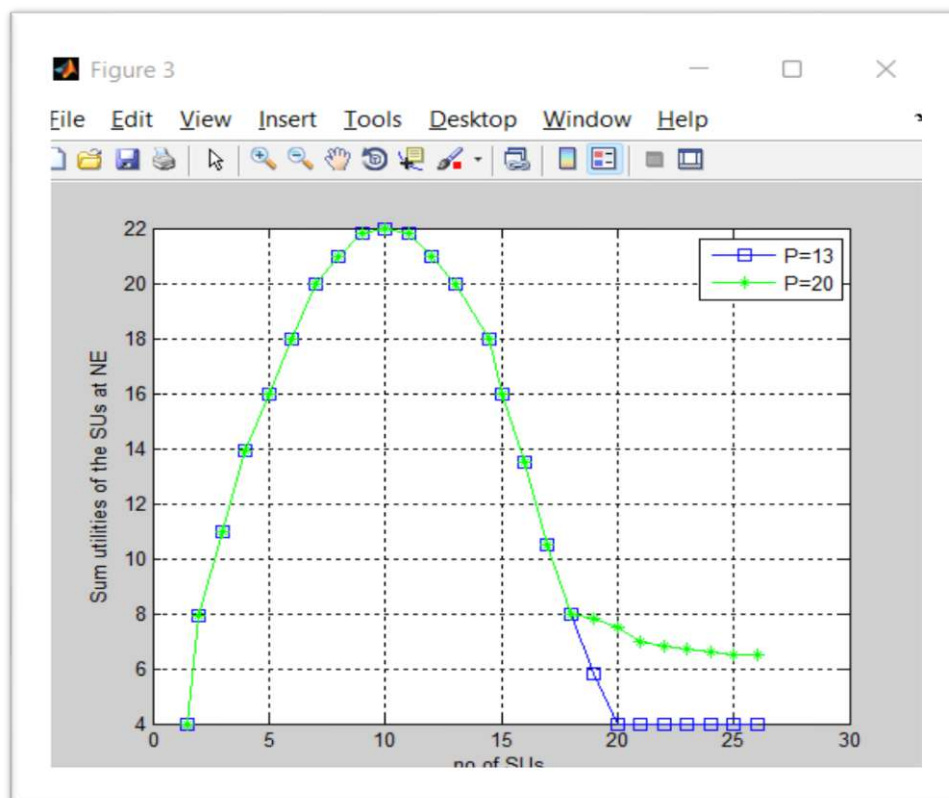


FIG 5 : SIMULATION RESULT -2



- In the above graph, sum of utilities of secondary users increases drastically upto Nash Equilibrium point and then decreases eventually.

• FIG 6 : SIMULATION RESULT-3

- In the above graph, Number of secondary users increases gradually upto nash equilibrium point and the decreases eventually.

- The above graph is between the Number of secondary users and sum of utilities of the secondary users at Nash Equilibrium.

5. CONCLUSION

In this project, the RA of CR-NOMA using a game-theoretic approach is studied. Several PUs coexist with the SUs using the game theory by modeling the natural interactions between the players in RA process. In particular, the power allocation problem is represented as a game, and NE is approached as the optimal power allocated to each user in the system. Finally, the superiority of the proposed scheme is shown through MATLAB simulation. The sum utilities of SUs with NOMA has significant improvements up to 37.5% increase while compared with the OMA approach. Consequently, the maximum possible number of SUs in the energy-efficient mode that can be afforded in the system has increased up to 5.6%. Based on that, Internet of Things (IoT) devices and Vehicle to Vehicle (V2V) communication could be a practical applications for the proposed system, where maximum capacity and efficient spectral sharing are met. In future works, the EH for the cooperative system model will be considered

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Performance Analysis of Matrix Inversion Algorithms for Massive MIMO Precoding under Rural and Urban Scenarios

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ABSTRACT

Massive MIMO or Very Large Scale MIMO is a key technology in recent 5G and beyond 5G wireless standards to attain high speed, secure, error free communication and accessibility among trillions of users. All the above is possible with increase in complexity of the massive MIMO system. To improve massive MIMO system performance, efficient linear precoding algorithms are used at the downlink. The complexity of linear precoding algorithms lies on the hardware demanding large size matrix inversion module. In this paper, the performance of various approximations such as Neumann series, Conjugate Gradient (CG) and Preconditioned Conjugate Gradient (PCG) algorithms that simplify the matrix inversions of linear precoding algorithms are discussed. The simulations are carried out under various propagation scenarios like rural macro cell and urban micro cell.

The future wireless systems need to provide many developments over fixed networks in terms of security, speed, robustness and variety of services being offered. It is possible to provide the above services to the everyday increasing number of customers only by means of technology that supports a very high capacity, data rate, low power consumption and reduced latency. Though, these targets cannot be satisfied simultaneously, they form the basis for the higher capacity 5G networks. One of many techniques used to meet the above desired benefits is Multiple Input Multiple Output (MIMO). In Point to Point MIMO, both Base Station (BS) and Mobile Terminal (MT) are equipped with multiple antennas that exploit the spatial diversity property of the channel. In Multi-User MIMO (MU-MIMO) systems, a central BS is connected to more than one mobile terminals, thereby reducing the complexity of MT s. An emerging area in MUMIMO communication is Massive MIMO systems. In Massive MIMO, antennas of around hundred are installed in BS whereas MU-MIMO employs antennas in the order of 10 to 20 inside BS.

Keywords—Massive MIMO, Zero-Forcing precoding, Krylov subspace iterative algorithms, Conjugate gradient precoding, Neumann series

1. INTRODUCTION

The future wireless systems need to provide many developments over fixed networks in terms of security, speed, robustness and variety of services being offered. It is possible to provide the above services to the everyday increasing number of customers only by means of technology that supports a very high capacity, data rate, low power consumption and reduced latency. Though, these targets cannot be satisfied simultaneously, they form the basis for the higher capacity 5G networks [1-4]. One of many techniques used to meet the above desired benefits is Multiple Input Multiple Output (MIMO). In Point to Point MIMO, both Base Station (BS) and Mobile Terminal (MT) are equipped with multiple antennas that exploit the spatial diversity property of the channel. In Multi-User MIMO (MU-MIMO) systems, a central BS is connected to more than one mobile terminals, thereby reducing the complexity of MT s. An emerging area in MUMIMO communication is Massive MIMO systems. In Massive MIMO, antennas of around hundred are installed in BS whereas MU-MIMO employs antennas in the order of 10 to 20 inside BS. The channel noise effects and channel fast fading effects diminishes. But, it causes interference between the adjacent users which is mitigated by means

of efficient precoding techniques. This precoding is an efficient signal processing technique done on modulated symbols at the transmitter side. By the application of suitable precoding techniques, full potential massive MIMO system can be obtained. Precoding is a signal processing technique that transforms the input multiuser data into the array of data vectors of size equal to the antenna array dimension of the massive MIMO BS transmitter. For regular MIMO systems any type of precoding algorithm such as linear and nonlinear techniques is used as the size of matrix is small. Dirty Paper Coding (DPC) and THP precoding are the non linear precoding techniques discussed in [5] and [6] that achieve optimum capacity. But, such complex non-linear algorithms fail for massive MIMO system as their dimension is very huge in the order of Hundreds. Hence, linear precoding techniques such as Matched Filtering (MF), Regularized Zero Forcing (RZF), Zero Forcing (ZF) are the linear precoding techniques that achieve satisfactory performance with lesser complexity compared with non-linear precoding techniques. But the implementation of linear precoding techniques depends on the ability to perform matrix inverse operations faster though the dimension of the antenna array increases with the matrix size. Moreover, hardware implementations find it difficult to implement matrix inversions as they deal with division operations and implementing division in hardware is very tedious. Since, finding matrix inversions directly is challenging in hardware suitable approximations can be used to replace direct inversion operation with tolerable error performance.

2. LITERATURE SURVREY

More precisely, on a quasistatic channel where a codeword spans across only one time and frequency coherence interval, the reliability of a point-to-point MIMO link scales according to $\text{Prob}(\text{link outage}) \sim \text{SNR}^{-n_t n_r}$ - where n_t and n_r are the numbers of transmit and receive antennas, respectively, and signal-to-noise ratio is denoted by SNR. On a channel that varies rapidly as a function of time and frequency, and where circumstances permit coding across many channel coherence intervals, the achievable rate scales as $\min(n_t, n_r) \log(1 + \text{SNR})$. The gains in multiuser systems are even more impressive, because such systems offer the possibility to transmit simultaneously to several users and the flexibility to select what users to schedule for reception at any given point in time [2]. The price to pay for MIMO is increased complexity of the hardware [number of radio frequency (RF) chains] and the complexity and energy consumption of the signal processing at both ends. For point-to-point links, complexity at the receiver is usually a greater concern than complexity at the transmitter. For example, the complexity of optimal signal detection alone grows exponentially with n_t [3], [4]. In multiuser systems, complexity at the transmitter is also a concern since advanced coding schemes must often be used to transmit information simultaneously to more than one user while maintaining a controlled level of interuser interference. Of course, another cost of MIMO is that of the physical space needed to accommodate the antennas, including rents of real estate. With very large MIMO, we think of systems that use antenna arrays with an order of magnitude more elements than in systems being built today, say 100 antennas or more. Very large MIMO entails an unprecedented number of antennas simultaneously serving a much smaller number of terminals. The disparity in number emerges as a desirable operating condition and a practical one as well. The number of terminals that can be simultaneously served is limited, not by the

number of antennas, but rather by our inability to acquire channel-state information for an unlimited number of terminals. Larger numbers of terminals can always be accommodated by combining very large MIMO technology with conventional time- and frequency-division multiplexing via orthogonal frequency-division multiplexing (OFDM). Very large MIMO arrays is a new research field both in communication theory, propagation, and electronics and represents a paradigm shift in the way of thinking both with regards to theory, systems, and implementation. The ultimate vision of very large MIMO systems is that the antenna array would consist of small active antenna units, plugged into an (optical) fieldbus. We foresee that in very large MIMO systems, each antenna unit uses extremely low power, in the order of milliwatts. At the very minimum, of course, we want to keep total transmitted power constant as we increase n_t , i.e., the power per antenna should be $\propto 1/n_t$. But in addition we should also be able to back off on the total transmitted power. For example, if our antenna array were serving a single terminal, then it can be shown that the total power can be made inversely proportional to n_t , in which case the power required per antenna would be $\propto 1/n_t^2$. Of course, several complications will undoubtedly prevent us from fully realizing such optimistic power savings in practice: the need for multiuser multiplexing gains, errors in channel state information (CSI), and interference. Even so, the prospect of saving an order of magnitude in transmit power is important because one can achieve better system performance under the same regulatory power constraints. Also, it is important because the energy consumption of cellular base stations is a growing concern. As a bonus, several expensive and bulky items, such as large coaxial cables, can be eliminated altogether. (The coaxial cables used for tower-mounted base stations today are up to 4 cm in diameter!) Moreover, very-large MIMO designs can be made extremely robust in that the failure of one or a few of the antenna units would not appreciably affect the system. Malfunctioning individual antennas may be hotswapped. The contrast to classical array designs, which use few antennas fed from a highpower amplifier, is significant. So far, the large-number-of-antennas regime, when n_t and n_r grow without bound, has mostly been of pure academic interest, in that some asymptotic capacity scaling laws are known for ideal situations. More recently, however, this view is changing, and a number of practically important system aspects in the large- (n_t, n_r) regime have been discovered. For example, [5] showed that asymptotically as $n_t \rightarrow \infty$ and under realistic assumptions on the propagation channel with a bandwidth of 20 MHz, a time-division multiplexing cellular system may accommodate more than 40 single-antenna users that are offered a net average throughput of 17 Mb/s both in the reverse (uplink) and the forward (downlink) links, and a throughput of 3.6 Mb/s with 95% probability! These rates are achievable without cooperation among the base stations and by relatively rudimentary techniques for CSI acquisition based on uplink pilot measurements. Several things happen when MIMO arrays are made large. First, the asymptotics of random matrix theory kick in. This has several consequences. Things that were random before, now start to look deterministic. For example, the distribution of the singular values of the channel matrix approaches a deterministic function [6]. Another fact is that very tall or very wide matrices tend to be very well conditioned. Also, when dimensions are large, some matrix operations such as inversions can be done fast, by using series expansion techniques (see the sidebar). In the limit of an infinite number of antennas at the base station, but with a single antenna per user, then linear processing in the form of maximum ratio combining for the uplink (i.e., matched filtering with the channel vector, say \mathbf{h}) and maximum-

ratio transmission (beamforming with $\mathbf{h} \mathbf{h}^H$) on the downlink is optimal. This resulting processing is reminiscent of time reversal (TR), a technique used for focusing electromagnetic or acoustic waves [7], [8]. The second effect of scaling up the dimensions is that thermal noise can be averaged out so that the system is predominantly limited by interference from other transmitters. This is intuitively clear for the uplink, since coherent averaging offered by a receive antenna array eliminates quantities that are uncorrelated between the antenna elements, that is, thermal noise in particular. This effect is less obvious on the downlink, however. Under certain circumstances, the performance of a very large array becomes limited by interference arising from reuse of pilots in neighboring cells. In addition, choosing pilots in a smart way does not substantially help as long as the coherence time of the channel is finite. In a time-division duplex (TDD) setting, this effect was quantified in [5], under the assumption that the channel is reciprocal and that the base stations estimate the downlink channels by using uplink received pilots. Finally, when the aperture of the array grows, the resolution of the array increases. This means that one can resolve individual scattering centers with unprecedented precision. Interestingly, as we will see later on, the communication performance of the array in the large-number-of-antennas regime depends less on the actual statistics of the propagation channel but only on the aggregated properties of the propagation such as asymptotic orthogonality between channel vectors associated with distinct terminals. Of course, the number of antennas in a practical system cannot be arbitrarily large owing to physical constraints. Eventually, when letting n_r or n_t tend to infinity, our mathematical models for the physical reality will break down. For example, the aggregated received power would at some point exceed the transmitted power, which makes no physical sense. But long before the mathematical models for the physics break down, there will be substantial engineering difficulties. So, how large is “infinity” in this article? The answer depends on the precise circumstances of course, but in general, the asymptotic results of random matrix theory are accurate even for relatively small dimensions (even ten or so). In general, we think of systems with at least 100 antennas at the base station, but probably fewer than 1,000. Taken together, the arguments presented motivate entirely new theoretical research on signal processing and coding and network design for very large MIMO systems.

This article will survey some of these challenges. In particular, we will discuss ultimate information-theoretic performance limits, some practical algorithms, influence of channel properties on the system, and practical constraints on the antenna arrangements.

3. PROPOSED METHOD

We studied the performance of several main Linear Precoding algorithms in large-scale MIMO systems. For the convenience of expression, in a single cell system, we use indicates the downlink channel matrix from base station to user. Based on the theoretical analysis, we studied the performance of the main Linear Precoding algorithms, and made performance simulation under the actual scene conditions, and compared with the theoretical results. In the single cell large-scale MIMO transmitter block diagram shown in Fig. 1, the base station precodes the signal and sends the signal vector to the user. \mathbf{s} represents the original signal, and \mathbf{x} represents the information vector sent by the sender to the user after precoding.

$$\mathbf{x} = \sqrt{\rho} \mathbf{W} \mathbf{s}$$

P is the average transmission power of the base station. Therefore, the signal received by the kth user in the cell can be expressed as:

$$y_k = Hx + n = \sqrt{\rho} H_k W_k S_k + n_k$$

Here, is the superposition of user interference signal and channel noise of the same pilot in other cells.

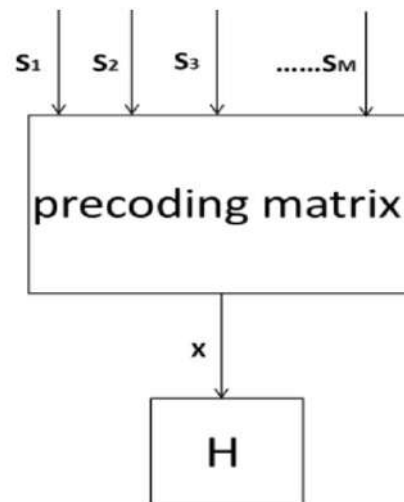


Fig 4: Single cell large-scale MIMO transmitter block diagram

Zero Forcing Precoding Algorithm

Zero forcing linear precoding scheme was originally proposed by Freescale Semiconductor Company. Different from the MRT precoding technology, ZERO FORCING precoding can completely remove the interference among users. It requires that all the signals received by users in the system do not contain the interference generated by other users, that is, make the precoding vector w_k of user K in the channel matrix of other users in the zero space of, that is, the interference items of other users in the signals received by user K:

$$\sum_{i=1, i \neq k}^k h_k w_i s = 0$$

The specific implementation process of Zero forcing linear precoding is as follows:

- 1) the channel is estimated in the client. That is to say, the pilot signal is used to estimate the channel among users and the estimated value of channel matrix is obtained ($k=1,2,\dots,K$)
- 2) feedback channel estimation of the client. The channel matrix estimated above ($k=1,2,\dots$) is used to calculate the precoding matrix. In the TDD system, the base station directly estimates the channel information state of the downlink channel transmitter at the uplink pilot, and improves the accuracy of the channel information state; in the frequency division duplex system, the base station needs to obtain the channel information state of the transmitter through

the uplink feedback channel.

3)the precoding matrix is calculated at the transmitter. Zero forcing precoding can be expressed as pseudo inverse matrix of user channel matrix:

$$W_k = H_k^H (H_k H_k^H)^{-1}$$

It can be seen from the above formula that precoding in multiuser MIMO can be regarded as a process of maximizing the ratio of target user gain to inter user interference plus noise to some extent. MRT maximizes the target user's signal. When the interference between users is negligible compared with the noise, MRT is a near optimal algorithm in the signal limited system. Zero forcing precoding is intended to cancel the interference between users and lose some signal gain at the same time. When the number of users is large or the noise is relative to the interference, it can get the performance close to the system capacity limit. The main problem of Zero forcing precoding is that according to its scheme, antenna data must be processed together at the same time, and each antenna cannot be processed separately.

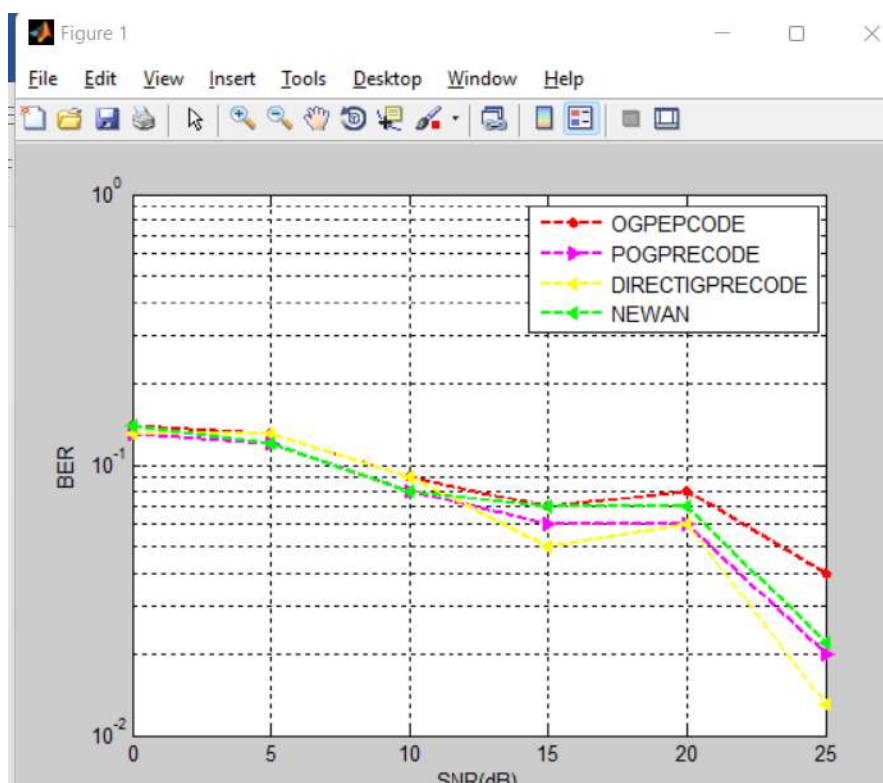
Conjugate Gradient Approximation

Conjugate Gradient (CG) is Krylov subspace based iterative solver for linear equations is described in [11]-[13]. Specifically, CG is a solver of problems is

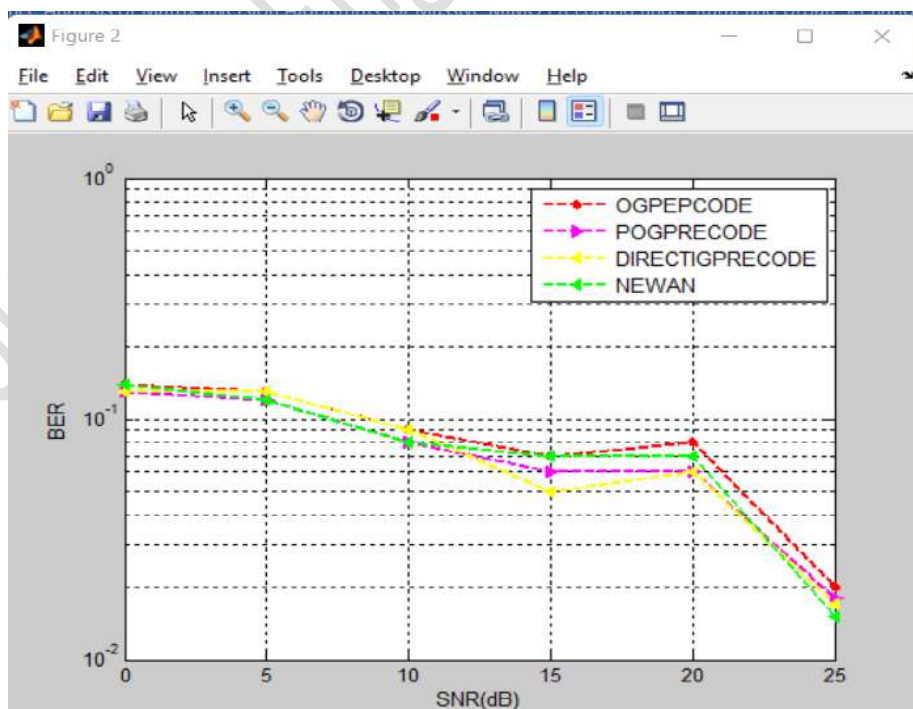
$$\hat{d} = \arg \min \|b - Gd\|$$

where G is a positive definite matrix and b is a column vector containing the transmitted symbol vector. This reduces the computational complexity to a considerable level instead of directly inverting the matrix . The result obtained at the end of final iteration is the product of inverted matrix and the data vector, is then multiplied with the channel matrix that yields the received signal vector.

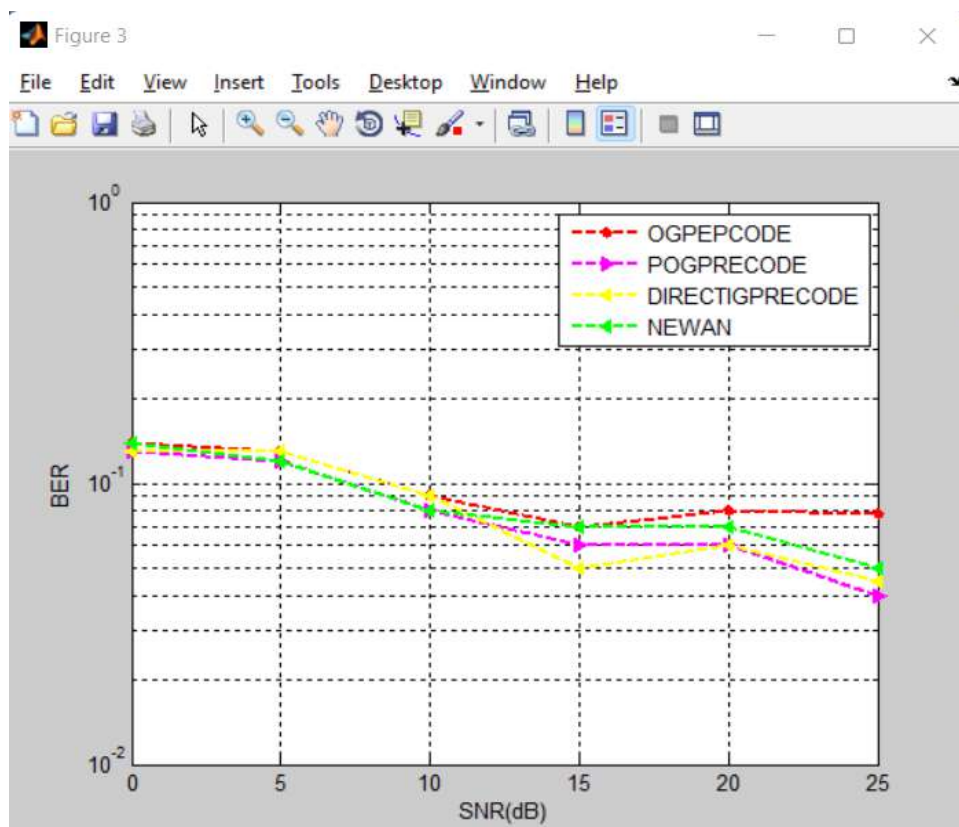
4. RESULTS



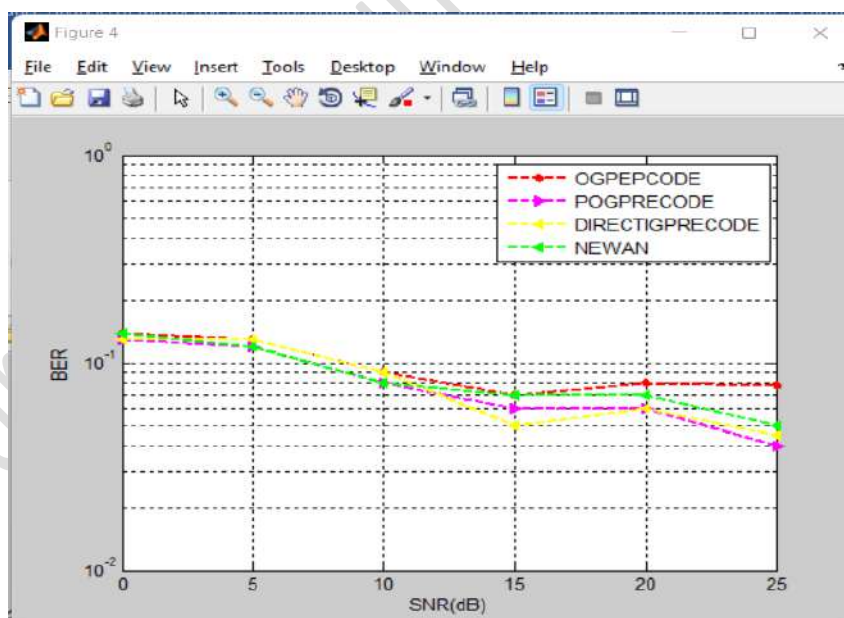
Rural scenario with 100 Tx antennas



Rural scenerios with 200 Tx anten



Urban scenario with 100 Tx antennas



urban scenario with 200 Tx antennas

We have used the different precoding techniques like Conjugate gradient , preconjugate gradient and Neuman series . In the above simulation results, x-axis is bit error rate and y-axis is signal-to-noise ratio. To get efficient output we need to decrease bit error rate and increase signal to noise ratio. Here we took 100 Tx and 200 Tx antennas for comparing rural

5. CONCLUSION

The data symbols of 4 users are simultaneously taken and modulated by 16-QAM modulation and precoded by CG, PCG and Neumann algorithms. These are compared in rural and urban scenarios. From the simulation results we conclude that Neumann series and PCG works well in all type of scenarios for varying SNR values. But, the drawback in Neumann series is the requirement of higher order matrix multiplications as the number of iteration increases and in PCG the selection of suitable preconditioners is much more challenging. Hence, CG based precoding can be selected for both rural micro cell and urban macro cell scenarios since the performance is proven to be better in all scenarios. The implementations of CG based iterative precoding can be simplified by proper selection of methods that accelerate these iterative algorithms so as to reduce the number of computations.

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**EFFICIENT ALGORITHM TO CURTAIL THE ATTENUATION IN TERAHERTZ
COMMUNICATION NETWORKS**

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ABSTRACT

Terahertz (THz) communication has been regarded as one promising technology to enhance the transmission capacity of future internet-of-things (IoT) users due to its ultra-wide bandwidth. Nonetheless, one major obstacle that prevents the actual deployment of THz lies in its inherent huge attenuation. Intelligent reflecting surface (IRS) and multiple-input multiple output (MIMO) represent two effective solutions for compensating the large pathloss in THz systems. In this paper, we consider an IRS-aided multi-user THz MIMO system with orthogonal frequency division multiple access, where the sparse radio frequency chain antenna structure is adopted for reducing the power consumption. The objective is to maximize the weighted sum rate via jointly optimizing the hybrid analog/digital beamforming at the base station and reflection matrix at the IRS. Since the analog beamforming and reflection matrix need to cater all users and subcarriers, it is difficult to directly solve the formulated problem, and thus, an alternatively iterative optimization algorithm is proposed. Specifically, the analog beamforming is designed by solving a MIMO capacity maximization problem, while the digital beamforming and reflection matrix optimization are both tackled using semidefinite relaxation technique. Considering that obtaining perfect channel state information (CSI) is a challenging task in IRS-based systems, we further explore the case with the imperfect CSI for the channels from the IRS to users. Under this setup, we propose a robust beamforming and reflection matrix design scheme for the originally formulated non-convex optimization problem. Finally, simulation results are presented to demonstrate the effectiveness of the proposed algorithms. Index Terms—Hybrid beamforming, Intelligent Reflecting Surfaces, THz, Multiple-input multiple-output.

1. INTRODUCTION

With the rapid proliferation of internet of things (IoTs) users, the future IoT networks need to support the huge transmission capacity [1], [2]. As such, the sub-6 Gigahertz (GHz) and millimeter-wave (mm Wave) may not be able to support these users communications. That being said, terahertz (THz) communication (0.1-10 THz) has been regarded as a promising technology to deal with the above problem due to its ultra-wide bandwidth [3], [4]. However, there are two major shortcomings for THz communications, namely severe signal attenuation and poor diffraction [5]. Multiple-input multiple-output (MIMO) has been recognized as an effective technology to enhance the THz signal strength owing to the high beamforming gain. Indeed, it has been shown that the signal strength grows linearly with the number of antennas at the base station (BS) [6]. Meanwhile, the small wavelength in THz makes it easy to pack more antennas together, and form a massive MIMO array. This way, the problem of severe signal attenuation of THz can be substantially relieved. Nonetheless, the property of poor diffraction still makes THz vulnerable to blocking obstacles that break the line-of-sight (LoS) links. To address this problem, intelligent reflect surface (IRS) can be deployed to create additional links [7], [8], and thus, enhance the performance of THz systems. Being equipped with a large number of

reconfigurable passive elements [9]– [11], IRS can reflect the incident signals to any direction via adjusting the phase shifts. As a result, when there is no direct link between the transmitter and receiver, communication can still be realized via building a reflective link with the help of the IRS as shown in Fig. 1. Therefore, incorporating MIMO and IRS into the THz communication can effectively enhance the signal reception and reduce the probability of signal blockage. In this paper, we study a multi-user IRS-aided THz MIMO system, where the BS employs sparse RF chain structure for lowering the circuit power consumption [12]. Meanwhile, considering that the wideband THz signals may suffer from frequency selective fading, orthogonal frequency division multiple (OFDM) is also adopted. Based on this system model, we design the hybrid analog/digital beamforming at the BS and the reflection matrix at the IRS for maximizing the weighted sum rate under perfect and imperfect channel state information (CSI). Intelligent reflecting surface (IRS), which enables the reconfiguration of wireless propagation environment by smartly controlling the signal reflections via its massive low-cost passive elements, has recently emerged as a promising new technology for significantly improving the wireless communication coverage, throughput, and energy efficiency [1]– [3]. By jointly adjusting the reflected signal amplitude and/or phase shift at each of the IRS elements according to the dynamic wireless channels, the signals reflected by IRS and propagated through other paths can be constructively combined at the intended receiver to enhance the received signal power. Compared to the traditional active relaying/beamforming techniques, IRS possesses much lower hardware cost and energy consumption due to passive reflection and yet operates in full-duplex without the need of costly self-interference cancellation [1]. However, the enormous passive beamforming gain provided by IRS is achieved at the expense of more overhead for channel estimation in practice, due to the additional channels involved between the IRS and its associated access point (AP)/users. Prior works on IRS mainly focus on the design of reflection coefficients under the assumption of perfect channel state information (CSI) [4], which facilitates in deriving the system performance upper bound but is difficult to realize in practice. In contrast, there has been very limited work on the joint design of practical channel estimation and reflection

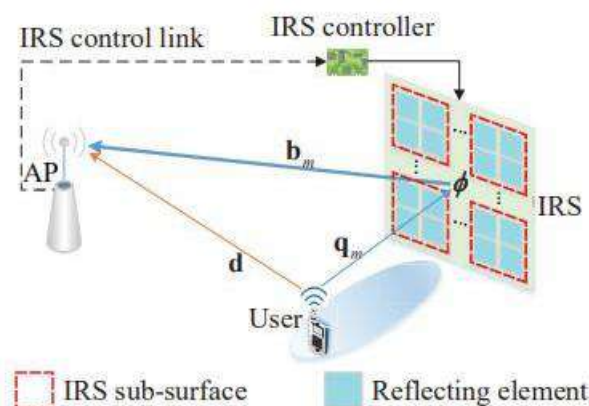


Fig. 1. An illustration of IRS-enhanced OFDM communication in the uplink optimization under

imperfect CSI tailored to the IRS-aided system, especially for wideband communications. It is worth noting that such design is practically challenging due to the lack of transmitting/receiving as well as signal processing capabilities of the passive IRS elements while their numbers can be practically very large, which thus calls for innovative solutions to tackle these new challenges. As compared to the approach of equipping the IRS with dedicated sensors/receiving circuit to enable its channel estimation, it is more cost-effective to estimate the concatenated user-IRS-AP channels at the AP with properly designed IRS reflection pattern based on the received pilot signals sent by the user and reflected by the IRS [1]. Prior works adopting this method for IRS channel estimation have assumed a simple element-by-element ON/OFF-based reflection pattern [5]–[7], which, however, has two main drawbacks. First, it is practically costly to implement the ON/OFF switching of the massive IRS elements frequently as this requires separate amplitude control (in addition to phase shift) of each IRS element. Second, the large aperture of IRS is not fully utilized as only a small portion of its elements is switched ON at each time, which degrades the channel estimation accuracy. To overcome the above issues, we propose in this letter a new IRS reflection (phase-shift) pattern for channel estimation by considering the full reflection of the IRS at all time, i.e., all of its elements are switched ON with maximum reflection amplitude during both the channel estimation and data transmission phases. As shown in Fig. 1, we consider a practical wideband IRS enhanced orthogonal frequency division multiplexing (OFDM) system under frequency-selective fading channels, for which a practical transmission protocol is proposed to execute channel estimation and reflection optimization successively. Specifically, a novel phase-shift pattern satisfying the unit-modulus constraint is designed for the IRS to facilitate the concatenated user-IRS-AP channel estimation at the AP based on the uplink pilot signals from the user. A closed-form expression on the channel estimation error is also derived to show the impact of different system parameters. Based on the estimated CSI, the reflection coefficients are then optimized to maximize the strongest time-domain path channel gain, which is shown to have a much lower computational complexity as compared to the semidefinite relaxation (SDR) method in [7] and yet achieve very close performance to it. Notation: Superscripts $(\cdot)^T$, $(\cdot)^H$, and $(\cdot)^{-1}$ stand for transpose, Hermitian transpose, and matrix inversion operations, respectively. $\lfloor \cdot \rfloor$ is the floor function, \odot denotes the Hadamard product, and $\text{rank}(\cdot)$ denotes the matrix rank, and $\angle(\cdot)$ denotes the phase of a complex number.

2. LITERATURE SURVEY

The MIMO THz communication has become a research hotspot in recent years. Considering the large signal attenuation, Lin et al. study the indoor short range MIMO THz communications [13], [14]. The authors propose a hybrid analog/digital beamforming to maximize the energy efficiency of the system. Busari et al. consider three hybrid beamforming array structures, namely fully-connected, subconnected and overlapped subarray [15]. Then, a single-path THz channel model is used to investigate the performance of the system under different array structures. Additionally, due to the ultra-wide bandwidth, frequency selective hybrid beamforming design in THz system is necessary. For example, Tan and Dai first analyze the array gain loss in the wideband THz system and then

propose a time delay network to obtain the near-optimal array gain [16]. However, the complexity of the considered system is prohibitively high. Yuan et al. build a 3-D wideband THz channel model and propose a two-stage hybrid analog/digital beamforming for maximizing the capacity of the system [17]. After that, the imperfect CSI is also considered and a robust beamforming design scheme is developed. In parallel, IRS has attracted great attention in the past two years owing to its ability to enable cost-effective and energy efficient communications. Wu and Zhang provide a basic IRS communication system model in [9], based upon which the joint active beamforming at the BS and passive beamforming at the IRS is designed to minimize the system power consumption. In addition, Ning et al. propose to apply THz to IRS [18], and consider the beam training and hybrid analog/digital beamforming. They propose two effective hierarchical codebooks and beamforming design schemes to obtain the near-optimal performance. To study the performance of IRS in frequency selective fading channels, Zhang et al. consider a MIMO OFDM system [19], where only one common set of IRS reflective matrix is designed for all subcarriers. Based on this, a new alternative optimization algorithm is proposed. Yang et al. investigate the channel estimation and beamforming design problem in the IRS-based OFDM system [20], and propose a practical transmission protocol as well as channel estimation scheme. On this basis, a strategy of jointly optimizing power allocation and the reflection matrix is developed for maximizing the achievable rate. Although THz and IRS techniques have been investigated in the literature, e.g., in [9], [13]–[21], most of them do not consider the hybrid beamforming at the BS for IRS communication [9], [18]–[21]. In fact, in a THz-based IRS communication system, the BS should employ a sparse RF antenna structure for reducing the power consumption and the multiple subcarriers transmission technology for overcoming the frequency selection channel fading. As a result, how to design the hybrid analog/digital beamforming at the BS and reflection matrix at the IRS catering to all subchannels will be challenging. In addition, how to obtain the perfect CSI remains a non-trivial task for IRS-based reflection links. For the direct link from the BS to users, the CSI can be readily estimated by conventional channel estimation methods. For the indirect link from the BS to the IRS, the CSI is also relatively easy to obtain since the locations of IRS and BS are fixed. However, the accurate CSIs of reflection links from the IRS to users are usually difficult to obtain due to the mobility of users. Nonetheless, [9], [18]–[21] all assume perfect CSI. Although Zhou et al. investigate the robust beamforming design in an IRS system [22], the conventional multiple antenna structure and single carrier scenario are considered.

3. PROPOSED METHOD

We consider an IRS-aided THz multi-user MIMO system with OFDMA as shown in Fig. 1, where the BS is equipped with N_{TX} antennas and N_{RF} ($N_{RF} \leq N_{TX}$) RF chains. The diagram of the sparse RF chain at the BS is illustrated in Fig. 2. We assume that there are no direct links between BS and users due to the blockage of walls or other obstacles, and the users can only receive the reflected signals from IRS. Let N_{IRS} , M and K denote the number of IRS elements, users and subcarriers, respectively. We assume that the CSIs of all links can be obtained using existing channel estimation schemes proposed in broadband IRS system [23]–[25]. In addition, the computation of resource allocation is executed in BS, and then the BS needs to convey the resource allocation results (reflection matrix of the IRS) to IRS. As shown in Fig. 1, the IRS phased shifts are controlled by an attached controller. Therefore, the BS can transmit the reflection matrix to controller via a dedicated separate wireless

control link [9]. The received signal on the k th subcarrier at the m th user can be expressed as

$$y_m[k] = \mathbf{G}_m[k] \mathbf{F} \mathbf{v}_m[k] x_m[k] + \sum_{j \neq m}^M \mathbf{G}_m[k] \mathbf{F} \mathbf{v}_j[k] x_j[k] + n_m[k]$$

$$\mathbf{G}_m[k] = G_t G_r \eta_k \hat{\mathbf{g}}_m[k] \Phi \hat{\mathbf{H}}[k]$$

with G_t and G_r as the transmit and receive antenna gains, respectively, and η_k as the pathloss compensation factor [18]. $\mathbf{g}_m[k] \in \mathbb{C}^{1 \times N_{IRS}}$ denotes the channel vector from IRS to the m th user on the k th subcarrier, $\Phi \in \mathbb{C}^{N_{IRS} \times N_{IRS}}$ is the reflection coefficient matrix with $\Phi = \text{diag}\{\phi_1, \dots, \phi_{N_{IRS}}\}$, $\mathbf{H}_b[k] \in \mathbb{C}^{N_{IRS} \times N_{TX}}$ represents the channel matrix from BS to IRS on the k th subcarrier, $\mathbf{F} \in \mathbb{C}^{N_{TX} \times N_{RF}}$ is the analog beamforming matrix with $\mathbf{F} = [\mathbf{f}_1, \dots, \mathbf{f}_{N_{RF}}]$, $\mathbf{v}_m[k] \in \mathbb{C}^{N_{RF} \times 1}$ and $x_m[k]$ denote the digital beamforming and transmit signal for the m th user on the k th subcarrier, respectively, $n_m[k]$ is the independent and identically distributed (i.i.d.) additive white Gaussian noise (AWGN) with zero-mean and variance N_0 . In (1), the first term is the designed signal, while the second term is the multi-user interference that must be mitigated by designing proper digital beamforming and reflection matrix. Next, we present the THz channel model. Let f_c and B , respectively, represent the central frequency and bandwidth. Then, the frequency band of the k th subcarrier can be expressed as

$$f_k = f_c + B \left(\frac{k-1}{K-1} \right), k = 1, 2, \dots, K.$$

Although there are a few scattering components in THz communication, their power are much lower (more than 20 dB) than that of LoS component [26], and thus, we only consider the LoS component and ignore the other scattering components. Accordingly, the channel matrix $\mathbf{H}_b[k]$ can be expressed as

$$\hat{\mathbf{H}}[k] = q(f_k, d) \mathbf{H}[k],$$

where $q(f_k, d)$ is the complex path gain satisfying

$$\mathbf{a}_t(\theta_k) = \frac{1}{\sqrt{N_{TX}}} \left[1, e^{j\pi\theta_k}, e^{j2\pi\theta_k}, \dots, e^{j(N_{TX}-1)\pi\theta_k} \right]^T,$$

$$\mathbf{a}_r(\varphi_k) = \frac{1}{\sqrt{N_{IRS}}} \left[1, e^{j\pi\varphi_k}, e^{j2\pi\varphi_k}, \dots, e^{j(N_{IRS}-1)\pi\varphi_k} \right]^T.$$

Here, $\theta_k = 2d_0 f_k \sin(\phi_t)/c$ and $\varphi_k = 2d_0 f_k \sin(\phi_r)/c$, d_0 denotes the antenna distance, and $\phi_t/\phi_r \in [-\pi/2, \pi/2]$.

$\pi/2$] are, respectively, angle of departure (AoD) and angle of arrival (AoA). Similarly, $g_m[k]$ can be expressed as

$$\begin{aligned}\widehat{\mathbf{g}}_m[k] &= q(f_k, d_m) \mathbf{g}_m[k], \\ \text{where } \mathbf{g}_m[k] &= \frac{1}{\sqrt{N_{\text{IRS}}}} [1, e^{j\pi\varphi_{k,m}}, e^{j2\pi\varphi_{k,m}}, \dots, e^{j(N_{\text{IRS}}-1)\pi\varphi_{k,m}}], \\ q(f_k, d_m) &\text{ is defined as} \\ q(f_k, d_m) &= \frac{c}{4\pi f_k d_m} e^{-\frac{1}{2}\tau(f_k)d_m},\end{aligned}$$

with d_m as the distance from the IRS to the m th user. The BS-IRS-user m link channel can such be expressed as

$$\mathbf{G}_m[k] = u_m[k] \mathbf{g}_m[k] \Phi \mathbf{H}[k],$$

$$\eta_k q(f_k, d) q(f_k, d_m) = \frac{\chi c}{8 \sqrt{\pi^3} f_k d d_m} e^{-\frac{1}{2}\tau(f_k)(d+d_m)},$$

$$\begin{aligned}y_m[k] &= u_m[k] \mathbf{g}_m[k] \Phi \mathbf{H}[k] \mathbf{F} \mathbf{v}_m[k] x_m[k] \\ &+ \sum_{j \neq m}^M u_m[k] \mathbf{g}_m[k] \Phi \mathbf{H}[k] \mathbf{F} \mathbf{v}_j[k] x_j[k] + n_m[k].\end{aligned}$$

where χ is the IRS element gain. Finally, we rewrite (1) as

we consider an uplink OFDM system, where an IRS is deployed to assist in the transmission from a user (in its vicinity) to an AP, both of which are equipped with a single antenna. Note that the IRS is practically composed of a large number of passive reflecting elements to maximize its reflection power, which, however, incurs high overhead/complexity for channel estimation and reflection optimization. By grouping adjacent elements of the IRS with high channel correlation into a sub-surface to share a common reflection coefficient [7], the complexity of channel estimation and reflection design can be significantly reduced. Accordingly, the IRS composed of K reflecting elements is divided into M sub-surfaces, each of which consists of $K^- = K/M$ adjacent elements, e.g., $K^- = 4$ as illustrated in Fig. 1. Moreover, the IRS is connected to a smart controller to enable dynamic adjustment of its elements' individual reflections. In this letter, quasi-static frequency-selective fading channels are considered for both the user \rightarrow AP direct link and the user \rightarrow IRS \rightarrow AP reflecting link, which remain approximately constant within the transmission frame of our interest. This is a valid assumption as IRS is practically used to mainly support low-mobility users in its neighborhood only. with OFDM, the total bandwidth allocated to the user is equally divided into N sub-carriers, which are indexed by $n \in \mathbb{N}, \{0, 1, \dots, N-1\}$. For simplicity, we assume that the total transmission power at the user P_t is equally allocated over the N sub-carriers with the power at each sub-carrier given by $p_n = P_t/N, \forall n \in \mathbb{N}$. Without loss of generality, it is assumed that the baseband equivalent

channels of both the direct link and the reflecting link have the maximum delay spread of L taps in the time domain. At the user side, each OFDM symbol x , $[X_0, X_1, \dots$

$, X_{N-1}]^T$ is first transformed into the time domain via an N -point inverse discrete Fourier transform (IDFT), and then appended by a cyclic prefix (CP) of length L_{cp} , which is assumed to be longer than the maximum delay spread of all channels, i.e., $L_{cp} \geq L$. At the AP side, after removing the CP and performing the N -point discrete Fourier transform (DFT), the equivalent baseband received signal in the frequency domain is given by

4. EXISTING METHOD

With OFDM, the total bandwidth allocated to the user is equally divided into N sub-carriers, which are indexed by $n \in N$, $\{0, 1, \dots, N-1\}$. For simplicity, we assume that the total transmission power at the user P_t is equally allocated over the N sub-carriers with the power at each sub-carrier given by $p_n = P_t/N$, $\forall n \in N$. Without loss of generality, it is assumed that the baseband equivalent channels of both the direct link and the reflecting link have the maximum delay spread of L taps in the time domain. At the user side, each OFDM symbol x , $[X_0, X_1, \dots, X_{N-1}]^T$ is first transformed into the time domain via an N -point inverse discrete Fourier transform (IDFT), and then appended by a cyclic prefix (CP) of length L_{cp} , which is assumed to be longer than the maximum delay spread of all channels, i.e., $L_{cp} \geq L$. At the AP side, after removing the CP and performing the N -point discrete Fourier transform (DFT), the equivalent baseband received signal in the frequency domain is given by where y , $[Y_0, Y_1, \dots, Y_{N-1}]^T$ is the received OFDM symbol, $X = \text{diag}(x)$ is the diagonal matrix of the OFDM symbol x , d , $[D_0, D_1, \dots, D_{N-1}]^T \in \mathbb{C}^{N \times 1}$ is the channel frequency response (CFR) of the user \rightarrow AP direct link, $q_m \in \mathbb{C}^{N \times 1}$ is the aggregated CFR of the user \rightarrow IRS link associated with the m -th sub-surface, ϕ_m denotes the common reflection coefficient within the m -th sub-surface, $b_m \in \mathbb{C}^{N \times 1}$ is the aggregated CFR of the IRS \rightarrow AP link associated with the m -th sub-surface, and v , $[V_0, V_1, \dots, V_{N-1}]^T \sim \mathcal{N}_c(0, \sigma^2 I_N)$ is the additive white Gaussian noise (AWGN) vector. In addition, the reflection coefficient ϕ_m characterizes the equivalent interaction of the m -th sub-surface with the incident signal, which can be expressed as [4]

5. RESULTS

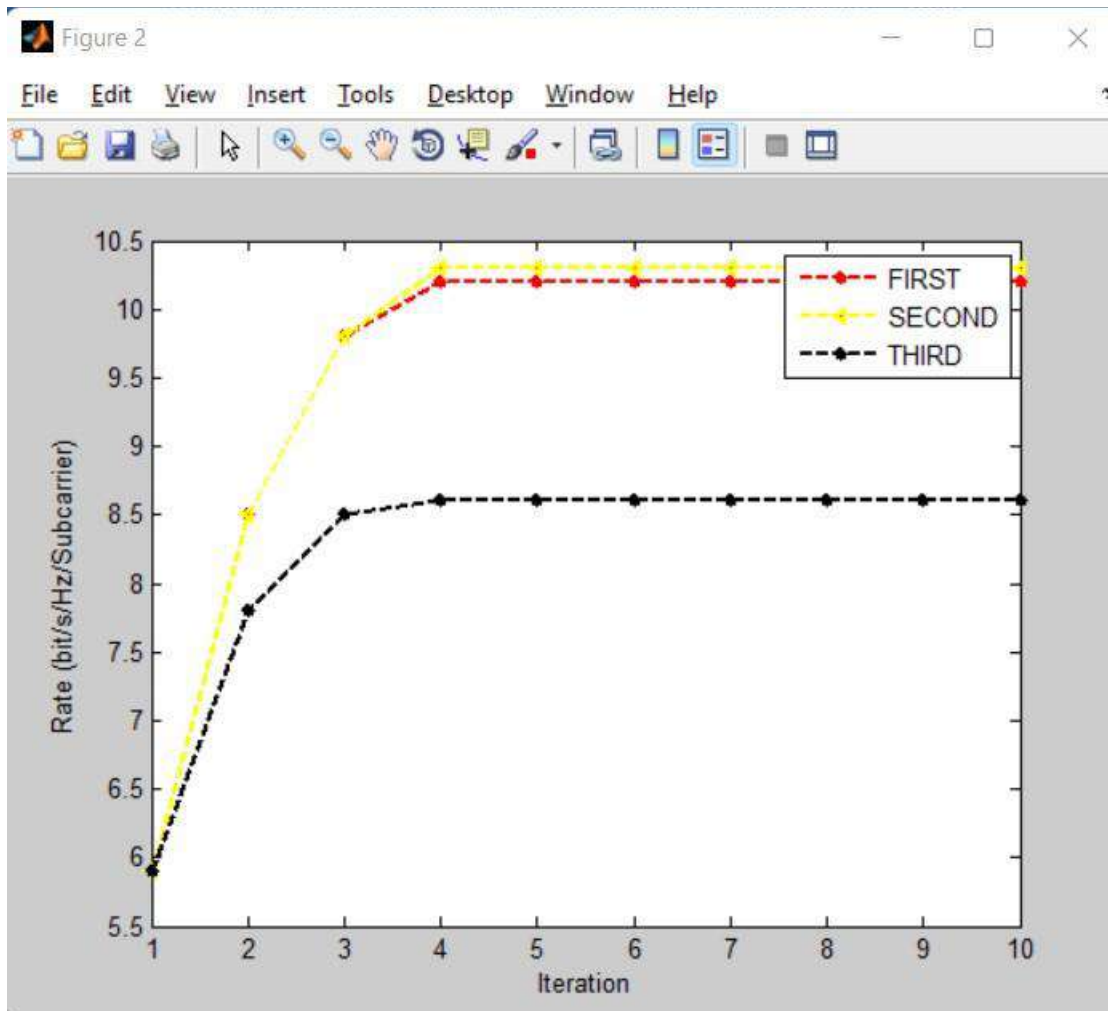


Fig.: The rate versus iteration for solving the reflection matrix.

shows the convergence performance of the proposed inner iterative algorithm for solving the digital beamforming & refraction matrix.

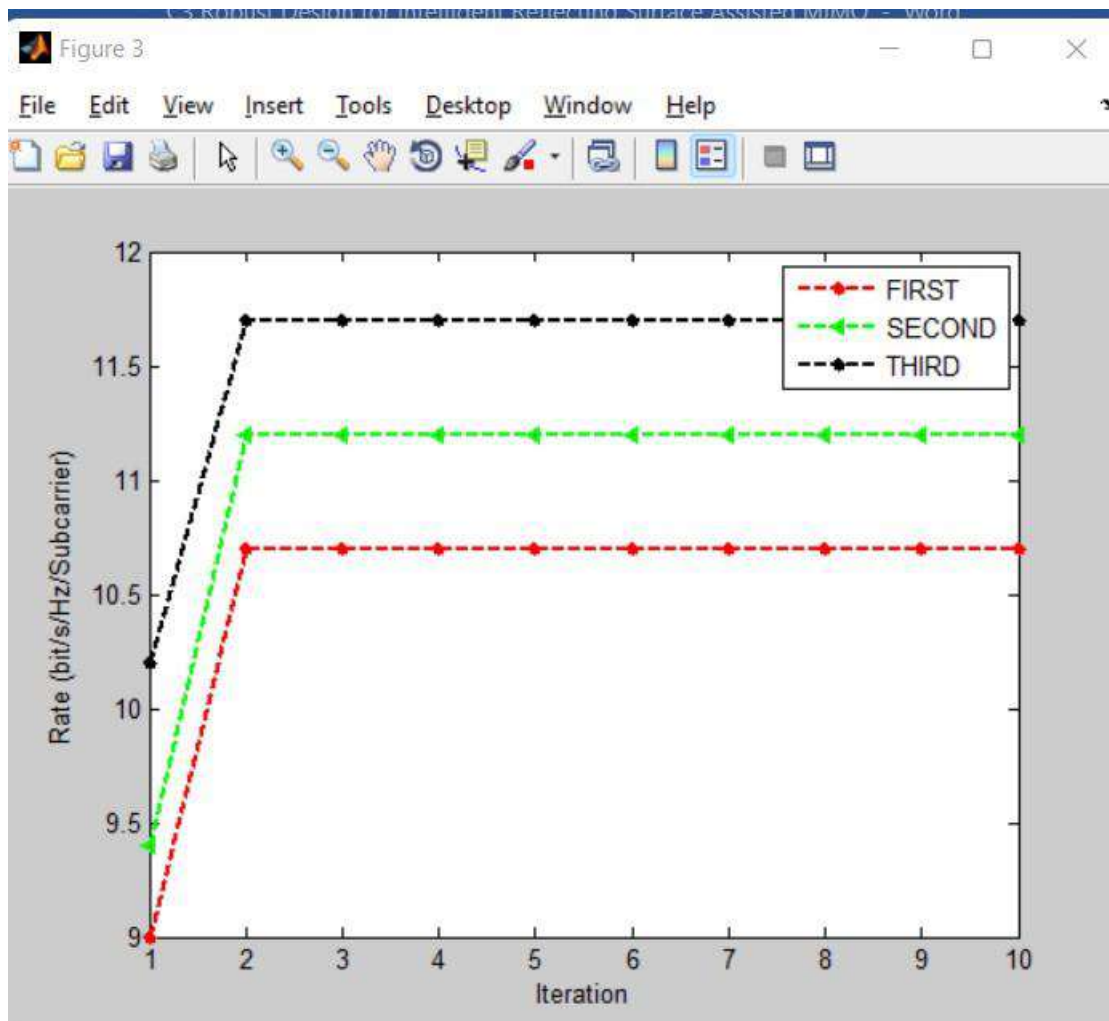


Fig.: The rate versus iteration for the proposed Algorithm 1.

The convergence performance of Algorithm 1 order different estimation errors is plotted in fig.7.6, where we set the maximum transmit power P_{\max} and a_m . It is clear that the rate tends to stabilize after 3 iterations, which demonstrates the fast convergence of the proposed algorithm, $\epsilon=0$ which means perfect CSIS between the IRS and users.

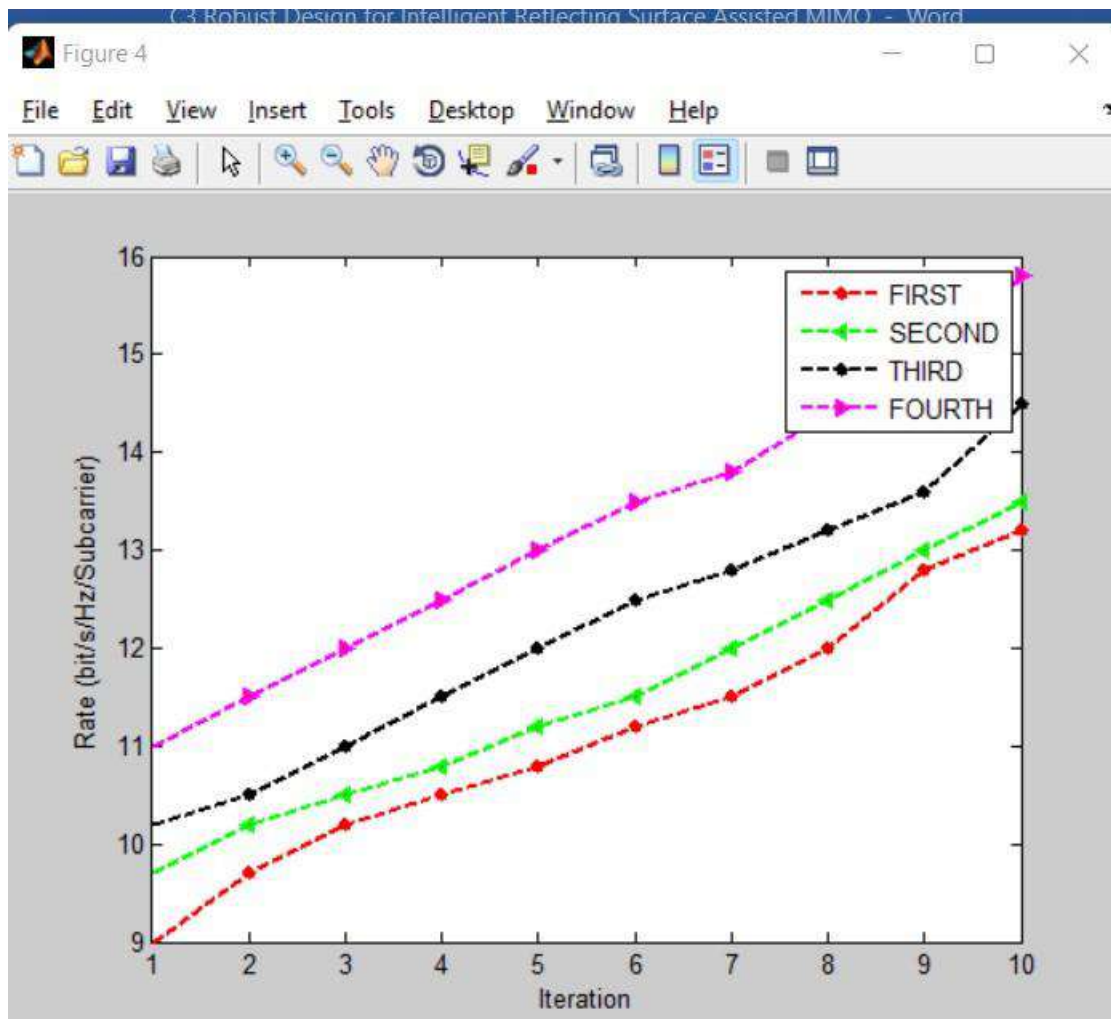


Fig.: The rate versus the allowable maximum transit power.

It shows the rate versus P_{\max} under different estimation errors, where we set $a_m=1$, w_c plot the rate under the fussy digital structure, namely each antenna is connected to each RF chain.

It is clear that the rate under the fussy digital structure is higher than that under the space RF chain structure for the same condition, while the circuit power consumption is very high for the former.

This is also one of the reasons for which the sparse RF chain structure is usually adopted when the ultra high frequency carrier is applied.

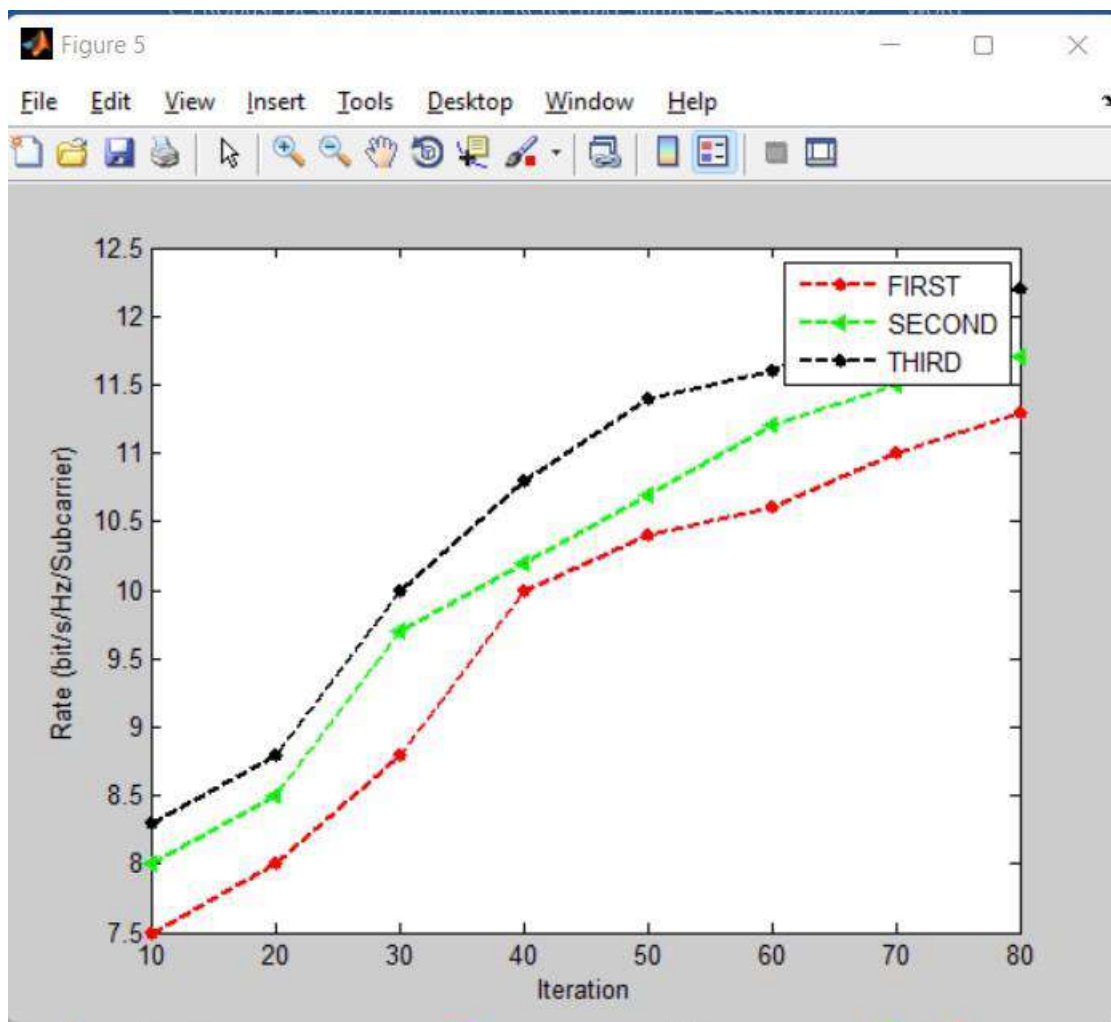


Fig. The rate versus the number of antennas.

In fig, we plot the rate under different antennas where we set $P_{\max}=4\text{dB}$ and $a_m=1$. It is obvious that the rate increases with the number of antennas, but with a decreasing slope.

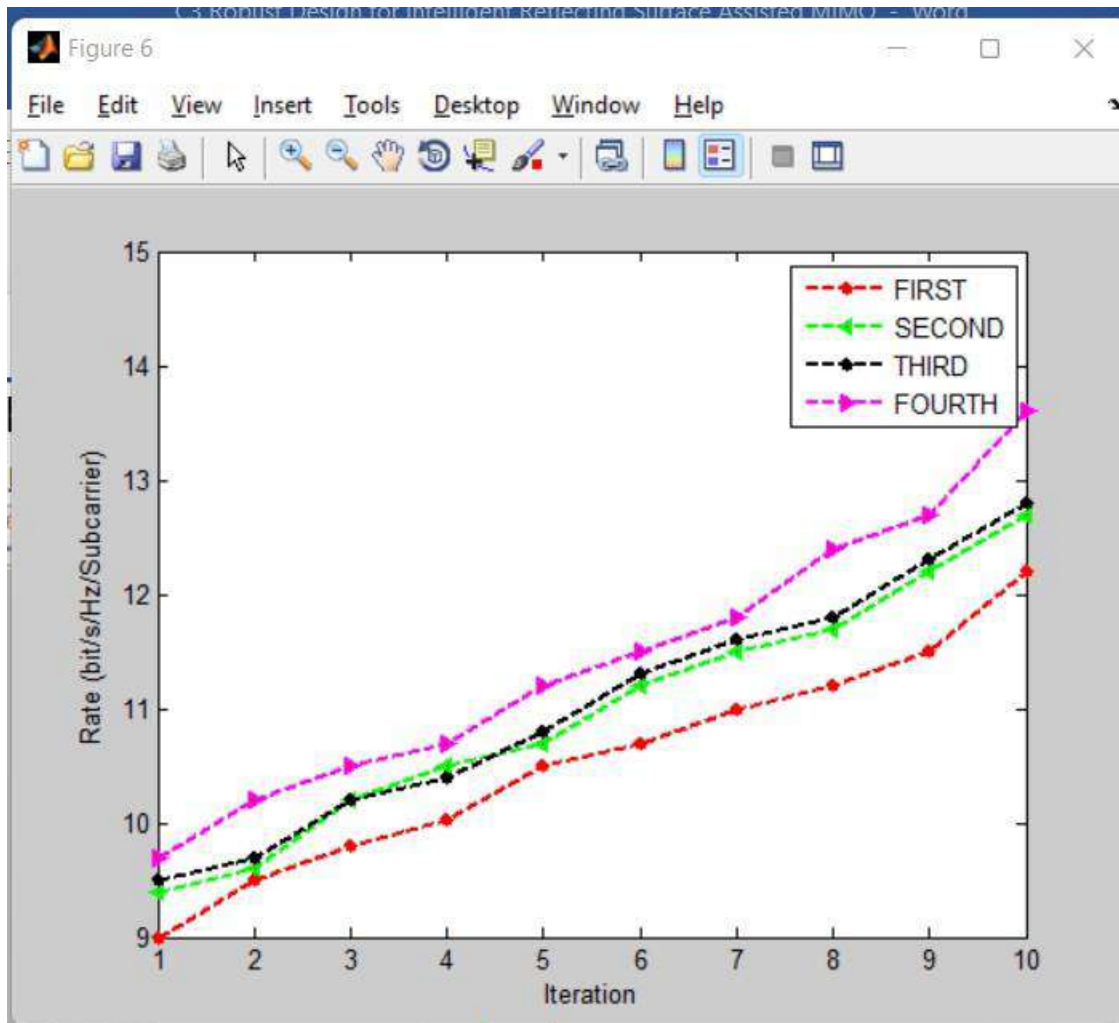


Fig.: The rate versus the allowable maximum transmit power with different weights.

In Fig. we plot the rate versus P_{\max} for different number of IRS refraction elements with $\epsilon = 0$. It is observed that a large number of IRS refraction elements leads to a higher rate. This is because a higher beamforming gain can be achieved when there are either more antennas at the BS or more refraction elements at the IRS.

6. CONCLUSION

In this paper, we have considered an IRS-aided THz MIMO-OFDMA system, where the BS is equipped with a sparse RF chain structure. First, we have proposed a joint hybrid analog/digital beamforming and reflection matrix design to maximize the weighted sum rate under perfect CSIs. Next, considering the imperfect CSIs from the IRS to users, we have redesigned a robust joint optimization algorithm. From simulation results, we have found that the channel estimation error has a large impact on the system sum rate. Moreover, allocating a higher weight to a particular user can improve that user's rate, but at the cost of sum rate. Consequently, channel estimation schemes and users weight selection are important criteria for the design of practical systems, and we need to adjust the weights according to different quality of service requirements of the users.

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DESIGN IMPLEMENTATION AND COMPARATIVE ANALYSIS OF ADVANCED ENCRYPTION STANDARD (AES) ALGORITHM

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ABSTRACT

Security is major concern in data handling, communication, message transmission and electronic transaction on public network. Cryptography (secret writing) is the encryption process of transformation of messages to make information secure and resistant to attack. AES is symmetric encryption standard recommended by NIST. AES is proved to be highly secure, faster and strong encryption algorithm. AES is used commonly because of its great competence and easiness. But in recent years cyber-attacks are continuously developing, therefore security specialists must stay busy in the lab inventing new schemes to keep attackers at bay. Possible attacks on symmetric algorithm can be Brute-force Attack, Differential Attack, Algebraic Attack and Linear Attack. So to provide strong security in message transmission, AES algorithm with hybrid approach of Dynamic Key Generation and Dynamic S-box Generation is proposed. In hybrid approach first we will add more complexity in data to increase Confusion and Diffusion in Cipher text by using Dynamic Key Generation and then by using Dynamic S-Box Generation we will make it difficult for attacker to do any down study of static set of S-box.

1. INTRODUCTION

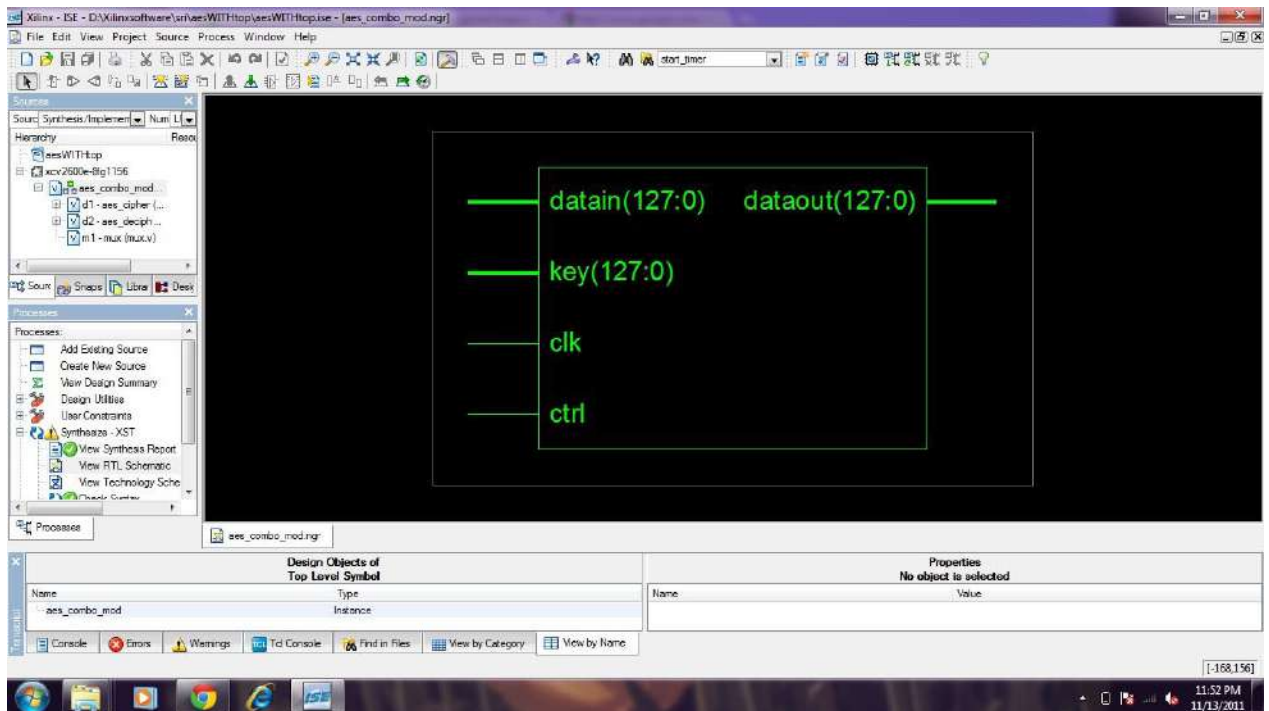
Very-large-scale integration (VLSI) is the process of creating integrated circuits by combining thousands of transistor-based circuits into a single chip. VLSI began in the 1970s when complex semiconductor and communication technologies were being developed. The microprocessor is a VLSI device. The term is no longer as common as it once was, as chips have increased in complexity into the hundreds of millions of transistors. The first semiconductor chips held one transistor each. Subsequent advances added more and more transistors, and, as a consequence, more individual functions

2. PROPOSED METHOD

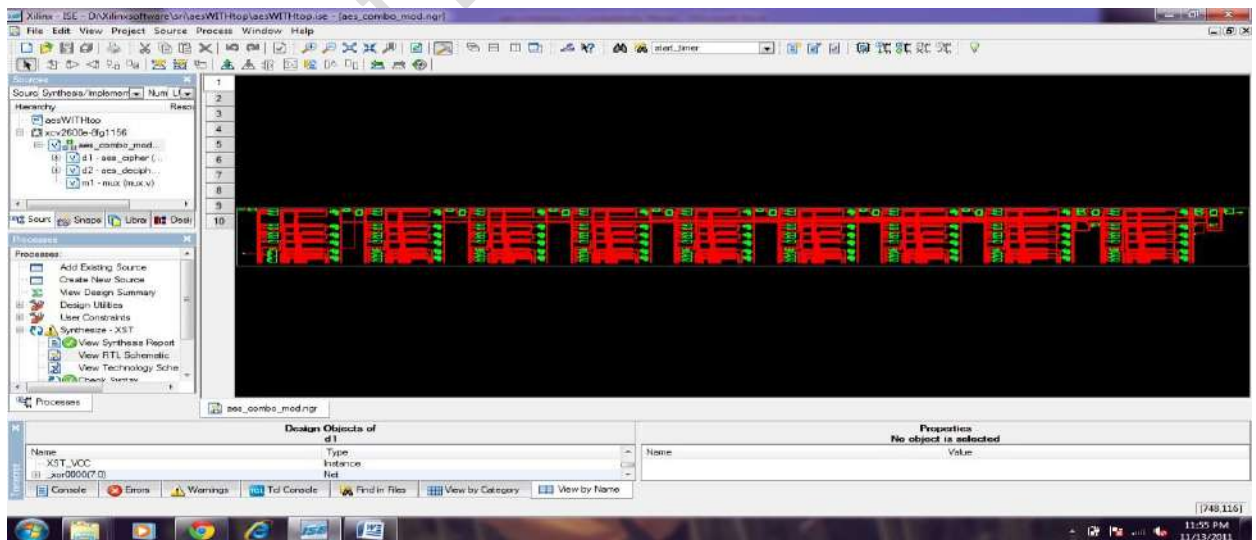
systems were integrated over time. The first integrated circuits held only a few devices, perhaps as many as ten diodes, transistors, resistors and capacitors, making it possible to fabricate one or more logic gates on a single device. Now known retrospectively as "small-scale integration" (SSI), improvements in technique led to devices with hundreds of logic gates, known as large-scale integration (LSI), i.e. systems with at least a thousand logic gates. Current technology has moved far past this mark and today's microprocessors have many millions of gates and hundreds of millions of individual transistors. At one time, there was an effort to name and calibrate various levels of large-scale integration above VLSI. Terms like Ultra-large-scale Integration (ULSI) were used. But the huge number of gates and transistors available on common devices has rendered such fine distinctions moot. Terms suggesting greater than VLSI levels of integration are no longer in widespread use. Even VLSI is now somewhat quaint, given the common assumption that all microprocessors are VLSI or better. As of early 2008, billion-transistor processors are commercially available, an example of which is Intel's Montecito Itanium chip. This is expected to become more commonplace as semiconductor fabrication moves from the current generation of 65 nm processes to the next 45 nm generations (while experiencing new challenges such as increased variation across process corners). Another notable example is NVIDIA's 280 series GPU. This microprocessor is unique in the fact that its 1.4 Billion transistor count, capable of a teraflop of performance, is almost entirely dedicated to logic (Itanium's transistor count is largely due to the 24MB L3 cache). Current designs, as opposed to the earliest devices, use extensive design automation and automated logic synthesis to lay out the transistors, enabling higher

levels of complexity in the resulting logic functionality. Certain high-performance logic blocks like the SRAM cell, however, are still designed byhand to ensure the highest efficiency (sometimes by bending or breaking established designrules to obtain the last bit of performance by trading stability).

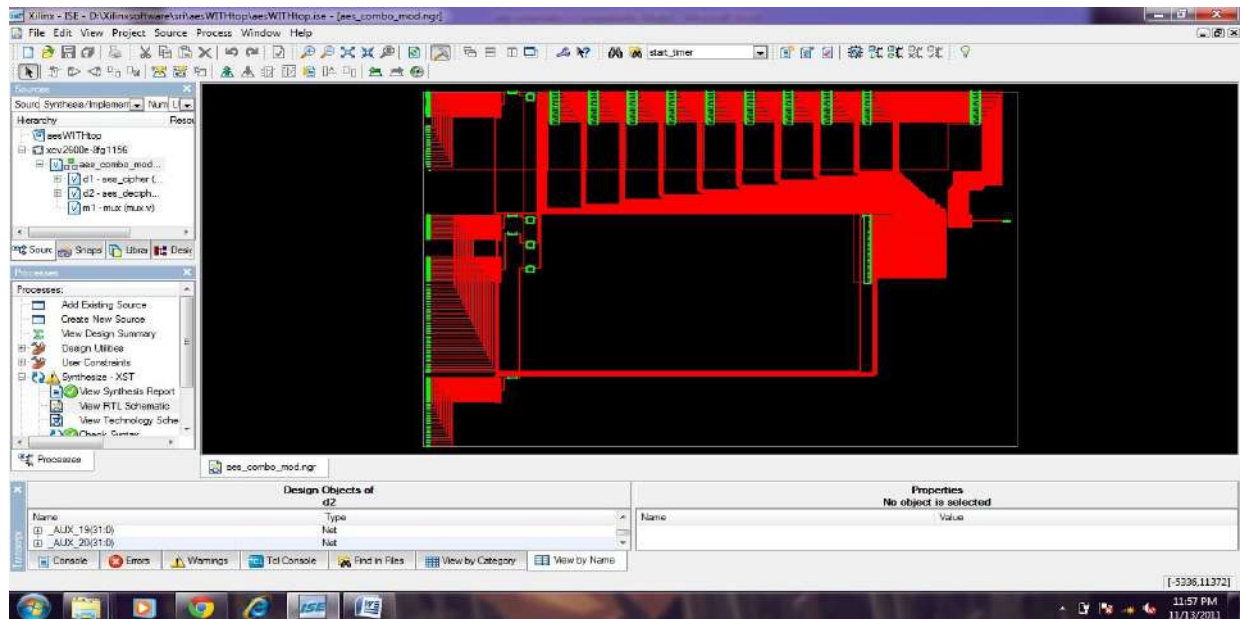
3. RESULTS

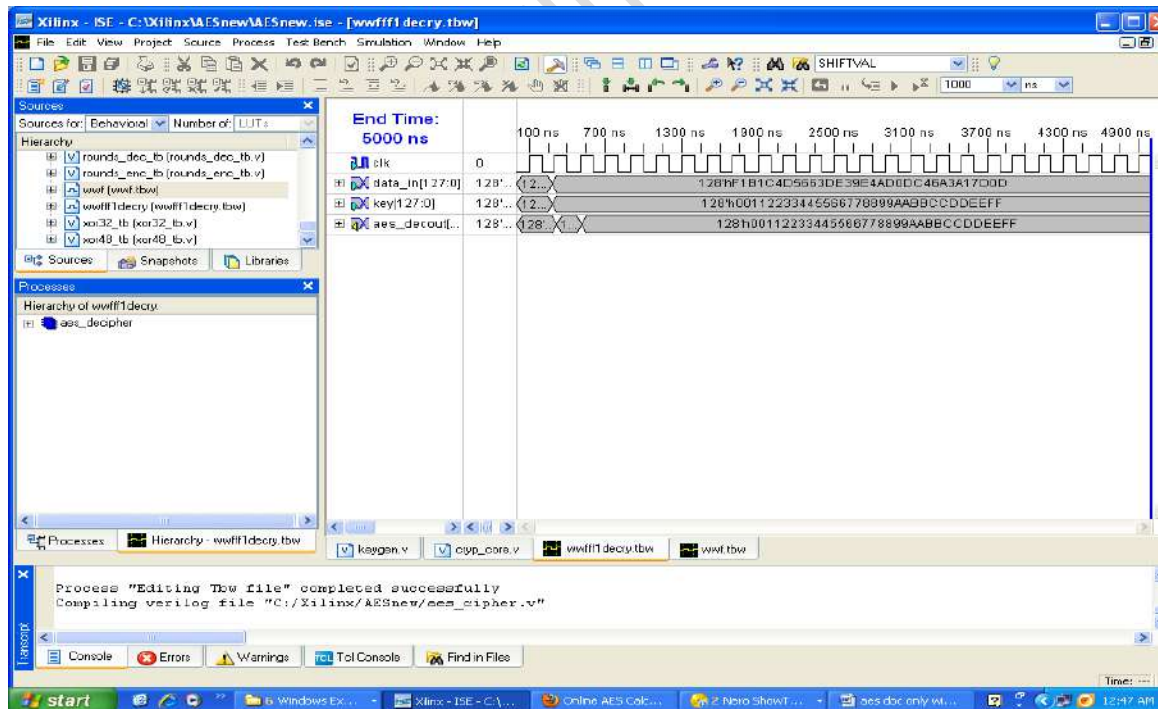
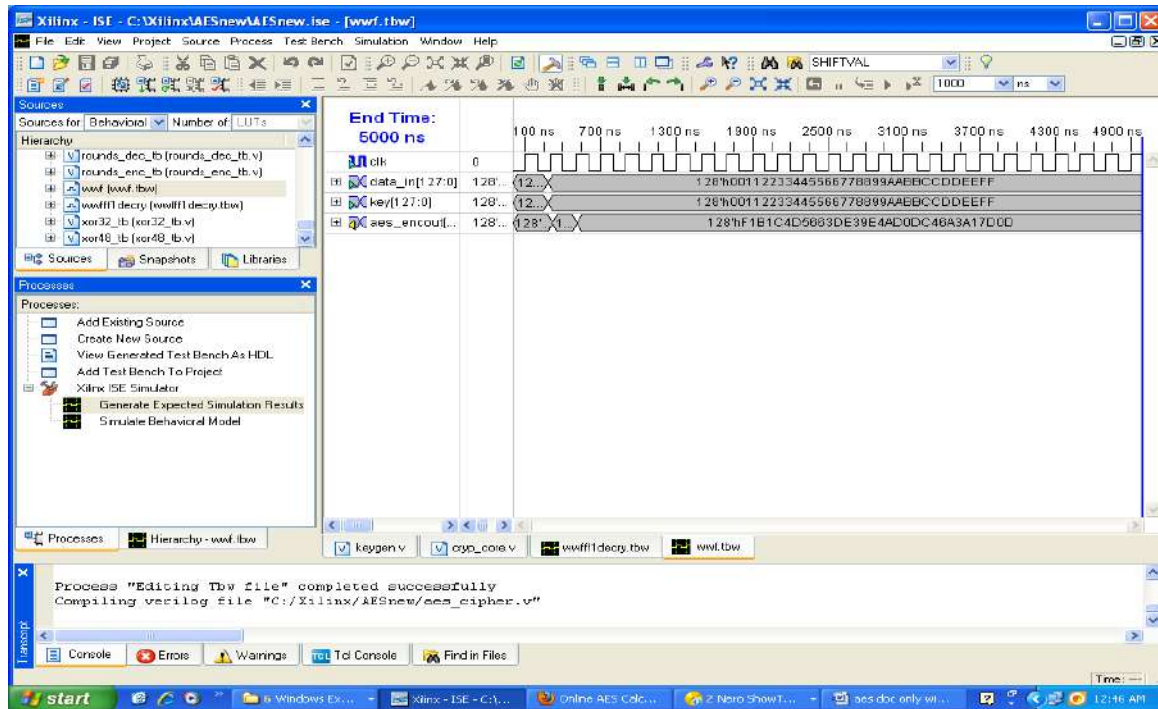


RTL SCHEMATIC OF ENCRYPTION



RTL SCHEMATIC OF DECRYPTION





5. CONCLUSION

In this project, we have given 128 bits input and 128 bits security key and observed how it is delivered at the output with security. In this project there is no revealing of the original message to the hackers. The original message can be revealed to only sender and the receiver. So, in future, any propriety information can be transmitted securely by using this project (military or banking purposes) Modern applications of AES cover a wide variety of applications, such as secure internet (ssi), electronic financial transactions, remote access servers, cable modems, secure video surveillance and encrypted data storage. The future scope of our project is to extend 128 bits inputs to n bits (n is any integer value).

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IOT BASED ANTENNA POSITIONING SYSTEM

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ABSTRACT

All wireless communication systems work on antennas for reception of signals. Proper positioning of antennas is necessary according to satellites/transmitters to achieve effective wireless communication. So here we propose an IOT based antenna positioning system that allows for remotely positioning of antennas based over IOT. Here we use sensor based system with motor on each antenna using antenna to check its facing direction that is transmitted over IOT. If the direction of a satellite or transmitting station changes over time, the antenna direction must also be changed accordingly. The receiving antennas may be placed far apart from each other across the globe. So our system allows for antenna positioning over very long distances. The antenna positions are visible over internet to controlling operator on the IOT GUI. We here use IOT Gecko to develop the antenna monitoring gui system. Our system allows for monitoring antenna direction as well as transmitting new coordinates to position the antenna and motor appropriately positions the antenna accordingly.

1. INTRODUCTION

IOT is one of the latest and emerging technology with the ability to transform the beautiful world like industries with smart machines, smarter cities etc. However, the importance of technology like IOT in communication systems has very great impact. In wireless communication concept antennas important for receiving signals. For very effective results of wireless communication the proper direction of antennas matters. So in my research I propose a very dynamic model for antenna positioning based on IOT technology. Sensors will be mounted on the antenna to detect the proper direction and the interesting thing is the motors using IOT concept will change the direction from anywhere across the world. The direction of transmitting stations changes with time means when the transmitting station changes over time the antenna direction need to be automatically changes accordingly. In simple words this model will help us in monitoring the direction of antennas and transmitting new coordinates to properly position the antennas. The internet of things being a fascinating and exciting concept has one of the major challenging aspects of having a secure ecosystem encompassing all building blocks of IoT architecture. RFID is a promising technology for the proliferation of IoT, and it can be used to identify the items. In IoT (Internet of things), "things" refer to a wide range of devices such as heart monitoring implants, remotely handling home appliances, biochip transponders used on farm animals, cameras that are streaming live feeds of wild animals in coastal waters etc. Thus we can say that "things" are a "mixture of hardware, software, data and services". System engineering of a satellite based data communication baseline concept is presented to achieve terabit per second throughput if sensors and actuators are augmented, the technology becomes as more general class of cyber physical systems which can also encompass the technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities. As we know wireless communication systems work on antennas for reception of signals. It is necessary to properly position the antennas in the

direction of the transmitters for effective communication.

SYSTEM REQUIREMENT SPECIFICATION

A.Functional Requirements

B. Functional specifications are the do's / don'ts statements for a program, i.e. they define how to respond to the inputs given and how to behave according to the situation. Often the specifications specifically state what cannot be done to the application depending on the conditions and circumstance. Such specifications should satisfy the specifications of the customer. That tells the

These requirements directly specify functionality (features) of system by user directly. This system will give the following characteristics. Framework offers tools for logging in. Device capable of determining the frequency of the signals. May increase the detection range. You can use an IoT program here, so that we can monitor antenna positioning anywhere in the world.

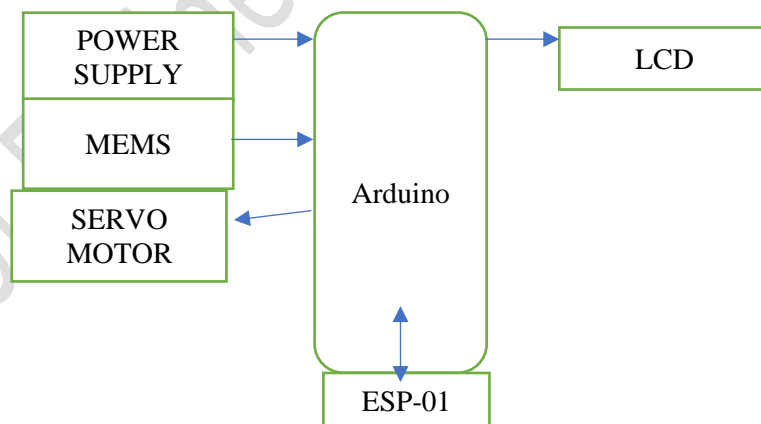
B. Non-Functional Requirements The non-functionality criteria specify how a system should be. This describes the system's consistency or characteristics of non-functionality specifications and also describes the user experience when performing the project.

C. Availability Remotely Accessible and accessible at all times.

D. Maintainability Location of the antenna will be retained, depending on the signal power.

E. Performance –Quality is related to the intensity of the received signals, by giving the antenna angle at a given location.

2. PROPOSED METHOD

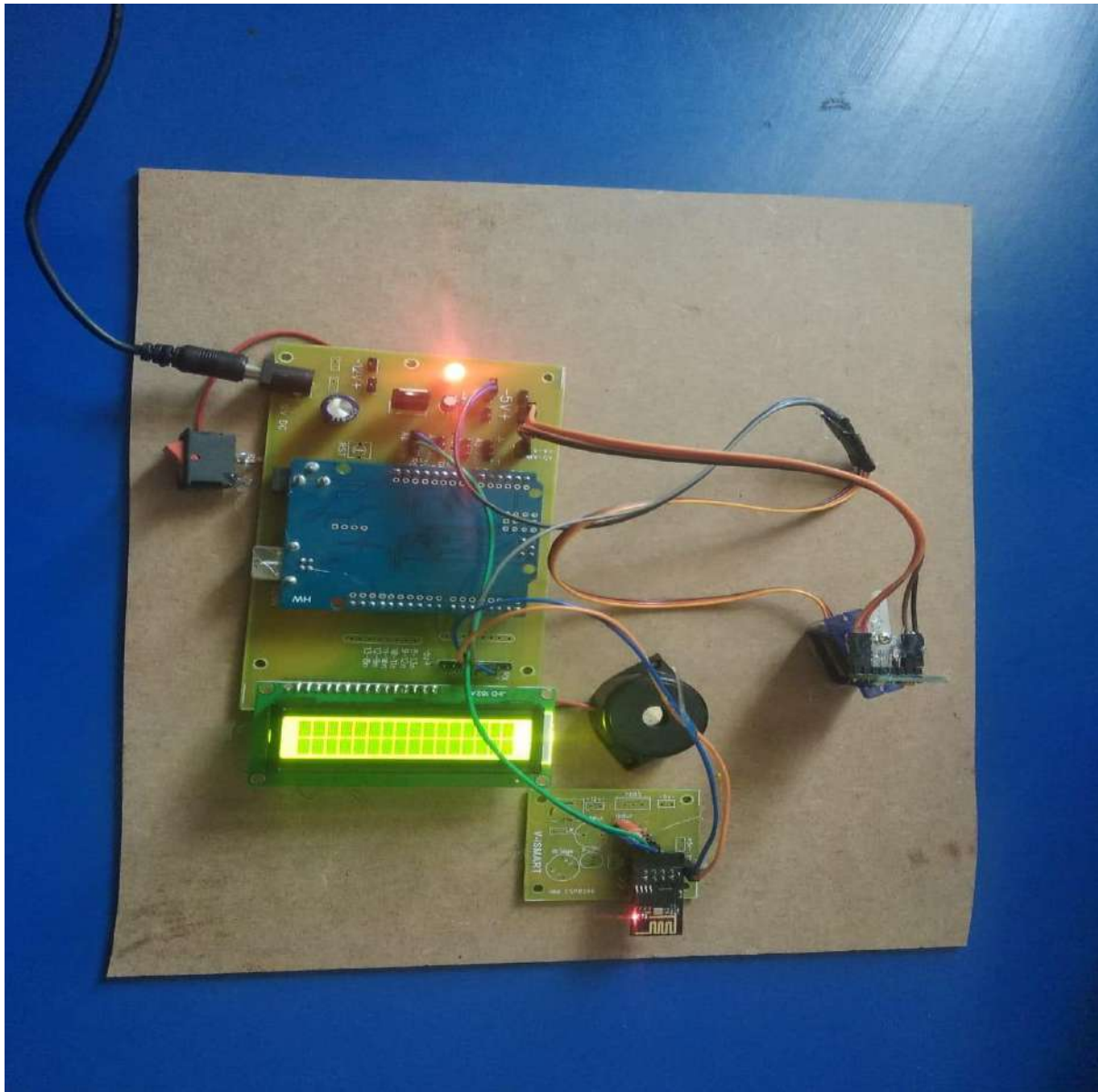


BLOCK DIAGRAM

Hence, we propose an antenna positioning system which enables antennas to be placed remotely over IoT. Because the position of the transmitting station changes over time even the position of the antenna should be changed accordingly. This is used by measuring the degree of command from remote and input to drive the motor at the desired degree.

3. RESULTS

In this paper, the positioning of the antenna device is based on an accurate measurement of the antenna's rotational velocity to determine its angular location and provide maximum signal strength to the user. In the page shown above, the position of the antenna to be changed will be toggled by the admin. The above figure shows the hardware setup of the Antenna positioning system. A positive continuity test allowed the circuit to be operated and therefore all components performed successfully as planned



5. CONCLUSION

Information technology plays a vital role in our daily lives like connected cars, smart cities, smart parking, e-commerce etc. IoT and microcontrollers are the most common and important technical concepts in every field of life. The IoT is used to build antenna monitoring system with the GUI. This system allows tracking of the location of the antenna as well as transmitting new coordinates so that the antenna is located correctly, and the motor positions the antenna. This method overcomes the drawbacks of the current system caused by misalignment due to a manual adjustment of antenna location. The paper provided is useful in remote areas. With

more sophistications and advanced technologies this project can be built in future.

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Covid-19 Smart Wearable Mask Using BMP Sensor

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ABSTRACT

Monitoring and managing potential infected patients of COVID-19 is still a great challenge for the latest technologies. In this work, IoT based wearable monitoring device is designed to measure various vital signs related to COVID-19. Moreover, the system automatically alerts the concerned medical authorities about any violations of quarantine for potentially infected patients by monitoring their real time GPS data. The wearable sensor placed on the body is connected to edge node in IoT cloud where the data is processed and analyzed to define the state of health condition.

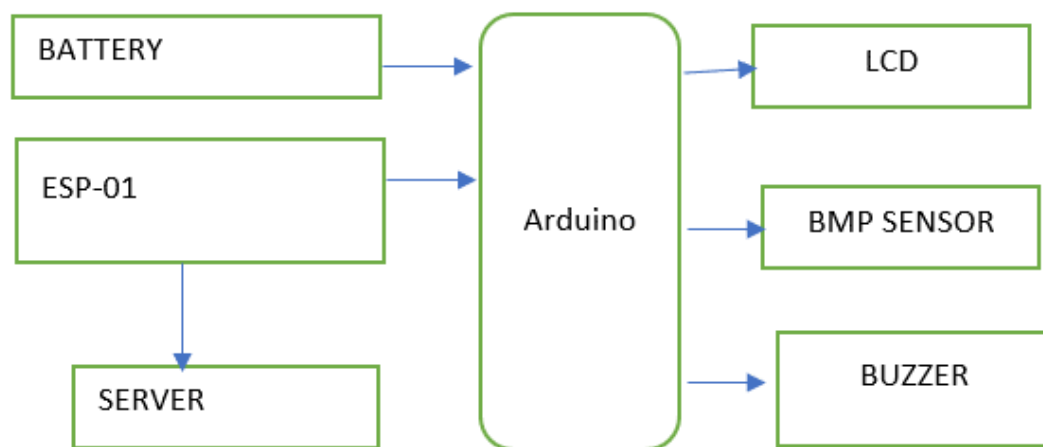
1. INTRODUCTION

Efforts to control spread of COVID-19, institute quarantine and isolation measures, and appropriately clinically manage patients all require useful screening and diagnostic tools. While Covid-19 is spreading, other respiratory infections may be more common in a local community. The WHO has released a guideline on case surveillance of COVID-19 on January 31, 2020. For a person who meets certain criteria, WHO recommends to first screen for more common causes of respiratory illness given the season and location. If a negative result is found, the sample should be sent to referral laboratory for Covid-19 detection. Case definitions can vary by country and will evolve over time as the epidemiological circumstances change in a given location., a confirmed case from January 15, 2020 required an epidemiological linkage to Wuhan within 2 weeks and clinical features such as fever, pneumonia, and low white blood cell count. On January 18, 2020 the epidemiological criterion was expanded to include contact with anyone who had been in Wuhan in the past 2 weeks. Later, the case definitions removed the epidemiological linkage. Since the outbreak of Covid-19, the use of face masks has become ubiquitous. The fear of being infected has caused everyone who can wear face mask to do so and this has contributed to the shortage of this product. Policies on wearing face masks differ among countries. WHO discourages the use of facemask among healthy people unless they are taking care of a person with suspected Covid-19 infection or with respiratory symptoms, the use of face mask is always recommended because it could prevent infection transmission from asymptomatic carriers. In China, national policy encourages the use of face masks among people with low or moderate risk of infection but discourages those with a very low risk of infection from wearing a mask. People in quarantine should wear a face mask if they leave their home for any reason to prevent potential transmission in the asymptomatic phase. In addition, vulnerable populations such as the elderly or those with underlying medical conditions should wear a mask. A recent study by *Leung et al* [1]. showed that wearing face mask significantly reduced the shedding of respiratory viruses such as influenza virus and coronavirus. Based on these recent findings and in an attempt to reduce the spread of Covid-19 in the so-called second phase of the epidemic, many EU governments have made it mandatory to wear face masks in public. The potential air propagation of Covid-19 depends on many factors including the particle size, the

speed of exhaled air (increased by breathing < speaking < coughing < sneezing) as well as temperature and humidity. The WHO, CDC and European Center for Disease Prevention and Control strongly recommend that people perform hand hygiene frequently and avoid touching their eyes, nose

2. PROPOSED METHOD

The proposed system is implemented with three layered functionalities as wearable IoT sensor layer, cloud layer with Application Peripheral Interface (API) and Android web layer for mobile phones. Each layer has individual functionality, first the data is measured from IoT sensor layer to define the health symptoms. The next layer is used to store the information in the cloud database for preventive measures, alerts, and immediate actions. The Android mobile application layer is responsible for providing notifications and alerts for the potentially infected patient family respondents. The integrated system has both API and mobile application synchronized with each other for predicting and alarming the situation. The design serves as an essential platform that defines the measured readings of COVID-19 symptoms for monitoring, management, and analysis. Furthermore, the work disseminates how digital remote platform as wearable device can be used as a monitoring device to track the health and recovery of a COVID-19 patient.



3. RESULTS

Real-Time View:

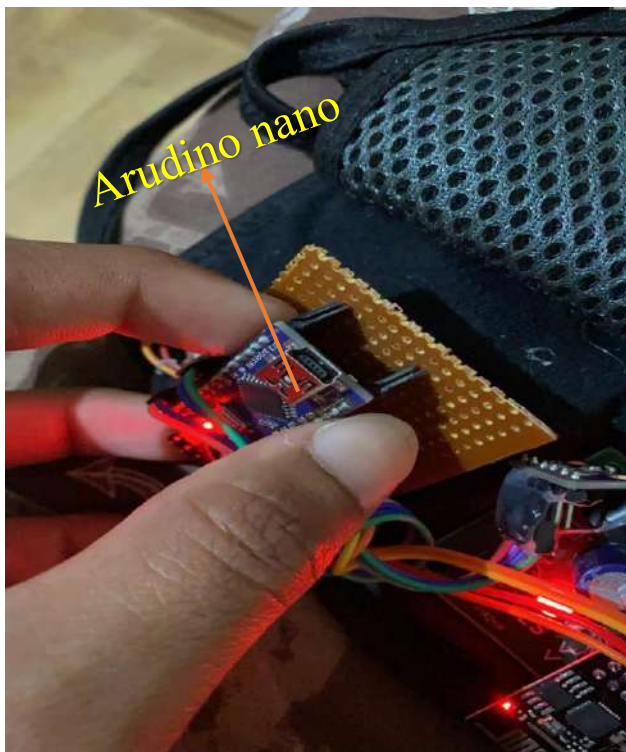


Fig-4.1 Real Time View (1)

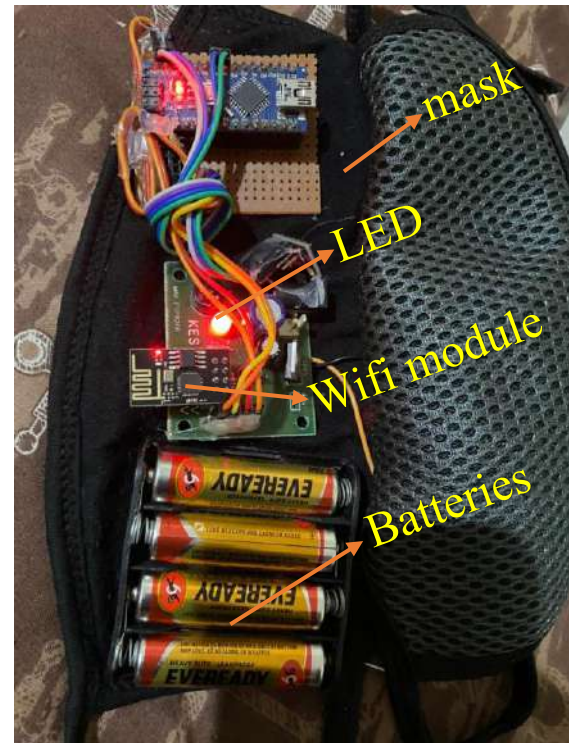
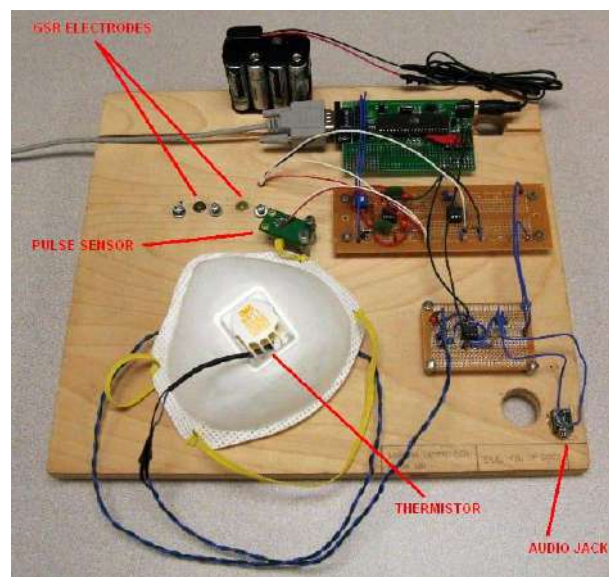


Fig-4.2 Real Time View (2)

Assembled View:



Observations:



Fig-4.4 Graph of Temperature

The above temperature graph provides the statistics about the temperature measured for each hour and plotted on the for better understanding and visualisation. consider temperature on y-axis and date on x-axis. In the entire day it will measure the temperature readings for each hour and get's update the values where we can see the variations in the graph for every hour and get's stores the data in the server where we can cross check if needed.



Fig-4.5 Graph of Humidity

The above humidity graph provides the statistics about the temperature measured for each hour and plotted on the for better understanding and visualisation. consider humidity on y-axis and date on x-axis. In the entire day it will measure the humidity readings for each hour and get's update the values where we can see the variations in the graph for every hour and get's stores the data in the server where we can cross check if needed.



Fig-4.6 Graph of Pressure

The above pressure graph provides the statistics about the temperature measured for each

hour and plotted on the for better understanding and visualisation.consider pressure on y-axis and date on x-axis.In the entire day it will measure the pressure readings for each hour and get's update the values where we can see the variations in the graph for every hour and get's stores the data in the server where we can cross check if needed.

4. CONCLUSION

A wearable device prototype is designed to monitor the Covid-19 health symptoms of potentially infected patients (PIP) during the quarantine period from remote locations. The 3D prototype design involves three-layer wearable body sensor, web API layer and mobile front-end layer for an automated health care system to reduce stress and provide a means of communication between doctors, medical authorities, and family respondents. Each layer has its own functionality where wearable sensor layer is used to measure temperature, heartbeat, SpO2, and cough count. Also provides the GPS location data of the patient to the medical authorities in real time and notify the respondents of the family to reduce the alleviated stress. The Application peripheral interface layer is responsible to store, collect and analyze the data to monitor and control the social life and manage during the pandemic era.

The 3D wearable design prototype is quite simple, ease of use for the potential infected patient to carry and ensure the quality of life by reducing the spread of COVID-19. The Android mobile application is very useful to provide the status of the patient to the family respondents and helps in reducing the transmission rate. The wearable device is fully developed to receive the health symptoms of the patient during and after infection [14]. This system has been tested and verified in real time scenario in hospital to manage, monitor, and control the COVID-19 potential infected patients in the spread of the disease. It has been suggested to use the wearable device as a prototype for the passengers of the airport to quarantine during their entry and exit. There has been extensive study of this work to provide the best performance of the device by comparing the existing domains. The new features of this design accomplish different objectives to measure the health symptoms, track and monitor the patient during quarantine, maintain the data to predict the situation and alert the authorities on timely basis for efficient monitoring and use android platform to keep updated about the health status of the patient for family respondents.

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Generative Adversarial Networks for Retinal Image Enhancement with Pathological Information

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ABSTRACT

Age-related macular degeneration (AMD) is a disease of the central retina, which is one of the main reasons for vision loss of elderly people. To monitor the level of AMD, the doctors mainly use the retinal fundus images. However, the quality of retinal images can be affected during the imaging process. It leads to low contrast and blurry images. Those bad quality images can not be used for analyzing and diagnosis. For that reason, there are many studies about image enhancement in order to improve the quality of retinal photography. However, previous methods could not guarantee to keep the disease information after the enhancement process. Therefore, we introduce a generative adversarial model for AMD retinal image enhancement with additional factors to preserve the disease information. By exploiting drusen segmentation masks, our proposed model can enhance retinal photography quality and keep the pathological information. Index Terms—deep learning, GAN, image enhancement, retinal image.

1. INTRODUCTION

Age-related macular degeneration (AMD) is a typical medical condition, which can cause vision loss in elderly people. The retinal image is the key factor for AMD examination. However, due to the quality of machines or the operator level, the poor quality retinal image may appear [1]. These retinal images can affect the diagnosis of doctors. Recently, various retinal image analyzing studies are done using deep learning methods to classify retinal images to aid diagnosis and monitor AMD disease progression [2], [3]. However, the performance of those automatic image system can also decrease by the poor quality retinal images. Many previous studies were able to improve the quality of retinal images by adjusting the illumination or contrast [2], [5], [5]. While these methods can remove the dark regions and give less blurry images, the pathological information is completely ignored. Therefore, the pathological information, which is the most important, maybe lost during the enhancement. In AMD, the main factor is drusen. The drusen are the small yellow or white areas in the retinal images. The doctors usually focus on drusen to detect and monitor the level of AMD. To solve that problem, we propose the deep-learning based method for AMD retinal image enhancement. We first make a drusen segmentation model and then produce drusen segmentation masks as additional information for our proposed enhancement model. By this setting, our method can keep the medical characteristic of retinal images during the enhancement process. Because of the importance of retinal images in eye examination, there are many works on retinal image analysis and improvement. The previous enhancement methods usually applied histogram equalization and matching [2], [5], [5]. It can improve the contrast of retinal images but the outputs are not realistic. On the other hand, deep-learning based methods provide many advantages in the image-to-image translation task. Therefore, researchers also apply generative adversarial networks (GANs) for the enhancement task. The normalized convolution is used in [6] while Zhao et al. [7] exploited the CycleGAN model [8]. Although GANs can produce more realistic images, the preservation of pathological information is not guaranteed.

2. LITERATURE SURVEY

Computer vision and image processing techniques play an important role in all fields of medical science and are especially relevant to modern Ophthalmology. Medical imaging has revolutionized the field of medicine by providing cost-effective healthcare and efficient diagnosis in all major disease areas. Medical imaging allows scientists and physicians to understand potential life-saving information using less invasive techniques. Applications that can interpret an image are being developed, which in turn can aid a physician in detecting possible subtle abnormalities. The computer indicates places in the image that require extra attention from the physician because they could be abnormal. These technologies known as Computer Aided Diagnosis (CAD) systems show that CAD can be helpful to improve diagnostic accuracy of physicians and lighten the burden of increasing workload. The influence and impact of digital images on modern society, science, technology and art are tremendous. Image processing has become such a critical component in contemporary science and technology that many tasks would not be attempted without it. Digital image processing is an interdisciplinary subject that draws from synergistic developments involving many disciplines and is used in medical imaging, microscopy, astronomy, computer vision, geology and many other fields. The rapid and continuing progress in computerized medical imaging, the associated developments in methods of analysis and computer-aided diagnosis, have propelled medical imaging into one of the most important sub-fields in scientific imaging. Medical image analysis is an area of research that attracts intensive interests of scientists and physicians and covers image processing, pattern recognition and computer visualization. Medical image processing involves the study of digital images with the objective of providing computational tools which will assist the quantification and visualization of interesting pathology and anatomical structures. The progress achieved in this field in recent years has significantly improved the type of medical care that is available to the patients.

The application of digital imaging to ophthalmology has now provided the possibility of processing retinal images to assist clinical diagnosis and treatment. Automated diagnosis of retinal fundus images using digital image analysis offers huge potential benefits. Due to advances in computer technology, medical diagnosis can be benefited from computers which will assist doctors to analyze medical data and images with improved accuracy. Designing and developing computer-aided diagnostic tools or systems for medical images is a fast growing area in recent years.

Development of an automated system for analyzing the images of the retina will facilitate computer aided diagnosis of eye diseases. The interest towards automatic detection of glaucoma and diabetic retinopathy has been increasing along with the rapid development of digital imaging and computing power. However, the most important single event that attracted the wider attention of medical research community has been the decision to recognize digital imaging as an accepted modality to document eye fundus. This introductory chapter presents some background information on the anatomy of the eye, ocular diseases like glaucoma need for screening. Glaucoma is a chronic disease which if not detected in early stages can lead to permanent blindness. The medical techniques used by ophthalmologists like HRT and OCT is costly and time consuming. Hence there is a need to develop automatic computer aided system which can detect glaucoma efficiently and in less time. Optic disk and optic cup are prime features which help in diagnosing glaucoma. Thus proper segmentation of optic disk and optic cup plays an important role in detecting the disorder. In this paper an adaptive threshold based method which is independent of image quality and invariant to noise is used

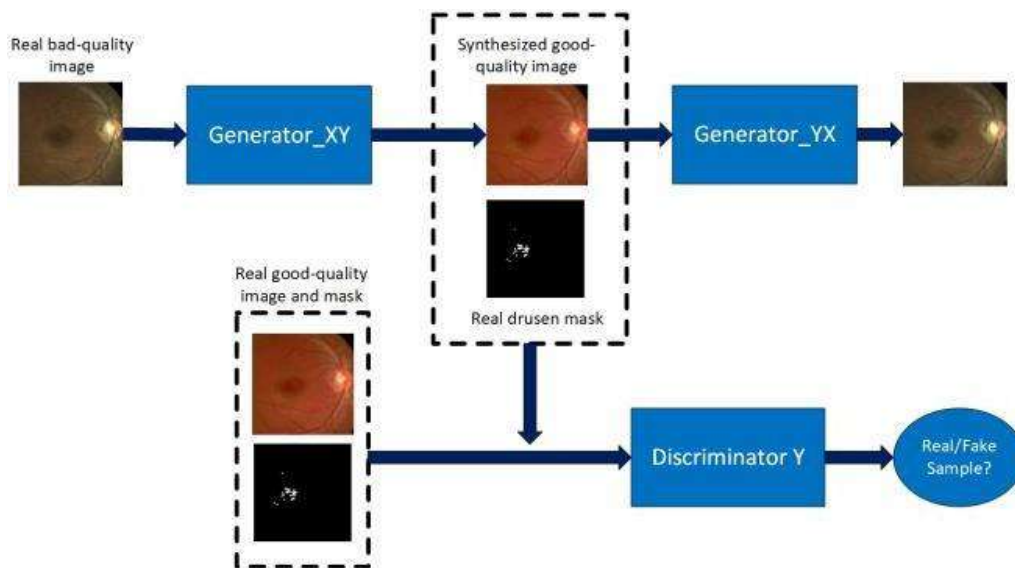
to segment optic disk, optic cup, Neuroretinal rim and cup to disk ratio is calculated to screen glaucoma. Another ocular parameter, rim to disk ratio is also considered which in combination with CDR gives more reliability in determining glaucoma and makes the system more robust. Further an SVM classifier has been used to categorize the images as glaucomatic or non glaucomatic. The experimental results obtained are compared with those of ophthalmologist and are found to have high accuracy of 90%. Also in addition, the proposed method is faster having low computational cost.

3. PROPOSED METHOD

Since it is hard to make a paired dataset that contains different quality fundus images of the same subject. In addition, even if we can take fundus images of the same patient in different quality, there is no guarantee that those images are corresponding in the pixel-level. For that reason, the possible way is to exploit unpaired dataset. Therefore, the CycleGAN-based model [8], which can be used for image translation with unpaired dataset, is applied in our image enhancement task as the main model. Although the CycleGAN can provide the realistic images, it may fail to maintain the pathological information such as drusen. Because the drusen information is not important for generating the realistic fundus images, the model can ignore them during training. To keep the pathological information, we apply drusen mask as an additional input for training our model. The full description of our CycleGAN-based model can be found in II-C. We use a private unpaired dataset for training the main model. However, since our AMD dataset does not include the label (good and bad quality class or drusen segmentation masks).

Fig. CycleGAN Based Model

The proposed framework for retinal image enhancement. Note that the discriminator DX is not shown for better visualization.



We exploit a CycleGAN-based model for the main task. The model includes two generators GXY and GY X and two discriminators DX and DY . The goal is to translate images from blurry ones (denote as domain X) to enhanced ones (denote as domain Y). The generator GXY takes blurry images as its input and produces enhanced images while the generator GY X does the inverse task. The main difference between our model and the original. CycleGAN is from the discriminators. The input of discriminator is not only the output images from the generator but also the drusen segmentation masks. The discriminator DY takes the segmentation mask and either real image from domain Y (real sample) or the output of generator GXY (fake sample) and try to distinguish

whether the input is real or fake. The discriminator D_X does a similar task in domain X . The additional segmentation masks help the model to focus on the drusen area while producing the output images. If the output fundus image looks realistic but it is not consistent with the drusen masks, the discriminator can easily classify it as a fake sample. By adding the drusen segmentation mask, the generator should make not only realistic output images but also accurate pathological information. The main model is described in Fig. 1. The objective function of our model is the same as the original CycleGAN, which includes the adversarial loss and cycle consistency loss. Let define x and m_x are the real image and its corresponding drusen segmentation mask from domain X while y and m_y are from domain Y ($x, m_x \in P_{data}(X)$ and $y, m_y \in P_{data}(Y)$). The adversarial loss of G_{XY} and D_Y with the conditional segmentation mask is described as:

$$\min_{G_{XY}} \max_{D_Y} L_{adv} = E_{y, m_y \in P_{data}(Y)} [\log D_Y(y, m_y)] \\ + E_{x, m_x \in P_{data}(X)} [1 - \log D_Y(G_{XY}(x), m_x)]$$

4. RESULTS

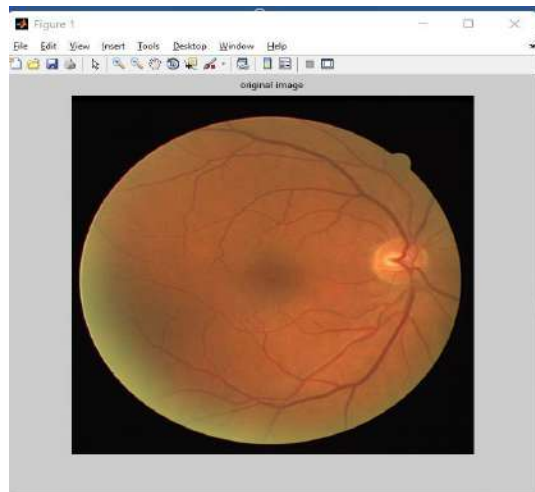


Fig 1 Original Image

We will use fig 7.1 as Original image to identify the real quality of the image and also we will identify the AMD disease by using this fig 7.1.

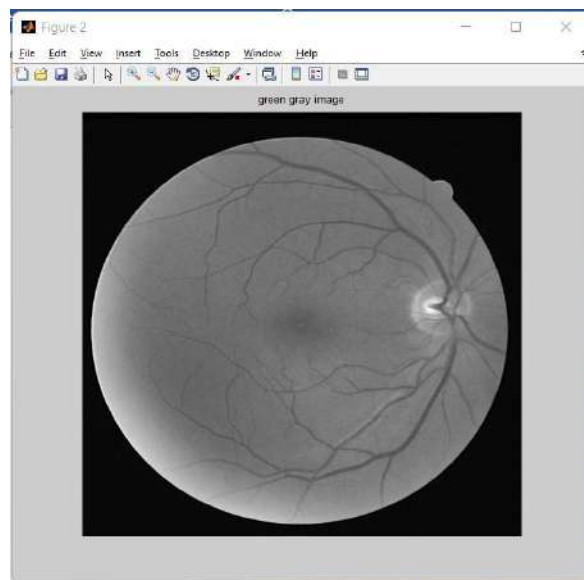


Fig 2 Green Gray Image

Green gray image in generative adversarial networks is used for colour generation in the original image as shown

in fig7.2. From original image i.e.,fig 7.1 it will convert into Green Gray Image.

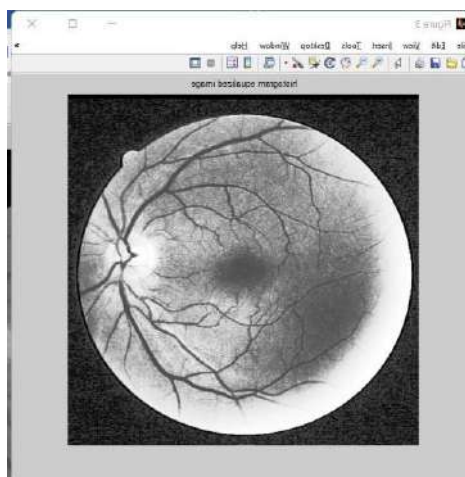


Fig 3 Histogram Equalized Image

Histogram Equalization method is used in this figure and this histogram equalized image is used in improving the contrast in the image and it is shown in fig 7.3.

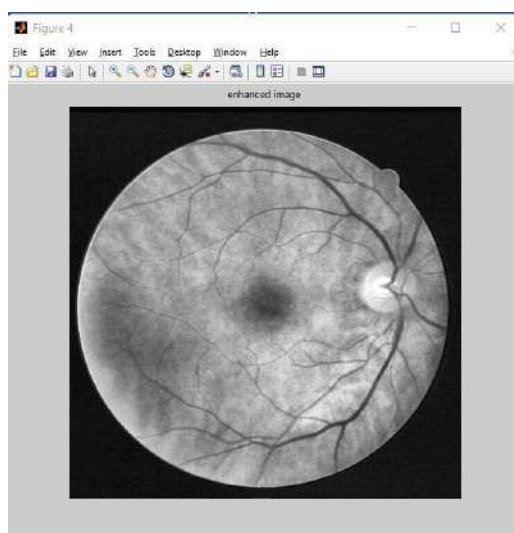


Fig 4 Enhanced Image

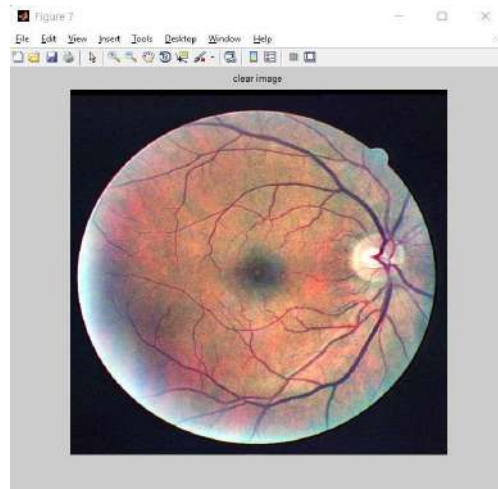


Fig 5 Clear Image

From the fig 7.4 enhanced image is converted into clear image as shown in fig.7.5. Clear image is used to allow us to enlarge the image with close to the original image quality .

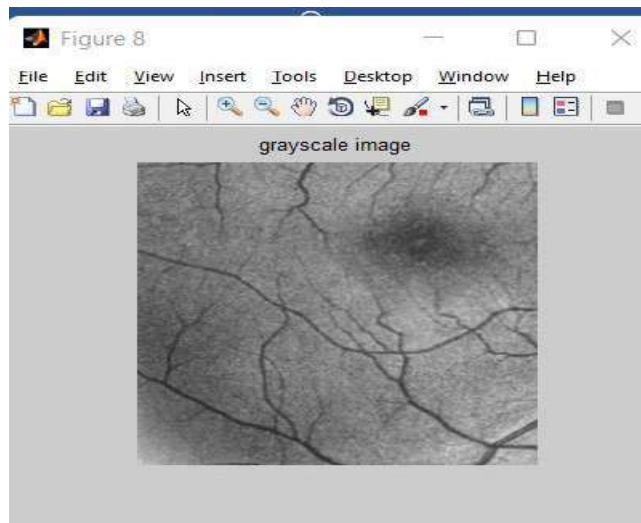


Fig 6 Grayscale Image

The Grayscale image is used to simplify the algorithm and reduces computational requirements in the image.

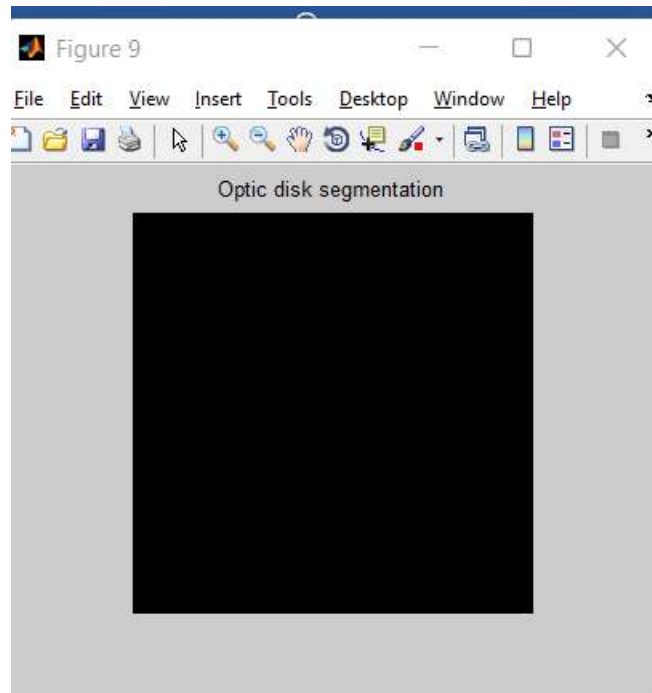


Fig 7 Optic Disc Segmentation

Optic disc segmentation is an essential step in creating a frame of reference for diagnosing optic nerve head pathologies such as glaucoma.

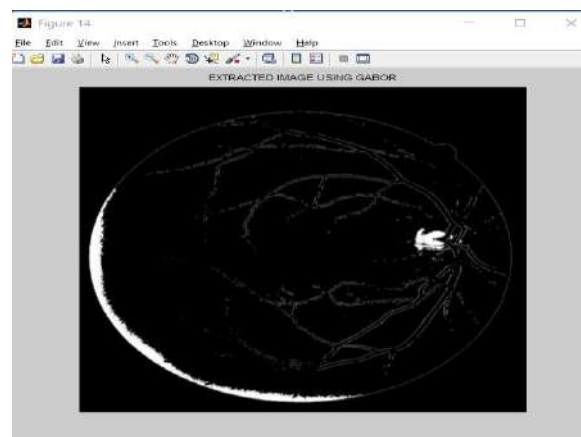


Fig 8 Extracted Image Using Gabor

Extraction method is used to helps in reducing the amount redundant data from the data set in the image and we

will use Gabor(a linear filter used for texture analysis) as shown in fig 7.8.

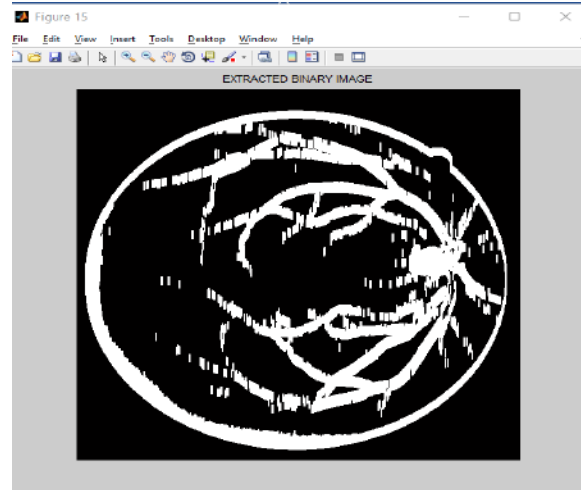


Fig 9 Extracted Binary Image

Extracted binary image allows easy separation of an object from the background using black and white colours as shown in fig.7.9.

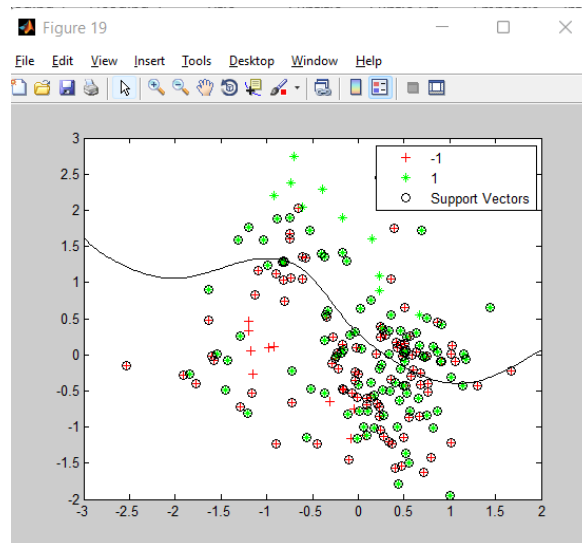


Fig 10 Medium Graph Image

Medium graph image is used in designing of image transformations and also used in separating the own integral regions and segments which is further useful in analysis of the given image as shown in fig 7.10.

5. CONCLUSION

In this study, we introduce a framework based-on CycleGAN model in order to improve the quality of AMD retinal images. The drusen segmentation model is exploited to make additional information for training our main model. By both qualitative and quantitative results, we show that the drusen segmentation masks help our model to keep the pathological information during the image translation process.

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Implementation of Optimized Digital Filter using Kogge-Stone Adder

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ABSTRACT

This project presents a VLSI implementation of a high speed Kogge-Stone adder (KSA) using 0.18 μ m process technology. The adder is known to be one of the fastest adder architectures, and this is validated through a comparison with other adder architectures including the standard ripple carry adder and the carry look ahead adder. Furthermore, our KSA adder is also compared with a default optimized adder from the Artisan standard cell library. The adders are compared for bit widths of 8, 16, and 32. The adders are designed using Verilog and synthesized using both front-end and back-end tools, with complete validation and verification stages, including analysis for performance, power, and area. Results show that in terms of performance, KSA results in the lowest propagation delay with almost constant delay for all bit widths, with up to 70% less delay as compared to all other architectures. Area and power penalty is found to also increase by roughly 59%. In terms of energy usage, the KSA adder results in up to 64% less. In the case when speed and energy are critical, this fast and energy efficient KSA adder can be readily integrated into custom VLSI designs.

1. INTRODUCTION

Filter is a frequency selective network. It passes a band of frequencies while attenuating the others. Filters are classified as analog and digital depending on nature of inputs and outputs. Filters are further classified as finite impulse response and infinite impulse response filters depending on impulse response. This chapter gives a brief about the types of filters. Analog filters can be passive or active. Passive filters use only resistors, capacitors, and inductors. Passive designs tend to be used where there is a requirement to pass significant direct current (about 1mA) through low pass or band stop filters. They are also used more in specialized applications, such as in high-frequency filters or where a large dynamic range is needed. (Dynamic range is the difference between the background noise floor and the maximum signal level.) Also, passive filters do not consume any power, which is an advantage in some low-power systems. The main disadvantage of using passive filters containing inductors is that they tend to be bulky. This is particularly true when they are designed to pass high currents, because large diameter wire has to be used for the windings and the core has to have sufficient volume to cope with the magnetic flux. Very simple analog low pass or high pass filters can be constructed from resistor and capacitor (RC) networks. In the low pass case, a potential divider is formed from a series resistor followed by a shunt capacitor, as illustrated in Figure 1.1. The filter input is at one end of the resistor and the output is at the point where the resistor and capacitor join. The RC filter works because the capacitor reactance reduces as the frequency increases. It should be remembered that the reactance is 90° out of phase with resistance. At low frequencies the reactance of the capacitor is very high and the output voltage is almost equal to the input, with virtually no phase difference. At the cutoff frequency, the resistance and the capacitive reactance are equal and the filter's output is 1 / $\sqrt{2}$ of the input voltage, or -3 dB. At this frequency the output will not be in phase with the input: it will lag by 45° due to the influence of the capacitive reactance. At frequencies above the 3 dB attenuation point, the output voltage will reduce further. The rate of attenuation will be 6 dB per doubling of frequency (per octave). As the frequency rises, the capacitive reactance falls and the phase shift lag approaches 90°. A high pass response can be obtained by swapping the components. Placing a capacitor in series with the input, followed by a shunt resistor, gives a high pass filter with the same 3dB frequency, but with a 45° phase lead. However, as the frequency rises, the attenuation and phase shift decrease. Low pass and high pass RC networks are illustrated in Figure 1.

If the series resistor in the low pass filter is now replaced by a series inductor, to form an LC network, the frequency response changes. The reactance of the series element is increasing while that of the shunt element is reducing, so the rate of increase in attenuation is doubled compared to simple resistor-capacitor or resistor-

inductor filter. At frequencies significantly above the pass band, the rate of increase in attenuation with frequency is 12dB/octave.

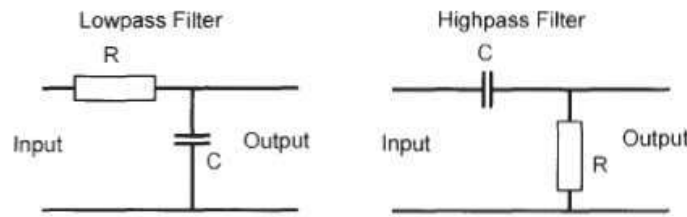


Figure 1 Low pass and High pass RC Networks

Also the phase shift is doubled; it is 90 degrees at the cutoff frequency and rises to a maximum of 180 degrees at very high frequencies. The simple LC network is actually a series tuned circuit. If there were no series source or shunt load resistances present, there would be a magnification of the applied voltage by the inductor's Q factor. The Q of an inductor is given by the ratio of inductive reactance divided by its series resistance. Series source resistance or shunt load resistance is needed to limit the Q and to give a smooth pass band response. Another effect of high Q values is that they would produce ringing at the output if an impulse were applied at the input. As more reactive elements are connected in a ladder of series inductors and shunt capacitors, so the rate of attenuation beyond the pass band increases in proportion. The rate of attenuation will be $n \times 6\text{dB/octave}$, where n is the number of reactive components in the ladder and is known as the filter order. The filter order is also equal to the number of poles in the frequency response.

2. FIR FILTER

Finite Impulse Response (FIR) filters are one of two primary types of filters used in DSP, the other type being Infinite Impulse Response Filters (IIR) filters. The impulse response of an FIR filter is "finite" because there is no feedback in the filter. Compared to IIR filters, FIR filters offer the following advantages:

They can easily be designed to be "Linear Phase". Linear-Phase filters delay the input signal, but don't distort its phase. They are simple to implement. On most DSP microprocessors, looping a single instruction can do the FIR calculation. FIR filters are suited to multi-rate applications. i.e: reducing the sampling rate (decimation) or increasing the sampling rate (interpolation), or both. Whether decimating or interpolating, the use of FIR filters allows some of the calculations to be omitted, thus providing an important computational efficiency. In contrast, if IIR filters are used, each output must be individually calculated, even if that output will be discarded (so the feedback will be incorporated into the filter). FIR filters have desirable numeric properties. In practice, all DSP filters must be implemented using "finite-precision" arithmetic, that is, a limited number of bits. The use of finite-precision arithmetic in IIR filters can cause significant problems due to the use of feedback, but FIR filters have no feedback, so they can usually be implemented using fewer bits, and the designer has fewer practical problems to solve related to non-ideal arithmetic. FIR filters can be implemented using fractional arithmetic. Unlike IIR filters, it is always possible to implement a FIR filter using coefficients with magnitude of less than 1.0. (The overall gain of the FIR filter can be adjusted at its output, if desired.) A disadvantage of using FIR filters is that they require more co-efficients than an IIR filter in order to implement the same frequency response, therefore needing more memory and more hardware resources to carry out mathematical operations. *Impulse Response* - The "impulse response" of an FIR filter is the set of FIR coefficients. Putting an impulse into a FIR filter which consists of a "1" sample followed by many "0" samples, the output of the filter will be the set of coefficients, as the 1 sample moves past each coefficient in turn to form the output. *Tap* - A FIR tap is a coefficient/delay pair. The number of FIR taps, often designated as "N" is an indication of ; the amount of memory required to implement the filter, the number of calculations required, and the amount of "filtering" the filter can do. More taps means more stop-band attenuation, less ripple, narrower filters, etc. *Multiply-Accumulate (MAC)* - In a FIR context, a MAC is the operation of multiplying a coefficient by the corresponding delayed data sample and accumulating the result. FIR filters usually require one MAC per tap. Most DSP microprocessors implement the MAC operation in a single instruction cycle. *Transition Band* - The band of frequencies between pass-band and stop-band edges. The narrower the transition band, the more taps are required to implement the filter. *Delay Line* - The set of memory elements that implement the " Z^{-1} " delay

elements of the FIR calculation.

3. RESULTS

The RTL schematic is abbreviated as the register transfer level it denotes the blue print of the architecture and is used to verify the designed architecture to the ideal architecture that we are in need of development .The hdl language is used to convert the description or summery of the architecture to the working summery by use of the coding language i.e verilog ,vhdl. The RTL schematic even specifies the internal connection blocks for better analyzing .The figure represented below shows the RTL schematic diagram of the designed architecture.

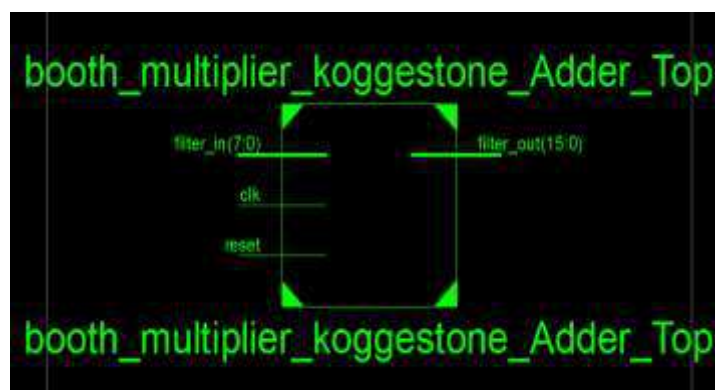


Figure 2 RTL schematic of top module

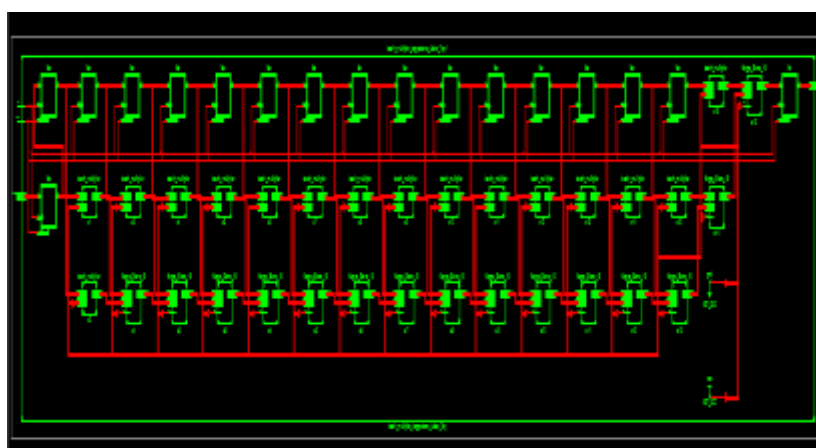


Figure 3 RTL schematic

TECHNOLOGY SCHEMATIC:- The technology schematic makes the reesentation of the architecture in the LUT format ,where the LUT is consider as the parameter o area that is used in VLSI to estimate the architecture design .the LUT is consider as an squarunit the memory allocation of the code is represented in there LUT s in FIR

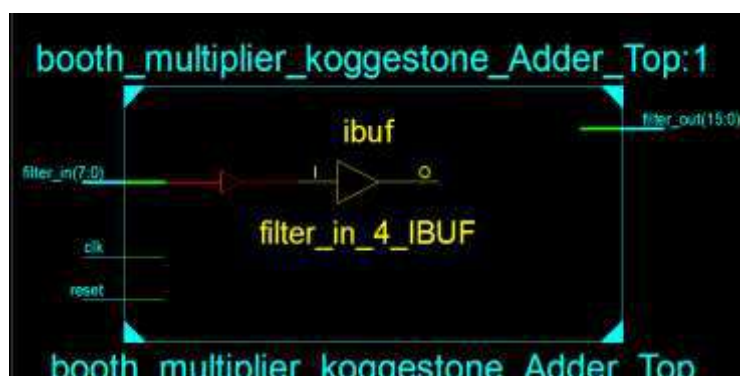


Figure 4 Technological schematic

3. CONCLUSION

In the last two decades, much architectures have been introduced for the design of low complexity fir operation. But there is no such improvement in the FIR design. This paper gives the solution for that type of requirements. From the table it can be concluded that the FIR BOOTH KOGGE STONE structure occupies less area, and consumes less power compare with the conventional structure. So, from this project it has a chance to use the corresponding structure based on the industrial requirements. In future there may be a chance to develop the layouts for the structures.

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High Speed and Efficient ALU using Modified booth Multiplier and Reversible Logic Gates

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Abstract:

The need of a computer in the modern world is inevitable, whose sole purpose is to compute rapid calculations. The need for an Arithmetic Logic Unit (ALU) is as important as the computer, simply because ALU forms the fundamental part of any Central Processing Unit (CPU). A modified structure for an 8-bit Arithmetic logic unit with modified Booth Multiplier is presented in this work. The 16-bit logic is arranged through a falling 1-bit arithmetic logic. The imperative modules of a 1-bit ALU are the module of power and the module of addition. This ALU arrangement has decreased door check and semiconductor count. Using a modified booth multiplier the arithmetic logic unit is implanted in this paper. The modified booth encoding method reduces the delay there by improving the speed of the overall device. This paper deals with the design of an-bit ALU using a hardware description language, VHDL that is structurally modelled to extend the efficiency and speed of the device. The design of an ALU using different reversible logic gates is proposed. The proposed reversible logic-based ALU is implemented using a Mentor Graphics tool in 130 nm technology for power efficiency. The power dissipation of two proposed ALU designs and a conventional area-based ALU have been compared. The conventional ALU dissipates the power 10% reversible logic based ALU.

1. Introduction

The present scenario of spectacular fusion of chip size reduction and increase in number of circuits on chips has given a tremendous growth in battery operated and power sensitive applications thus leading to the growth in the emerging field of Low Power Electronics. In our paper we are indulged in Static Power reduction at the Architectural level as in near future this area of power is going to rule the total amount of dissipated power in the SOCs (System on Chip). We have proposed of synthesizing the POWER GATING TECHNIQUE in specific the Fine-grained method in order to optimize the static power being dissipated. In this approach the inputs to the gates are blocked by using NMOS when not in use thus resulting in reduction of unnecessary utilization of input leading to significant amount of power reduction. Thus, our whole paper revolves around the concept of reduction of static power at Architectural level starting with 1 bit and extending till 8 bits with corresponding decrease in the power consumption. A processor is a main part of any digital system. And an ALU is one of the main components of a micro-processor. To give a simple analogy, CPU works as a brain to any system & and ALU works as a brain to CPU. So, it's a brain of computer's brain. They consist of fast dynamic logic circuits and have carefully optimized structures. Of total power consumption in any processor, CPU accounts a significant portion of it. ALU also contribute to one of the highest power-density locations on the processor, as it is clocked at the highest speed and is busy mostly all the time which results in thermal hotspots and sharp temperature gradients within the execution core. Therefore, this motivates us strongly for a energy-efficient ALU designs that satisfy the high-performance requirements, while reducing peak and average power dissipation. [1,2] Basically ALU is a combinational circuit that performs arithmetic and logical operations on a pair of n bit operands e.g. A [31:0] & B[31:0] for 32 bits. The typical internal structure of a 832bit ALU is shown internal Architecture of ALU.

2. Literature survey

An IC/IP goes through several procedures to reach the market. The IC is designed and sent to the fabricator and the IP undergoes software, firmware (netlist) and hardware (FPGA bitstream) designs and finally sent to the system integrator. As it is inevitable to send the design to the fabricator or system integrator to get their design come on a hardware, the original designers lose their sole ownership of the design and the foundry or system integrator may misuse the design. In this way, the design's functionality has been changed and increased the counterfeit of the design posing a huge loss to the electronic industry. A system is described in many different ways ranging from silicon to the entire ASIC, or from the logic gates to the IP. Any of these ways can provide potential entry points for an attacker to trace out and come up exactly what a design involves. Insertion of hardware trojans, reverse engineering, theft and counterfeiting are some of the main threats to the design. Reverse engineering may capture the Intellectual Property (IP) information and illegally pirate the circuit design. Reverse engineering of an IC can be prevented by insertion of programmable components (PC) such as RAM assist contents can even be configured after the manufacturing process as proposed by Baumgarten. But the inclusion of PC will reduce the performance due to the additional mask layer requirements. Thus, we are in the urge to propose an encryption logic to secure our n -bit ALU [4]. Shikha Khurana and Kanika Kaur have implemented a simple 4-bit ALU on an FPGA to analyze the design parameters. The operation was described by simple logical equations that gave one of the results (addition, subtraction, multiplication, comparator) based on the selection line input controlled by the MUX. VHDL was used to understand the complete designing at top level RTL module for 4-bit ALU. Verification of the designed RTL code was carried out by simulating all possible combinations using simulation techniques, and RTL was synthesized to obtain gate level netlist [5]. The ALU also includes a highest common factor (HCF) computer along with its basic operation programmed through simple behavior modelling defined by direct logical equation. Euclid's algorithm is used to find the HCF. The program is dumped on a Spartan 3 (XC3S400) FPGA. The simulation parameters and utilization summary of ALU design were analyzed and found that a smaller number of slice registers and bounded IOBs were being used. These parameters are compared over our proposed n -bit encrypted ALU for analysis [6]. Logic obfuscation is the hiding of the functionality and the implementation of a design. Logic obfuscation is incorporated by insertion of additional gates called key gates into the actual intended design. After the obfuscation, the design exhibits correct functionality only for the valid key and wrong output for invalid key [7]. It is also inferred that the power-delay product and area overhead increases about 26% for random insertion of 5% of the total number of gates in the original ISCAS-85 combinational benchmark circuits [8]. Thus an efficient logic is to be developed with minimum number of key gates at the same time ensuring that all major signals flow through them for better encryption. Hence, the structural modification-based netlist obfuscation technique is applied on the ALU designs to enhance their design securities. Structural or layout level modifications, where the circuit is described in the fundamental gate-level as individual modules correctly mapped to manifest the desired circuit without affecting its functionality. It extends the flexibility and reusability of the modules for various purposes by various other higher-level modules that demands its functionality [10]. The implementation of structural modelling for functional obfuscation was to modify the functionality at the sub-circuit (gate-level) which increases the complexity and cost of reverse engineering.

3. Proposed Method

Circuit specific parameters like the number of inputs, number of outputs and the number of gates were used for signature generation. This is then applied in any chosen combination / formula for

signature generation. Since not all primary inputs are utilized in most of the circuits, these unused inputs are employed to modify the sub-circuit module function such that on inputs other than specified inputs, the outputs do not follow the definition of the function that the circuit was designed for. In a method proposed. The CUTs were analyzed based on connectivity and fault impact to evaluate circuit security by logic encryption. Our structural modelling also involves functional obfuscation technique that employs key insertion that changes the functionality of the circuit for wrong key inputs. Modified High Speed Vedic Multiplier Design and Implementation The proposed research work specifies the modified version of binary Vedic multiplier using Vedic sutras of ancient Vedic mathematics. It provides modification in preliminarily implemented Vedic multiplier. The modified binary Vedic multiplier is preferable has shown improvement in the terms of the time delay and also device utilization. The proposed technique was designed and implemented in Verilog HDL. For HDL simulation, modalism tool is used and for circuit synthesis, Xilinx is used.

The simulation has been done for 4-bit, 8-bit, 16-bit, multiplication operation. Only for 16-bit binary Vedic multiplier technique the simulation results are shown. This modified multiplication technique is extended for larger sizes. The outcomes of this multiplication technique are compared with existing Vedic multiplier techniques. "Design and Analysis of Approximate Compressors for Multiplication", Inexact (or approximate) computing is an attractive paradigm for digital processing at nanometric scales. Inexact computing is particularly interesting for computer arithmetic designs. This paper deals with the analysis and design of two new approximate 4-2 compressors for utilization in a multiplier. These designs rely on different features of compression, such that imprecision in computation (as measured by the error rate and the so-called normalized error distance) can meet with respect to circuit-based figures of merit of a design (number of transistors, delay and power consumption).

Four different schemes for utilizing the proposed approximate compressors are proposed and analyzed for a Dadda multiplier. Extensive simulation results are provided and an application of the multipliers to image processing is presented. The results show that the proposed designs accomplish significant reductions in power dissipation, delay and transistor count compared to an exact design; moreover, two of the proposed multiplier designs provide excellent capabilities for image multiplication with respect to average normalized error distance and peak signal-to-noise ratio (more than 50 dB for the considered image examples). C. Liu, J. Han, and F. Lombardi, "A Low-Power, High-Performance Multiplier with Configurable Partial Error Recovery", Proc. of IEEE Design, Automation & Test in Europe Conference & Exhibition (DATE), [Approximate circuits have been considered for error-tolerant applications that can tolerate some loss of accuracy with improved performance and energy efficiency. Multipliers are key arithmetic circuits in many such applications such as digital signal processing (DSP). In this paper, a novel multiplier with a lower power consumption and a shorter critical path than traditional multipliers are proposed for high-performance DSP applications. This multiplier leverages a newly-designed approximate adder that limits its carry propagation to the nearest neighbors for fast partial product accumulation. Different levels of accuracy can be achieved through a configurable error recovery by using different numbers of most significant bits (MSBs) for error reduction. The multiplier has a low mean error distance, i.e., most of the errors are not significant in magnitude. Compared to the Wallace multiplier, a 16-bit multiplier implemented in a 28nm CMOS process shows a reduction in delay and power of 20% and up to 69%, respectively. It is shown that by utilizing an appropriate error recovery, the proposed multiplier achieves similar processing accuracy as traditional exact multipliers but with significant improvements in power and performance. "Design-Efficient Approximate Multiplication Circuits Through Partial Product Perforation" Approximate computing has received significant attention as a promising strategy to decrease power consumption of inherently error tolerant applications. In this paper, we focus on hardware-level approximation by introducing the partial product perforation technique for designing

approximate multiplication circuits.

We prove in a mathematically rigorous manner that in partial product perforation, the imposed errors are bounded and predictable, depending only on the input distribution. Through extensive experimental evaluation, we apply the partial product perforation method on different multiplier architectures and expose the optimal architecture-perforation configuration pairs for different error constraints. We show that, compared with the respective exact design, the partial product perforation delivers reductions of up to 50% in power consumption, 45% in area, and 35% in critical delay. In addition, the product perforation method is compared with the state-of-the-art approximation techniques, i.e., truncation, voltage over scaling, and logic approximation, showing that it outperforms them in terms of power dissipation and error.

3. RESULTS

The RTL schematic is abbreviated as the register transfer level it denotes the blue print of the architecture and is used to verify the designed architecture to the ideal architecture that we are in need of development. The HDL language is used to convert the description or summery of the architecture to the working summery by use of the coding language i.e., Verilog, VHDL. The RTL schematic even specifies the internal connection blocks for better analyzing. The figure represented below shows the RTL schematic diagram of the designed architecture.

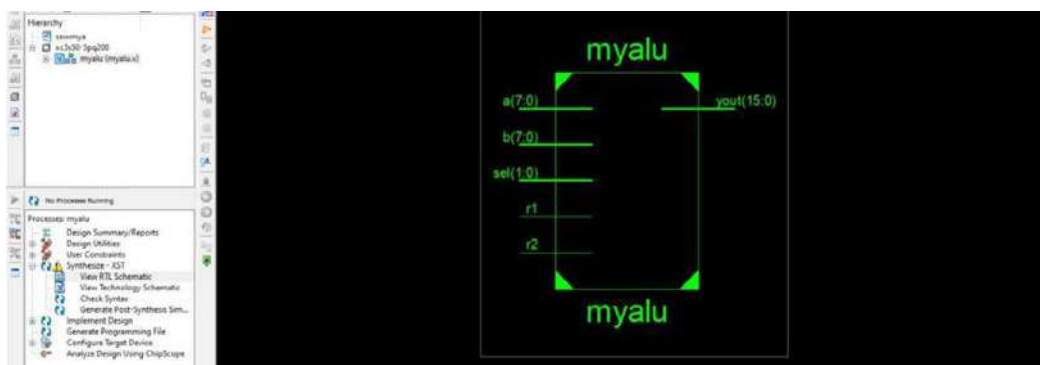


Figure 1: Pin diagram of ALU

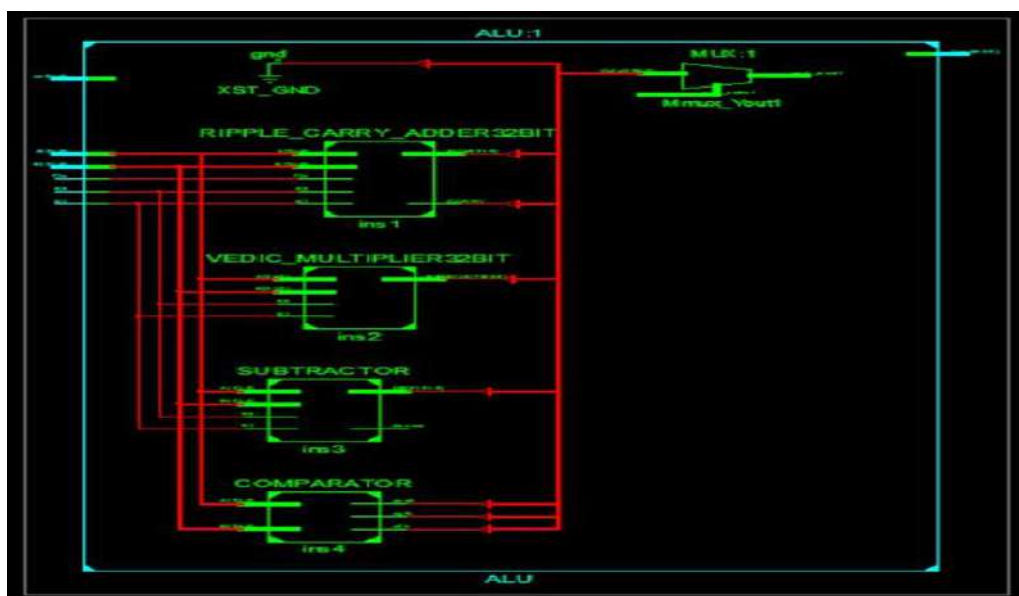


Fig2: Internal structure of RTL Schematic of ALU

The simulation is the process which is termed as the final verification in respect to its working where

as the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implantation to the simulation on the home screen of the tool ,and the simulation window confines the output in the form of the wave forms. Here it has the flexibility of providing the different radix number systems.

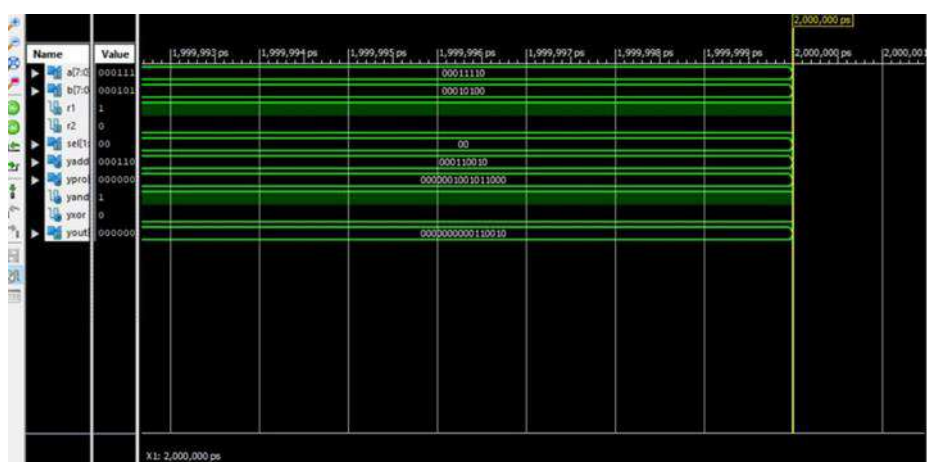


Figure 3: Simulated Waveforms of ALU

The xc3s500e device belonging to the fg320 package of Spartan3E family is used for the analysis. It is observed in Table that our designed ALU, in spite of encrypting the circuit and extending flexibility and reusability, the circuit uses a negligible percentage of the device resources in excess to the simple 32-bit ALU. In this project designed 32-bit ALU is not only secured but also efficient. and this project aimed at maximum efficiency and the same has been verified and validated from the device utilization summary. Thus, an efficient and an encrypted ALU that gives correct output results only for correct key input is designed. High speed and efficient ALU using modified booth multiplier and reversible logic gates

Device Utilization Summary (estimated values)			
Logic Utilization	Used	Available	Utilization
Number of Slices	2496	4656	53%
Number of 4 input LUTs	4512	9312	48%
Number of bonded IOBs	130	232	56%

Figure 4: device utilization summery

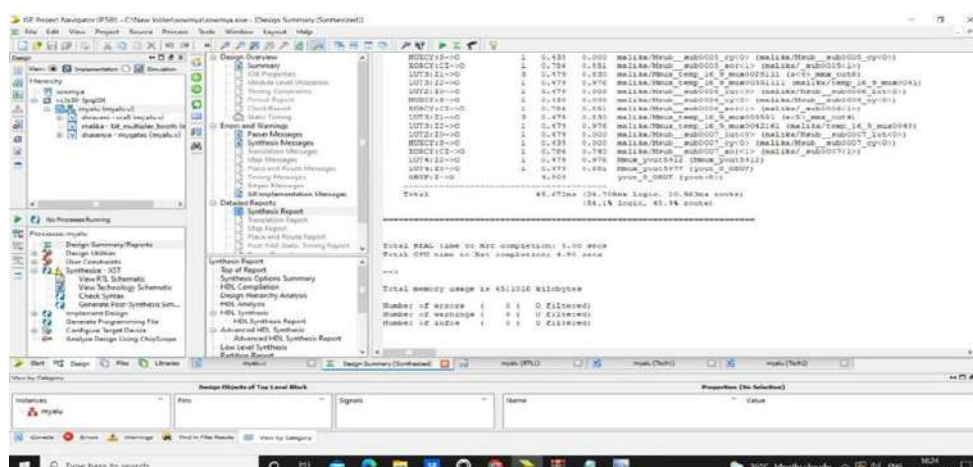


Figure 5: Time analyzer

5. Conclusion

The behaviorally modelled 4-bit ALU is extended to a structurally modelled n -bit ALU improving its speed and area occupied. These new ALU designs are advantageous to previously published work in implementations that favor low delay and high logical calculation output, which is desirable for realization of a reversible central processing unit. They use the reversible gates, but as their sole goal is to reduce logic size or number of garbage bits for a specific fixed-size circuit, very little knowledge is actually gained from this approach. And in booth multiplier number of gates is reduced and hence area of booth multiplier is less than combinational multiplier gives optimum number of components required. Hence for less delay requirement Booth multiplier is suggested. It can be concluded that High speed and efficient ALU using modified Booth multiplier is superior in respect like area, complexity.

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Implementation of D&F Relay Node for Cooperative MIMO Systems through SDR platform

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ABSTRACT

In recent years, relaying networks are promising for future wireless communication systems, which profoundly enhance link capacity and exploiting cooperative diversity. In this paper, we propose a prototype of a Decode-&Forward (D&F) Relay Node system based on Software Defined Radio (SDR) using Universal Software Radio Peripheral (USRP) and MatlabTM software. The developed testbed platform allows implementing and test new algorithms and specifications for LTE/LTE-A and 5G. Both Single-Input Single-Output (SISO) and Multi-Input MultiOutput (MIMO) are supported in our testbed. The considered D&F MIMO cooperative system in this paper utilizes Orthogonal Space-Frequency Block Codes (OSFBCs) for the transmission of the data symbols of the source to the destination. The transmission data from eNB has been measured using commercial 4G/5G measurement equipment. It has been demonstrated that D&F cooperative system substantially improves the Bit Error Rate (BER) and throughput of the user, taking higher performance with the 2×2 MIMO technique. Index Terms—Decode-&-Forward, Relay Node, SDR, MIMO, BER, Throughput

1. INTRODUCTION

At present, wireless communications are being focused to achieve higher data rates, channel capacity, better connectivity, and mobility [1]. In this sense, Relay Nodes (RNs) have captured significant attention in the research community due to that can be implemented to increasing customer demands, extend cell-edge coverage, reduce the power transmission from evolved Node-B (eNB) to users equipment (UEs) and increase the system capacity [2]. Consequently, several system models involving RNs have been proposed in the literature, where a stage of intermediate nodes helps the transmitter to communicate with a receiver using shared radio resources [3]. The 3GPP has addressed the study and standardization of RNs in several releases [4], [5]. It should be noted that most of the works described above analyze the network performance in theory or by simulation [6], [7]. Currently, there are some testbed development platforms, which are suitable for RNs research and implementation. Software Defined Radio (SDR) has been a promising way for the development and configuration of Physical Layer (PHY), Medium Access Control Layer (MAC) and some Radio Link Control (RLC) with much more efficient programming environment. Universal Software Radio Peripheral (USRP) with Labview and GNU Radio have been used widely as SDR platform these days [8]– [10] the design and implementation of a complete functional testbed framework based on the SDR platform and MatlabTM is presented. The key target is to develop a D&F Relay Node to evaluate the real performance and viability for its implementation through a 2×2 MIMO SDR platform. In addition, the authors focus on the study of downlink performance in an indoor-to-indoor scenario, using the 64-QAM modulation scheme and the 2×2 Transmission Diversity MIMO technique. The millimeter wave technology has been known for many decades, and it has been deployed for military applications. With the advances of process technologies and low-cost integration solutions, this technology has started to gain a great

deal of momentum from academia, industry, and standardization body [1]. The major quality of 60 GHz is the huge globally licensefree spectrum between 57-66 GHz which will support very high data rate wireless applications [2]. Another challenge for using 60 GHz is the penetration loss which is also very high in the 60 GHz band. LoS propagation path between two devices at 60 GHz may completely be blocked by surrounding objects and human bodies. When a 60 GHz link is blocked reflections from the surfaces can be exploited to sustain the link connectivity between the devices which will add more losses [4]. Short range is a huge challenge for 60 GHz system. For point-to-point indoor communication in order to get up to 10 m range, an antenna with high gain of 15 dBi or higher is required [5]. The effective interference levels for 60 GHz are lower than what for the congested 2–2.5 GHz and 5–5.8 GHz regions [6]. However, in some cases where dense 60 GHz wireless network existed, the interference level is considerable. So, interference mitigation techniques are needed [7]. Directional antenna proposed to overcome high values of FSPL in [8], but the signals with the proposed technique can be easily blocked by any obstacle. Beamforming or beam steering is proposed in [9] to overcome blockage in directional antennas and enhance their performance in 60 GHz system. However, the proposed scheme adds more overhead and complexity to the system. Many methods proposed to solve those challenges, but the easiest and most efficient method is the using of relay nodes [10]. The first study of using relay nodes with 60 GHz is provided in [4]. The paper shows that the value of FSPL can be reduced by more than 33% by using relay nodes. The proper positioning is provided in the paper. However, the simulation results based on device to device communication network. In [11] a relay selection scheme is proposed to replace a long direct path with several multi-hop paths to improve the network throughput. However, to the best of our knowledge, the small range mitigation by multi-hop communication isn't studied yet. By relaying signal from the source to the destination, the long path between the source and the destination is then broken into short paths which in turn reduce the FSPL [12]. Indirect path via relay node can provide LoS in some cases where the direct link between the source and the destination is blocked. The main contributions of this paper include the following. (1) Finding the best position of relay node to reduce the FSPL between transmitter and receiver. (2) Finding the best position of relay node to reduce the penetration loss, human bodies, by providing LoS in case of blockage.

2. LITERATURE SURVEY

The discussion on next generation beyond 4G (B4G) radio access technology has been opened, targeting up to 1000 times increase in the mobile broadband capacity, consisting of a 10 times increase in the number of mobile subscribers and 100 times more data traffic per user [1]. This work is carried out in parallel with ongoing Release 12 standardization of third generation partnership project (3GPP) Long Term Evolution Advanced (LTE-A). It can be seen from the traffic forecasts [2] that within B4G timeframe, the target year being 2020, mobile video will probably stay as the most capacity-consuming traffic type, although other types of communications such as gaming and device-to-device communication (D2D) will also have significant increase in volume. As the consumption peak of mobile video applications, including for example real time entertainment consumption of video streaming, various webcasts, mobile TV and video sharing, is assumed to be during evening hours [3], peak traffic is expected to be consumed mainly in indoor locations. The higher capacity requirements can be met by boosting the spectral efficiency, using more frequency spectrum, and, most importantly, increasing the number of cells. This leads to very dense small cell deployments with limited coverage per cell and, along with the traffic forecasts, focuses the B4G scope on local area (LA) networks. Smaller cell coverage increases the demands on the backhaul (BH) network connecting the increasing number of access points (AP) to main controlling node, to each other, and to

external networks. As the installation of the APs and the deployment of the network should be of low cost and “plug and play” type, wireless backhaul (BH) becomes a viable option. As the frequency resources are scarce, in-band self-backhauling is an important enabler for cost-efficient transceiver design. By defining a common radio interface that is applicable to all local area traffic types – uplink (UL), downlink (DL), device-to-device, and backhaul, the use of frequency resources would be optimized. Thus, combining wireless inband self-backhauling with dense local area deployment can be seen as the long term optimization goal in B4G physical layer design. Time division duplexing (TDD) can be seen as an attractive duplexing method alternative over frequency division duplex (FDD) when considering a local area concept, and the tight cost efficiency requirements related to B4G. The amount of available unpaired TDD spectrum is larger than the amount of paired spectrum, radio frequency component costs are low, and TDD properties such as reciprocity and good UL-DL-BH scalability can be efficiently utilized to create link-independent air-interface and flexible resource partitioning between link directions. Multi-hop relaying and routing have been widely studied in the literature. Considering the scope of this paper, the most interesting results can be found from [4]-[6]. In [4], throughput performance of multi-hop relaying was studied in a halfduplexing TDD network for local area scenario. The results indicate that in the dense deployment scenario, relaying, even with a single half-duplex relay, is capable of providing the system with high performance increase. A concept of using prior knowledge of the previously transmitted data to cancel interference in multi-hop TDD links was introduced in [5]. Routing solutions and methods to select the set of active users at each time instance and to control the transmit power of the nodes were presented in [6]. End-to-end throughput in conventional multihop networks decreases rapidly when the number of hops is increasing due to half-duplex relays. In [7] it was shown that the throughput in multihop networks can be improved by employing full-duplex relays when the relays are modeled to operate without self-interference. However, in practice compact full-duplex devices are subject to self-interference caused by the coupling of the strong transmitted signal to the receiver chain, which limits the transmitted power and decreases the gains from the full-duplex operation. In [8] it was shown that power control improves the performance of the full-duplex relay significantly in case of self-interference. However, the study considered only a single we evaluate the performance of multihop networks in an indoor environment employing full-duplex relays and assuming realistic levels of self-interference based on the recent literature. We study the effect of residual self-interference to the throughput of the multi-hop links in a network of multiple simultaneously active multi-hop flows. The means of achieving reasonable self-interference levels via antenna design, and analog and digital interference cancellation (IC) are discussed. We also study the effect of power control to the performance of full duplex relay links. The effect of having either one or two active relays in the link is studied, and the results are compared to the results achieved by using half-duplex relays. The selection of best multi-hop route is based on the algorithm presented in [4]. Also the indoor channel model and the model of the local area scenario are based on the study in [4]. We find that having a reasonable residual self-interference level, the throughput performance of multi-hop network having full duplex relays is

improved over the network with relays operating in half-duplex mode CONVENTIONAL energy-constrained communication systems have a limited operational lifetime, and in order to maintain network connectivity, periodical battery replacement or recharging is performed, which is nevertheless costly, inconvenient and sometimes impossible. As such, energy harvesting, which scavenges energy from external natural resources such as solar, wind or vibration, has gained a great deal of interest, since it provides a cost-effective solution to prolong the lifetime of wireless communications systems. However, the amount of energy harvested from natural resources is random and highly depends on some uncontrollable factors such as the weather conditions, which makes reliable communication difficult. An interesting solution that overcomes the above limitation is to harvest energy from man-made radio frequency (RF) electromagnetic radiation (also known as wireless power transfer) [1], [2]. Since RF signals can carry both information and

energy, there has been a tremendous upsurge of research activities in the area of simultaneous wireless information and power transfer (SWIPT). In the pioneering works on SWIPT by Varshney [3] and Grover [4], the fundamental tradeoff between the capacity and energy was studied. Later in [5], practical architectures, i.e., time-switching and power-splitting, for SWIPT systems were proposed, and the optimal transmit covariance achieving the rate-energy region was derived. The extension of imperfect channel state information (CSI) at the transmitter was addressed in [6]. More recently, sophisticated architectures improving the rate-energy region were proposed in [7], [8]. In addition, the energy efficiency of OFDMA systems with SWIPT was studied in [9], and the application of SWIPT in multiuser systems and cellular networks was considered in [10], [11]. In parallel with the aforementioned works which mainly focus on the single hop scenario, employing intermittent relays to facilitate RF energy harvesting and information transfer has also drawn significant attention. The work in [12] investigated the symbol error rate of relay selection in cooperative networks, where energy-constrained relay nodes with limited battery reserves rely on some external charging mechanism to assist the source-destination information transmission. In [13], the authors studied the throughput performance of an amplify-and-forward (AF) relaying system for both time-switching and power-splitting protocols. extended the analysis to the adaptive time-switching protocol in [14]. The throughput of decode-and-forward relaying systems was investigated in [15], while the power allocation strategies for DF relaying system with multiple source-destination pairs was studied in [16]. More recently, the performance of energy harvesting cooperative networks with randomly distributed users was studied in [17]–[19]. It is worth pointing out that all these works are limited to the half-duplex (HD) relaying mechanism, where the relay node can not receive and transmit data simultaneously in the same frequency band. The HD architecture is widely adopted in traditional wireless relaying systems, because it can simplify the system design and implementation, it however incurs significant loss of spectrum efficiency. With the advance in antenna technology and signal processing capability, and in an effort to recover the spectral loss, full-duplex (FD) relaying, where the relay node receives and transmits simultaneously in the same frequency band, has received a lot of research interest (see references [20]–[25] and therein). However, to the best of the authors' knowledge, no works have considered the application of FD relaying in RF energy harvesting systems. Motivated by this, we focus on a source-relay-destination dual-hop scenario where the relay is powered via RF energy harvesting, and investigate the effect of FD transmission on the system throughput in a RF energy harvesting relaying system. As for the FD relay, we consider the separate antenna configuration, i.e., the relay is equipped with two antennas, one for information transmission and one for information reception. In addition, the time-switching protocol is adopted.¹ We study the throughput of both AF and DF relaying protocols, and characterize the fundamental trade-off between energy harvesting time and communication time. In particular, according to how the time split is optimized, three different communication modes are investigated, namely, instantaneous optimization based transmission which will be referred to as the instantaneous transmission hereafter, delay-constrained transmission, and delay tolerant transmission. In order to demonstrate the effect of the FD relaying architecture, the HD relaying architecture is also investigated. The main conclusion of this paper is that FD relaying is an attractive and promising solution to enhance the throughput of RF energy harvesting relay systems. The main contributions of the paper are summarized as follows:

- We propose the idea of employing both antennas at the relay to scavenge energy during the energy harvesting period, and demonstrate that, with optimal time split, the dual antenna case

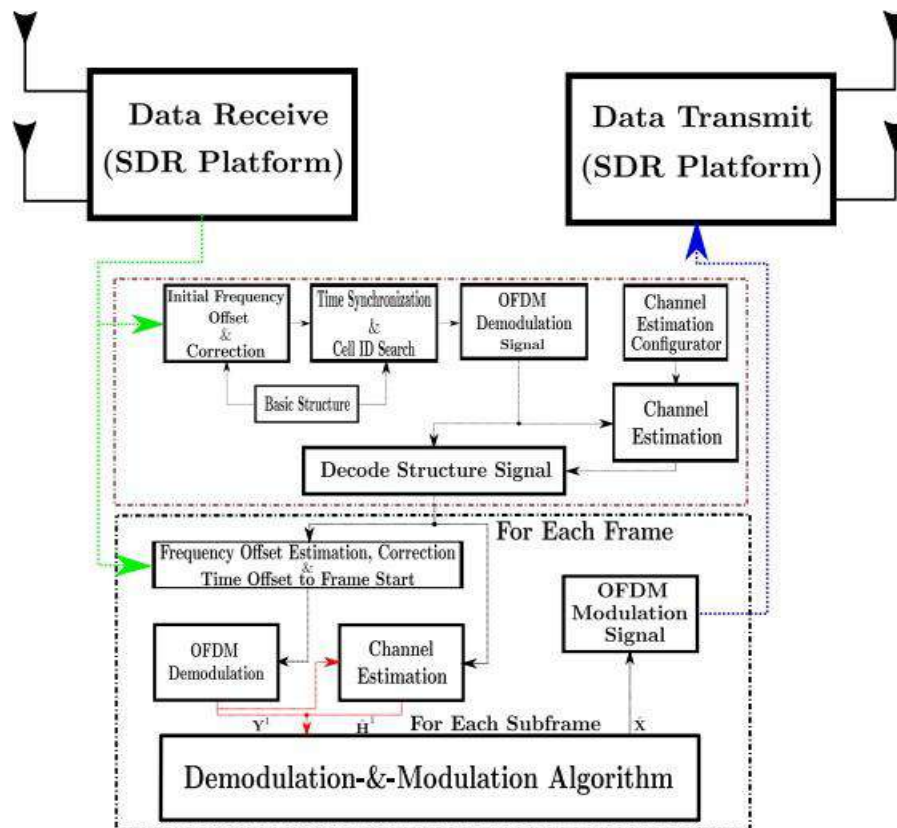
always outperforms the single antenna case. However, the performance gap gradually diminishes when the source transmit power is sufficiently large.

- For both AF and DF relaying systems, we present analytical expressions for the system throughput in all three

3. PROPOSED METHOD

The use of low cost, commercial Software Defined Radio has shown great flexibility and high performance to implement new radio solutions for LTE/LTE-A and 5G scenarios. In this section, the implementation of a cooperative relay node using an SDR platform is present. The developed relay protocol is based on a D&F Relay Node, which uses Frequency Division Duplexing (FDD) and multiple antennas (MIMO). It is assumed that all nodes operate in half-duplex mode.

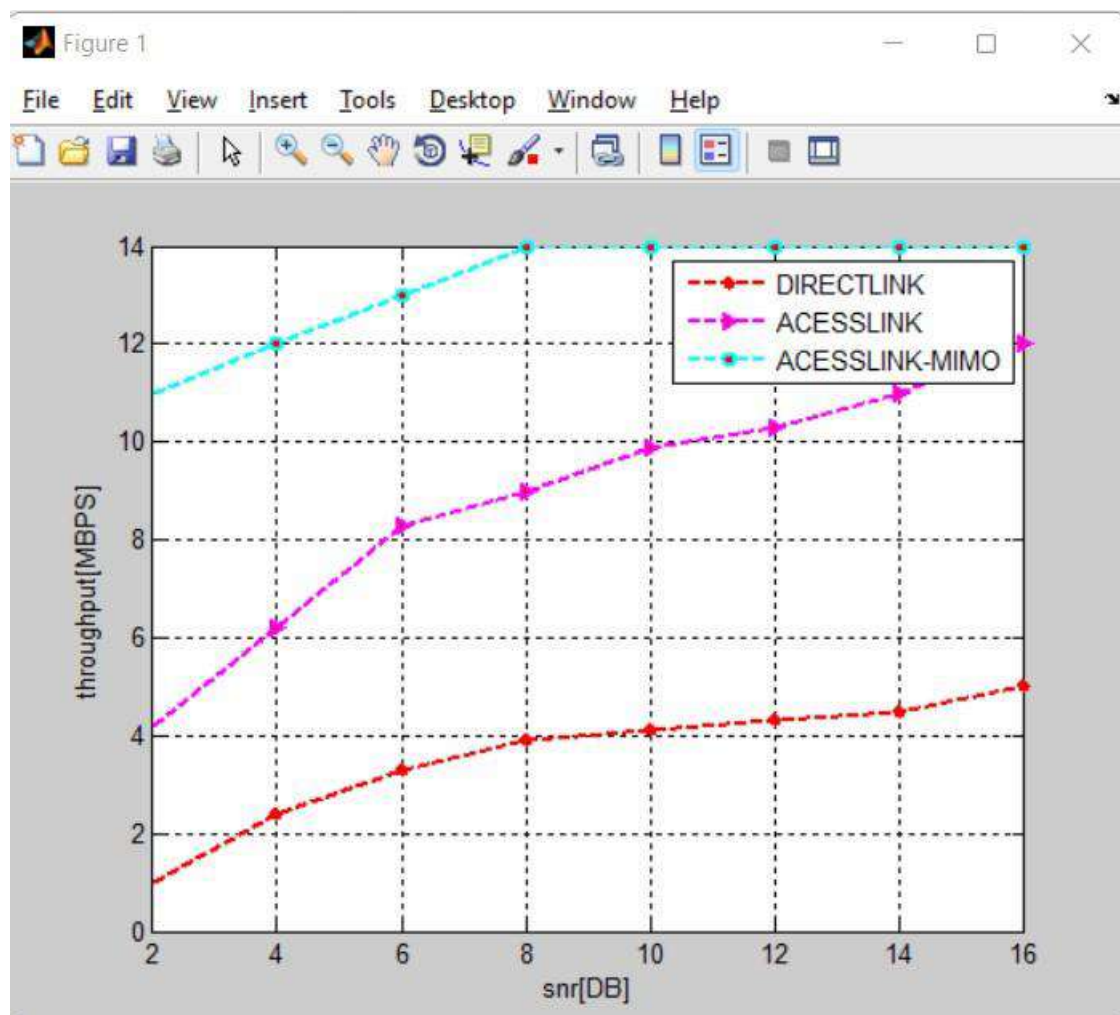
In this subsection, the operation of the D&F relay node using SDR platform is discussed. The goal of this paper is to evaluate the downlink performance. Taking into account the 3GPP classification [11], the developed RN is an L2, which is transparent to the UEs and does not have its own Cell ID. The implemented D&F Relay Node operates in FDD-LTE and is an in-band RN, that is, the two links (backhaul and access links) have the same frequencies. A simplified flowchart of a Decode-&-Forward Relay Node can be seen in Fig. 2. In Fig. 2, firstly, the IQ signals through the SDR platform are captured. After acquiring the received data symbols, any significant frequency offset must be estimated and removed, without which many errors would propagate. Besides, the Primary Synchronization Signal (PSS) and Secondary Synchronization Signal (SSS) are produced. The PSS and SSS are detected employing time-domain and frequency-domain correlation. Therefore, time offset synchronization and Cell ID in Time Synchronization & Cell ID Search block are obtained. Subsequently, to establish the quality of the correlation, the correlation is calculated for each of the three possible primary cell identities. The Basic Structure block is a configuration structure that takes into account the sample rate of the SDR equipment. Duplex mode (FDD), a cyclic prefix (Normal), and a number of resource blocks (depending on the sample rate of the SDR equipment) are assumed.

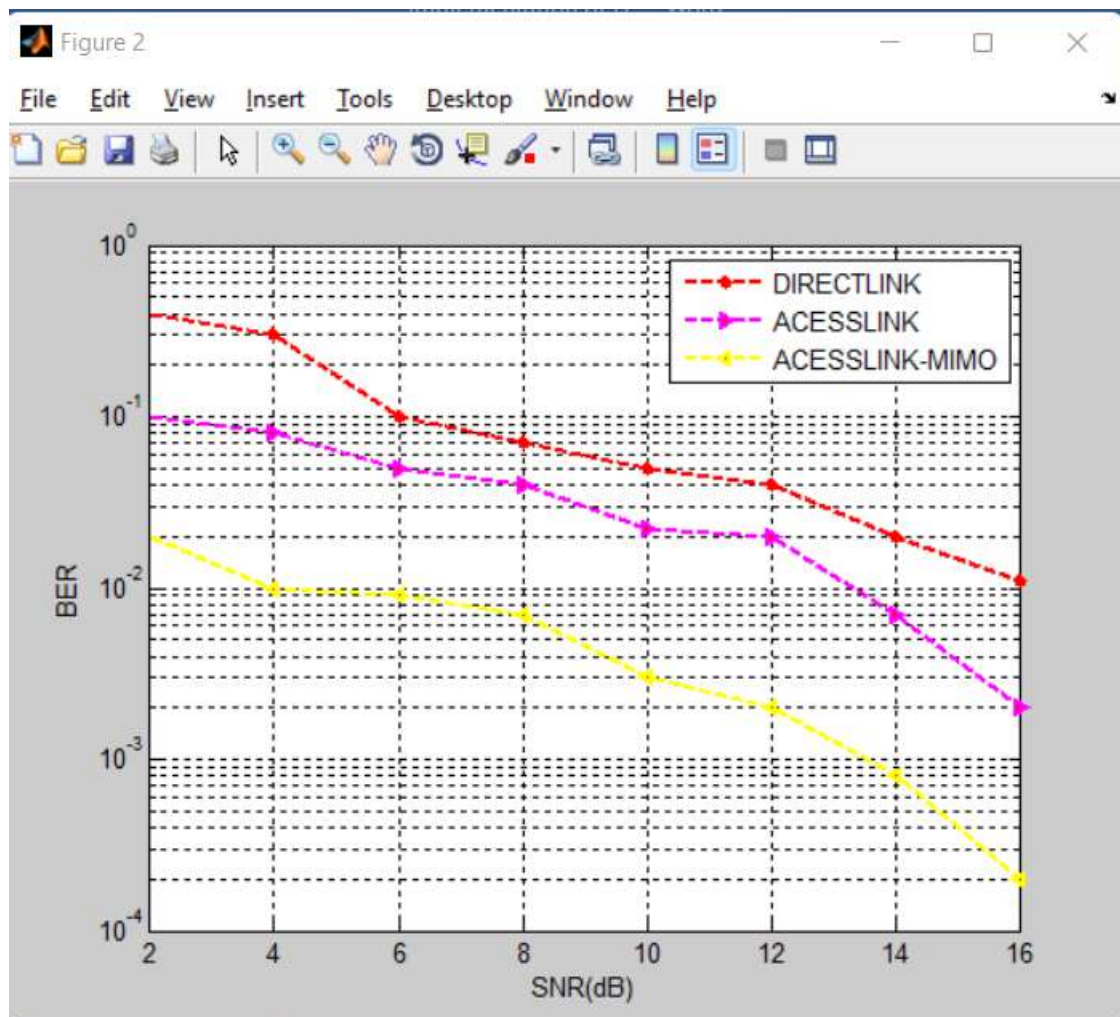


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signal is resampled to the nominal sampling rate. Afterwards, the RN can do the full received signal demodulation, and so, to perform the channel estimation. Finally, the demodulated received signal (Y_1) and the estimated channel matrix (H_1) are processed through the Algorithm 1 of Demodulation-&-Modulation for each subframe. This algorithm performs the demodulation and modulation of physical, control, and data channels, as well as, determines other reference signals. In the proposed Algorithm 1, the superscripts $(\cdot)_d$ and $(\cdot)_c$ in the functions describe the decoding and coding process, respectively. Also, the superscripts $(\cdot)_b$ and $(\cdot)_s$ of the output functions represent data bits and data symbols, respectively. On the other hand, the $\text{Map}(\cdot)$ function maps each symbol in the resource grid and \hat{x} subframe to the output is obtained. Finally, the concatenation of each subframe is carried out by means of the $\text{Cat}(\cdot)$ function, from which all the frames to be re-transmitted are obtained. The \hat{X} resultant

4. RESULTS





5. CONCLUSION

A D&F cooperative communication system in wireless environment based on USRP SDR and MatlabTM tool has been designed and implemented. Besides, it has been developed an 2×2 MIMO non-cooperative system for comparison. Based on the experimental results, we can conclude that the D&F cooperative system greatly improves the transmission reliability by exploiting spatial and user diversity. The BER and capacity of the 2×2 MIMO D&F cooperative system is higher than SISO D&F cooperative communication and 2×2 MIMO non-cooperative system. In addition, when SISO D&F Relay Node is employed, the system has a substantial benefit in comparison with the 2×2 MIMO non-cooperative system. On the other hand, the platform could be seen as a first step to the development of other relay node schemes and 5G communications.

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Smart Foot Over Bridge in the Railway Station

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Abstract:

The main aim of this topic is to create an artificial bridge from one platform to other platform and to make door automatic which will move in vertical direction below in parallel to platform level which is used to walk safely and helpful for handicap to take out from train at platform. Automatic railway track pedestrian crossing without using staircase will be helpful for the physically handicapped people. The technology will identify the status of each train using infrared sensors and informs to microcontroller. When the train is not present in the station the artificial bridge is connected and people can walk from one Platform to another easily without any use of stairs. When the train comes near the railway station the proximity sensor senses the train and gives information to the microcontroller so to disconnect artificial bridge before arrival of the train. Artificial bridge is created up to the train when the train is arrived in opposite track that saves time and provides life security to the person crossing the track.

1. INTRODUCTION

In India so many people are travelling through the trains because it is cheapest way for transport. Daily so many old people and physically disabled people also travelling for them stair case is difficult to reach from one platform to another platform. This idea is arranging the movable bridge for easy travelling from one platform to another platform. In most of the villages there is no staircase from 1st platform to 2nd platform. At that time people are crossing through railway tracks. Old people and physically disabled people are facing many problems at that time. For that purpose only we are introducing this automatic bridge between railway platforms using Node Mcu (micro-controller-unit). The current scenario of railway systems in India are not automated which is fully man made. In railway stations normally we use bridges to move from one platform to another platform. It is very difficult for the handicapped persons or elderly persons using bridges or staircase, for that purpose lift and escalator is present in railway station but it is also difficult and non-convenient for aged person and also time consuming, also sometimes people cross the railway track directly without using stairs. So it is risky for their lives. Many times people will be moving from one platform to another through the trains present on opposite side which may be a threat to life and is also difficult for physically disabled persons to use staircase to move from one platform to another. Also there is a space (distance) between the train door and the platform due to this distance we observe that legs of some passengers get stuck between those gaps. These gaps are influenced by platform's construction-tolerances, movement of the track and the type of train in operation. To solve the problem of walking on stairs we propose an idea of an artificial bridge, this artificial bridge can be used by old persons as well as to take the person with disabilities to another platform. This drawback of the distance can be vanished by using smart door. By using it the passengers can come out easily from the train, by this the accidents due to gap gets vanished. The above proposed system works on microcontroller based technology and gear motor mechanism which is employed to operate Platform Bridge.

2. LITERATURE SURVEY

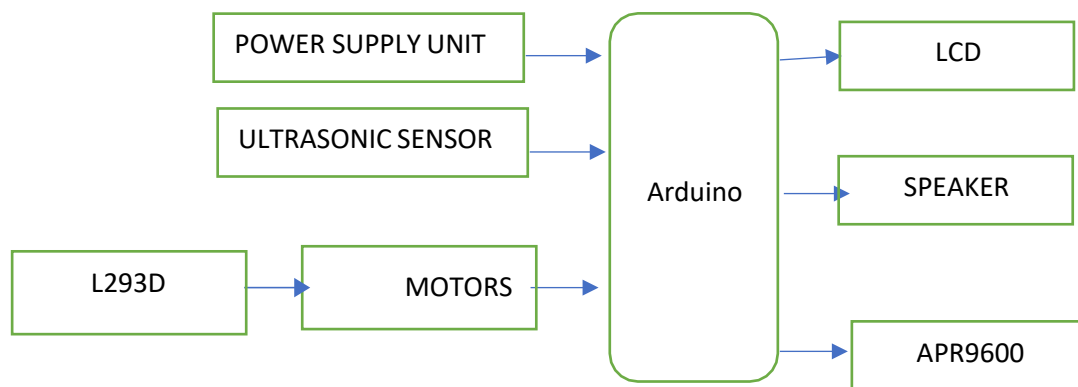
By the design of the automatic bridge between the railway platforms using node mcu will reduce the effort for the senior citizens and also for the handicapped people to climb the stairs in the railway station. They will cross through the bridge present between the platforms. When the train is not in the station the sliding platforms will open and also Barra gates will open for the passengers to cross the platforms. When the train is present in the station the Barra gates and sliding platform is also closed no

passenger will cross the platform at that time. They arranged the buzzer also for alerting the people who crossing the platform at the time when the train is coming to the station. They created the green and red lights also for alerting the people who cannot hear the sounds. Green light for travel through the platform and red light indicates the Barra gates are closing no one should not pass through the platforms[1][6]. There is a robot that follows the line. That line will be indicated in the white with black surface or black line with white surface. There are two sensors proximity sensor and IR sensor. The Proximity sensor for direction and IR sensor for obstacle detection. These sensors are arranged on the front end of the robot. It also contains IR-LED and photodiodes are arranged to the motor for on and off the transistors. When the white surface is detected the photodiodes decrease and leads to voltage drop the photodiodes are increased for the conduction of transistors so the motor will rotate and start moving. When the black line is detected the photodiodes are increased the motor will stop moving[2] IR sensor is arranged at two places in the station first sensor is arranged at the train arrival point when sensor detected it pass signal to the microcontroller. The micro controller alerts the buzzer and LED system and also closes the bridge. When another sensor detected it opens the bridge and also gives LED signal to move on bridge. It also contains the piezoelectric sensor arranged below the platform to generate the electricity and give to the station domestic appliances like fans, tube lights etc[3]. The mobile platforms are used to travel between the tracks. Those are transmitted the data from the sensors to the microcontroller with the help of the 8051 processor and also they used zig bee technology for transmitting the data[4]. According to the train timings the mobile bridge is open and closed through the automation process[5]. The RF receiver is connected to the train and transmitter to some away from the platform when the transmitter transmits the data there will be no bridge between the platforms[7]. In some stations there are line following robots those robots are travelling through the color indication of the line when they detect the black color it starts moving when the color changes to white it stops moving[8]. The Escalators are used to move from one platform to another platform for moving we need to use the stepper motor[9]. In some places RFid tags are used to detect the train position for open and close the mobile bridge on tracks[10]. WILD sensor is used to detect the train and send the information to the microcontroller for open and close the bridge on tracks[11]. At the platform only sensor is arranged when the sensor does not detect the platform will open otherwise it is closed[12]. Some trains having a system that can control the train through the satellite the train GPRS systems are connected through the satellite. With that information they are giving information to next station when they reach the previous stations[15]. The IR sensors are used to detect the train arrival and departure from the station sensor detects the train and send the voice message to the station for alert the passengers to move away from the platform[13].

3. PROPOSED METHOD

Shows System block diagram for Automated Foot Bridge across platform at railway station. Microcontroller controls all the operations through designed logic and program. Proposed system reads the NFC (Near field communication readers) for the request to Open and authorize the using of bridge.

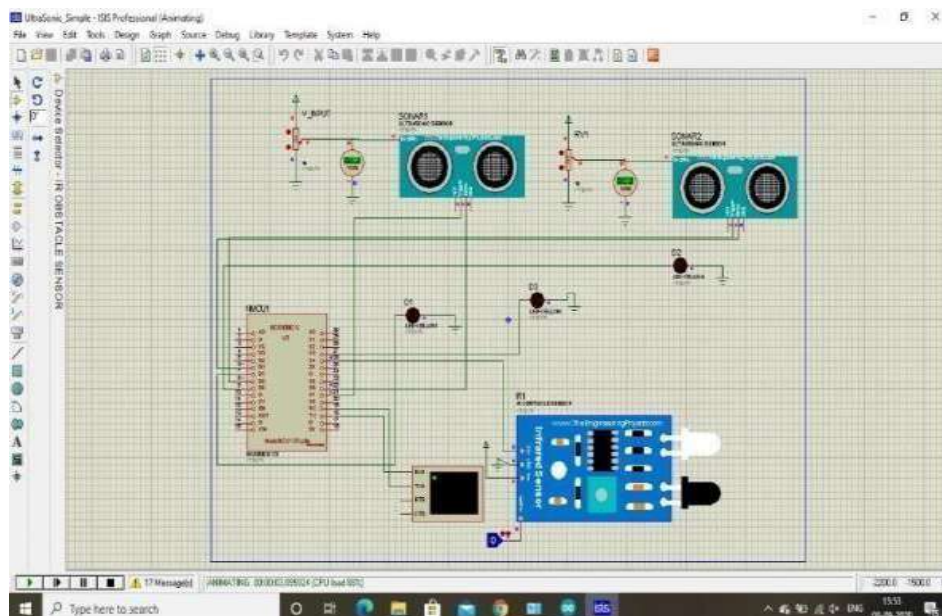
Here the disabled and senior citizens are already provided with the smart cards to Access automatic bridge. IR sensors are connected at either ends of both the platforms and it detects whether there is any person present on the bridge and if there is, it indicates an emergency situation. Based on the signals, the bridge automatically closes When it turns green which means at rain in inbound on the platform. Motor driver along With DC motor is used to demonstrate the working of the bridge. Water level sensing is Used to check the level before bridge operation t a band on operation if the water level is comparatively high to a level where it can damage the system and put human life on Risk.

**BLOCK DIAGRAM**

4. RESULTS

The below diagram shows the connection of the entire setup of the project in proteus. There are total three LEDs. LED 1 is indicated when the train is arriving. LED 2 indicates that the bridge is closed. LED 3 is indicated the bridge is opening. In the display screen, it shows the train arriving, bridge is opening, and bridge is closing. Those are seen in the below figures 8, 9, and 10.

Fig 1 : Software Design



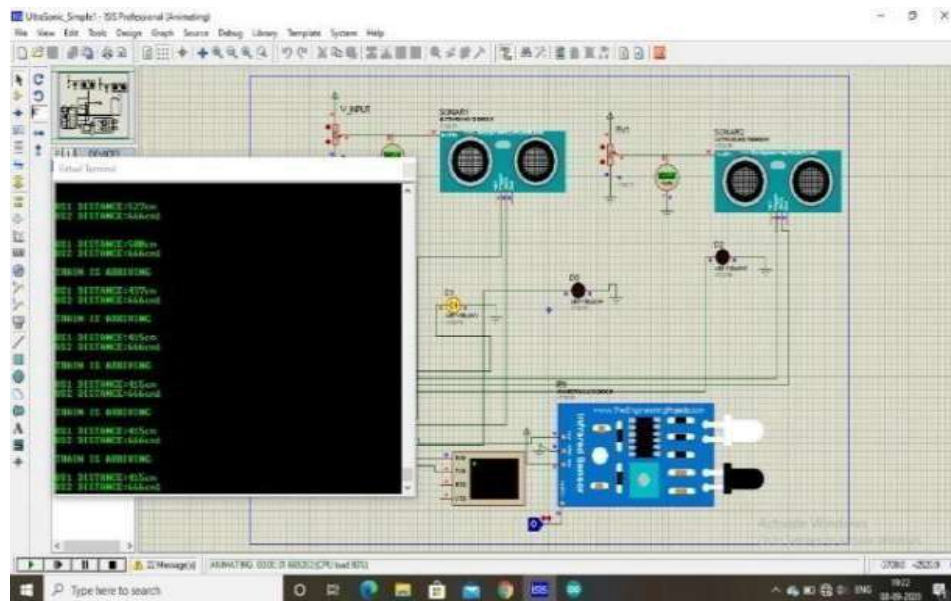


Fig .2 : OUTPUT 1

In the figure 8 the led 1 is turn on and displays a message as train is arriving and also display thatat what distance the train is from the station.

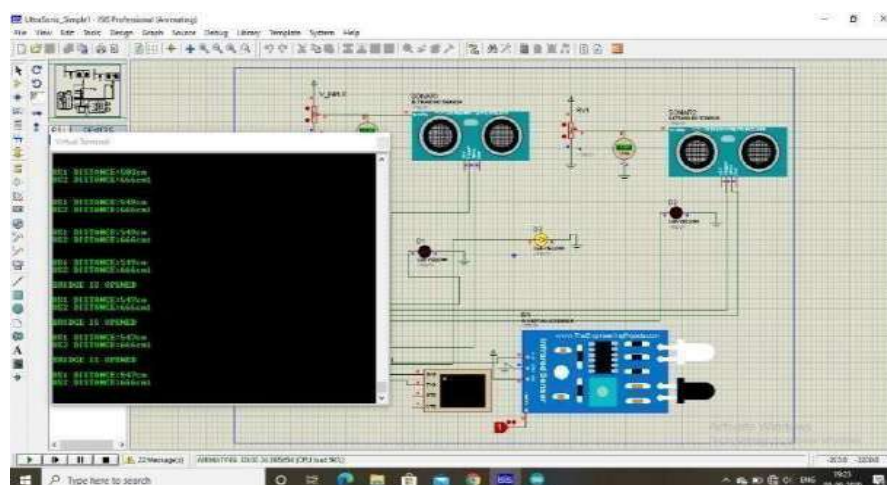


Fig.3 OUTPUT 2

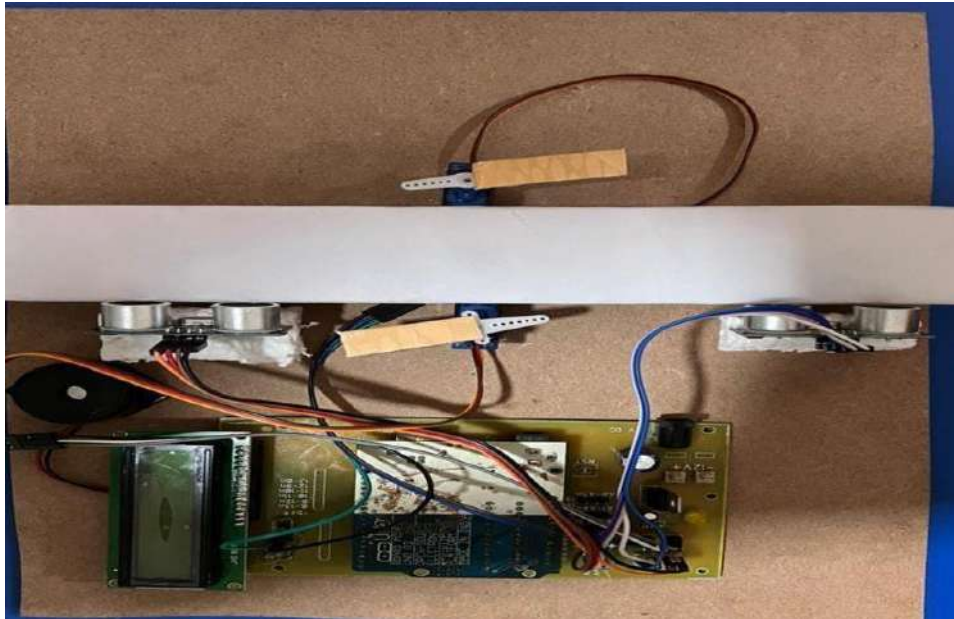


Fig 4 - Prototype

5. CONCLUSION

The main aim of the project is to help the old people and handicapped people to cross the platform without any problem. The cost of the project is less compared with the stair case, elevator and escalator. Through this we can also alert the people in the station of the train arrival. We can easily cross the bridge with less effort. By using the WI-FI, micro controller, sensor and led it can easily open or close the bridge. In case of any failure in the automation there will an automatic switch to open the bridge. The total data is transmitted through wireless for that wifi module is used to send and receive the information of train arrival and departure to the station that information is displayed in oled screen for alert people on the bridge. The color leds also used for not audible people. WI-FI is completely password protected that password is having with the higher official in the station or with the station master for the small village railway stations.

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OPTIMIZED PRECODERS FOR MASSIVE MIMO OFDM DUAL RADAR-COMMUNICATION SYSTEMS

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ABSTRACT

This project considers the optimization of a dual functional radar and communication (RadCom) system with the objective is to maximize its sum-rate (SR) and energy-efficiency (EE) while satisfying certain radar target detection and data rate per user requirements. To this end, novel RadCom precoder schemes that can exploit downlink radar interference are devised for massive multiple-input-multiple-output (MIMO) orthogonal frequency-division multiplexing (OFDM) systems. First, the communication capacity and radar detection performance metrics of these schemes are analytically evaluated. Then, using the derived results, optimum beam power allocation schemes are deduced to maximize SR and EE with modest computational complexity. The validity of the analytical results is confirmed via matching computer simulations. It is also shown that, compared to benchmark techniques, the devised precoders can achieve substantial improvements in terms of both SR and EE.

Index Terms—Energy-Efficiency, massive MIMO, radar and communication, OFDM radar, power allocation. Notwithstanding, most of the aforementioned studies considered joint beamforming or transmitting an integrated waveform mainly for long-range radars and communications where the round-trip time of the waves is sufficiently large to perform radar waveform transmission during downlink, and receiving the radar echos reflected from targets during uplink.

Hence, a pulsed radar transmitting a high-power waveform pulse with a reasonably selected pulse-repetition time (PRT) was considered in most studies. On the other hand, in short-range radars (i.e., automotive radars), as considered in this study, the range of the radar is usually up to $R_{\max} = 200$ m [26], and hence, the maximum round-trip time of the electromagnetic waves is $2R_{\max}/c_0 = 1.33$ μ s, where c_0 denotes the speed of light.

This is a very short time relative to the symbol duration of a typical OFDM system, and thus, the radar transmit and receive antennas must operate at the same time as a continuous-wave radar. Hence, in addition to interference from the communication system, this requires the self-interference between the simultaneously operating transmit and receive antennas to also be considered.

1. INTRODUCTION

Today's radar and communication systems require wideband frequency resources to provide

high-accuracy target detection and high data-rate communications. The co-existence of these systems in what has become a congested spectrum is precarious due to the inevitable interference between them. Several studies have explored how to facilitate such coexistence, particularly through designing robust waveforms that are less prone to interference [1], [2]. In one of the early works, opportunistic spectrum sharing was proposed, in which the communication and radar systems transmit at the same time and frequency if the interference is within tolerable levels [3]. Spectrum sharing has gained more interest with recent MIMO advancements where spatial diversity is utilized. In such systems, the radar waveform is beamformed in the null spaces of the communication interference channel to reduce its impact on the network [4]. This method was further improved by selecting the optimum base-station (BS) cluster with the most null-spaces [5]. The authors in [6] proposed incorporating the design of MIMO matrix completion radars with the communication covariance matrix to reduce their mutual interference. On the other hand, [7] proposed reducing the communication systems interference on radars by exploiting constructive interference within the communication system to minimize their transmit power. Conversely, in [8], joint radar waveform and communication covariance matrix design was also investigated to maximize the communication data-rate by minimizing the radar energy towards the communication receiver. An OFDM based radar waveform was also considered in [9] where the subcarriers are distributed between the radar and communication system. While the above mentioned studies concern relatively colocated radar and communication systems (e.g. a long-range radar and a communication cell), various current applications require simultaneous communications and radar sensing to safely and continuously perform their tasks. These include commercial flight control systems, automotive radar and communication systems, as well as intelligent transportation systems which require the vehicles to sense the environment and communicate with their surroundings to enable autonomous and safe driving conditions as well as infotainment, [1]. To achieve their dual systems require wideband frequency resources and an abundance of energy [18], [24]. As such, there has been increasing interest in developing solutions to enhance these platforms. One such solution considered designing an integrated waveform that can be realized using linear frequency modulation (LFM), continuous phase modulation (CPM) [10], quadrature amplitude modulation (QAM) [11], or OFDM waveforms, [12], [13]. However, using such waveforms imposes a performance tradeoff between the radar and the communication system, as well as restricting beamforming or/and multi-user communication. Furthermore, intrapulse radar-embedded communications were also considered to provide dual-function systems, and optimized via multiobjective optimization to maximize the signal to- interference ratio and minimize the correlation index [14], [15]. In contrast, other approaches considered utilizing spatial diversity in massive MIMO. For example, in [16], two beamforming techniques for downlink RadCom are proposed, one is based on dividing the BS antennas into two separate groups for the communication and radar, with the radar waveform designed to fall into the null-space of the communication channels; in the second method all the antennas are used to beamform the waveform towards the user equipments (UEs) and targets by treating the targets as virtual UEs. Optimum waveform design for the second method was proposed in [17]. The application of OFDM waveforms in vehicular system RadComs has recently gained popularity due to offering desirable signal processing flexibility [18], [25]. The design of such waveforms for vehicular radars were comprehensively studied in [18] and [19]. Other

techniques that follow this approach are proposed in [20] where an interference cancellation algorithm is recommended for mitigating the mutual interference caused by the Doppler shift or/and non-ideal hardware components. In other studies, optimization techniques were used to further enhance the Radcom performance. For instance, in [22], joint subcarrier and power allocation for a surveillance radar with a secondary communication function was formulated as a nonconvex optimization problem which when solved provided the optimum allocations that minimize power consumption. Likewise, resource allocation in wireless-powered RadCom was optimized in [23]. A brief comparison of the aforementioned RadCom studies is presented in Table I. Notwithstanding, most of the aforementioned studies considered joint beamforming or transmitting an integrated waveform mainly for long-range radars and communications where the round-trip time of the waves is sufficiently large to perform radar waveform transmission during downlink, and receiving the radar echos reflected from targets during uplink. Hence, a pulsed radar transmitting a high-power waveform pulse with a reasonably selected pulse-repetition time (PRT) was considered in most studies. On the other hand, in short-range radars (i.e., automotive radars), as considered in this study, the range of the radar is usually up to $R_{\max} = 200$ m [26], and hence, the maximum round-trip time of the electromagnetic waves is $2R_{\max}/c_0 = 1.33$ μ s, where c_0 denotes the speed of light. This is a very short time relative to the symbol duration of a typical OFDM system, and thus, the radar transmit and receive antennas must operate at the same time as a continuous-wave radar. Hence, in addition to interference from the communication system, this requires the self-interference between the simultaneously operating transmit and receive antennas to also be considered. In [21], we proposed a continuous-wave massive MIMO RadCom system with a novel precoder capable of interference exploitation and a waveform design that utilizes all the subcarriers for the communication and radar by transmitting an omnidirectional OFDM waveform. Moreover, since the communication data is beamformed onto the UEs, the targets are likely to be illuminated by the radar waveform and the processing gain of the symbol-based OFDM radar is used to improve the radar detection performance. Due to the aforementioned reasons, an OFDM waveform is employed as the radar waveform, which provides high signal processing flexibility, and enables the use of the same frequency resources for sensing and communications via the proposed architecture. The proposed RadCom architecture and optimized precoders are mainly developed for future vehicular systems, where radar sensing and communications are expected to be paramount requirements, especially for autonomous driving and intelligent transportation systems. In this study, we propose new precoder schemes that can enhance the sum-rate (SR) and energy-efficiency (EE) by optimizing the radar and communication power outputs, as well as, the beam power allocation to the UEs, without compromising the communication capacity or/and radar detection. Furthermore, we derive analytical expressions for the communication link capacity and radar SINR of our proposed RadCom architecture, [21] 1, under practical network conditions where the UEs and targets may have significantly different channel gains. Moreover, we investigate the influence of other network parameters on the SR and EE of the considered RadCom system and show that the proposed schemes offer superior performance to benchmark techniques. The contributions of this study can be summarized as:

- 1) Proposed novel RadCom precoder schemes that maximize the communication SR and EE, while maintaining a desired radar detection performance and minimum rate per UE

- 2) requirements.
- 3) Derived analytical expressions for the downlink communication capacity and radar SINR for our proposed RadCom, assuming randomly located UEs and targets.
- 4) Optimized the SR and EE of RadCom for different precoding schemes, while taking into account the communication and radar transmit powers, and number of UEs and antennas.

2. LITERATURE SURVREY

The problem of spectral congestion is forcing legacy radar band users to investigate methods of cooperation and co-design with a growing number of communications applications. This problem has motivated government entities like the Defense Advanced Research Projects Agency (DARPA) to begin funding and investigating these methods to not only ensure military radar coverage is maintained as spectral allocation is renegotiated, but to potentially improve both military radar and military communications by co-designing the systems from the ground up [1]. However, these issues extend far beyond just commercial communications and military radar, and include a wide variety of applications such as next generation automobiles, medical devices, and 5G wireless backhaul. As a result, researchers have begun investigating not just methods of military radar and communications coexistence, but more fundamentally methods of joint remote sensing and communications. These two functions, at their core, tend to be at odds with one another. For example, sensing typically sends a known waveform or stimulus and measures a response.

Only showing two users, a communications and radar user, and some external interference, the challenges facing heterogeneous two-user legacy systems is readily apparent. The users can be operating in the same band and adjacent in space, or co-located and operating in adjacent spectral bands. Regardless, both users present interference to the other and require mitigation to function optimally. Users are dynamic and adapt to the environment and one another. There are no dedicated radar or communications resources, but dynamic elements cooperate and are co-designed to meet the instantaneous mission. External interference is reduced inherently, as two-user systems are more easily extensible to multi-user, multi-function nodes capable of adapting and communicating to enable the joint, distributed mission. Environment, often referred to as the channel. In the case of the radar system, the sent signal is known and the target channel is unknown and is desired to be sensed (estimated). However, a communications system typically sends an unknown signal with the assumption that the propagation channel is known or previously estimated. We can also consider the near inverse of this situation: passive radar. In this case, we must estimate the data as a nuisance parameter to obtain the information we care about (channel estimation). A non-adaptive communications channel, where the channel is stationary or controlled, is the dual of the traditional radar system. Therefore, when considering the general task of jointly sensing and communicating, it becomes immediately apparent that the solution is non-trivial. A typical two-user topology and the problem of spectral congestion is illustrated in Figure 1. With opposing requirements, sensing and communications systems are often designed in isolation. The only consideration for the other user in legacy systems has been in the form of regulatory constraints, such as those imposed by the FCC in the United States. However, governmental regulation does nothing to incentivize either user to minimize interference beyond the required limits or assist

each other to mutual benefit. As future systems vie for spectral resources, RF convergence and cooperation is the solution to an increasingly crowded wireless domain. We define the ultimate solution, RF convergence, to be the operating point at which a given bandwidth allocation is used jointly for radar and communications to mutual benefit. This includes but is not limited to multi-function transceivers, inband full-duplex (IBFD) operation, shared waveforms, and dynamic time allocation. Shown in Figure 2 is where the authors see the future of channel topologies heading. Rather than dedicated radar or communications elements, universal dynamic users are designed to adapt to meet instantaneous mission needs. Bandwidth, data rate, and estimation rate [2] are modulated depending on communications need, targets present, and target dynamics. While one may note both cognitive radio and cognitive radar are both active fields of development, cognitive radio has typically been developed in the context of resource sharing [3], while cognitive radar has traditionally focused more on intelligent radar systems to improve radar performance [4]. Previous surveys have looked at the spectral congestion problem from a dynamic access perspective with a focus on regulatory issues and signal processing [5]. However, the focus in that work is still on dynamic communications users, not necessarily including remote sensing users. Recent work surveyed spectrum sharing methods and underutilization of RF resources [6], focusing mainly on communications with some mention of sharing with non-communications users. This work focused more on existing spectrum sharing regulation, as opposed to future architectures and limits of coexistence. In this work, we discuss the general problem of spectral congestion and the future solutions to this problem. For the two-user case, RF convergence is broken down into four topologies: the joint multiple-access channel, the monostatic broadcast channel, the bi-static broadcast channel, and the IBFD channel. These topologies have been explored in recent literature by various researchers as interest in RF convergence has resurged. The joint multiple-access channel problem is addressed in References

3. PROPOSED METHOD

The RadCom system under consideration, where the BS beamforms the UEs' data and omnidirectionally transmits interleaved OFDM radar waveforms via two radar transmit antennas, while the radar receive antennas receive the radar returns reflected off the targets [19]. The proposed architecture is mainly designed for the detection of near targets, and hence, includes a continuous-wave radar with simultaneously operating transmit and receive antennas. The communication antenna array beamforms data onto the UEs, while the radar antenna emits an omnidirectional OFDM radar waveform for detecting possible targets in the range, and the radar interference at the UEs is exploited. Employing separate waveforms for communications and sensing maintains communication capacity and satisfies the required radar detection performance during downlink transmission. Furthermore, all subcarriers can be used for both communications and radar sensing at the same time, and this enables highly efficient bandwidth utilization.

Moreover, the interfering communication signals with the radar waveforms are substantially suppressed by symbol-based OFDM radar processing gain, and thus, the impact of the communication signals on the radar target estimation is greatly alleviated system model in which massive MIMO downlink communication and transmission and reception of omnidirectional OFDM radar waveforms are simultaneously accomplished by the RadCom BS. Fig. 2 illustrates the block diagram of the proposed BS/AP architecture, where firstly, the radar waveform and communication precoder matrices are constructed, followed by the

inverse fast Fourier transform (IFFT) before the signals are conveyed to the antennas via digital-to-analog converters (DACs) and the transmitter's (Tx) RF chains. On the radar receiver side, the reflected signals are converted to baseband via the analog-to-digital converters (ADCs). Subsequently, the digital canceller estimates the self interference from the transmit antennas and eliminates it. The communication and radar operations are synchronized such that the radar transmit antennas emit the radar waveform, while the radar receive antennas receive the echos from the targets during the communication downlink¹. Note that while communication signals are beamformed towards the desired UEs by exploiting spatial diversity, the radar signals must be emitted into all directions to cover a wide range of area for sensing. This study focuses only on downlink communication and target detection simultaneously. Hence, uplink communication is not considered. However, during uplink, all radar transmit and receive antennas can be utilized for uplink communication to enhance the uplink capacity. Moreover, it is also possible to perform target detection during uplink by employing successive interference cancellation [21].

4. RESULTS

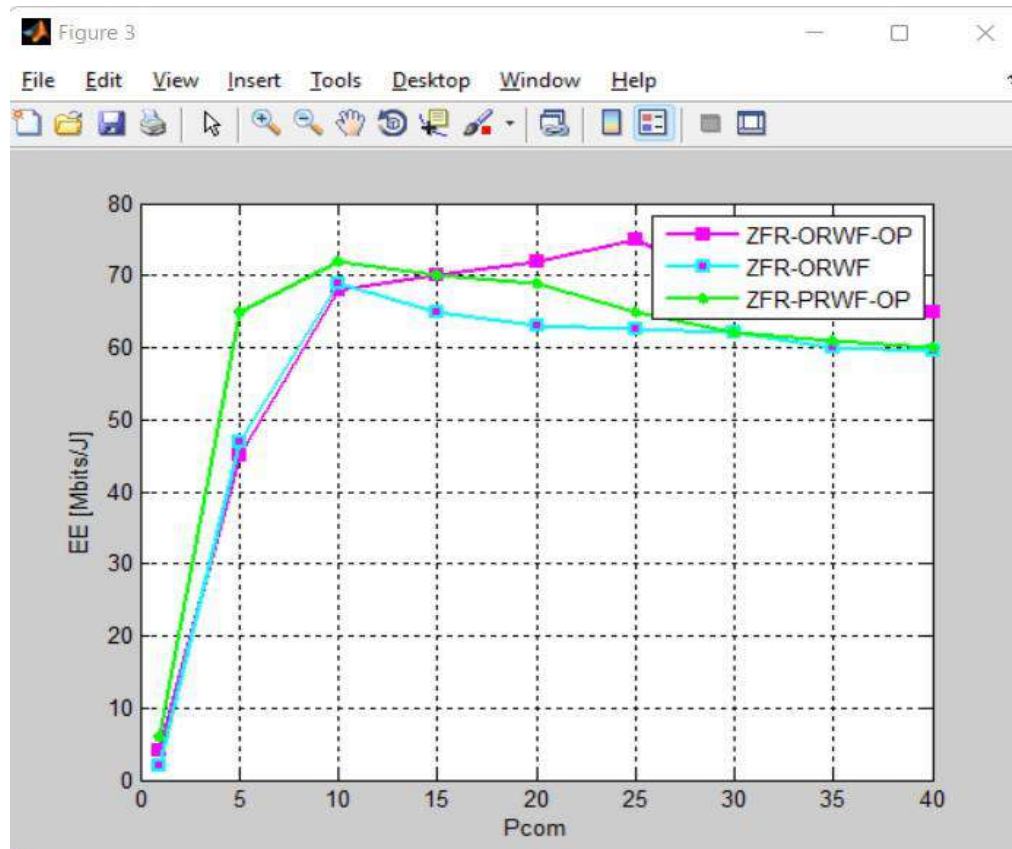
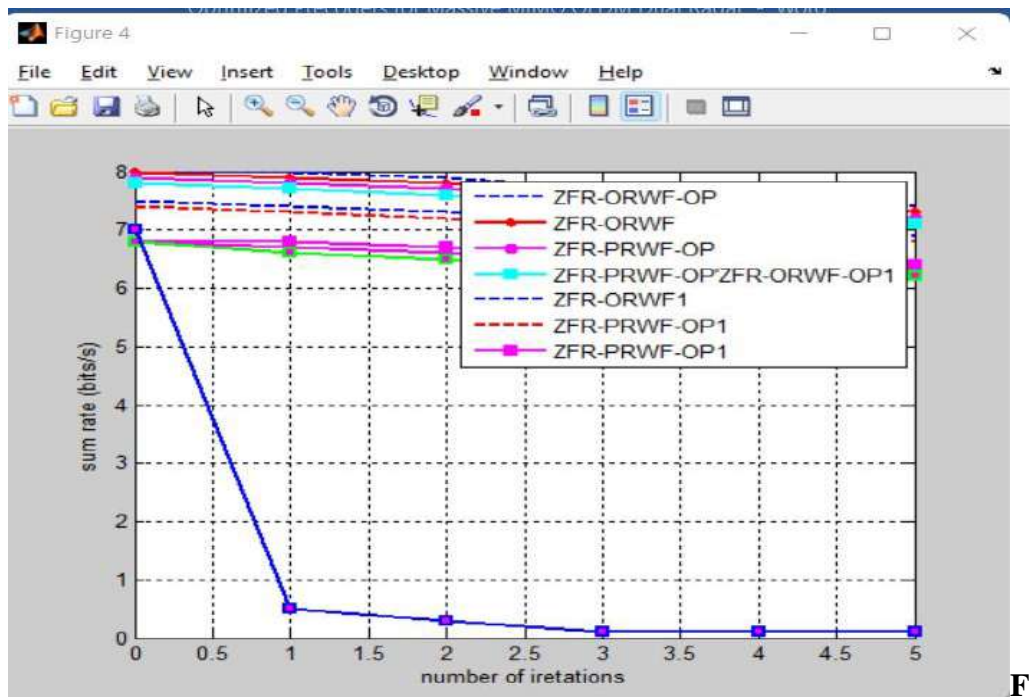
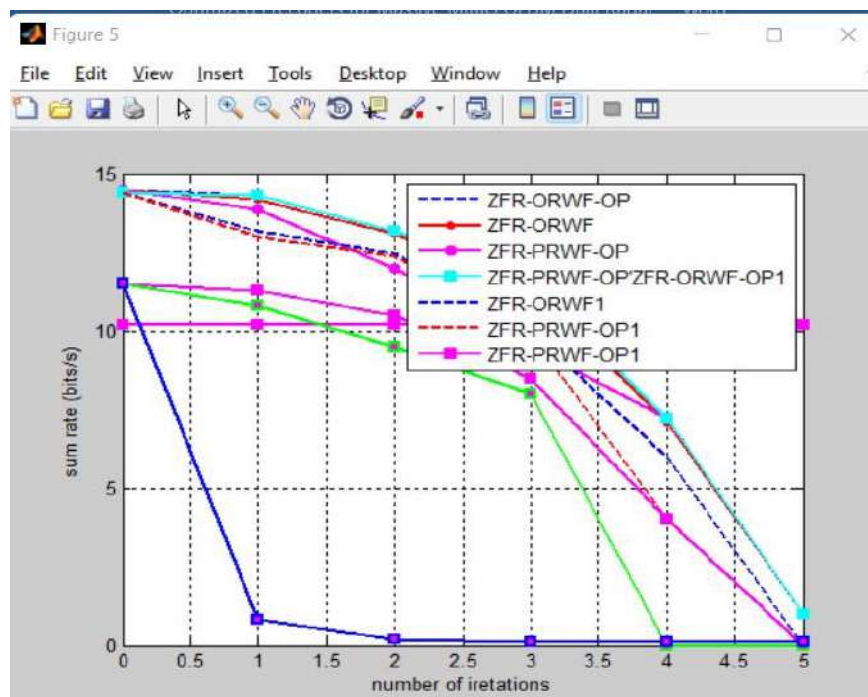


Fig 6. Analytical and simulation results of SR w.r.t. radar-communication power ratio.

$$M = 100, K = 10, P_{com} = 10 \text{ W.}$$



. SR of RadCom w.r.t increasing radar-communication power ratio. $M = 100$, $p_{com} = 10$ W.



EE of RadCom with different precoding schemes. $M = 100$, $K = 10$

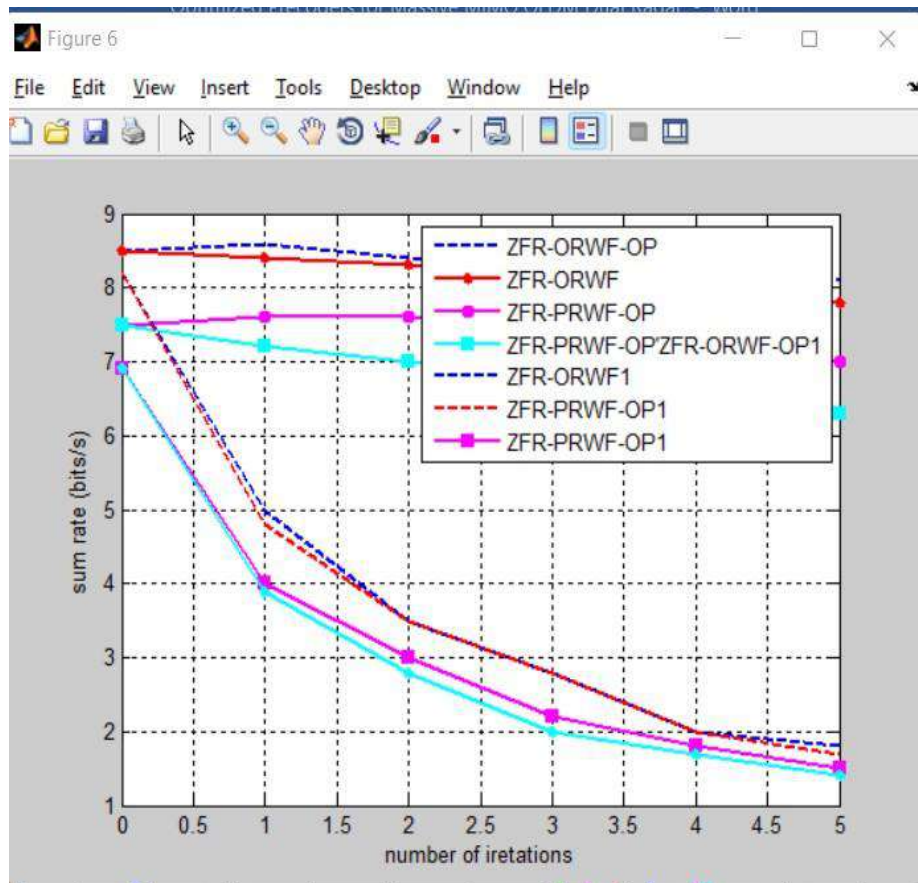


Fig 9. Resultant sum rate graph

5. CONCLUSION

This project has presented optimized massive MIMO OFDM RadCom precoders for practical network scenarios where the UEs and targets are randomly located in the network and have random channel gains.

Firstly, analytical expressions for the communication capacity and radar SINR have been derived:

Using these expressions, the beam power allocation, radar-communication power ratio, and communication power output have been optimized to maximize the network.

SR and EE, while guaranteeing a desired radar target detection SINR and UEs' minimum rate requirements.

The validity of the analytical results and proposed schemes have been validated via extensive numerical simulations. It was shown that the proposed precoders substantially benefit from the optimum radar waveform design and optimum beam power allocation, in addition to exploiting the radar interference to enhance SR and EE.

Lastly, the presented complexity analysis of the proposed schemes have demonstrated that the computational requirement is modest, making them viable options for realtime.

RadCom systems. Future extension of this work will consider multi-cell RadCom networks, including cell-free MIMO with inter-cell interference management and sharing of sensing information between the UEs.

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Trends and Challenges for the Spectrum Efficiency in NOMA and MIMO based Cognitive Radio in 5G Networks

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ABSTRACT

With the exponential demand for frequency spectrum and the new generation of communication systems (5G), efficient and less complex ways of using the spectrum are needed. Thus, spectrum sensing and sharing techniques have become essential to assist cognitive radio (CR). The non-orthogonal multiple access (NOMA) and multiple-input multiple-output (MIMO) are the most promising techniques for increase efficiency and system capacity in 5G networks. In this project, we presents the most promising approaches of spectrum efficiency in NOMA and MIMO based CR. We are using Cognitive Radio here because, It have an Intelligent algorithm that can sense, optimize, its environment, track changes and react upon it's findings. A CR is an autonomous unit in communications environment that frequently exchanges information with the networks it is able to access as well as with other CR's. The primary reason for adopting NOMA in 5G owes to its ability of serving multiple users using the same time and frequency resources. MIMO Technology is an established wireless communications technique for sending and receiving multiple data signals simultaneously over the same radio channel.

1. INTRODUCTION

Due to the high data rates required by 5G networks and the increased demand for frequency spectrum, more efficient ways of using the spectrum were needed. To increase efficiency, the CR uses spectrum detection and sharing techniques to dynamically allocate the secondary user (SU) in spectrum holes or along with the primary user (PU) in a shared band [1]–[3]. NOMA and MIMO are also promising techniques to improve the efficiency and capacity of the system [4]–[6]. NOMA allows multiple users to share the same frequency, time, and code resource elements across different power levels using transmitter overlay encoding and successive interference cancellation (SIC) on the receiver [6], [7]. MIMO uses multiple antennas in transmission and reception to increase radio link capacity by exploiting multipath propagation [8]. Among promising trends in this scenario we have deep learning based methods to increase performance of the NOMA and MIMO techniques, also to improve signal recognition methods [4]. Cooperative sensing in NOMA based CR are also promising methods of improve efficiency and reliability of the systems by achieving a win-win situation in a collaboration scheme [7], [9]. Simultaneous wireless information and power transfer (SWIPT) is also promising to optimization of the spectrum resource sharing [10]. In this approach, the SUs uses SWIPT for spectrum detection and then shares this information [11]. And compressive sensing is another promising trend by improve spectrum allocation in NOMA heterogeneous networks [12], [13]. In some articles, we can see some of this approaches. For instance, in [14] the authors proposed a sensing spectrum technique based on matched filter for NOMA based CR. They developed a method for detection of the modulations QAM64 and QAM-256 with a NOMA based matched filter. The evaluation of performance was made by analyses of bit error rate (BER) vs signal-noise rate (SNR), probability of detection and probability of false alarm. In this work, they obtained good results when the SNR is above 5 dB, but below 5 dB the results were not so good. Additionally, in [8] the authors proposed a approach for spectrum sensing based in energy detection in NOMA-MIMO based

CR. They used a blindly combined energy detector (BCED) to detect the presence of PU, and then a cognitive base station (CBS) simultaneously provides information for multiple CR using NOMA and MIMO techniques. The performance is compared with the same method for OMA-MIMO based CR using spectrum efficiency (bps/Hz) vs transmit power (dBm), also probability of detection and probability of false alarm. As results, they presents that spectrum efficiency in NOMA-MIMO based CR are superior than OMA-MIMO based. Although they tested just for the BCED method. So, in this article we propose a quantitative research in the most recent papers about the theme and a qualitative evaluation based on metrics to investigate the most promising trends for increase spectral efficiency, together with your challenges Cognitive Radio [1], [2] is an innovative radio technique that provides efficient radio spectrum utilization. Its main objective is to track a spectrum hole and to detect unoccupied licensed spectrum bands that are assigned to cognitive terminals (CTs) without interfering with the primary user (PU). Hence, spectrum sensing is a necessary function of cognitive radio network (CRN). Cooperative/coordinated spectrum sensing [3] is an effective approach to advance sensing accuracy. It is combining the sensing reports from all coordinated CTs in a fusion centre to decide on either the absence or presence of a PU. However, the sensing process sharing of additional CTs will cause increment of spectrum sensing and reporting energy consumption. Energy-efficient is a significant parameter for CRNs as the CTs are powered by batteries. Rapid growth in energy consumption has produced a shift towards energy-efficient design in wireless networks [4]–[7]. In wireless sensor networks [8], the sensor node lifetime depends on the consumed energy at a sensing process. To extend its lifetime, efficient usage of energy is a prerequisite. Therefore, energy efficiency is a significant parameter for CRNs

2. LITERATURE SURVEY

In recent years, we have witnessed explosive growth of wireless data traffic. With the development of emerging applications and smart terminals, it is predicted that mobile data traffic will grow by around 1000 times in the next decade [1]. One straightforward approach to accommodate the tremendous amount of wireless data is to find more spectrum resource by refarming the current spectrum. However, the available spectrum resource is crowded and limited. Meanwhile, it may take tens of years to repurpose a spectrum band for another use due to, for instance, regularization or standardization. Thus, the fifth generation (5G) communication network is expected to solve the issue with different methods. It is envisioned that 5G networks should have around 1000 times throughput improvement, 10 times spectrum efficiency improvement, and 100 times energy efficiency improvement [2]. To achieve these goals, the main working groups on 5G wireless networks commonly recognize promising evolutions of current networks from three aspects, as shown in Table 1. The first one is to renew the network architecture. In particular, 5G networks are expected to be more heterogeneous and denser than current ones to boost spatial reuse gains. For instance, 5G networks will deploy lots of picocells, femtocells, and microcells. Meanwhile, 5G networks will densify cells and users by shrinking cell sizes and simultaneously activating more users, respectively. The second one is to explore more spectrum resource to increase spectrum bands like millimeter-wave and unlicensed spectrum. The third one is to adopt new communication techniques to improve the spectrum efficiency, including cognitive radio (CR), device-to-device (D2D) communication, in-band full-duplex (IBFD) communication, non-orthogonal multiple access (NOMA), Long Term Evolution on unlicensed spectrum (LTE-U), and so on. All these evolutions make 5G networks more complicated than current ones. Although new spectrum resource will be explored in 5G networks, the available spectrum resource is still scarce in terms of the emerging mobile traffic. As such, a proper spectrum resource management scheme is crucial to accommodate the mobile traffic in 5G networks and improve the system performance. According to a study from Europe, 76 GHz spectrum resource is needed if the spectrum is exclusively used in 5G networks. However, the amount of spectrum can be reduced to 19 GHz with spectrum sharing. Therefore, we view the spectrum resource management

in 5G networks as spectrum sharing. The basic idea of spectrum sharing is to allow transceivers to use idle or underutilized spectrum band temporally and geographically. Indeed, spectrum sharing is a promising strategy to tackle the imbalance between limited spectrum resource and unprecedented traffic demands [3]. In this article, we provide a survey of recent techniques for spectrum sharing. Different from existing papers, we summarize five spectrum sharing techniques for possible use in 5G networks, as shown in Fig. 1. In particular, we study CR, D2D communication, IBFD communication, NOMA, and LTE-U. For each technique, we present the basic principle and the research methodology of the state of the art. We also emphasize the challenges to deploy each individual technique in 5G networks. Finally, we discuss the integration issue of multiple spectrum sharing techniques and identify potential challenges. CR is an effective technique to enhance the spectrum efficiency and potentially ameliorate the spectrum scarcity problem [4]. By sensing the radio environment, cognitive users can adaptively configure transmitters and protect incumbent users. In general, a cognitive period consists of two phases: spectrum sensing and cognitive transmission. In the spectrum sensing phase, cognitive users sense the radio environment and collect spectrum information (e.g., occupation status, traffic, energy, channel gain). In the cognitive transmission phase, cognitive users select the best spectrum bands and adapt transmissions according to the collected spectrum information. Besides the prior key technologies with massive multi-input-multi-output (MIMO) [6], [7], small cell [2] and heterogeneous networks (HetNets) [5], non-orthogonal multiple access (NOMA) has received various attentions both in academia and industry for its SE performance merits [8]–[10]. This is due to the fact that NOMA can share the same frequency resource block (called as the sub-band [11] in the following content) by multiple users [11]. In literature, NOMA technologies are categorized by different domains, for instance, code domain NOMA (e.g. sparse code multiple access (SCMA) [12], pattern division multiple access (PDMA) [8], [13]) and power domain NOMA [14].

3. PROPOSED METHOD

To improve efficiency and reduce complexity of 5G networks some techniques are being seen as promising trends. Among these techniques we have: deep learning based methods; cooperative, compressive and SWIT methods of sensing in NOMA and MIMO based CR.

It is designed a DNN to estimate the channel state information (CSI) in real-time and solve optimization problems in signal detection. Differently from traditional NOMA block-based system, the DNN is responsible for approximating the whole NOMA system, which includes the base station, all the users (signal receivers) and wireless channels [4], [15].

TABLE I
COMPARISON BETWEEN DNN-BASED METHOD AND SISD WITH IMPERFECT CSI (BIT/HZ/SEC VS SNR).

	$-5dB$	$5dB$	$15dB$	$25dB$
Proposed by [4]	≈ 5	≈ 14.8	≈ 25	≈ 37.5
SISD [4]	≈ 4.7	≈ 10.7	≈ 21.5	≈ 33

Table 5.1: SISD: support detection.

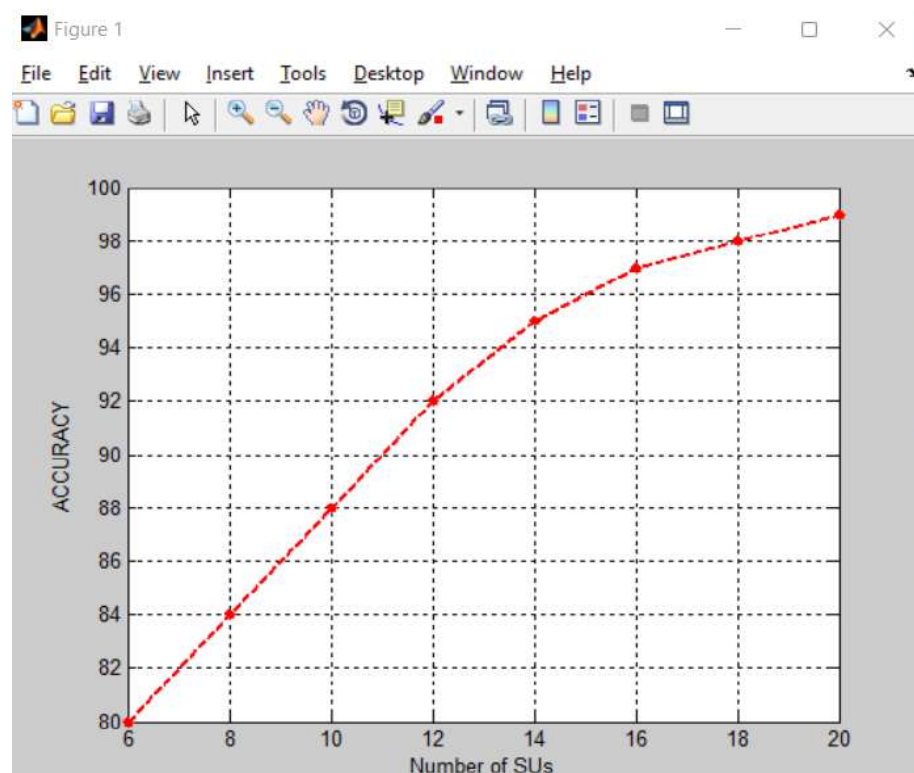
We can see in the Table I that the deep learning method proposed by [4] achieves better data rate (Bit/Hz/Sec) than the other method used for comparison. Also in [16], they propose a deep learning approach for reducing the complexity of the power consumption problem in NOMA architecture. For this they use the SWIP with the purpose of increasing the battery-life in communication devices. As input of the neural network they use the channel coefficients generated randomly. The output is the optimal solution for the power consumption problem.

In this approach the base station (BS) receives a copy from the strong user and other from the weak user in two phases. In the first phase, the weak user transmits his signal to the strong user and the BS. In the second phase the BS receives from the strong user the decoded signal that the weak user

transmitted in the first phase. Combining these two signals results in the increase the spatial diversity gain, then the BS can improve the reliability of the receive signal [7]. Furthermore, a spectrum sensing is made for identification of spectrum holes avoiding useless transmission, increasing performance of the system [7]. Another way to use the cooperative sensing in NOMA is proposed in [18]. In NOMA more than one user can transmitted simultaneously in the same time-frequency resource, so the number of channel states increase exponentially [18]. To deal with this challenge, is proposed use a machine learning

Using overlapping tiers of small cells, heterogeneous networks (HetNet) are used to increase the coverage and sum ratio of the cellular system [20]. NOMA technology improved the overall sum ratio of HetNet networks, but introduces a concern of managing the inter-user interference. To increase efficiency, it is seen as promising to use the restricted weighted fast iterative shrinkage-thresholding (R-WFIST) algorithm as an interference management technique based on compressive sensing with joint power allocation [12]. For this, the concatenated aggregate-interference vector over all small cells is multiplied by a compressed matrix. The R-WFIST is used as a compressive sensing algorithm to estimate the sparse power vector. The complexity of this approach depends mainly of the R-WFIST algorithm, which is very similar to the traditional methods [12].

4. RESULTS



5. CONCLUSION

In this Project, we present trends in spectrum efficiency for the new generation of communication systems (5G). With the advent of NOMA and MIMO technologies, new techniques to improve spectrum efficiency are seen as promising. Here we proposed four of them based on deep learning; cooperative, compressive and SWIT methods of detection and sharing of spectrum in CR based on NOMA and MIMO. We can see the main remarks of each trend. All of these techniques have not yet been studied deeply in real-world scenarios, giving us opportunities to research and develop new methods for the challenges so that the multiple users access the network with the stable speed without

any interrupt.

When 5G technology is implemented there will be the larger frequency bandwidth. To overcome the distractions during the spectrum efficiency the NOMA and MIMO is introduced based on Cognitive Radio where the cognitive radio have a intelligent algorithm that can sense optimize and manage the data based on the environment.

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Fog Fumigation Machine to room sanitization for CORONA AreaGanugula Vineeth¹, Maraju Manikanta Pavan Acharya¹, Pulimi Amulya¹,Sudnapu Sai Kumar¹, B. John Vijay Prathyush¹¹Department of Electronics and Communication Engineering, Malla Reddy Engineering College (A), Secunderabad, Telangana, India**ABSTRACT**

Environmental surfaces in health-care settings include furniture and other fixed items inside and outside of patient rooms and bathrooms, such as tables, chairs, walls, light switches and computer peripherals, electronic equipment, sinks, toilets as well as the surfaces of non-critical medical equipment, such as blood pressure cuffs, stethoscopes, wheelchairs and incubators. In non-healthcare settings, environmental surfaces include sinks and toilets, electronics (touch screens and controls), furniture and other fixed items, such as counter tops, stairway rails, floors and walls. Environmental surfaces are more likely to be contaminated with the COVID-19 virus in health-care settings where certain medical procedures are performed. 6-8 Therefore, these surfaces, especially where patients with COVID-19 are being cared for, must be properly cleaned and disinfected to prevent further transmission. Similarly, this advice applies to alternative settings for isolation of persons with COVID-19 experiencing uncomplicated and mild illness, including households and non-traditional facilities.

Transmission of the COVID-19 virus has been linked to close contact between individuals within closed settings, such as households, health facilities, assisted living and residential institution environments. 10 In addition, community settings outside of health-care settings have been found vulnerable to COVID-19 transmission events including publicly accessible buildings, faith-based community centres, markets, transportation, and business settings. 10,11 Although the precise role of fomite transmission and necessity for disinfection practices outside of health-care environments is currently unknown, infection prevention and control principles designed to mitigate the spread of pathogens in health-care settings, including cleaning and disinfection practices, have been adapted in this guidance document so that they can be applied in non-health care setting environments.

1. INTRODUCTION

The water pump actually works by detecting the infrared rays. Whenever the human body comes near a motion sensor so as the human body reflects infrared rays, the motion sensor detects this infrared rays and it gives us a HIGH signal through the output pin. This HIGH signal is then read by the Arduino. So if Arduino reads a HIGH signal, it will give a HIGH signal to the relay module which means that the relay will turn on, and as a result the Power relay will turn on and it will turn on the Water Pump for 15 seconds (Can be changed). Similarly if the Arduino reads a LOW signal, it will make the relay pin LOW and as a result the Water Pump will remain off. In this I had used 2 PIR sensors to make it more precise if any of them sense the motion then the relay will turn on for 15 seconds (Can be changed). We cannot use 5V Relay directly with the Water Pump because In my case, the water pump which I had used in this project has an Ampere(A) rating of 16Ampere and the 5V Relay has a max load of 10Ampere so to control the water pump I used one more relay with 5V Relay Module. which is 12V Power Relay. The method of room cleaning used in ward rooms and operating theaters usually involves cleaning and/or disinfecting using a mop. In some facilities, however, spraying of disinfectant onto floors and walls is also done. Such spraying is generally performed while wearing protective masks, goggles and/or protective clothing. However, the Centers for Disease Control and Prevention (CDC) does not recommend this practice because disinfection by spraying or fogging carries the risk of harmful side

effects.

Therefore, to re-evaluate this fogging disinfection method we established a temporary laboratory and examined the effectiveness of disinfectant on a variety of bacteria. The results of this study showed a good disinfection effect, so an automatic fogging disinfection unit (AFDU) capable of filling the room with fog was developed. The features of the AFDU were as follows: the particles were very fine and almost uniform at 10 μm or less; it could spray evenly throughout the room; after setting the disinfectant, fogging could be carried out completely automatically. In this study, the AFDU was used to disinfect an operating theater, and its effectiveness was examined.

2. RESULTS

The experiment carried out at the temporary laboratory used the following disinfectants: 0.2% benzalkonium chloride, 0.05% chlorhexidine gluconate, 0.2% alkyldiaminoethylglycine, and 1.0% povidone iodine. The effectiveness of disinfection depended on the types of bacteria and disinfectants. By spraying the disinfectants for 3, 5 or 8 minutes the reduction in bacteria and the effectiveness of disinfection could be easily observed. The optimal disinfection effectiveness was obtained with 1.0% povidone iodine. All bacteria were killed by povidone iodine spraying for 8 minutes. 0.2% Benzalkonium chloride (Figure 2) had the next best disinfection and bactericidal effect, exhibiting an effectiveness of 100% on *Staphylococcus aureus*, *Enterococcus faecalis*, *Acinetobacter anitratus* and *Candida albicans* with 5 minute spraying, and on *Serratia marcescens* and *Burkholder cepacia* with 8 minute spraying. However, it did not show adequate effectiveness against two kinds of *Pseudomonas aeruginosa* even with 8 minute spraying. 0.2% Alkyldiaminoethylglycine showed weak effectiveness, and 0.05% chlorhexidine gluconate spraying for 8 minutes was not effective enough, with 6 species of bacteria still surviving. The effectiveness of disinfection was higher on the lower shelf than on the middle and upper shelves. However, the difference was minimal and it is suggested that this system was effective for the uniform disinfection of a room in a short time. After fogging, 0.05% chlorhexidine gluconate and 1.0% povidone iodine remained adhered to the surfaces and problems relating to their odor and color led to the judgment that they were not suitable for the subsequent experiments.

3. CONCLUSION

Fog Fumigation machine has been constructed and can be easily installed and controlled remotely. By using this machine we can greatly control the virus or bacteria contamination. The method of room cleaning used in ward rooms and operating theaters usually involves cleaning and/or disinfecting using a mop. In some facilities, however, spraying of disinfectant onto floors and walls is also done. Such spraying is generally performed while wearing protective masks, goggles and/or protective clothing. However, the Centers for Disease Control and Prevention (CDC) does not recommend this practice because disinfection by spraying or fogging carries the risk of harmful side effects.

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DESIGN AND IMPLEMENTATION OF NOC ROUTER

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ABSTRACT

Memories are one of the most useful VLSI building blocks. **Semiconductor memory** is a digital electronic semiconductor device used for digital data storage. Thus stored data can be processed for realizing real time applications like routing a data through a router switch. The router is a **Network Router** has a one input port from which the packet enters. It has three output ports where the packet is driven out. Packet contains two parts. They are address, and data. Packet width is 8 bits. Destination address (DA) of the packet is of 8 bits, among those 2 bits are for address and the remaining 6 bits are for data. The switch drives the packet to respective ports based on this destination address of the packets. Each output port has 2-bit unique port address. If the destination address of the packet matches the port address, then switch drives the packet to the output port. In this paper the Xilinx 14.7ise Tool is used for synthesis and simulation. The HDL coding and test bench environment verification can be developed by using VERILOG.

1. INTRODUCTION

Router is a packet based protocol. Router drives the incoming packet which comes from the input port to output ports based on the address contained in the packet. The router has a one input port from which the packet enters. It has three output ports where the packet is driven out. The router has an active low synchronous input reset which resets the router.

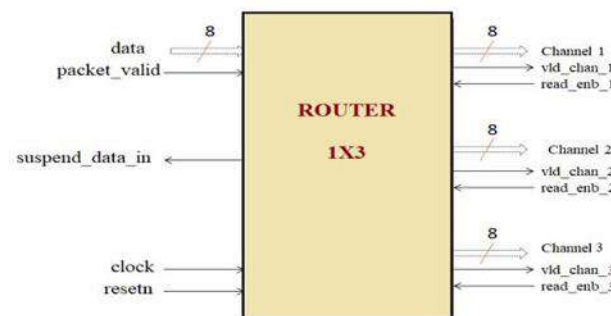


Figure: Block Diagram of Router'

Packet contains 3 parts. They are Header, payload and parity. Packet width is 8 bits and the length of the packet can be between 1 bytes to 63 bytes.

Packet Header:

Packet header contains two fields DA and length.

DA: Destination address of the packet is of 2 bits. The router drives the packet to respective ports based on this destination address of the packets. Each output port has 2-bit unique port address. If the destination address of the packet matches the port address, then router drives the packet to the output port. The address "3" is invalid.

Length: Length of the data is of 6 bits and from 1 to 63. It specifies the number of data bytes. A packet can have a minimum data size of 1 byte and a

maximum size of 63 bytes.

If Length = 1, it means data length is 1 bytes

If Length = 2, it means data length is 2 bytes

If Length = 63, it means data length is 63 bytes

Packet - Payload:

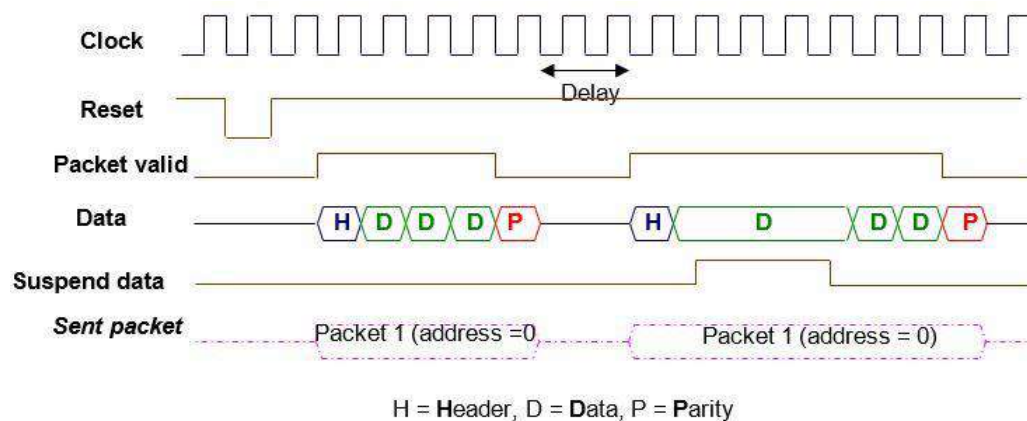
Data: Data should be in terms of bytes and can take anything.

Packet - Parity:

Parity: This field contains the security check of the packet. It should be a byte of even, bitwise parity, calculated over the header and data bytes of the packet.

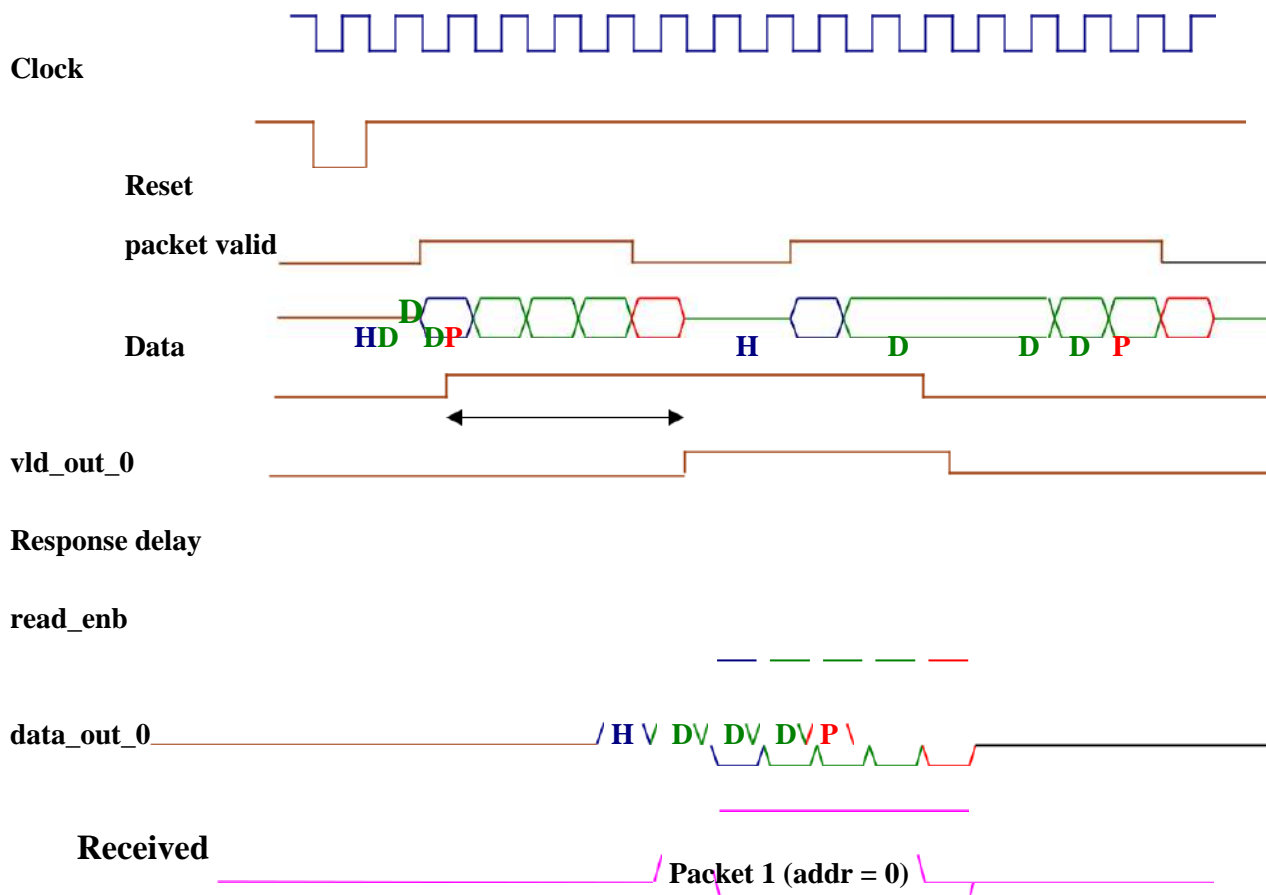
Router Input

Protocol:



The characteristics of the DUV input protocol are as follows:

- All input signals are active high and are synchronized to the falling edge of the *clock*. This is because the DUV router is sensitive to the rising edge of *clock*. Therefore, driving input signals on the falling edge ensures adequate setup and hold time, but the signals can also be driven on the rising edge of the clock.
- The *packet_valid* signal has to be asserted on the same *clock* as when the first byte of a packet (the header byte), is driven onto the *data* bus.
- Since the header byte contains the address, this tells the router to which output channel the packet should be routed (*data_out_0*, *data_out_1*, or *data_out_2*).
- Each subsequent byte of data should be driven on the *data* bus with each new rising/falling *clock*.
- After the last payload byte has been driven, on the next rising/falling *clock*, the *packet_valid* signal must be deasserted, and the packet parity byte should be driven. This signals packet completion.
- The input *data* bus value cannot change while the *suspend_data* signal is active (indicating a FIFO overflow). The packet driver should not send any more bytes and should hold the value on the *data* bus. The width of *suspend_data* signal assertion should not exceed 100 cycles.

Router Output Protocol:

The characteristics of the output protocol are as follows:

- All output signals are active high and can be synchronized to the rising/falling edge of the *clock*. Thus, the packet receiver will drive sample data at the rising/falling edge of the *clock*. The router will drive and sample data at the rising edge of *clock*.
- Each output port *data_out_X* (*data_out_0*, *data_out_1*, *data_out_2*) is internally buffered by a FIFO of 1 byte width and 16 location depth.
- The router asserts the *vld_out_X* (*vld_out_0*, *vld_out_1* or *vld_out_2*) signal when valid data appears on the *vld_out_X* (*data_out_0*, *data_out_1* or *data_out_2*) output bus. This is a signal to the packet receiver that valid data is available on a particular router.
- The packet receiver will then wait until it has enough space to hold the bytes of the packet and then respond with the assertion of the *read_enb_X* (*read_enb_0*, *read_enb_1* or *read_enb_2*) signal that is an input to the router.
- Indranil Sengupta This brief proposes an on-line transparent test technique for detection of latent hard faults which develop in firstinput first ouptput buffers of routers during field operation of NoC.

C. Grecu, P. Pande, B. Wang, A. Ivanov, and R. Saleh, "Methodologies and algorithms for testing switch-based NoC interconnects," In this paper, we present a novel methodology for testing such NoC architectures. The proposed methodology offers a tradeoff between test

time and on-chip self-test resources. The fault models used are specific to deep submicrometer technology

Survey on the design methods of low power SRAM cell L Saranya This paper proposes advent of portable electronics in our day to day life as made Power Optimization as one of the major challenges in the modern VLSI technologies. Static Random access memory (SRAM) has been widely used in the recent days due to its high performance in VLSI design techniques which operates in the range of submicron or nano range. In the SRAM cell, the scaling of transistor will increase the stability of the cell at the time of read and write operation.

3. RESULTS

RTL SCHEMATIC:- The RTL schematic is abbreviated as the register transfer level it denotes the blue print of the architecture and is used to verify the designed architecture to the ideal architecture that we are in need of development .The hdl language is used to convert the description or summary of the architecture to the working summary by use of the coding language i.e verilog ,vhdl. The RTL schematic even specifies the internal connection blocks for better analyzing .The figure represented below shows the RTL schematic diagram of the designed architecture .

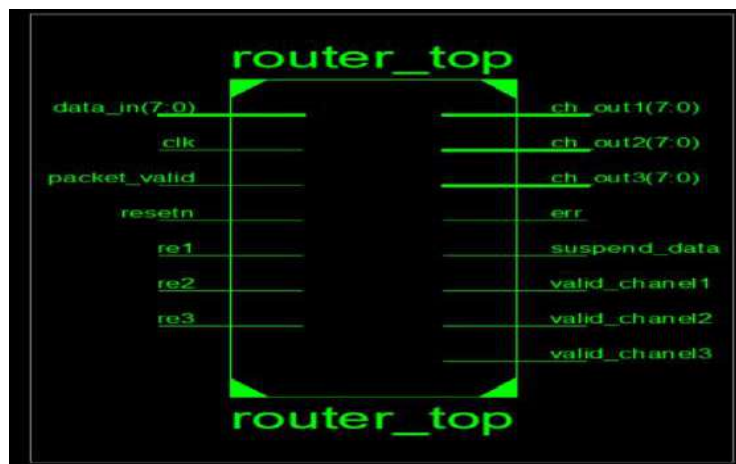


Fig. 1: RTL Schematic of Router

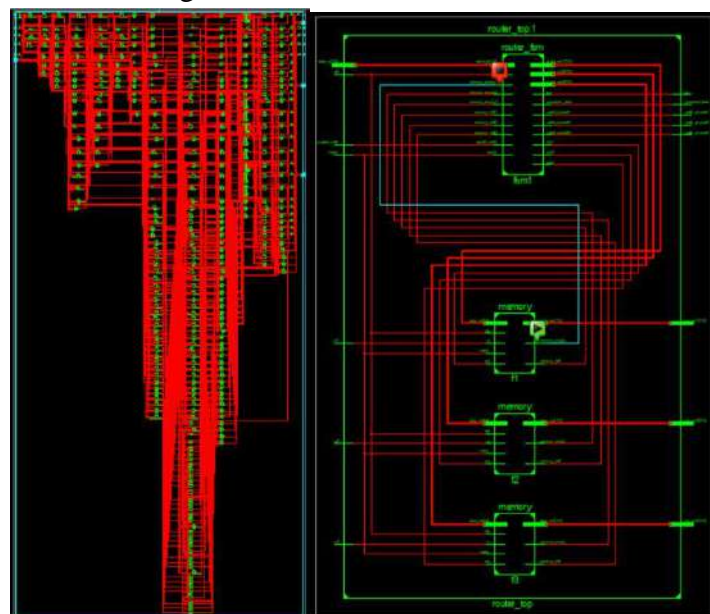


Fig. 2: View Technology Schematic of router

SIMULATION

The simulation is the process which is termed as the final verification in respect to its working whereas the schematic is the verification of the connections and blocks. The simulation window is launched as shifting from implantation to the simulation on the home screen of the tool, and the simulation window confines the output in the form of the wave forms. Here it has the flexibility of providing the different radix number systems.



PARAMETERS

Consider in VLSI the parameters treated are area ,delay and power ,based on these parameters one can judge the one architecture to other. the parameter are obtained by using the tool XILINX 14.5 and the HDL language is verilog language.

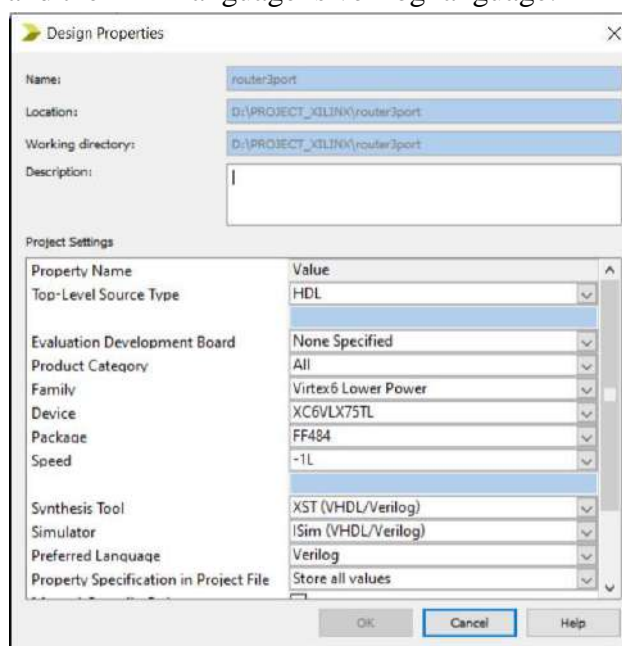


Fig. 3: Device used for router synthesis

Device Utilization Summary (estimated values)				
Logic Utilization	Used	Available	Utilization	
Number of Slice Registers	112	93120		0%
Number of Slice LUTs	243	46560		0%
Number of fully used LUT-FF pairs	109	246		44%
Number of bonded IOBs	43	240		17%
Number of BUFGB/BUFGCTRLs	3	32		9%

APPLICATIONS:

A **router** is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet. Data sent through the internet, such as a web page or email, is in the form of data packets. A packet is typically forwarded from one router to another router through the networks that constitute an internetwork (e.g. the Internet) until it reaches its destination node. A router is connected to two or more data lines from different IP networks. When a data packet comes in on one of the lines, the router reads the network address information in the packet header to determine the ultimate destination. Then, using information in its routing table or routing policy, it directs the packet to the next network on its journey.

The most familiar type of IP routers are home and small office routers that simply forward IP packets between the home computers and the Internet. More sophisticated routers, such as enterprise routers, connect large business or ISP networks up to the powerful core routers that forward data at high speed along the optical fiber lines of the Internet backbone.

4. CONCLUSION

In this project, the 3port router was the proposed design. The proposed router structure functionality is implemented in Verilog HDL and proven that this architecture gave less delay and high frequency, so speed of operation will increase. In this paper the Xilinx ISE14.7 EDA Tool is used for synthesis and simulation. The data which can be sent through the router is reached the destination with 3.935ns latency and the frequency was 360.101MHz.

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Automatic Fall Detection for Elderly People Using MEMS

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ABSTRACT

Abstract: Body Falls in older adults are the significant cause of injury. Falls incorporate dropping from a standing position or from uncovered positions, for example, those on stepping stools or stepladders. The seriousness of damage is commonly identified with the height of fall often leading to disability or death. In this research generally we use wearable sensor and vision based technique that is automatically detect body fall as early as possible. Accelerometer is used for measuring or maintaining orientation and angular velocity. In vision based procedure first we procure casings or video arrangements from the camera. The division module separates the body outline from the foundation. For Feature Extraction we used GLCM method. SVM method is used for classification. By using those methods we can surely detect the human body fall and can take the preventive measures.

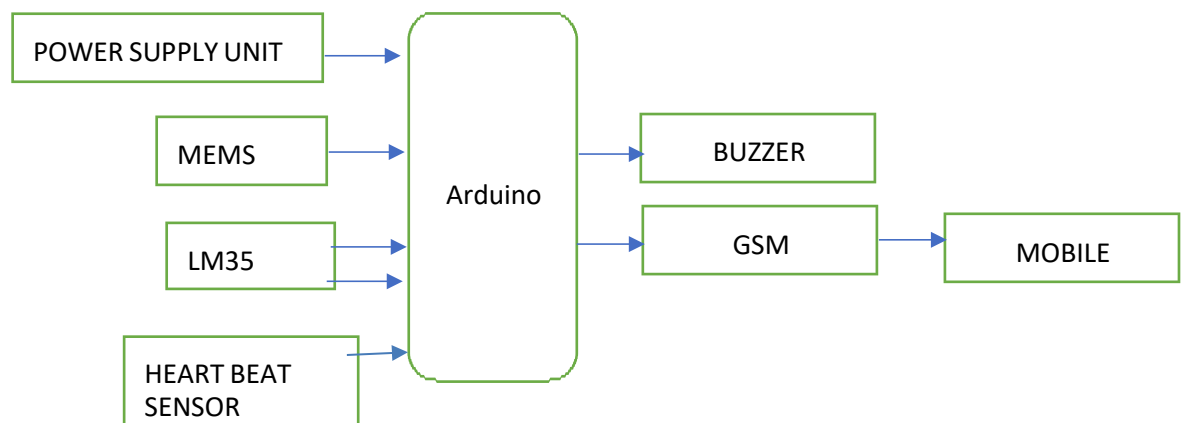
1. INTRODUCTION

The primary worries in the recent decades is with the senior or the old age population of the nation. These older population experience variety of illnesses and diseases condition at very uncertain time. Most of the time injuries are due to the falling on the ground, unconscious and hurting themselves. It will cause serious injury or sometimes death. Therefore, they should be urgently transported to the emergency clinic, where they will be watched and given medicinal assistance if wellbeing condition is in danger. Simultaneously, the measure of old peoples keeping up their independent life is developing quickly. Be that as it may, remote checking can help to prevent depicted situation, essentially diminish healthcare costs and simultaneously keep up patient's independent way of life. Consequently, there is a reasonable interest in solid multi-useful remote observing frameworks for old individuals, which gather and join various sources of medical information relating to ordinary daily routine of the monitored patient. As a response to the maturity masses, present day social medicinal services market gives a wide extent of restorative therapeutic gadgets for remote evaluating of basic wellbeing parameters. Most of the supplies is adjusted and maltreatment for spot checking and can't give a constant review of the patient's prosperity conditions. In addition, various parameters are estimated independently and checking procedure isn't synchronized. Simultaneously fall incident are viewed as one of the most widely recognized and most dangers among older populace, with about portion of nursing home occupants and 30% of freely living individuals falling every year. Along these lines, present day social healthcare will in general incorporate solid fall identification usefulness into general observing system.

The primary worries in the recent decades is with the senior or the old age population of the nation [1]. These older population experience variety of illnesses and diseases condition at very uncertain time. Most of the time injuries are due to the falling on the ground, unconscious and hurting themselves. It will cause serious injury or sometimes death [2]. Therefore, they should be urgently transported to the emergency clinic, where they will be watched and given medicinal assistance if wellbeing condition is in danger. Simultaneously,

the measure of old peoples keeping up their independent life is developing be that as it may, remote checking can help to prevent depicted situation, essentially diminish healthcare costs and simultaneously keep up patient's independent way of life [3]. Consequently, there is a reasonable interest in solid multi-useful remote observing frameworks for old individuals, which gather and join various sources of medical information relating to ordinary daily routine of the monitored patient.

Block Diagram:



As a response to the maturity masses, present day social medicinal services market gives a wide extent of restorative therapeutic gadgets for remote evaluating of basic wellbeing parameters. Most of the supplies is adjusted and maltreatment for spot checking and can't give a constant review of the patient's prosperity conditions. In addition, various parameters are estimated independently and checking procedure isn't synchronized. Simultaneously fall incident are viewed as one of the most widely recognized and most dangers among older populace, with about portion of nursing home occupants and 30% of freely living individuals falling every year. The system consist of a following parts i) Image Acquisition ii) Segmentation iii) Feature Extraction iv) Classification. As a rule, various parts involving the frameworks are crumbled and working independently from one another. Be that as it may, if we combine monitoring component (for example sensors, video camera, Smartphone's) into smart situations, we will almost certainly do overlook for elder individuals with different endless situation at home. With the ongoing advancement on ICT showcase wearable sensors and image processing are regularly conveyed related to environmental devices to improve fall discovery rates and limit false cautions.

2. LITERATURE SURVEY

Shery Oliver et.al [1] proposed to identify falls by handling with a few component extraction and grouping method for typical just as debilitated individuals. The feature extraction algorithm picked is equipped for detecting, preparing and imparting the fall event under genuine conditions. The blend of numerical information is utilized so as to identify fall with high exactness and dependability. Fouzi Harrou et.al [2] proposed Acknowledgment of human developments is exceptionally helpful for a few applications, for example, brilliant rooms, intelligent augmented experience frameworks, human

detection and condition displaying. The goal of this work centers around the identification and order of falls dependent on varieties fit as a fiddle, a key test in PC vision. The recognition is accomplished with multivariate exponentially weighted moving normal (MEWMA) checking plan, which is viable in identifying falls since it is touchy to little changes. Shockingly, a MEWMA measurement neglects to separate genuine tumbles from some like-fall motions.

To cure this restriction, an arrangement stage dependent on help vector machine is connected on distinguished successions. To approve this approach, two fall recognition datasets have been tried: the University of Rzeszow fall identification dataset (URFD) and the fall discovery dataset (FDD).

Yoosuf Nizamet.al [3] proposed Fall location for older is a noteworthy subject the extent that assistive advancements are concerned. This paper gives a survey of past chips away at a human fall identification gadgets and a primer outcomes from a creating profundity sensor based gadget. The three primary methodologies utilized in fall identification gadgets, for example, wearable based gadgets, encompassing based gadgets and vision based gadgets are distinguished alongside the sensors utilized. The structures and calculations connected in every one of the methodologies and their uniqueness is additionally represented.

Pooja Shukla et.al [4] proposed that the population of old people are living alone at home is more. Fall is one of the real hazards for old individuals. In some cases more seasoned individuals may quit fooling around damage to their spine (spinal rope) and that may prompt passing. Once in a while fallen harmed older might lie on the ground surface for a few time after a fall episode has happened. This makes it imperative to have a fall location framework. In this paper, she propose a novel and powerful fall location framework. Their methodology depends on movement history. Their calculation gives promising outcomes on video successions of everyday exercises and mimicked falls.

Wang, J. et.al [5] proposed, an upgraded fall recognition framework is proposed for old individual checking that depends on savvy sensors worn on the body. Which recognized the unplanned falls in the home medicinal services condition. By using data assembled from an accelerometer, cardio tachometer and savvy sensors, the effects of falls can be minimized and recognized from typical every day exercises. The proposed framework has been sent in a model framework as point by point in this paper.

4. RESULTS

Finally we can conclude that by using this project we can save the lifetime of a person and this project useful for the elderly people so they can live their life independently, Automatic falls can be easily detected through this technology.

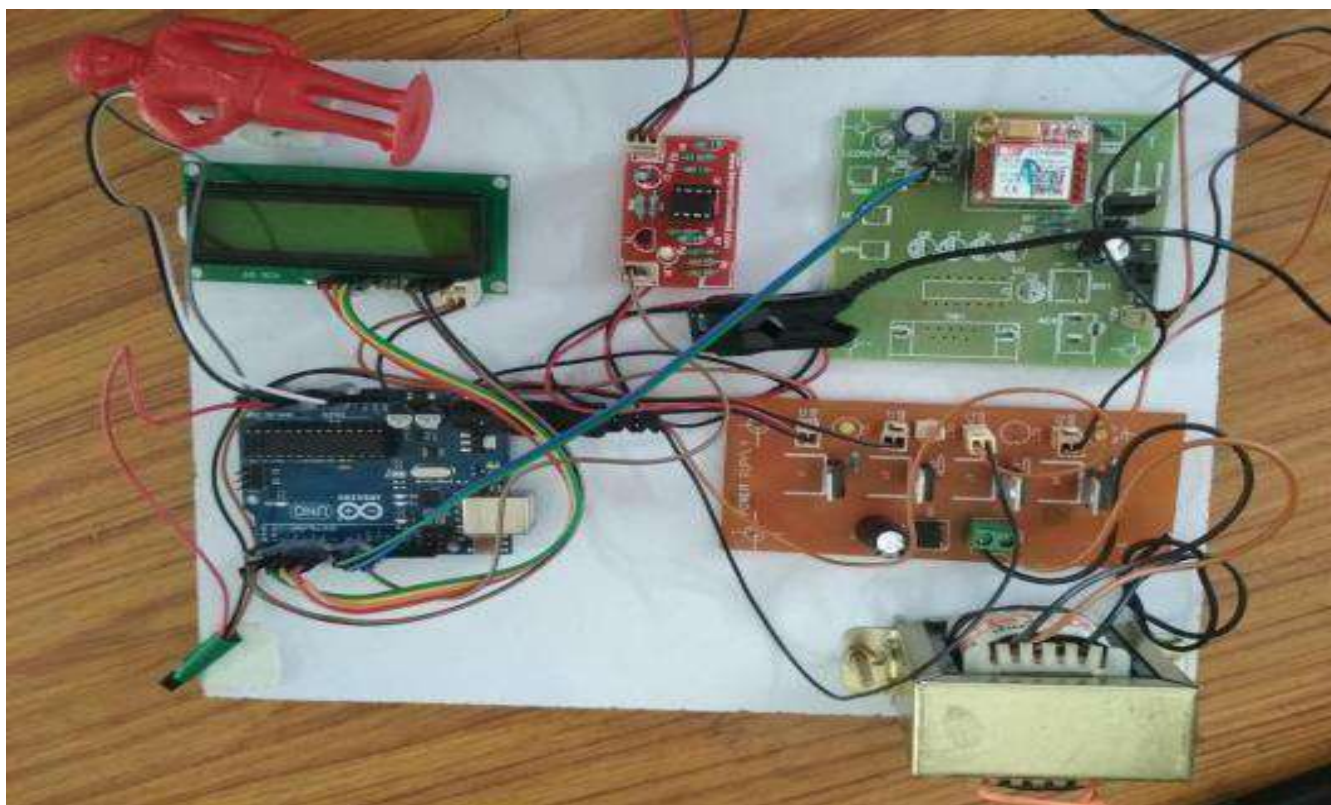


Fig PROTOTYPE

5. CONCLUSION

We have reviewed different techniques for the detection of a fall event using wearable sensors. Gyroscope sensor is mandatory to detect fall. From study of computerized image processing technique we come up with a following conclusion. The GLCM functions characterize the texture of an image by calculating how often pairs of pixel with specific values and in a specified spatial relationship occur in an image, creating a GLCM, and then extracting statistical measures from this matrix. The SVM method is used for classification

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Deep Learning based Convolutional Neural Networks (DLCNN) on Classification Algorithm to Detect the Brain Tumor Diseases using MRI and CT Scan Images

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Abstract:- The Brain Tumors is the one of the leading disease affects the humans, thus the early detection of brain tumors prevent millions of deaths. Thus, most of the researches are focusing on detection of brain tumor using machine learning based approaches. But, those approaches are failed to provide the classification accuracy. To overcome these drawbacks, in this work Adaptive Neuron Fuzzy Inference System (ANFIS) based Deep Learning based Convolution Neural Networks (DLCNN) classification algorithm has been performing with the help of effective use of Grey level Co-occurrence Matrix (GLCM) features. Initially, Probabilistic Kernel Fuzzy C Means Segmentation (PKFCM) based multi level segmentation operation has been performed to detection of accurate tumor region. The simulations are conducted on various datasets, the results shows that the proposed work shows the better performance compared to various conventional approaches with respect to both quantitative and qualitative evaluation.

Keywords:- Brain Tumor , Detection, Disease, Fuzzy, Machine Learning , Deep Learning , Convolution and Segmentation.

I. INTRODUCTION

The brain tumor is a standout amongst the most widely recognized as relatable point Brain illnesses. The World Health Organization (WHO) estimates that Analysis and medicine would vital to more than 1crores population of persons would endure from tumor for every year in the globe. Developments in restorative imaging systems permit using them inside few domains of medicine, for instance, workstation helped pathologies diagnosis, surgical arranging and guidance, longitudinal dissection. Around every last one of restorative image modalities, Magnetic Resonance Imaging (MRI) also Computed Tomography (CT) need aid the mossy cup oak intermittently used imaging strategies clinched alongside neuroscience Furthermore neurosurgery. Segmentation of objects, primarily anatomic structures and more Pathologies starting with MRI images may be a crucial task, since the outcomes every now and again turned the foundation to different requisitions. Systems for performing segmentation shift comprehensively contingent upon those specific provisions and image modality. Additionally, the

segmentation from claiming medicinal images will be a was troublesome task, Since they for the most part incorporate an expansive amount of data, Furthermore here and there a couple artifacts due to patient's restricted securing run through Furthermore fragile tissue boundaries, typically not great defined. 2 At managing brain tumors, separate issues arise, which make their segmentation troublesome. There may be a limitless population about tumor sorts which bring a mixture of shapes also sizes. It might develop at whatever range also done divergent image intensities. Some about them misshape those encompassing structures or might make identified with edema that transforms those intensities from claiming images around those tumors. Additionally, those presences from claiming a couple MRI procurement conventions provides for divergent majority of the data on the brain. Each image generally highlights a specific region of the tumor. The Robotized segmentation with former models alternately using the former information will be challenged with executes. The flawed segmentation for interior structures of the Brain is from claiming great energy should contemplate also for those medications from claiming tumors. It dives during diminishing those mortal sins also upgrading the surgical or radio restorative. Over saw economy for tumors. To brain oncology, it is also alluring with bringing a reminiscent human brain model that could coordinate tumor data concentrated from MRI and CT information, for example, such that localization, type, shape, utilitarian positioning, and additionally influence with respect to other brain structures. Despite different efforts also guaranteeing brings about the therapeutic Imaging community, exact also proliferation segmentation and abnormalities, Characterization need aid even now difficult assignments. Existing strategies clear out significant Space to expanded automation, materialness Furthermore accuracy. In the requisition for image processing, smoothening of the image will be, Crucial should aggravate the characteristic extraction also classification steps simpler. Hence impeccable sifting method is compulsory over biomedical image transforming. The Suitableness denoising calculation to MRI brain images may be vital to finish secondary execution. Those unwanted parcel in the MRI images might Make evacuated by correct segmentation algorithm. Characteristic extraction is the following Stage after preprocessing also 4 segmentation which may be took

after Eventually Tom's perusing characteristic Determination. The point when those required offers are chose it may be subjected of the Classification transform. Those issues for picking those proper channels to Denoising, segmentation algorithms, characteristic extraction Furthermore prediction, calculation for those orders about brain MRI images still remains as a real. To achieve this extensive research goal, specific objectives are set. The research objectives of this paper comprise of the following components.

- PKFCM is employed for detection of brain tumor effectively with exact Region of Interest (ROI) extraction and feature extraction is done by utilizing GLCM approach.
- Finally, ANFIS based DLCNN is applied to classify whether the image is normal or abnormal then form abnormal the type of cancer is classified as benign or malignant.

The remaining part of the paper is systematized as follows. Section 2 describes the related works for brain tumor detection and classification with their drawbacks, section 3 deals with proposed method detection and classification of brain tumor with detailed operation. Section 4 deals with experimental results of proposed method and comparison with respect to the various state of art approaches using quantitative evaluation and finally section 5 the conclusion and scope for future enhancements.

II. LITERATURE SURVEY

The classifier which is the way toward changing the quantitative input (i.e. Features) to subjective yield (i.e. Diagnosis, prognosis, etc.) is considered the most essential piece of an example order framework. The yield of the classifier can be either an unmistakable esteem, showing one of the predefined classes, or a genuine esteem vector, reflecting the probability that an example has a started from a particular class as depicted. To boost the execution of the classifier, it is most essential to ideally tune all the former stages (segmentation, feature extraction and choice). Setting up a classifier requires three phases: the learning stage, the execution assessments organize, and the testing stage. These stages, by and large, cover, as will be examined. Despite the fact that it may appear to be intelligent that a bigger number of features would be more useful than fewer features, this isn't the case in genuine applications, because of the accompanying three primary reasons as depicted [2]. Right off the bat the multifaceted nature and computational cost of the classifier increments profoundly. Also, despite the fact that the quantity of misclassified information may diminish, when more features are included for preparing the classifier, it has been demonstrated that the speculation blunder will inevitably increment [3]. Thirdly, on account of a predetermined number of accessible information and huge number of accessible features, it is more probable that features with little to no separation power will initiate clamor, debasing the speculation of the classifier to obscure information [4]. Thusly, feature determination is an imperative advance for drawing out the more instructive features and for ideal tuning the classifier's ability to dependably characterize obscure data.

The utilization of different DLCNN [5] for image order breaks down. The absence of quicker union rate of the traditional neural systems is additionally clarified. This lays accentuation on the prerequisite of adjusted neural systems with unrivaled meeting rate for image order applications. In authors have arranged four unique types of tumor utilizing LDA method[6]. Be that as it may, the classification precision revealed in the work is at the request of 80% which is generally low. This additionally proposes the different purposes behind misclassifications. SVM based characterization of different levels of MRI glioma images was performed by authors in [7-8], which is guaranteed to be superior to anything principle based frameworks yet the precision revealed in the SVM based classification is low. This SVM based classification managed just glioma images and subsequent absence of summing up capacity is another downside of this framework. In [8-9] authors need to utilize those Kohonen neural networks to image classification. A percentage adjustment of the accepted Kohonen neural system is also actualized here, which demonstrated on a chance to be a great deal better than those accepted neural networks.

In [9-10] authors need to utilize a mixture methodology, for example, mix from claiming wavelets and SVM to classifying those abnormal and the typical images. This SVM technique uncovers the prevalence of the mixture SVM of the Kohonen neural networks as far as execution measures. Yet the real detriment for this framework will be the little measure of the data set utilized to usage. The classification precision outcomes might lessen when the span of the dataset will be expanded. An change about customary SVM for example, any rate as square SVM (LS-SVM) for brain tumor distinguishment is suggested by authors in [10-11]. Both bi-level classifications also multiclass order need aid performed with hint at those unrivaled way of the suggested system again the traditional classifiers. This likewise specified a critical note that these contrasts between different calculations build when those amounts about classes' increment. Thus, this approach suggested those needs to multiclass classification strategies over bi-level classification systems. In turn adaptation for LS-SVM is recommended and successfully actualized by authors in [9]. A far reaching similar examination will be performed the middle of those SVM, neural classifier and the factual classifiers. 63 Effects proposed the preferences from claiming SVM as far as order exactness. Bi-level order alone is performed, which will be insufficient for judging those natures of the robotized framework in [10-11] authors utilize those altered PNN for tumor image order. Abnormal images, for example, such that metastasis, glioma and meningioma would separated utilizing the any rate as square characteristic conversion based PNN. A similar examination may be additionally, performed for SVM. This methodology inferred that the convert based PNN may be better than the SVM as far as classification exactness. In [8-9] authors bring illustrated another methodology by coordinating wavelet entropy built spider meshing plots and PNN is recommended to those orders of MRI brain images. Wavelet entropy based spider meshing plots to the characteristic extraction also PNN to the order. PNN gives a general answer for those example order issues and the corrected

order. In [8-10] authors bring introduced a canny order method should identify ordinary also, abnormal slices of the attractive reverberation human brain images (MRI and CT). Over characteristic extraction stage, the practically proficient characteristics in statistical, and more Haar wavelet offers would concentrate starting with each cut of the brain MRI images. The order stage, at 70 first performs order transform eventually Tom's perusing using FIS and more furthermore FFNN may be used to arrange those brain tissues similarly as ordinary or abnormal.

III. IMPLEMENTATION OF PROPOSED METHOD DLCNN CLASSIFICATION ALGORITHM

Figure 1 shows the proposed method of brain cancer detection and classification process. Initially query image applied from image acquisition unit, and then it is applied to preprocessing stage. Here, by using different types of filters to remove the artifacts and noises from source image and performs the image enhancement. Then PKFCM segmentation applied for brain tumor detection and effective ROI extraction. Then by using the GLCM feature matrix to achieve the features and create the database using features. Then by applying the ANFIS based-DLCNN classification methodology to detect the normal and abnormal stage of cancer, at the same time type of classification also recognized.

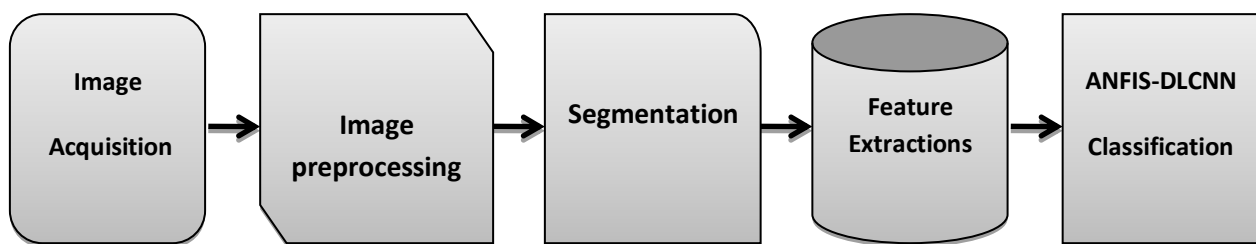


Fig. 1: Proposed Method a DLCNN Classification Algorithm

• **Preprocessing:** Images are generally infected by noise. Usually, noise is nothing but the unwanted by-product occurred during image capture. In general, noise occurs due to various reasons like imperfect instruments, problems with the data acquisition process and interfering natural phenomena. Furthermore, noise is introduced by transmission errors and compression. The various types of noises are salt and pepper, impulse valued, spike, random, data drop out and independent noise. These clamors are happened because of the sharp and unexpected changes of picture sign and residue particles in the picture obtaining source or over warmed broken segments. In pre-processing stage, the brain is filtered in order to improve the search for abnormalities without undue influence from the background of the brain and some filtering or cropping is accomplished in order to improve the quality of the of the image and to reduce noise. Brain MRI images contain some labels; those are equipment name, hospital name and

brain tumor view which do not give any details regarding abnormalities. Hence, they are removed by keeping the largest area in the Brain after thresholding and labeling the connected components.

• **Segmentation:** PKFCM segmentation algorithm efficiently overcomes the geometric allied problem in FCM algorithm, but due to the absence of efficient spatial information, FCM is sensitive to noise. In the proposed PKFCM algorithm, spatial information is incorporated in the form of kernel function which does not produce considerable effect on noise. Generally, the neighborhood pixels are highly correlated in spatial domain. Therefore, if the segmentation algorithm fails to incorporate the relationship between the neighborhood pixels, the performance of the algorithm would be minimized due to the effect of noise. To circumvent this shortcoming, in the proposed algorithm local neighborhood information is integrated in the similarity measure of objective function.

The objective function of the proposed algorithm is defined as

$$J_{PKFCM} = \sum_{i=1}^C \left(\sum_{k=1}^n U_{ik}^m ||\varphi_L(x_k) - \varphi_L(v_i)||^2 \right) \quad (1)$$

The membership function U_{ik} is updated as

$$U_{ik} = \frac{1}{\sum_{j=1}^c \left(\frac{D_{ik}^2}{D_{jk}^2} \right)^{1/(m-1)}} \quad (2)$$

Where m is the fuzzy coefficient, and D_{ik} is the similarity measure which is given as

$$D_{ik} = ||\varphi_L(x_k) - \varphi_L(v_i)||^2(3)$$

Generally, c numbers of membership values are to be computed for the pixel under consideration while segmentation an image into c clusters. Segmentation is achieved by assigning the pixel to any cluster i for which it possesses high membership value. From this, one can deduce that the segmentation results rely on the similarity measure which is utilized to calculate the membership value. Therefore, in the proposed algorithm novel spatial neighborhood information is incorporated in its similarity measure to overcome the effect of noise. Incorporating spatial neighborhood information in the similarity measure results in

$$D_{ik} = ||\varphi_L(x_k) - \varphi_L(v_i)||^2 g_{ik}(4)$$

In above equation the term g_{ik} indicates the spatial information and is defined as

$$g_{ik} = (1 - \beta H_{ik})(5)$$

Here, H_{ik} indicates spatial function for ROI region of interest(ROI), and $\beta \in [0,1]$ is neighborhood attraction parameter that controls the significance of neighboring

pixels on center pixel x_k . The value of β between 0 and 1 indicates the influence of neighboring pixels on center pixel. If β value is 0, then the similarity measure tends to be that of PKFCM algorithm without the above-specified spatial information. The noise resistance capability of PKFCM algorithm relies on the spatial function For any noisy center pixel x_k having large gray level difference with its neighboring pixel x_a , the spatial information H_{ik} computed will be large, and thus the spatial function in above Equation becomes small for all values β of other than zero. After the first iteration, the noisy pixel x_k will be attracted to the cluster i to which its closest neighbor x_a belongs. If the value of H_{ik} remains to be high till the last iteration, despite being its dissimilarity, the center pixel x_k will be forced to cluster it is clear that after each iteration, the similarity measure of noisy pixels as well as other pixels in a window tend to a similar value, ignoring the noisy pixels. In this case, the gray level value of noisy pixel is large when compared to other pixels within the window, but the spatial function g_{ik} incorporated balances their similarity measure. The spatial function thus eliminates the effect of noise in the segmentation process.

Input: brain image, output: U cancer detected image
1: for $t = 1$: do
2: Randomly initialize membership matrix U_{ik} on input image I
3: Compute the spatial neighborhood information using Equation (5)
4: Compute the probability similarity measure using Equation (4)
5: Compute the updated membership value using Equation (2)
6: Update objective function objective function J_{PKFCM}
7: end for
8: return U if the membership degrees of each pixel of the image to different clusters

Table 1: The DLCNN Classification Algorithm

• **Feature Extraction:** For successful detection and classification of brain cancer, the feature extraction stage is very important. Since, the feature extraction techniques improve the performance of the system. Feature extraction is an important component that decides performance of classification. Feature extraction is also called as description. Description deals with the process of extracting attributes, which produce some quantitative information of interest, in order to differentiate one class of objects from another. When the input data used for manipulation is complex, then it is converted into the group of characteristics called feature vector. It is process of collecting image information such as color, shape, and texture. Features comprise the appropriate information of an image and it is used in the image processing task (Examples: Searching, Retrieval, and Storing).

In GLCM, the relevance of radius and angle are the most crucial input parameters. Several First Order Statistics (FOS) texture features like mean, variance, energy skewness and entropy and Second Order Statistics (SOS) comprises of GLCM, contains features such as contrast, correlation, cluster prominence, cluster shade, dissimilarity, homogeneity, sum average, sum of squares, difference entropy and sum entropy are to be extricated from the

segmented nodule. GLCM uses second order image statistics; it has an advantage that it considers the spatial properties. But, it has limitation that it does not consider the primitive shapes. Hence, the performance of GLCM is very effective in the classification of brain cancers compared to the other conventional features. Texture measures based on FOS (or histogram based) are measured from the image pixel information and not considering the relationship between neighboring pixels. Intensity levels of the entire image are used in the texture analysis of histogram based approaches. Several FOS based features includes mean, variance, average energy, skewness and entropy. Computation of histogram based gray level entails only single pixels. Histogram based method are easy to compute the gray level images. Using histogram based features, the characteristics of the lung nodule can be found.

Spatial distribution of gray level images estimates the property of the image correlated to SOS which consider the correlation between pixels. The SO image histograms are defined by GLCM, which presents higher data concerning to periodicity; spatial dependency and inter pixel bond of gray level image. The GLCM is considered as the well known, commonly used statistical technique for extracting texture features. It computes not only the single pixel but also the

neighborhood properties for extraction of features. Based on joint probability distributions of pixel pair, this method can be employed. GLCM depicts how frequently the pixels are positioned in the geometric location in relation with another pixel.

GLCM of image $P(i, j)$ can be expressed as

$$P(i, j) = \text{count} \left((P_{x,y,z}, v)(P_{x,y,z}, \alpha) \right) \quad (6) \quad =$$

$j, \alpha \in \{1, 2, 3, \dots, 26\}$

where v is the function which takes one voxel from 26 neighboring voxels according to the index α , $P_{x,y,z}$ is the value of the voxel with xyz coordinates α is the i^{th} entry of the marginal probability matrix is achieved by the summation of the row of $P(i, j)$.

GLCM can be calculated from texture images using different values of θ and d and these probability values create the co-occurrence matrix $P(I, j, d, \theta)$ as shown in figure 4. GLCM are considered for the orientations of 0° , 45° , 90° , and 135° ; distance $d=1, 2, 3$ and 4 are calculated.

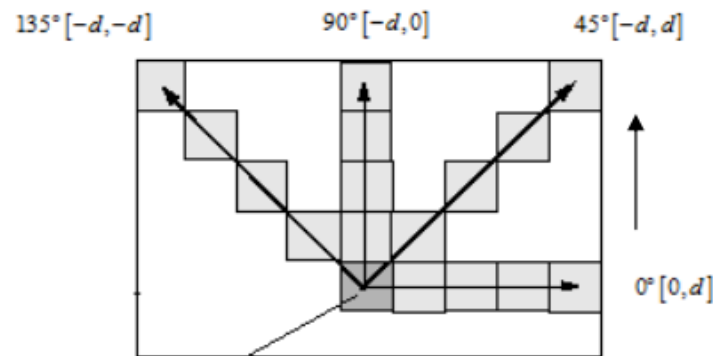


Fig. 2: Distances and Orientations to compute GLCM

- **ANFIS-DLCNN Classification:** The essential structure of a fuzzy inference framework is promoted in figure 3. The framework changes over the crisp input to a linguistic variable utilizing the membership functions put away in

the fuzzy information database. It is contained three stages that progression the framework inputs to the fitting framework outputs.

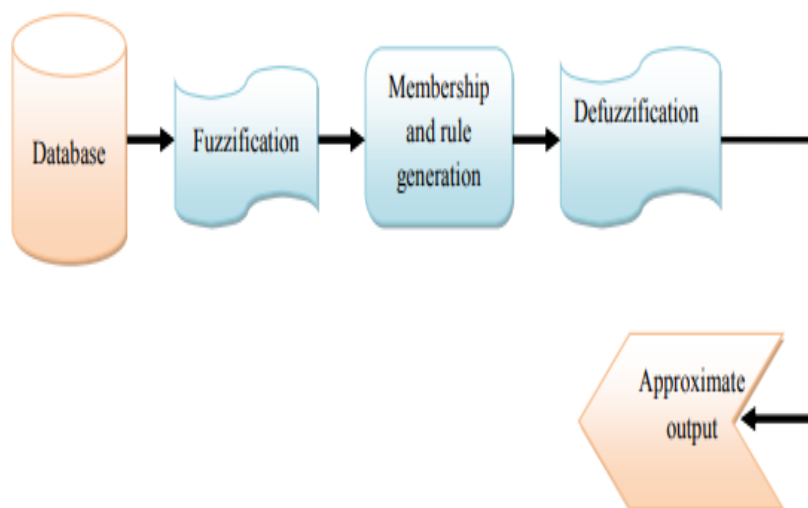


Fig. 3: Structure Fuzzy Inference System

- **Database:** A database which characterizes the membership functions of the fuzzy sets utilized as a part of the fuzzy guidelines.
- **Fuzzification:** The way toward changing crisp input values into linguistic qualities is called fuzzification and it includes two procedures. To start with, the input qualities are converted into linguistic ideas spoke to by fuzzy sets. Linguistic variables are the input or output variables of the framework whose qualities are from a characteristic

dialect, rather than numerical qualities. At that point membership functions are connected to the estimations and the level of truth in each introduce is resolved.

- **Membership and rule generation:** Membership functions are utilized as a part of the fuzzification and defuzzification ventures of a FIS, to outline non-fuzzy input qualities to fuzzy linguistic terms and the other way around. A membership function is utilized to evaluate a linguistic term. The most well known sorts of membership

functions are triangular, trapezoidal along with Gaussian shapes. For considering rule generation in a FIS, a rule base is assembled to control the output variable. A fuzzy rule is a simple IF-THEN rule by means of a condition as well as a conclusion. The estimations of the fuzzy rules and the permutation of the consequences of the individual regulations are performed with fuzzy set operations.

- **Defuzzification:** On the off chance that a crisp estimation of the framework is required, the last fuzzy output must be defuzzified. This is the motivation behind the defuzzifier segment of a FLS. Defuzzification is performed by the membership function of the output variable. This can be used by different techniques like gravity, bisector of area, mean of maximum, smallest of maximum and largest of maximum.

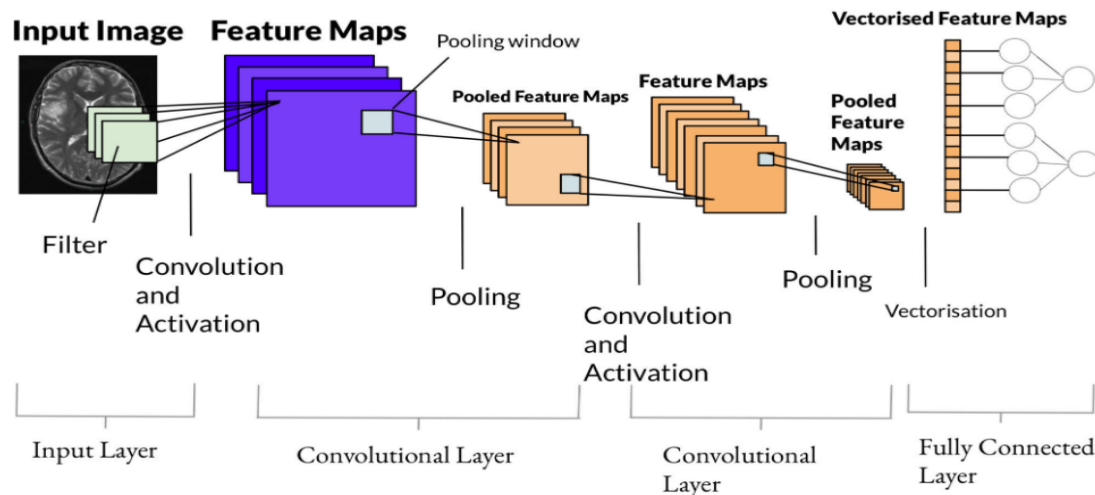


Fig. 4: Convolution Layers of DLCNN Classification

In the collected images 80% is used for training the system and remaining 20% is used for testing the system. In proposed work, deep learning is used for classification, where the data rely on layers of the artificial neural networks whereas in current machine learning is used, requiring structured data as shown in figure 4. The output layer depends on the input layer with multiple interconnections of interchange nodes. Weight age value is calculated for each node. If the intensity is high, then the weight age value will be around 0.9 or 0.8(high). If the intensity is less, then the weight age value is also less, around 0.1 or 0.2. Weight age values of all the frames are summed up for the given image. The weight age values of an image containing the tumor and image not containing the tumor is calculated beforehand. The weight age that is found for the given image is compared with weight age values tumor and no tumor images. Based on near similarities on weight age values, the image is classified. The advantage of using DLCNN is it increases model complexity by adding more layers. Therefore, it is more accurate compared to SVM, which is a machine learning approach. Figure 4 represents the architecture of artificial neural networks. DLCNN basically consists of two stages for classification such as training and testing. The process of training will be performed based on the layer based architecture. The input layer is used to perform the mapping operation on the input dataset; the features of this dataset are categorized into weight distributions. Then the classification operation was implemented in the two levels of hidden layer. The two levels of hidden layer hold individually normality and abnormalities of the Brain cancer characteristic information. Based on the segmentation criteria, it is categorized as

normal and abnormal classification stage. These two levels are mapped as labels in output layer. Again the hidden layer also contains the abnormal cancer types separately; it is also holds the benign and malignant cancer weights in the second stage of hidden layer. Similarly, these benign and malignant weights are also mapped as label into output layer. When the test image is applied, its GLCM features are applied for testing purpose in the classification stage. Based on the maximum feature matching criteria utilizing Euclidean distance manner it will function. If the feature match occurred with hidden layer 1 labels, then it is classified as normal brain tumor image. If the feature match occurred with hidden layer 2 labels with maximum weight distribution, then it is classified as benign effected cancer image. If the feature match occurred with hidden layer 2 labels with minimum weight distribution, then it is classified as malignant affected cancer image.

IV. EXPERIMENTAL RESULTS

Total 500 Brain tumor template images are adopted for this experiment analysis where 150 of malignant, 150 of benign and 1350 of normal X-ray images with the consideration of patient mean age around 45.6year and ranging from 18 to 81. The brain grazes assortment from 2mm to 20mm in mass and several patients contain several grazes whereas some other patients might have merely one. Figure 4 shows the step by step output of the proposed methodology such as input MRI image, Pre-processed image, Multi Level segmentation, Brain Tumor Detected image and Tumor Classification output.

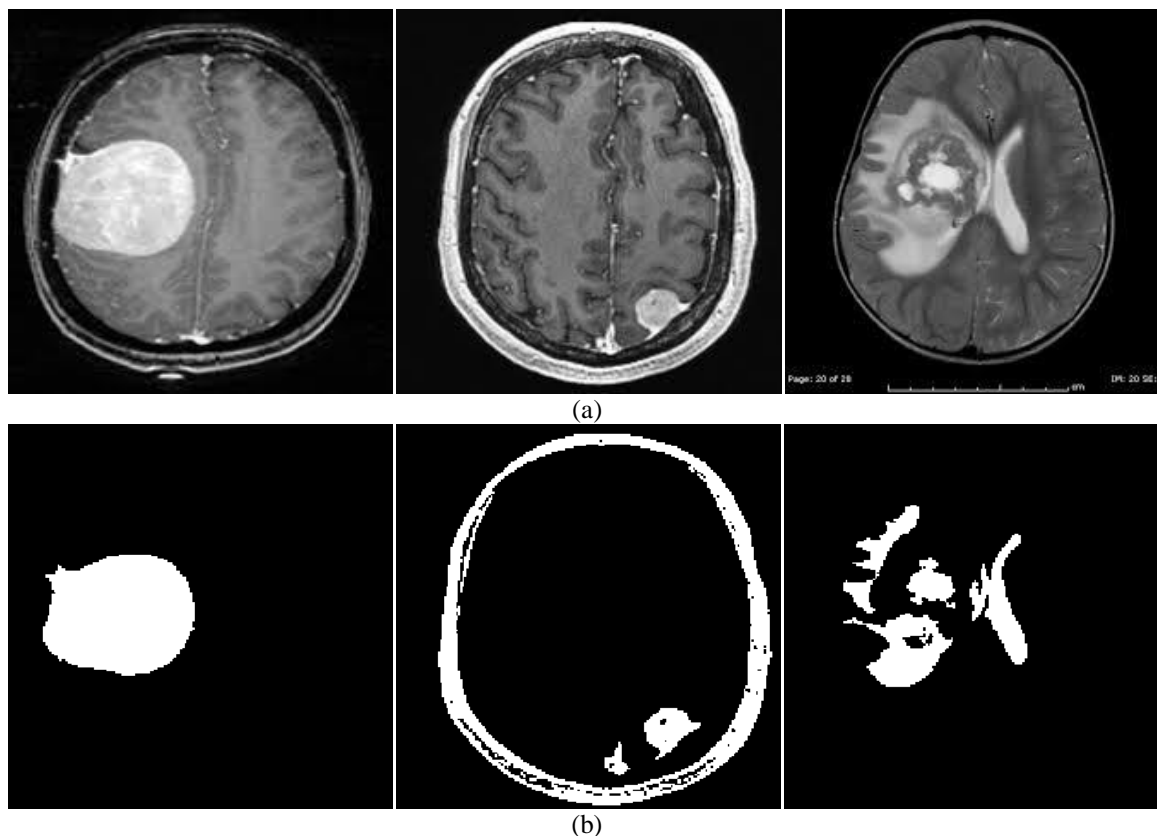


Fig. 5: a. Input MRI image b. Brain Tumor Detected Images using MRI and CT Scan

Figure 5 represents the database of input images and corresponding segmented images as tumor detected outputs. For valuation of classification outcomes, we utilized three qualitative metrics such as specificity, accuracy and sensitivity are very high. The accuracy can be defined as out of certain random test cases, how many outcomes give the perfect classification output. The sensitivity is defined as individual classification accuracy, how much the method is sensitive towards the malignant and benign cancers. And specificity is defined as the how much accurately the location of tumor is recognized.

$$Accuracy = \frac{TP + TN}{TP + FP + TN + FN}$$

$$Specificity = \frac{TN}{TN + FP}$$

$$Sensitivity = \frac{TP}{TP + FN}$$

where TP conveys the amount of test cases properly recognized as malignant, FP conveys the amount of test cases improperly recognized as malignant, TN conveys the amount of test cases properly recognized as benign and FN is conveys the amount of test cases improperly recognized as benign.

Method	Accuracy(in %)	Specificity(in %)	Sensitivity (in %)
SVM [1]	76.09	75.51	77.40
MK-SVM [2]	80.01	79.18	80.72
KNN [3]	80.42	80.18	81.81
CNN[4]	90.11	89.28	90.36
Proposed	95.91	95.81	96.34

Table 2: Performance of Quality Metrics using Existing and Proposed DLCNN-ANFISI-Model

In the training procedure, network limits were attuned by the preparation slaughter and after that the justification dataset would be utilized to check the matching amount of the attuned system. The matching curvatures of system depend on network testing slaughter and training loss slaughter. In order to additionally calculate the planned technique, we contrasted it with pair of NN-contained methods utilized in [2], [4]. For the categorization, we adopted SVM [1], multi-kernel SVM [2] and K-nearest

neighbor (KNN) [3] classifiers from the literature for comparison with the proposed ANFIS-DLCNN classifier model. Table 2 demonstrates that quality evaluation criteria of existing and proposed classifiers, where proposed ANFIS-DLCNN classifier outperforms the conventional SVM, MK-SVM and KNN classifiers to distinguish the benign and malignant from the brain tumor X-ray images and the graphical representation presented in figure 6.

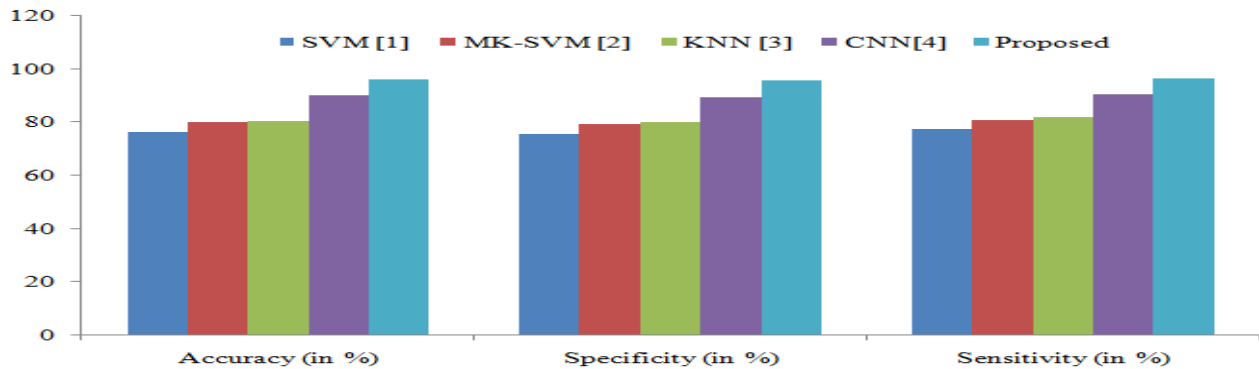


Fig. 6: Graphical Representation of Comparisons of SVM, MK-SVM, KNN and CNN

V. CONCLUSION

The proposed system is an optimization method for brain tumor detection at early stage itself. The proposed work starts by partitioning of images based on the direction of captured MRI and CT is achieved through histogram equalization. Better segmentation achieved for feature extraction by using GLCM. Each pixel is examined here to achieve higher accuracy. In this research, classification of brain tumor with benign and malignant tumors detected from MRI images using a Deep Neural Network. Data augmentation helped to get better results with good accuracy. Problems of over-segmentation have been overcome by GLCM. Thus the location, size, and grade of the tumor is also detected which tells us whether the biopsy is actually required or not, deaths occurring due to biopsy can be avoided. Our proposed architecture achieved high accuracy after providing the datasets for training. In future, exact shape also can be extracted along with size and location with high accuracy. Not only brain tumors but also other diseases like lung cancer detection, brain cancer detection etc can be detected using this system but by providing the related datasets of that particular disease. In future more database images of primary and secondary tumor along with various types can be further classified reducing the computation and processing time of image classification using parallelization techniques. The future work also aims to predict the exact measurement of the tumor so as to assist the physician to predict the severity of the tumor easily. The soft computing techniques will be combined with VLSI and Embedded technology so that it can be directly incorporated in the system as chip set which makes the prediction process easier. The Accuracy, Specificity and Sensitivity results are 95.91%, 95.81% and 96.34% respectively.

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SKIP CLOUD IN OPEN SOURCE CLUSTERING DATA DISTRIBUTION NETWORKS LIVE CONTENT IN TRUSTED BROKER USERS SYSTEMS

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Abstract: In recent occasions, lots of cloud providers have presented numerous publish or subscribe services. The representation of publish or subscribe is extensively used with regards to data distribution because of its ability of speeding up system to large size. Various services of pub or sub that originate from cloud services were introduced in earlier works a number of them don't get together the requirements of consistency during matching live content in very vibrant situations. Within our work we spotlight on two important difficulties for example organizing of servers in cloud setting to achieve scalable furthermore to consistent routing but something is managing of subscriptions furthermore to occasions to achieve equivalent matching relating to the servers. We introduce an effective and consistent matching service for content-basis services in cloud setting. The suggested system will bond the brokers completely through distributed overlay means by which ensures of consistent connectivity between brokers completely through its multi-level clusters and offer low routing latency. For attaining latency of low routing furthermore to consistent links between servers, we submit a distributed overlay procedure to setup servers of matching service of occasions for content-basis services in cloud setting.

Index Terms: Brokers, Distributed, Cloud, Services, Servers and Clusters.

I. INTRODUCTION

Inside the recent occasions, cloud technologies have given the majority of chances for your applications concerning computing too communication, through which servers are connected by fast systems furthermore to storage abilities. Several figures of how can be used as managing consistent view however, these methods might convey huge traffic overhead. Inside our work we offer a powerful and consistent matching service of occasions for content-basis services in cloud setting. Inside our work we focus on two important troubles for example organizing of servers in cloud setting to attain scalable additionally to consistent routing but something is managing of subscriptions additionally to occasions to attain equivalent matching involving the servers [1]. The recommended system will bond the brokers completely through distributed overlay way in which ensures of consistent connectivity between brokers completely through its multi-level clusters and supply low routing latency. For supporting extensive users, we produce a deliberation over cloud setting by means of data centers that are distributed geographically completely online. All the data center includes large figures of servers that are supervised by management service of knowledge center cloud based on Internet of things networks applications using form and agriculture networks systems[7][8]. For attaining in the latency of low routing additionally to consistent links between servers, we submit a distributed overlay procedure to set up servers of matching service of occasions for content-basis services in cloud setting. For effective matching of occasions between numerous servers, a hybrid multidimensional space partitioning method was introduced that allows related Subscriptions to get damaged into similar server and will be offering numerous candidate corresponding servers for each event.

II. METHODOLOGY

Within the recent occasions, distribution of understanding within the critical applications provides you with several new developments. The foremost is fast growth and development of live content however these guys very vibrant atmosphere. The pattern of publish or subscribe is mainly useful for distribution of understanding due to its scalability, and proficient charge of processing the occasions. Of these patterns, a receiver can put its importance as being a subscription. Occasions are usually printed employing a sender to system that complement the occasions and distributes them for your concerned subscriber. Within the distribution applying traditional data, live posts mostly are created by way of publishers at low speed making numerous publish or sign up for implement the routing means of multi-hop to distribute occasions. We provide a effective and consistent matching service of occasions for content-basis services in cloud setting. To give the latency of low routing furthermore to consistent links between servers, we submit a distributed overlay procedure to setup servers of matching service of occasions for content-basis services in cloud setting [2]. Distributed overlay procedure will grant the subscriptions furthermore to occasions to obtain forwarded between brokers within the consistent approach[5]. Multidimensional space partitioning method was introduced that enables related subscriptions to obtain broken into similar server and provides numerous candidate corresponding servers for every event. However, it lessens locations furthermore to maintain workload stability among each server [3]. Completely through hybrid space partitioning method important subscriptions are recorded into many subspaces, making obvious on high corresponding throughput and offer numerous candidate servers for each event. The suggested system will bond the brokers completely through distributed overlay

means by which ensures of consistent connectivity between brokers completely through its multi-level clusters and offer low routing latency [6].

III. AN OVERVIEW OF PROPOSED SYSTEM

Characterized by growing live content of arrival rate, critical applications create vast challenge on distribution of important live content towards concerned users in the dependable approach. Distribution of knowledge inside the critical applications will give you several new developments for instance fast development of live content but these guys very vibrant atmosphere [4]. Typically of services of event matching of traditional publish or subscribe systems in addition increase the risk for throughput of low matching on the way of matching large figures of skewed subscriptions. In distribution applying traditional data, live content articles are mainly produced by means of publishers at low speed making numerous publish or subscribe to implement the routing methods for multi-hop to distribute occasions. Due to the significance in helping users to create real-time decisions, distribution of knowledge has come to be considerably crucial in numerous important Applications. We spotlight on two important trouble for example organizing of servers in cloud setting to attain scalable additionally to consistent routing but something is managing of subscriptions additionally to occasions to attain equivalent matching involving the servers. We offer a powerful and consistent matching service of occasions for content-basis services in cloud setting. The device will bond the brokers completely through distributed overlay way in which ensures of consistent connectivity between brokers completely through its multi-level clusters and supply low routing latency [8]. For attaining of latency of low routing additionally to consistent links between servers, we submit a distributed overlay procedure to set up servers of matching service of occasions for content-basis services in cloud setting. Distributed overlay process will grant the subscriptions additionally to occasions to get forwarded between brokers in the consistent approach. Inside the recommended system as proven in fig1, the entire brokers as front-finish are provided to the net, and subscriber along with author will bond to those questions direct means [5][6]. For achieving consistent connectivity additionally to low routing latency, brokers are connected completely through distributed overlay. The whole content space is split as disjoint subspaces and each of the is maintained by means of brokers. Subscriptions additionally to occasions are transmitted towards subspaces that overlap together and for that reason subscriptions and occasions will drop into similar subspace are coordinated based on identical broker. Following the conclusion of technique of matching, occasions are broadcasted towards equivalent concerned subscribers. We systematize servers into distributed overlay procedure to reduce the routing latency inside an efficient way and so on framework provides you with several positive aspects in relation to effective distribution of knowledge [7]. It permits the device to appropriately group related subscriptions into similar broker because of high bandwidth between brokers within cloud setting, therefore the local time period of searching would be to a great extent reduced that is required for reaching the throughput of high matching [6]. While all the subspace is supervised by means of numerous brokers, this structure is fault-tolerant still when large figure of brokers will crash immediately. Because the management service of knowledge center will give you expanding cloud servers, method is effortlessly extended to Open Source Network Systems (OSNS).

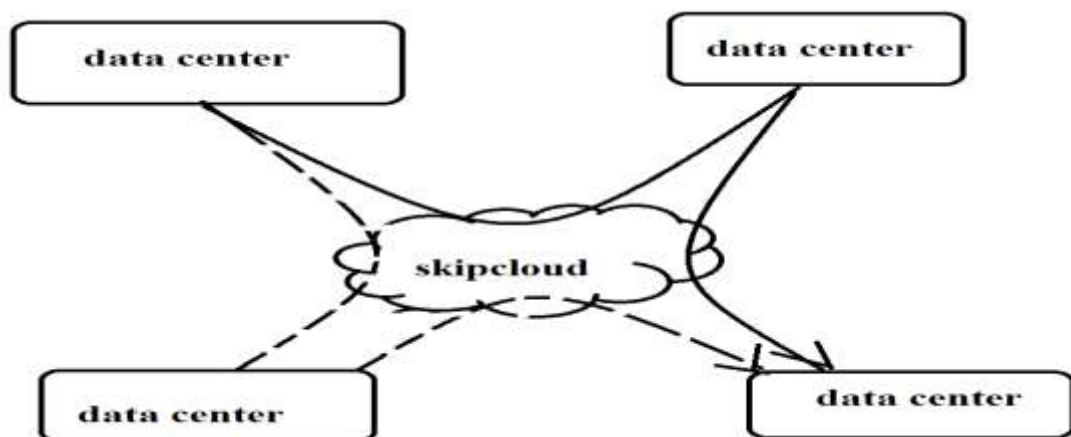


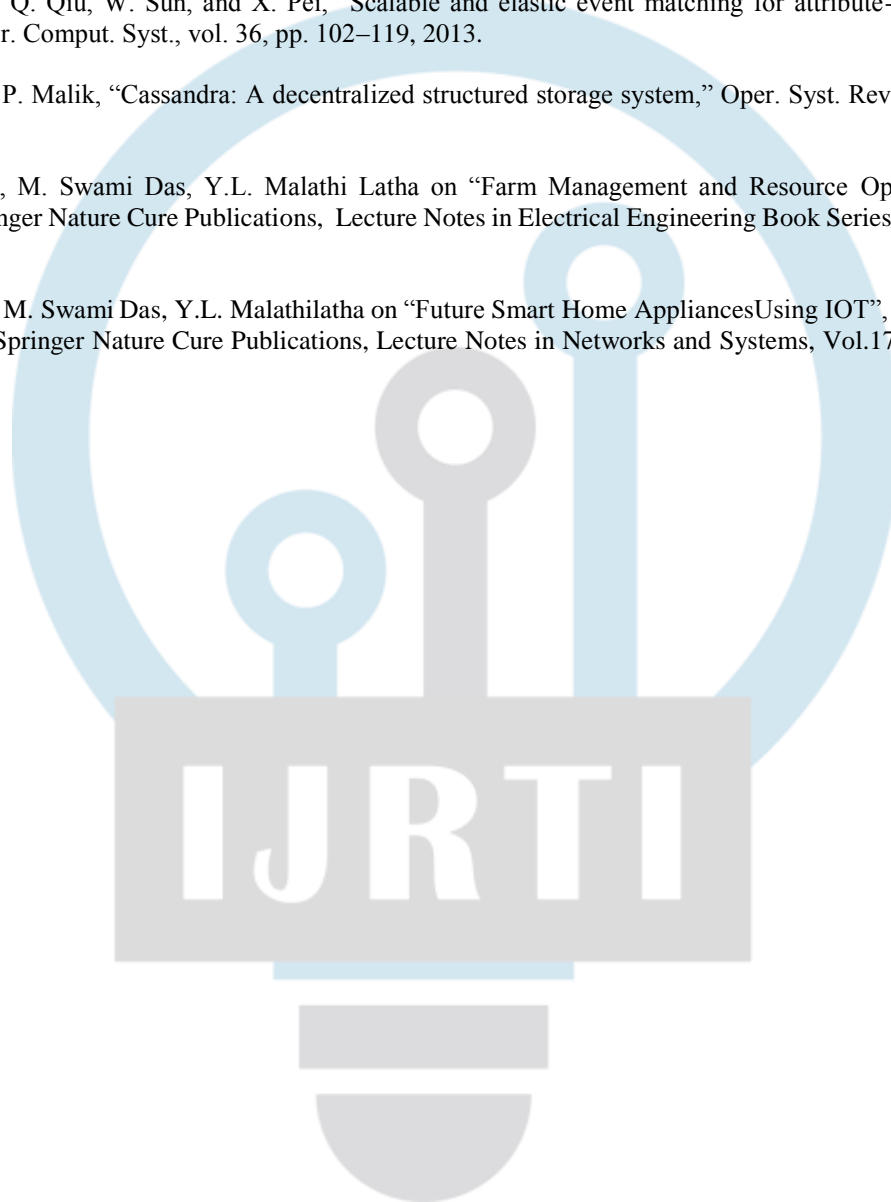
Figure: Skip Cloud in Open Source Network System Framework Clustering Data Center using OSNS Systems

IV. CONCLUSION

Huge efforts were created on cloud based social networks is broker basis publish or subscribe within the recent occasions. Within our work we advise an effective and consistent matching service for content-basis services in cloud setting. The un will bond the brokers completely through distributed overlay means by which ensures of consistent connectivity between brokers completely through its multi-level clusters and offer low routing latency. We spotlight on two important difficulties for example organizing of servers in cloud setting to achieve scalable furthermore to consistent routing but something is managing of subscriptions furthermore to occasions to achieve equivalent matching relating to the servers. For latency attainment of low routing furthermore to consistent links between servers, we submit a distributed overlay procedure to setup servers of matching service of occasions for content-basis services in cloud setting. The suggested distributed overlay procedure will grant the subscriptions furthermore to occasions to obtain forwarded between brokers within the consistent approach.

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HOME HEALTH CARE SYSTEMS USING IOT BASED ON CLOUD

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Abstract: Today most of the applications based on IOT connected services. The ability to locate and connect the devices using sensors and communication protocols like RFID, the data stored in the cloud storage system. The stored data is processed and generate reports based on the present and past data. This will help the patients the relevant instructions to be following quickly cure health conditions and predict the future. The applications of IOT are discussed. We have presented one of the application is IOT cloud based health care system, in which the system collects the data from wearable sensor devices. These devices connected to the communication protocols to store the patient data in the cloud health care system. The system data is analyzed, process, monitor, report the results. These results help the patient's recommendations by doctors, guidelines, instructions to cure the diseases with reduced cost. In future IOT cloud health care system can be extended to intelligent health care monitor and control system.

Keywords: RFID, IOT, Intelligent, Cloud, Diseases and Control System.

1. Introduction

Internet of things is inter- networking of physical devices(i.e connected devices) and other items using electronics, software, sensors, actuators and other network connectivity devices. The evolution of IOT. Internet of Things broadly into five stages in year 1997 ARPANET In 1999 Auto-ID center founded in MIT., In the year 2000 demand for expedited logistic, using RFID tags for routing inventory and loss prevention, in year 2003- EPC Global founded in MIT, in the year 2005- Four important technologies of the internet of things, in 2008 IOT enable to reach real world physical objects, In 2010 used cost reduction applications used in surveillance, security, healthcare, transport, food safety, document management. Later the development of IOT based applications.

In future by 2020 ability the devices are located indoors to receive geological signals, locating the people using every objects, and efficient tele-operation and monitor control, software agents and sensor controlled devices using web applications. Virtual personalities operating in smart spaces using connect, communication with social, environmental, and user contexts. IOT objects are sensor controlled network infrastructure. IOT with sensor and actuator, technologies use

assmarthome,smartgrids,intelligenttransportationandsmartcities.[1,3]InternetofThingsconnectingeveryobjectsusingsmartphone,internetsensortotheinternet.Thesearecommunicated to applications and people for further processing. Internet of things world wisenetwork ofinterconnectedobjectsthat are uniquely addressedusingprotocols.Thesystemcontrols using wireless sensors, radio Frequency Identification (RFID) and other systems. [3].[7,8]ApplicationsofIOTare1)smarthome2)Wearable3)smartcity 4)Smartgrids,5)industrial internet 6) connected car 7) connected health(digital health) 8) Smart retail 9) Smartsupplychain10)smartfarming[6]ApplicationsofhealthcareIOTaremobilemedicalapplications for example wearable devices. These devices allow the patients to capture healthdata. The data is communicated protocols to cloud systems and further analyzed. The Heathmonitoring system helps the patient's precautions, remedies and prescriptions. The rest of thepaper is organized 2 related study, section 3 proposed model, section 4 Applications of IOT,Section5Interpretationsanddiscussions.andsection6Conclusion.

2. RelatedStudy

ProblemIdentification

Internet of things using Smart connected devices are used sensor to collect the health data andcommunicated t the cloud data server and internet. Cloud processing and visualization. Softwareagentsandprocessinganalyzeandvisualizationsystems.DesignanddevelopasolutionIntelligent IOT based health care systems collect health data, communicate process, store andsuggest the disease stage and give guidelines to the patients, prevention, cure diseases withreduced cost. Tocollect the patientdata using IOT basedmedical devices and applications.These can be connected to Health care IT system through online network. The data is analyzed incloud and health monitoring system that the system will give guidelines and instructions to thepatients.

LiteratureSurvey

IOT connected every device. IOT cloud based technology to perform efficient operations usingsensingdevices.IOT of thingsis a global network connectedvirtualobjects with standardcommunication using wired or wireless telecommunication. Challenges build system, minimizeenergy consumptions. Communication software demand hardware, storage and maintenance andapplication services. [3] Sreekath,etl [5][7][8] studied IOT health care wireless sensor networks.Connected health care environment update clinician work, improve patient care, saftey, reducecost, and continuous monitoring. IOT Medical devices via gateway secure cloud systems store,process,analyzeandpredictresultsforpromotingmedicinesandcurehealthofpatients.Healthcare devices used to patients.Continuous monitoring of health conditions and correlatesthe physiologicalparametersandhealthdata forperditionandanalysisare

- Usedevices(SmartPhonesorTabletsorLaptops/Desktops)
- Recordtheclinicaldata
- Providetreatmentbydoctor
- Reducethehealthcarecostbyaccuracydiagnosesusing IOT devices.
- PatientmonitoringsystemonIOTcloudarchitecture.

It has three layer approaches are:

- a). Data acquisition sensing and transmission: Record the patient data for example Temperature, blood pressure. etc
- b). Data concentration and cloudlet processing: The collected data is communicated to Data storage and cloud data processing.
- c). The cloud data centers connected via internet to cloud processing analytics visualization Systems. Cloud Processing Analytics are:

The processed data from layer two is further analyzed and predicted and reporting the information to doctor. Data acquisition: Sensors measure the patient information and communicated to data transmission components. Data Transmission components: These components are responsible for recording the patient house (or remote location) data with the security and privacy and communicated via Smartphone Wi-Fi or IOT devices or Internet concentrator.

The storage processing device store the data and this is further analyzed data and reporting the condition of health to the doctor. The doctor will suggest the medical reports guidelines to the patients by IOT connected systems.[2] Sensors use by medical devices, remote and continuous monitoring of patients healthcare.

3. Proposed Model

The proposed IOT health care system has a sensor connected smart medical wearable devices. These devices connected to internet and cloud systems. [7] The cloud systems store, process, aggregate, analyze and services to the patients time to time. The following are some connected technologies gained and strength the need of services to patients and control the cost of applications. The figure.1. Shows the healthcare system services.

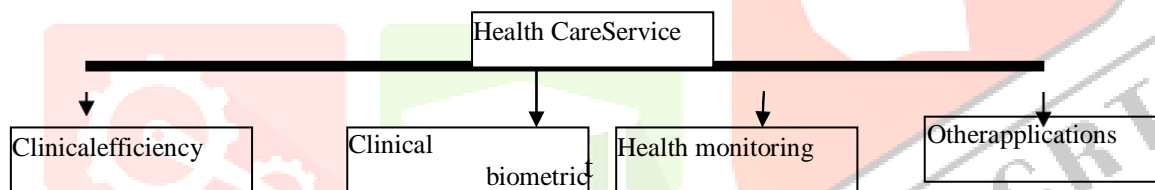


Figure:1. Health Care System Services

- **Patients safety:** To provide the safety to the patients in hospital
- **Reduce the cost:** The healthcare system provides the users with affordable cost
- **Store the million of records of patients:** The system is to store and maintain the health records of patients.
- **Analysis of real-time data:** The system is applying intelligent prediction algorithm to predict and monitor the patient health condition.

- **Predictions of diseases and remedies:** The system automatically predict the future Network of Sensors, Actuators, Mobile Devices, Internet of things for safety of billion of People.

IOT Enabled Controlled Health Care Systems

- Sensors
- Actuators
- Computing Devices
- Data communication capabilities
- Data Transportation.

The proposed model is shown in Figure.2.

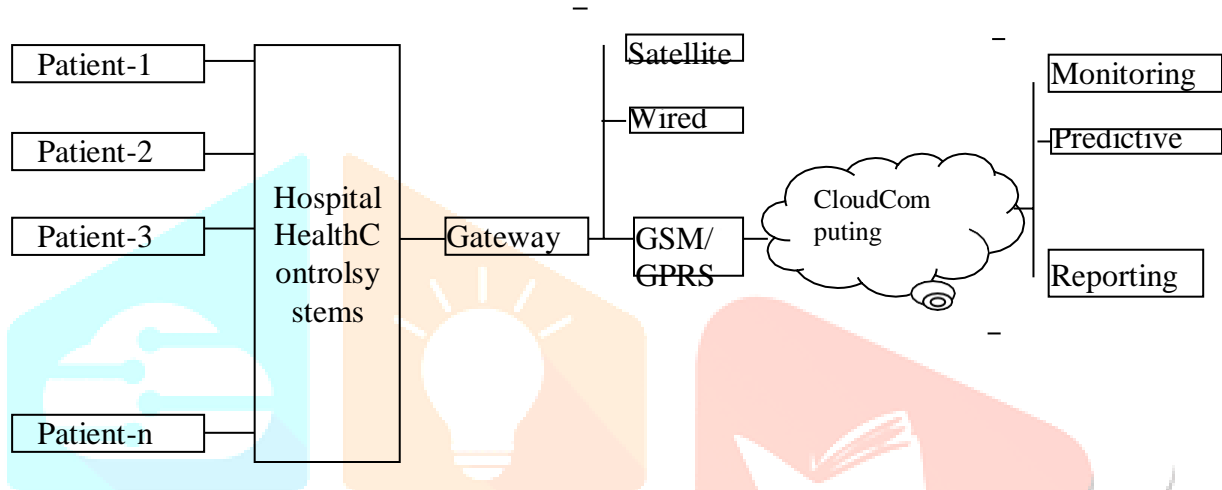


Figure: 2. IOT with Cloud Based Patient Monitoring and Reporting Systems

Health Management System is collected information following are:

- Patient Information
- Diseases and Emergency Cases
- Patient compliance and Treatment
- Medical devices and Diagnostic Devices
- IOT Sensors
- Mobile Users or Smart Phone Users
- Hospital Monitor and Management

Storage, visualization, daily activities, products and services, Optimize the operations and functions. Applications of IOT-

Health Care System to connected devices will utilize the resources and provide quality of care, better clinical outcomes, reduced visits, emergency admissions, reduction of bed days of care, patient at home. Supervision by IOT connected devices. For example some Devices are Blood pressure, ECG, Heart measuring devices, and Activity monitor: Time spent rest or sleeping, step counting, walking measured device, calorie spent device, Safety monitors: Fall detection system, personal safety and tracking device, Medication Monitors: Smart pill dispenser, Medication adherence systems.

IOT HealthCareConnectedMedicalDevices:

- Accessreal-timevisibilityofpatientconditionandactivities
- Monitorcompliance
- Highperformancecomputing
- Remotemonitoring

4. HomeHealthCareSystemrealdata collectedfromhospitalusingIOTDevices.

Internet of things is a wireless network between objects. Usually the network configuration isHouseholdApplications.Mobilereceiversarecommunicationbetweenpeopleandthings[6].

.Internet to reach out into the real world of IOT, Microcontroller, Sensor, wireless connectivity,cloud based software/infrastructure and application development. [8] IOT the operations andfunctions dynamically controlled. Improve resource utilization; relationship between the humanand nature dynamically control the operations - Intellectual entity by Human society, physicalsystem.Transport,internetnetworkingAccessibility,usability.

Wearable devices, home health monitoring devices, and provide better service. Solution allowingfor remote monitoring system. IOT health care monitoring system shown in Figure.3 Future ofIOT areTraffic issue, Production,Logistics, Retailing, Resource and power control, Daily life,trafficissue.

ThemainthreecoresectorsusedIOT

- Enterprise
- Home
- Government

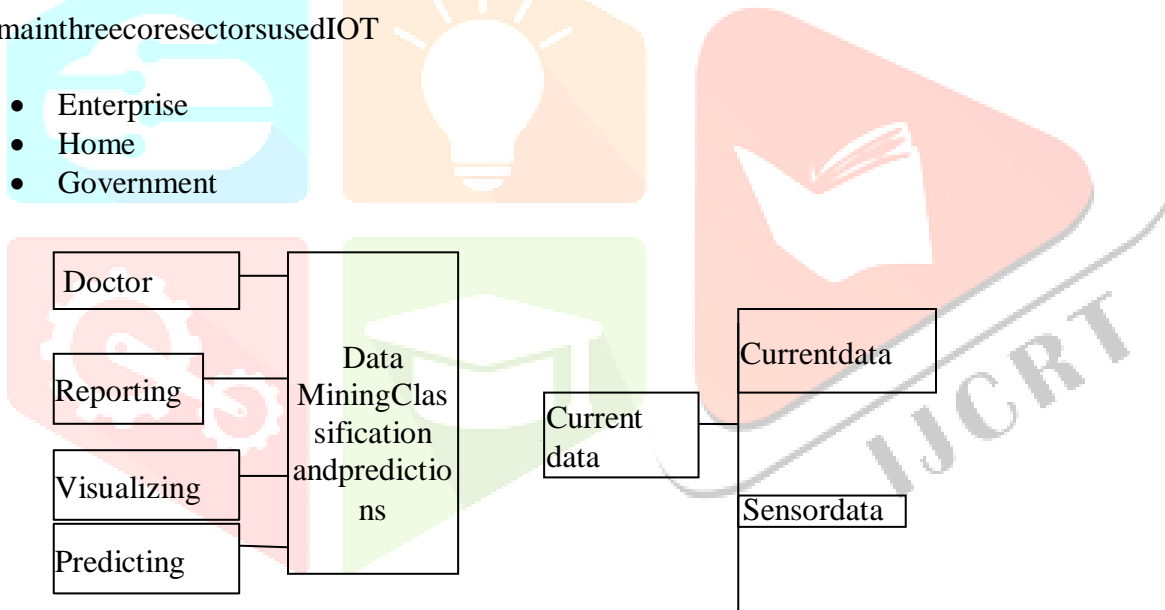


Figure: 3. Health CareAnalyticsProcessusingIOTSystem

5. Interpretations and Discussions

IOT Applications into various domains. The one of the most important section is IOT approach cloud based health care system is read the patient data using sensor controlled wearable devices. The devices communicated to cloud storage. The data is analyzed and reports, predictions by using the various techniques. The proposed model health care system has Clinical efficiency, Monitoring sensors and other applications. The figure shown in 2. Patient monitoring and reporting system collect the patient medical data using wearable sensor devices and the communicated using protocols like GSM/GPRS wired /wireless networks to cloud storage and computing system. The data is further monitored, analyzed and reporting results. These results help the doctors give guidelines suggestions to the patients to recover health with affordable cost. Health monitoring system includes patient information, diseases prediction, medical diagnostic devices, IOT sensor, mobile devices and other software services.

6. Conclusion

Internet of things various applications smart phone, smart cities, industrial internet, connected car, health care system and other applications. In future growth of IOT connected device in the world. As the study we have taken applications of IOT cloud based health care system provides data sensing and transmission, data storage and processing, and cloud process analysis proposed model shown in Figure.1 health care services, Figure.2 IOT based patient monitoring and reporting system, and Figure.3 shows the analysis process. In future we can extend the scope of the paper using data mining algorithms to classify the medical data and predict the future patterns based on the given present input and past data of the patient.

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2. <https://iot-analytics.com>
3. <http://www.tcs.com>
4. <http://www.link.springer.com/chapters>



COMBINATION OF KEY PROCESS WITH USER PROXY TESTER ENABLED FOR TIMING AND RE-ENCRYPTION ROLE FOR ONLINE HEALTH CLOUDS

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Abstract— New primary encryption tool called keyword search associated with a specific test and time-enabled proxy re-encryption function, a kind of time-dependent SE scheme. It can allow patients to delegate partial access rights to others to perform search functions in their records in a limited period of time. You can control the length of time for the delegate to find and decrypt the delegate's encrypted documents. In addition, the delegate can be automatically denied access and search authority after a specified period of actual time. It can also support associated keyword search and resist keyword guessing attacks. By solution, only the particular tester can test for the presence of certain keywords. We formulate a system model and a security model for the proposed Red-dtPECK scheme to show that it is an efficient scheme that has been tested as safe in the standard model. Comparison and extensive simulations show that it has low computation and storage stress.

Keywords: *Searchable encryption, time control, conjunctive keywords, designated tester, e-health, resist offline keyword guessing attack.*

INTRODUCTION

The electronic health record system will make medical records computerized with the ability to prevent medical errors [1]. It will make it easier for a patient to create their own health information in one hospital and manage or share the information with others in other hospitals. Several practical patient-centered EHRs have been implemented such as Microsoft Health Vault [2] and Google Health

[3]. Given the ambitious prospect of ubiquitous electronic health records, patient privacy concerns emerge. Healthcare data collected in a data center may contain proprietary information that is vulnerable to potential leakage and disclosure to individuals or companies who may profit from it. Although a service provider can convince patients to believe that privacy information will be kept in a safe place, electronic health records may be exposed if the server is compromised or an internal employee misbehaves. Serious privacy and security concerns are the dominant obstacle to widespread adoption. Public Key Encryption System with Keyword Search (PEKS) [4] - [7] allows the user to search for encrypted information without decrypting it, which is convenient for enhancing the security of electronic health record systems. In some cases, the patient may wish to act as a delegate to delegate his right to search to a delegate, which could be his physician, without revealing his private key. A proxy re-encryption method can be offered to completely fill the requirements. The server can convert the patient's encrypted index into a re-encrypted form that the delegate can look up. However, another problem appears when the access is propagated. When a patient recovers and leaves the hospital or is transferred to another hospital, he does not want the private data to be researched and used by his previous doctors anymore. One possible way to solve this problem is to re-encrypt all its data with a new key, which will bring a much higher cost. Deauthorizing with a scalable size would be even more troublesome. In this paper, we seek to solve the problem with a proposed new mechanism to automatically revoke the authorization after a period of time previously set by the data subject. In the traditional time-editing system [28], [30],

the timestamp is encapsulated in the ciphertext at the beginning of the cipher algorithm. It means that all users including the data owner are time limited. The beauty of the proposed system is that there is no time limitation for the data owner because the time information is included in the re-encryption stage. The data owner is able to pre-set various effective access periods for different users when they properly set their authorization. The effective time period specified by the data owner can be expressed as the start time and the closing time. A time server is used in the system, which is responsible for generating a timecode for users. After receiving an effective time period T from the data owner, the time server creates an ST timestamp using its own private key and the delegate's public key. In this way, the time period T is encapsulated in the ST timestamp. Through the re-encryption algorithm implemented by the proxy server, the time period T will be included in the re-encrypted ciphertext. It is the proxy re-encryption function that has its timing enabled. When the delegate issues a query request, it must create a magic door for the queried keywords using its own private key and ST time stamp. Only if the time period encapsulated in the scanning door matches the effective time period contained in the re-encrypted proxy ciphertext, the cloud service provider will respond to the search query. Otherwise, the search request will be rejected. This way, the delegate's access will expire automatically. The data owner does not need to perform any other operation to cancel the authorization. To our knowledge, this is the first work that enables automatic timing-based invalidation of authorization in a searchable cipher system. A keyword search scheme associated with a specific test and a timer-enabled Re-Proxy (Re-dtPECK) function is proposed, which has the following advantages.

1) We design a new searchable cipher scheme that supports safe search with associated

keywords and authorized authorization function. Compared with current systems, this work can achieve timed-enabled proxy re-encryption with effective delegation invalidation.

2) The owner-imposed authorization timing preset is enabled. The privileged access period can be predefined for a different delegate.

3) The proposed scheme is officially proven to be secure against the chosen keyword attack in the given time. Moreover, it can also resist offline keyword guessing attacks. The test algorithm cannot work without the private key of the data server. The eavesdroppers did not succeed in guessing the keywords by the testing algorithm.

2. RELATED WORK:

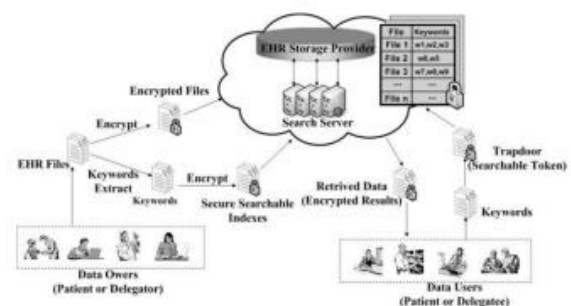


Fig no 1: Existing Model

In practice, the size of the keyword space is not always greater than the level of the polynomial. It is possible for an attacker to launch dictionary attacks or offline keyword guessing attacks (KG attacks) to exploit hidden keywords. Keywords for electronic health records are usually chosen from a small space, especially medical terms. If the opponent detects that trap doors or coded pointers have lower entropies, KG attacks can be launched if the opponent is struggling to guess potential candidate keywords. They broke many classic schemes with KG attacks. To counteract the threats, the concept of a specific PEKS test (dPEKS) has been proposed. Only the designated tester, which is usually the server, is able to implement the test algorithm. Improved security models have also been introduced. However, they were unable to support querying for multiple keywords or delegate search functionality.

Proxy Re-Encryption (PRE) allows a proxy with a re-encryption key to convert the ciphertext encrypted by the delegate's public key into those

that can be decrypted by the delegate's private key.

Re-encrypting proxy using global keyword search (Re-PEKS) introduced the concept of keyword search in PRE. Users with a keyword trap can search for the ciphertext while the hidden keywords are unknown to the agent. An improved scheme has been proposed to support the related keyword search functionality. All of these Re-PEKS schemes are proven to be safe in a random Oracle model. However, testing on a stochastic oracle model is likely to result in unsafe schemas.

Existing systems have a high communication or computing cost.

On the other hand, current schemes require an index list of keywords that were queried when creating a magic door, which will leak information and affect the privacy of the query.

If the opponent detects that trap doors or coded pointers have lower entropies, KG attacks can be launched if the opponent struggles to guess potential candidate keywords.

3. PROPOSED SYSTEM:

The timed-enabled proxy re-encryption lookup form is displayed. In this model, we highlight the implementation of a controlled time function. The data owner acting as the delegate sends a list of the delegates' effective authorization periods to the time server and proxy server. The list entry contains the identity of each delegate and the effective time period, eg. Indicates that delegate Jim is authorized to issue queries and perform decryptions on the data owner's encrypted data from January 1, 2014 to November 1, 2015. After the list is received, the time server generates a timestamp for each delegate, which is sent to the individual. A timestamp is a magic door to an effective time period and is hidden by the time server's private key. In the re-encryption process, the proxy server will encapsulate the actual time in the re-

encrypted ciphertext. In order to reduce computing costs, the proxy server will not re-encrypt the ciphertext until it is accessed, which is called the slow re-encryption mechanism [31]. At the query stage, the data owner can perform normal searches with his private key. However the delegate has to create the keyword trap with the help of timestamp. The cloud data server will not return matching files unless the effective time encapsulated in the timestamp matches the time in the re-encrypted ciphertext, which is different from traditional SE proxy re-encryption schemes.

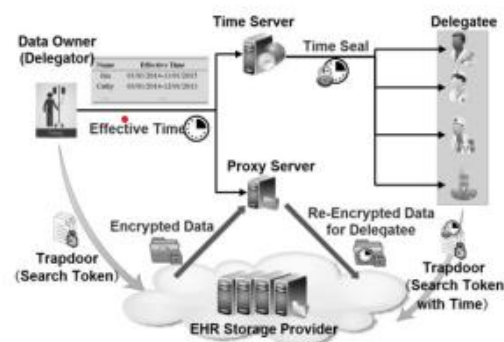


Fig no 2: Proposed Architecture

The EHR data server is semi-reliable, which is honest in searching information for the benefit of users but curious to spy on patients' private information. On the other hand, a malicious external attacker can eavesdrop and analyze information transmitted over a public channel, such as encrypted indexes and gateways. intends to infer privacy information based on this data. Additionally, revoked delegates can try to access data after the specified time period using their private keys. Since most of the storage and search work is completed by the data server, it is assumed that the data server will not be colluding with a malicious external attacker or invalid delegates. Our Red-dtPECK scheme for cloud electronic records is designed to achieve the following objectives.

- 1) Delegating authority. The proposed SE scheme should allow the delegation of authority imposed by the data owner, i.e. the data owner can delegate his search right to other users without revealing his private key.
- 2) Cancellation is controlled by time. An important design goal is to enable time-controlled access revocation. The delegation designation will

expire when the actual pre-selected time period does not coincide with the current time. The authorized user must be prevented from accessing the logs over time.

3) Different authorization times for different users. Another system challenge is to achieve different access times that the owner sets for different delegates. The data owner himself will not be limited by time.

4) Security objectives. The privacy concerns of this safe search system are summarized below. **1) Semantic keyword security:** Due to the suggestion of the RedtPECK scheme, we will demonstrate that it is indistinguishable from the keywords chosen at the time of the chosen attack (IND-CKCTA). **2) Resistance to KG Attacks:** Since EHR keywords are always chosen from a small space, relevant search cryptosystems may be vulnerable to offline KG attacks. The proposed scheme must withstand such an attack. **3) Standard Model:** The security demonstrated in Standard Model is known to be stronger than in Oracle's Random Model. This security feature ensures a higher level of security.

Methodology:

GlobalSetup(k): Taking a security parameter k as an input, this function generates a global parameter $G P$.

- **KeyGenSer($G P$):** Taking $G P$ as an input, this algorithm generates a private and public key pair (skS , pkS) for the data server.

- **KeyGenRec($G P$):** Taking a global parameter $G P$ as an input, this function generates a private and public key pair (skR , pkR) for the receiver.

- **KeyGenT S($G P$):** Taking a global parameter $G P$ as an input, this function generates a private and public key pair ($skT S$, $pkT S$) for the time server.

- **dPECK($G P$, pkS , pkR , skR , W):** Taking $G P$, pkS , pkR , skR and a keyword set $W = (w_1, \dots, w_l)$ as the inputs, the function returns a ciphertext CI of W for R_i .

- **Trapdoor($G P$, pkS , skR , Q):** Taking $G P$,

pkS , skR_i and a keyword query for $Q = (w_1, \dots, w_m)$, $m \leq l$ as the inputs, it outputs a trapdoor TQ, I for Q generated by R_i .

- **Test($G P$, TQ, I , skS , CI):** Taking $G P$, TQ, I , skS and a ciphertext CI of W as the inputs, the function returns '1' if W includes Q and '0' otherwise.

5 CONCLUSIONS

We have proposed a new Re-dtPECK scheme to perform privacy-preserving and time-enabled keyword search mechanism for EHR cloud storage, which can support automatic revocation of authorization. Experimental results and security analysis indicate that our system has much higher security than current solutions with reasonable scaling for cloud applications. As far as we know, to date, this is the first encryption scheme to support lookups with a time-enabled proxy re-encryption and a dedicated tester for storing privacy-preserving HER records. The solution can ensure the confidentiality of electronic health records and resist KG attacks. It has also been shown to be formally safe based on the Standard Model under the robustness assumption of the 1-ABDHE truncated decision problem and the DBDH problem. Compared with other classical search cipher systems, efficiency analysis shows that our proposed scheme can achieve high computing and storage efficiency as well as high security. The simulation results also showed that the communications and computing overheads of the proposed solution are feasible for any real-world application scenario.

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A QUERY BASED APPROACH TO SOLVING THE ENTITY INFORMATION

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Abstract: In response to a user question, this study investigates "on-the-fly" data cleansing. A new Question-Driven Approach (QDA) is created that executes a limited number of cleaning steps that are only required to appropriately answer a particular selection query. Over typical query-driven systems, a full empirical examination of the suggested method shows a considerable benefit in terms of efficiency. It's clear that data-driven technologies like decision support tools, data exploration and analysis, and scientific discovery tools rely heavily on the quality of the data they work with, which is why data quality research is so important. It's common knowledge that the quality of the results of an analysis is directly related to the quality of the data used to do the analysis. In order to ensure the quality of their data, businesses nowadays spend a significant portion of their budgets on cleaning operations, such as eliminating duplicates or repairing mistakes, and filling up missing information. Systematic ways to cleaning issues have been investigated by both industry and academics given the problem's essential relevance.

Keywords: Query-driven approach, QDA, query-aware, entity resolution, SQL selection queries.

I. Introduction

Query-driven ER was codified and actual evidence was provided to demonstrate that some cleaning processes might be skipped depending on the query. Several new avenues of enquiry have been opened up by

this study. Though selection questions (as addressed in this study) are essential in their own right, developing QDA approaches for other query types is a promising avenue for future research. Another aim is to find efficient ways to maintain a database's state for future queries.

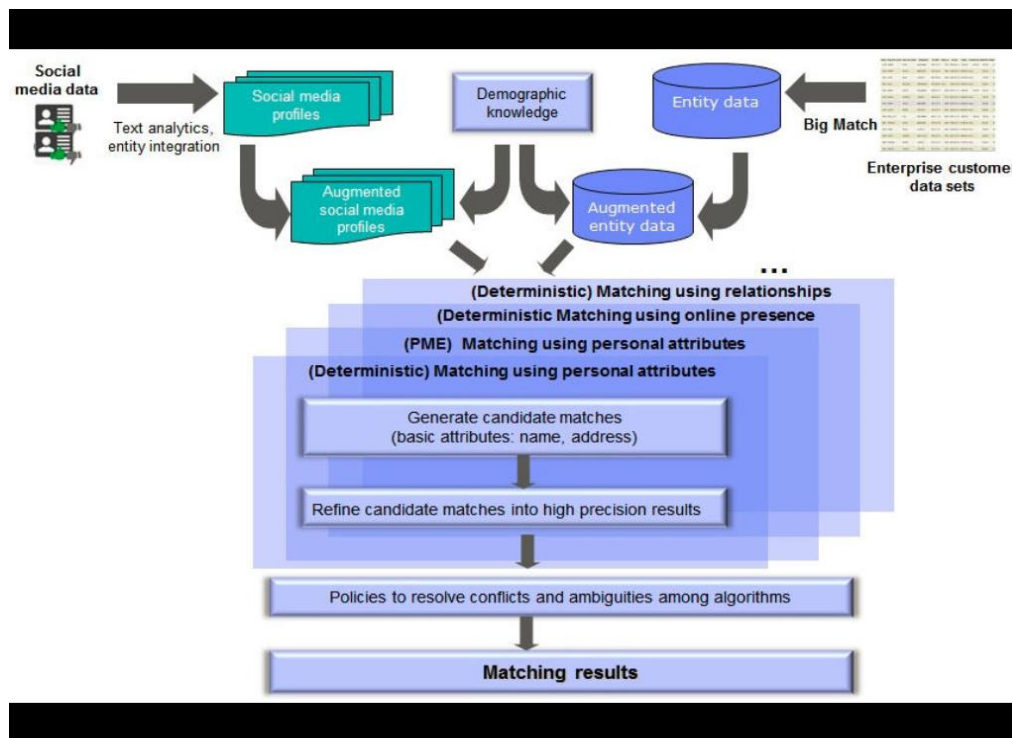


Figure 1: System architecture

In query-aware data cleaning, the demands of the query govern which sections of the data should be cleaned, this article tackles the topic. For today's rising need for (near) real-time analytical applications, a new paradigm of data cleaning is emerging: query-aware cleaning (QAC). Web data repositories, social media postings and clickstream information are just some of the data sources that modern businesses have access to. An analyst's goal is generally to combine data from several sources (including their own) in order to undertake collaborative analysis and decision-making. When data from many sources is combined, a single real-world item may have numerous representations, posing problems for data quality. It is our goal in

this work to examine and discuss the Entity Resolution (ER) problem. Data warehouses often execute entity resolution as an offline pre-processing step before making data accessible for analysis — a method that works well under ordinary conditions. Emerging applications, on the other hand, need analysing just a tiny section of the information and providing results in (near) real-time. [8] and [23] are examples of this. This strategy is driven by a variety of factors. Because current apps must perform analytical activities on the fly, they are unable to employ time-consuming typical back-end cleaning solutions because of the necessity for real-time analysis. When a data analyst discovers and analyses data in a single integrated step (e.g., queries on

online data), the system will know "what to clean" only at query time (while the analyst is waiting to analyse the data). Finally, consider a situation in which a small business has access to a vast dataset but only needs to study a piece of it in order to swiftly answer a few analytical questions. It would be a waste of limited computing resources for that company to attempt to clean up all of the data, particularly because the majority of it is likely to be superfluous. An increasing number of articles in the literature have presented query-aware ER techniques. While query-aware ER is addressed by such systems, they are confined to mention-matching and/or numerical aggregation queries that are conducted on top of dirty information. The kind of queries required for data analysis, on the other hand, typically need SQL-style options. For example, a user who is only interested in articles produced by "Alon Halevy" and which have a high citation count (e.g., more than 45 citations) can utilise this feature. Prior work failed to take use of the semantics of such a selection predicate in order to decrease cleaning, as we have done. [2] To deal with these new issues, we developed the Query-Driven Approach (QDA). When used in combination with blocking, QDA is a significantly more effective supplementary paradigm for increasing efficiency than traditional methods such as blocking [19],

[24], [28]. QDA evaluates whether pairings of entities in a block B do not need to be resolved in order to discover all of the entities in B that meet the complicated selection predicate P. So, a graph is used to represent all the entities in the data set, with edges that could belong to cliques resolving and possibly altering the query's outcome. Cleaning the data first and then querying on top of the cleaned data yields the same results as using QDA. QDA, on the other hand, is able to calculate these responses far more quickly. Vestibulitis is an important term in QDA. No need for a cleaning step (i.e., a resolve call) if QDA can ensure that it can still calculate an accurate final answer without knowing the result of this resolution.

II. Literature Survey

H. Altwaijry et al For a wide range of SPJ SQL queries, this study investigates an analysis-aware data cleaning architecture. A new framework for query processing and entity resolution (ER) called QuERy is proposed in this paper. It is the goal of QuERy to answer complicated queries submitted on top of filthy data in a timely and accurate manner Extensive testing of the suggested approach proves its superiority in terms of efficiency over conventional methods in these specific circumstances.

I. Bhattacharya et al It is the purpose of entity resolution to ensure that all database references to the same real-world entities are consistent. The difficulty of fast processing queries that need resolved entities from 'unclean' databases is motivated by the number of publicly accessible databases with unresolved entities. In this paper, we suggest a two-stage collaborative resolution technique for inquiries. Adaptively extracting and resolving database references that are most useful in resolving the query allows it to be done on-the-fly. On two large real-world publishing databases, we illustrate the benefits of collaborative resolution and at the same time establish the requirement for flexible query processing algorithms. In the next section, we demonstrate how the identical inquiries may be answered in real time using our adaptive technique while keeping the benefits of communal resolution.

M. Bilenko et al Problems with linking concentrate on discovering if two object descriptions belong to the same source item. There are several practical applications for solving this challenge, such as removing duplicate entries from databases and matching citations in scientific works. In this work, we look at how the record linkage issue manifests itself in a new domain: online comparison

shopping. Using streaming data, we address the problem of learning a similarity function for record pairings. The learnt similarity function is then utilised in clustering to identify which records are related and should be linked together. To overcome this issue, we propose an online machine learning technique that uses linear combination of fundamental functions to train a composite similarity function. It is shown that our technique can successfully train several distance functions for product data with varied features on numerous real-world datasets from an Internet comparison shopping site. Experiments highlight the relevance of taking into account numerous performance metrics in the assessment of record linkage.

Z. Chen et al Entity Resolution (ER) is a key real-world issue that has sparked a lot of recent study. It is concerned with figuring out which descriptions of objects in a dataset relate to one another. Many alternative ER techniques have been developed to meet the ER problem because of its practical relevance for data mining and data analysis. The ER Ensemble framework proposed in this study is a novel one. In order to improve the quality of ER, ER Ensemble combines the findings of various base-level ER systems into a single solution. Because no one ER approach consistently outperforms others in terms of

quality, the system suggested in this research takes use of that fact. As a result, various ER solutions are better suited for different situations. Two new supervised learning-based combining algorithms are included into the system. Using both techniques, a clustering decision is generated by combining the base-level ER systems' clustering judgments with the context of the local area. The framework is studied experimentally by applying it to a variety of diverse contexts. The results of the trials show that the suggested framework produces much greater disambiguation quality than the present state-of-the-art alternatives.

W. Cohen et al Methods for matching names and records are described in an open-source Java toolkit. On the job of matching entity names, we sum up the findings from several string distance measures, including edit-distance metrics, rapid heuristic string comparators, token-based distance metrics, and hybrid approaches, all of which were used. After that, we'll go through an addition to the toolbox that lets you compare records. Finally, we show findings for basic baseline record-matching algorithms based on string comparisons across fields after discussing some of the problems inherent in making a comparable comparison for record-matching approaches.

III. Proposed Methodology

It is the primary goal of QDA to quickly calculate a response to a question. A normal ER procedure applied to the whole dataset should get the same result as running query Q on the cleaned data. As part of this piece, we make QDA capable of working with eager clustering algorithms. Traditional eager-ER algorithms (abbreviated eager-ER), which employ transitive closure clustering [18] to group matched entities together into clusters, repeatedly choose a pair of nodes to resolve next, apply the resolve function, merge nodes if it gives a good result and repeat the process. Two notable distinctions separate our eager-QDA technique from the eager-ER approach, which is extremely similar. Prior to resolving any nodes, eager-QDA employs a pair-picking approach of its own. This method aims to reduce the number of calls required to answer a certain query.. If the selected pair isn't vestigial, eager-QDA first checks if it can avoid making this call by determining whether it is. Following are the stages that make up eager-QDA as a conceptual model: Creating and tagging the graph is step one. The first step is to create and label a graph called G. How to Decide on a Resolving Aspect. Based on this policy, it chooses edge e_{ij} as the one to deal with. Either e_{ij} can be swiftly added to the result set, or many important cliques may

be broken if this policy is used. This is intuitively the case. We've tried a lot of various things. One that has shown the greatest results is based on choosing edges according to their weight, which is determined by adding the values of its affected nodes: $w_{ij} = v_i$. The policy of edge-picking is not the subject of this study. 3) The removal of the edge is a lazy process. This is only one of the numerous improvements we have performed in eager-QDA. Algorithm checks to see whether the selected border e_{ij} is still there. In this case, the algorithm will return to Step 2 and try again. Keep in mind that if nodes v_k and v_l are merged, e_{ij} may be lost. In G , only the common edges of v_k and v_l may remain after combining the two sets. For each merging, however, the process of identifying common edges and then aggressively eliminating them from auxiliary data structures is an $O(R)$ operation. In order to save time and money, eager-QDA does not delete the edges during the merging process, but instead does it later on. If v_i (or v_j) was deleted from V may be in an earlier iteration, or whether it is not in the same neighbourhood as v_j (or vice versa), it may be done in $O(1)$ time by verifying if the algorithm has already merged v_i (or v_j) with another node v_k . Vestibularity Testing (4). Edge e_{ij} , in this stage, is checked to see whether or not it is an obsolete Stopping Condition.

Whenever an edge $e_{ij} \in E$ exists, the algorithm iterates by proceeding to Step 2 instead of resolving it. 6) Finding the Solution. Finally, the method uses the needed response semantics S to calculate the final answer to the inquiry.

As a result, we must devise algorithms that carry out the aforementioned stages. This means that the resolve function should be used as little as possible, while yet being able to accurately and quickly locate an answer to a query. A basic method, such as resolving all $O(n^2)$ edges in random order, may be more efficient than using a complex algorithm to resolve all the edges in the given number of iterations. In the next sections, we'll go through each step in great depth.

Algorithm for Query Optimization

For each dependence rule that is constructed, this algorithm provides a pseudo-code for calculating its execution time. Data table properties and the number of requested locks is included into this calculation. The result is the number of inputs needed for each query component. We calculate the query completion probability for each dependence rule based on all of these parameters. Execution of the most likely rule follows.

Input: Let the input be Dependency Rule Set DRS.

Output: Let the output be Final resultant SEquence selected SEq.

Step1: Initialize Query Completion Probability Set QCPS.

Step2: For each rule R_i from DRS

Compute Query completion probability Q_{cp} .

$$Q_{cp} = N * \log(R_i(N_i)) + (R_i(NL) * (N * \log(R_i(NDTR)))$$

$$QCPS = \sum QCPS(i) + Q_{cp}.$$

End.

Step3: Choose the most probable Rule.

Step4: Return selected Dependency Rule Set DRS(i).

Step5: Stop.

If there is an assignment (of MustMerge or MustSeparate values) of yet-unresolved edges (by eager-QDA) that might modify the values of the resolves consumed by QDA, then lazy-QDA needs to know about it. As a result, lazyQDA does a "stress test" utilising the extremes of the two CC ranges. The first extreme (CC+) assumes that all unresolved edges are yes edges and then applies CC clustering as usual. Instead, the second extreme (CC) designates all unresolved edges as CC and then performs CC. By default, CC+ attempts to reduce the number of clusters to a minimum while still applying the greatest force, given the restrictions of previously resolved edges. As an alternative to this, CC makes a concerted effort to break apart all records into as many clusters as feasible using as much power as possible. There are two stress tests used by eager-QDA to determine whether or not an edge is "stable," and if it fails both of them, it is

regarded to be "stable." Using this test, you can tell whether an edge is stable.

The suggested query optimizer's structure is as follows: The following is a description of a general process for reducing the complexity of a query: - Finding an internal query representation into which user inquiries may be mapped is the first and most important stage. Logical transformations are applied to the query representation in the second phase to ensure that the query is consistent. As a further step, you'll map your converted query into a variety of simple operations. The total cost of each access plan is then calculated. Finally, we choose the least expensive option and put it into action. We've built a query optimizer model around this basic process so that it can adapt to the evolving needs of a growing database. Creator, Transformer, Plan Generator, Evaluator and Decider are the four components in this suggested approach. The following is a list of the different modules' functions. The module Creator accepts the user query as an input and creates a query tree structure in which the leaf nodes of the tree include nodes that access a relation and inside nodes that contain relational operators. When reading data from a database, the leaves of a tree depict data flow from the database's root upwards. This module may be used to create an internal representation

of the query, such as a query tree structure. Alternatively, it might be described as a procedure for constructing join nodes one at a time. Adding a relation allows you to link to a new node. If a query tree's root join node includes all of the operand relations of the input query, it is considered full. The connect operators provided by the module Transformer allow us to express the processing tree in a syntactical manner. The optimizer's task is to come up with a query

evaluation plan that yields the same result as the provided expression given a relational algebraic expression. The module Plan Generator is in charge of this part of the process. A query tree is substituted with the physical operators that may be implemented in this module. An access plan describes how the query is to be evaluated. There is a price to pay for carrying out each strategy.

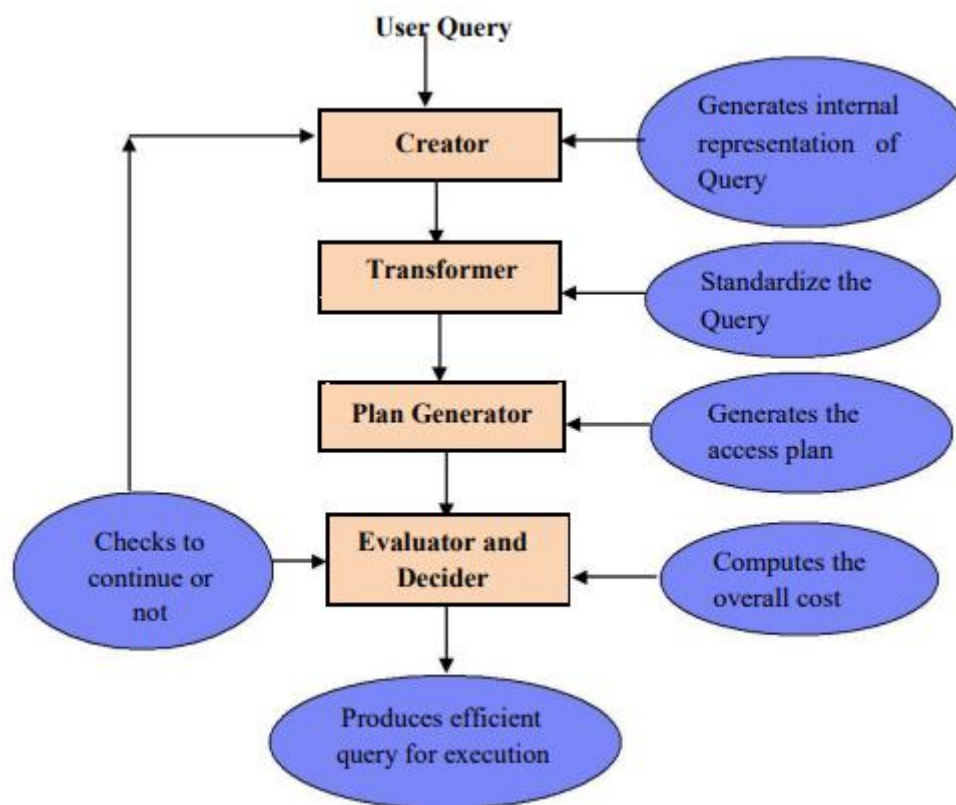


Figure 2: proposed query optimizer

In order to achieve the lowest feasible implementation costs for relational algebra operations, the primary goal of query optimization is to find the most efficient implementation possible. To correctly estimate the costs of various queries, one of

the most challenging things in query optimization is to do. The module Evaluator is in charge of this. It is shown in Figure 6.13 that the suggested query optimizer architecture is laid up.

Experimental Evaluation and Results

Unlike the Google Scholar dataset used in the previous section, the hotel dataset utilised here is much bigger. This dataset contains information on hotels (e.g., hotel-id, hotel-name, hotel-address, hotelcity, hotel-country, hotel-stars, hotel-price, etc.). There are 184,169 hotels in all, with about 40% of them being duplicates. All records have their own signature produced using min-hashing [22]. (i.e., an array of integers where each integer is generated by applying a random hash function to the hotel-name of the record). In the next step, we utilise locality-sensitive hashing [17] to group data with a high degree of similarity into 1,000 large blocks. To further divide these large blocks, we employ the same blocking strategy we did in the previous section. In other words, the first two letters and final two letters of the hotel's name are used to divide the data in each large block into smaller blocks. Thus, if the first or final two letters of the names of two hotels in a large block match, they are placed in the same little block. In order to determine whether two records are identical, we created a pairwise resolve function. The names of hotels are compared using Soft-TF-IDF.

The questions utilised in these tests may be divided into three categories. Hotel accommodations in the United States that are both inexpensive and of superior quality fall under this category. P1: price t1, t2: stars, and nation = "US" are the three predicates in this class. For example: a triple 1 = (price/t1, min, price) is an in-preserving triple, as are three triples 2 = (stars/t2, max), and 3 = (country='US', EXAMPLE, country). Table 2 shows that the ensuing combination 1 2 3 is not conserving. Class two: hotels that are overpriced. The two predicates in this class are p1 price t1 and p2 stars t2. Out-preserving triple 1 = (price t1, minimum, price) is followed by an out-preserving triple (stars t2, maximum, stars) in such queries. When we look at Table 2, we can see that the outcome is out-preserving. 3) Hotels in this category are of subpar quality. The two predicates in this class are p1 stars t1 and p2 nation = t2. Two triples: 1 = (MAX, MAX, stars; country=t2, EXEMPLAR, country) and 2 = (country, EXEMPLAR) are used in these queries. Using Table 2, we can see that the outcome is neither in- or out-preserving, since it is neither 1 nor 2.

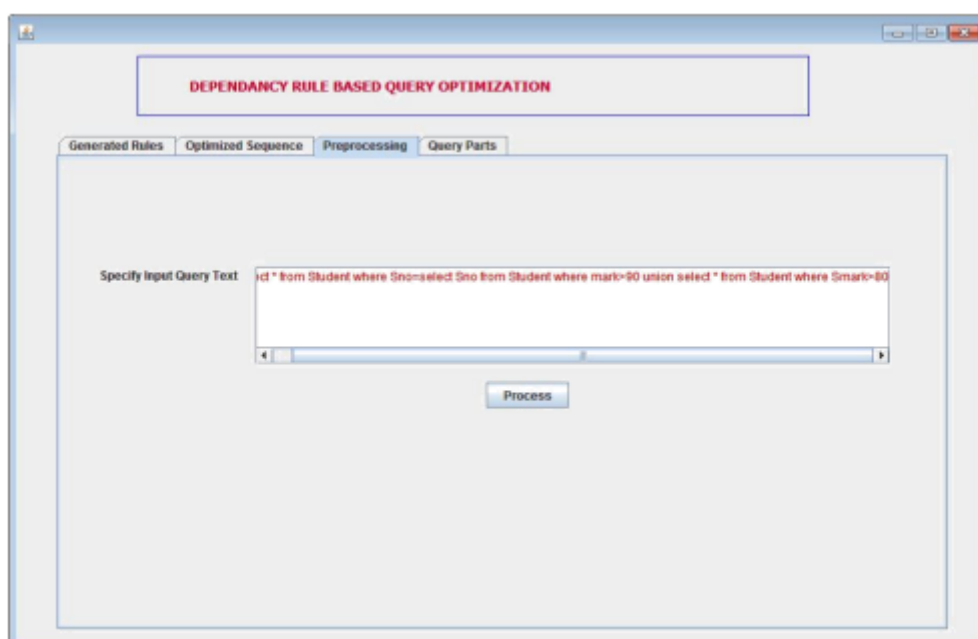


Figure 3: Snapshot of query submission interface

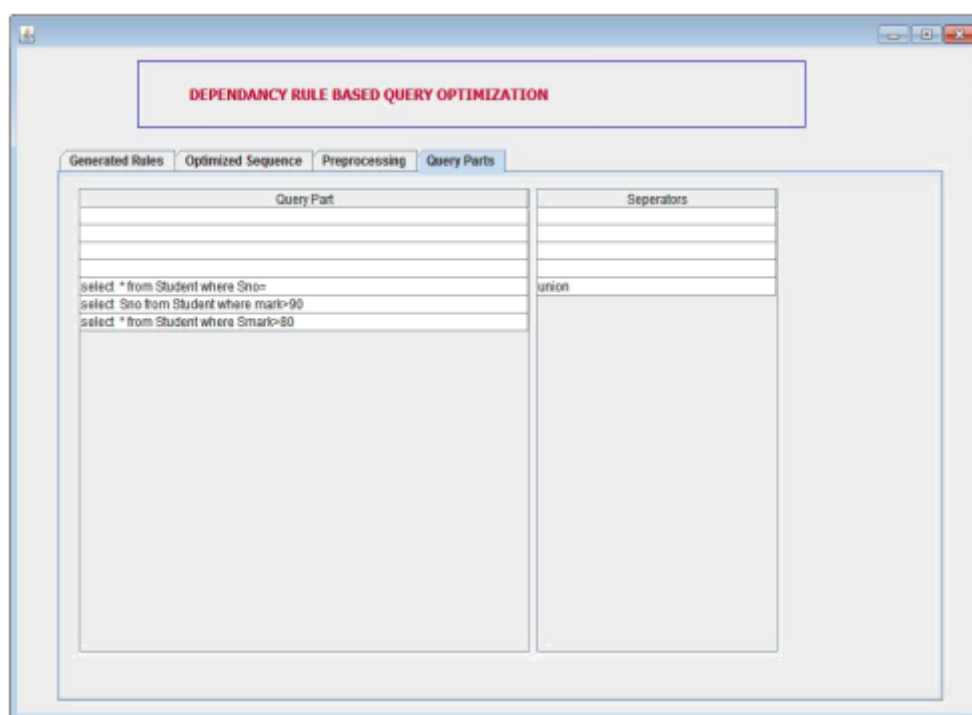


Figure 4: Identification of query paths

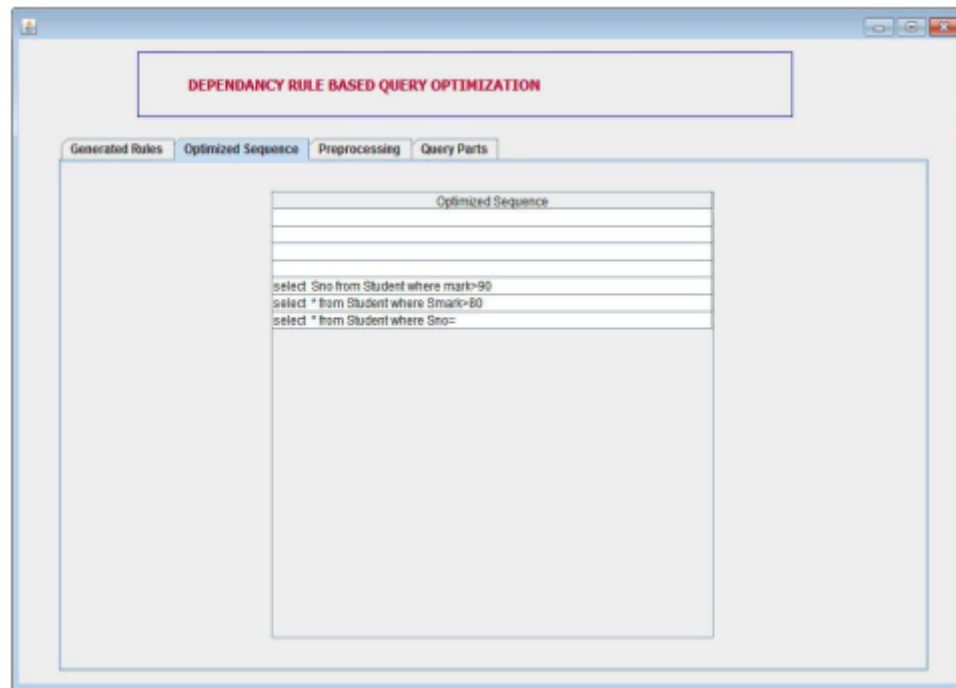


Figure 5: final optimized sequence

The ideal query execution sequence must be determined from the produced query execution sequences. According to how many inputs are necessary for each query, how many data tables are needed, and how many locks are needed, the best possible sequence is determined by calculating total execution time. We calculate the query completion probability for each dependence rule based on all of these parameters. It helps us choose the best query sequence for execution based on this completion probability.

CONCLUSIONS AND FUTURE WORK

Data is cleansed "on the fly" during a selection query in this study, which we explored in detail. In order to correctly

answer a selection inquiry, we have created QDA, which issues the smallest amount of cleaning steps possible. Query-driven ER was codified and several cleaning stages were experimentally cut. The findings of this study suggest a number of new avenues for further exploration (e.g., developing solutions for efficient maintenance of a database state for subsequent querying).

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MUTUAL AND APPROVAL BASED ON FILTER OF ONLINE SOCIAL RANKING**Chekurtha Archana¹****Dr Manyam Thaile²**

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Abstract: Online social networks are increasingly including social voting as a new feature. It presents a distinct set of problems and possibilities for recommending it. For social vote recommendation, we present a collection of MF and NN-based recommender systems (RSs) that investigate user social networks and group membership information. Social network and group affiliation information may increase the accuracy of popularity-based voting suggestion greatly, and in NN-based techniques, social network information dominates group affiliation information via trials with genuine social voting traces. In addition, we've found that social and group information is much more important to cold users than it is to regular ones. When it comes to hot voting recommendations, simple meta-path NN models outperform computationally complex MF models, but MF models are better suited for nonhot voting recommendations. Further, we suggest a hybrid RS, which incorporates the best of many single techniques.

Keywords: Collaborative filtering, online social networks (OSNs), recommender systems (RSs), social voting.

I. Introduction

Social networks like Facebook and Twitter make it easier for friends to share information with each other. In addition to being able to send text, image, and video updates to friends who are directly connected to the user, popular OSNs allow users to rapidly and easily distribute such updates to a much broader group of friends who are not directly connected to the user. Many online social networks (OSNs) now allow users to vote on numerous topics, such as their status updates, profile photographs, games they've played, things they've bought, websites they've visited, and so on, with their friends. Some OSNs, such as Sina Weibo [12], allow users to start their own voting campaigns on any issue of their choice, with user-customized voting choices. Participants in the campaign are encouraged to share it with their social media networks. Social

voting, in addition to promoting social connection, has several business applications. Voting may be started by advertisers to promote certain companies. Market research may be initiated by product managers. Votings may be carefully launched by e-commerce companies in order to attract more clients online. As social voting becomes more popular, it raises the issue of "information overload," in which a user may get overwhelmed by the number of votes she has received as a result of her friends' direct and indirect participation in the voting process.

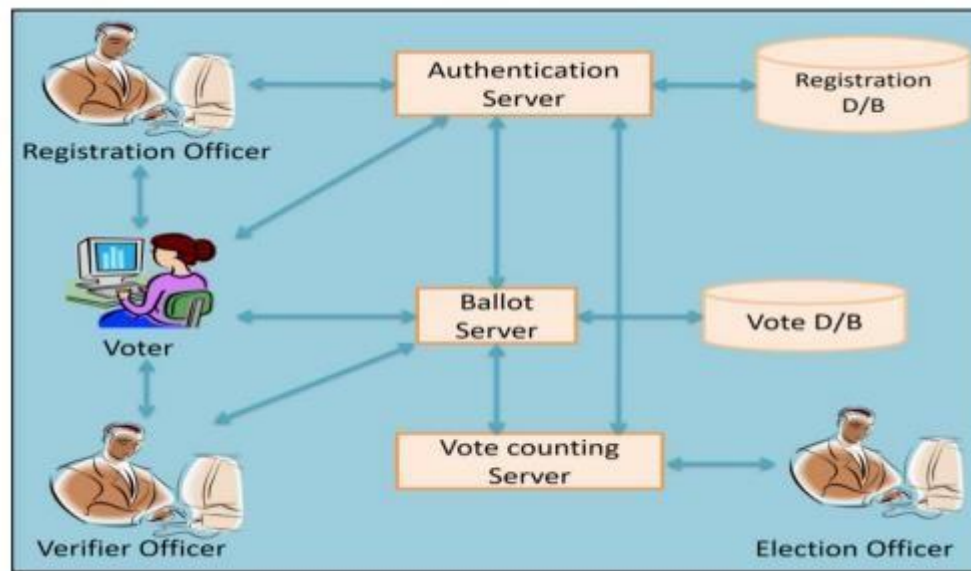


Figure 1: Proposed Architecture of Online Voting System

Presenting "the correct votings" to "the right users" is crucial for enhancing user experience and maximising participation in social votings, but it is also difficult. In order to avoid information overload, recommender systems provide users with suggestions for things that they may be interested in. On the topic of online social voting RSs, we discuss our most recent efforts to promote attractive voting campaigns for users in this article. Instead of recommending books and movies to friends, social votings are passed on via social connections. If her friends started the vote, participated, or retweeted it, she is more likely to see the results. Users' voting visibility is strongly linked to the voting activity taking place in their social circles. A user is more likely to engage in a vote if her friends have participated in the voting, as a result of social propagation. The voting habits of a person are closely tied to the social circles in which they are embedded. RSs using social trust information have distinct issues and potential when it comes to social voting [14].

There are no negative samples in voting participation statistics since it's all binary. Developing RSs for social voting, on the other hand, is exciting. This is why we've created a new set of

regression-based models, including matrix-factorization models and closest neighbour ones, to discover the voting preferences of individuals by mining data on their involvement in elections, friendships with other individuals, and membership in user groups. Real social voting traces from Sina Weibo are used to analyse and compare the performance of the various models that have been offered. The paper's contribution is three-fold. To the best of our knowledge, little research has been done on online social voting. We build MF-based and NN-based RS models, respectively. Using real-world social voting data, we demonstrate how data from social networks and group affiliations may both be mined to increase the accuracy of voting recommendations based on popular opinion. Experiments on NN-based models show a dominance of social network data over other group affiliation data. Cold users, on the other hand, value social and group information more highly than heavy users. NN models based on simple metapaths outperform computationally complex MF models in hot voting suggestion, whereas MF models may better mine users' interests in nonhot votings.

II. Related work

During the 2010 U.S. congressional elections, Bond et al. [1] ran a 61-million-person experiment on Facebook [24] to examine social impact. They showed that people's willingness to participate in elections is influenced by the strength of their links inside OSNs. In contrast to [1,] our research focuses only on OSNs, where social effect on user adoption of online social votings is studied. Based on user input, collaborative filtering RSs may forecast users' interests, resulting in highly accurate suggestions. A survey of RSs was given by Adomavicius and Tuzhilin [2]. For rating prediction, Koren [4], [5], Salakhutdinov and Mnih [7] suggested models based on MF. Collaborative filtering for top-k recommendation was explored by Cremonesi et al. [10] and Shi et al. [28]. An optimization criterion proposed by Rendle et al. is general. Based on the maximum posterior estimation for optimum customised ranking, Bayesian Personalized Ranking (BPR)-Optimization (Opt) was developed. To improve BPR-Opt, Rendle et al. introduced the general learning algorithm LearnBPR. BPR may be used in conjunction with our suggested algorithms, such as Weibo-MF and NN, to improve their performance. OSNs, which are becoming more and more popular, supplement traditional rating-based RSs by providing more context and context information. Just a few examples of earlier research into the integration of social network information to improve recommendation accuracy can be found in the literature today. User-item rating matrix and user-user connection matrix should be factored together to predict item ratings, according to Ma et al [12]. According to Ma et al. [13], a user's rating of a product is impacted by the opinions of his or her friends.

There are two elements to a user's rating: the user's personal rating of the item, and the ratings of the item by the user's friends. Once this was done, the authors advocated linearly combining the two ratings to arrive at a single final anticipated score. A user's interests might be swayed by his or her social circle, according to Jamali and Ester. Because of this, the user's latent feature must be comparable to the latent features of his or her friends in order for MF to work. Yang et al. asserted that a user's interest is multi-faceted and suggested to partition the original social network into circles. Different types of goods may be predicted with the use of difference circles. Jiang et al. [18] explored the usage of information from numerous platforms to better understand consumer demands. To address the issue of cross-platform behaviour prediction, they introduced a semi-supervised transfer learning approach in RS, which takes use of the limited number of overlapping crowds to bridge information across multiple platforms.

A star-structured hybrid graph centered on a social domain and connected to other item domains was proposed by Jiang et al to enhance information for reliable user-item connection prediction. Furthermore, being aware of the context is a critical component in making better recommendations. Context-aware recommendation in mobile digital assistants may be achieved via a collaborative nowcasting model that models the complicated association between contextual signals and between context and intent to solve the sparsity of contextual signals. Researchers from China and Taiwan studied the content information on location-based social networks with respect to point-of-interest attributes, users' personal interests as well as sentiment indications, which models three types of information under one recommendation framework with regard to their relation to check-in actions. Unlike conventional recommendation items, online social votings do not have the same level of social propagation. Unlike previous social-based RSs, our models additionally include user-group membership information in addition to social connection data. Use social network and group information together for better recommendations. A user's activity is reflected in binary rating data, which is the focus of one-class collaborative filtering (OCCF). Only positive samples can be found in OCCF, and there are a significant number of entries that are missing. For example, see [17]–[19] for examples of OCCF research. OCCF is another possible classification for this piece of writing. Because we're dealing with binary data from many sources, including user-to-user trust connections and affiliations to user-groups as well as binary voting behaviours, we're dealing with more complexity. To the best of our knowledge, we are the first researchers to look at the growing phenomenon of online social voting.

The so-called neighbours of a target user are identified using NN algorithms. Combining the preferences of nearby users may create a forecast of the target user's item choices or a list of suggested goods. In order to include social networks into NN-based top-k RSs, Jamali and Ester [26] suggested a technique called Trust-CF. Predicted rating is calculated by Trust-CF as weighted average of all observed ratings in conventional CF and social neighbourhood. It is not possible to use Trust-CF with binary data since the weighted average of all observed items equals 1. According to Yang and colleagues [14], the Trust-CF-ULF strategy incorporates social network information into the top-k ranking systems. Incorporating CF-ULF and social networking into one strategy is known as the "Trust-CF-ULF method." As a specific instance of our hybrid NN techniques, meta path-based algorithms explore a broader range of neighbourhoods than [14]. There hasn't been much research done on social voting as a new social network application. To put it another way, the distinctiveness of online social voting lies in its ability to spread across social networks. The goal of starting a vote is to get people talking about their thoughts. As a result, online social voting subjects tend to be more interesting than those of other OSN apps. Our online social voting data trail is summarised in Section III, which includes some intriguing information.

III. Materials and Methods

A mix of Twitter and Facebook, Sina [20] (the Chinese term for "microblog") was introduced in August 2009 by the Sina company, China's largest web platform. More than 600 million people have signed up by 2013, and in 2016 there were over 120 million daily active users [21]. Weibo users follow each other on the site. Users may publish (tweet) and distribute them to their followers. Interest groups may also be formed based on a user's location, demographics, and the subjects they're interested in. Sina Weibo has voting [22] as a standard feature. As of January 2013, more than 92 million Weibo users have participated in different ballots. Each day, more than 2.2 million votes are cast on Sina Weibo. A voting campaign may be started by anybody, as seen in Figure 1. There are two main methods for other users to notice and participate in a vote once it has been started. After a user participates in a vote or initiates a voting, everyone of his/her followers may view the voting; a user can also opt to just retweet a voting without participating. Alternatively, you may use Weibo's voting suggestion list, which is made up of the most popular votes and customised recommendations from users. Weibo's vote suggestion methods are unknown to us.

In particular, proposed semi-supervised transfer-learning approach in Recommendation System to tackle the subject of cross-platform behaviour prediction, which totally uses the small variation number of overlapping crowds to bridge the information across various platforms, has been developed. By describing a social network as a star-structured hybrid graph centered on a social domain, which links with other things domains to assist increase the prediction accuracy, we can provide more information for accurate user-item connection prediction.

OSNs may benefit from a systematic approach to managing shared information. During this system's first examination, however, the lack of evidence-based aggregation for knowledge sharing in OSNs will jeopardise the security of user information. Some fundamental information sharing patterns are supported by relevant multiparty authorization in OSNs. An associate degree model is developed to capture the core options of multiparty authorization requirements that have not been accommodated to this point by existing access management systems and models for OSNs. In order to change a cooperative authorization management of knowledge sharing in OSNs, it is necessary for multiparty access management policies to be in place.

Data Set: We were able to collect user voting records straight from the Sina Weibo technical support staff. 2 Between November 2010 and January 2012, the data collection contains vote results. The data collection contains extensive information about the voting sessions in which each user participated, as well as the contents of each voting session and the time at which each voting session ended. In this case, we only know how many people participated in the voting process, not how many people voted. We also do not know which voting option a user selected. Additionally, the data collection covers social relationships between individuals as well as groups that a user has joined. Bidirectional social linkages are the only ones found in the data set, i.e., when A follows B, and vice versa. As a result, the next research will examine the influence of social links amongst users who have more or less similar social standing. Table I presents a summary of the data set's statistical characteristics. Each user has an average of 82.7 followers, and each user has taken part in an average of 3.9 voting sessions. If we only consider users who have cast at least one vote, the average number of votes cast by each user is 7.4. On the next page, you can find the distribution curves for the statistics indicated above. The distribution of the number of votings in which a user has participated for all users who have participated in at least one voting.

Voting Recommendation: In OSNs, we are considering the top-k ballot idea. For each and every consumer, the RS must recommend a small number of votes, denoted by the letter k, from among all available ballots. We give performance data for top-k referral in Area IV-A based on the number of referrals received. The use of MF approaches was shown to be particularly successful as a top-k proposal as a whole. [10] and [12] Additionally, information from social media may be used to improve the accuracy of top-k referrals. [14] As a result, we begin with MF techniques that make use of both social media network information and team affiliation information. On the fourth floor, we propose a multichannel multifunction design (MF), which factors in user-voting inter activity, individual customer communications, and group communication at the same time, all while customising to increase top-k hit price. NN tactics are considered in addition to MF approaches in Area IV-C, in addition to MF procedures.

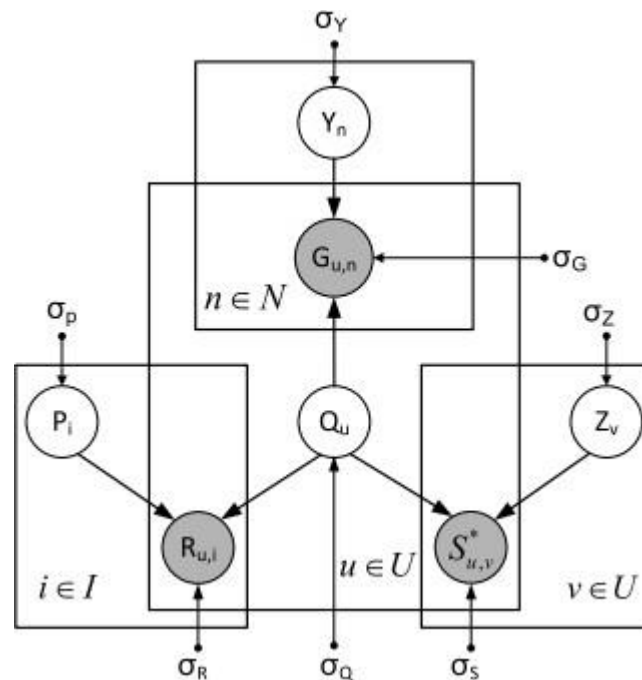


Figure Weibo-MF Graphical model

Mathematical Model

Step 1. Give S a chance to be a framework that depicts the execution of the application. $S = \{.....\}$

Step 2. Recognize the modules as $M S = \{M...\}$ $M = \{E, R\}$ where, E = New Users. R = Registered User.

(i) Identify Event to E as I_e . $I_e = \{W, n\}$ where, W =Initiated Voting. n =Number of Interested Users.

(ii) Identify the modules of R as $M_r = \{T_l, L_v\}$ where, T_l = Time for Voting Event. L_v =Live Voting event.

Step 3. Distinguish the Processes as $P_S = \{M, P \dots\}$ $P = \{P_g, P_f, P_c, P_{disp}\}$ where, P_g =Process for notify voting event. P_f = Process of Finding Interested User. P_c = Process of finding voting product. P_{disp} =Process of showing voting results.

Nearest-Neighbour Approaches: Additionally investigated have been NN-based recommendations, which are in addition to MF approaches. NN approaches are widely used in RSs [4, [14], and [15] [for example, see [4]. So, it is quite attractive to investigate the effectiveness of NN designs in the context of the social ballot referral problem. Individuals' communities can be determined using a joint filtering system in NN-based methods, or they can be a collection of directly or indirectly linked friends in a social media, or they can simply be a collection of individuals with similar rates of interest in a single team in NN-based methods. This enables it simple to include social depend on as well as user-group communication into a NN-based top-k recommendation system. In this field, we experiment with a variety of approaches to bring a target person closer to their local community.

Methodology

By using the same trace, we may compare the performance of a group of voting RSs. As a starting point, we use a straightforward popularity-based RS. MostPop: This RS suggests to users the things that have received the most votes, that is, the votings that have received the greatest number of votes. In order to test numerous variations of the Weibo-MF model presented in (5), we assigned different weights for social and group information in different parts of the model. 1) Voting-MF (majority vote): Setting the parameters for (5) to zero means that we are simply considering the user-voting matrix and are not taking into account any social or group information. It should be noted that the Voting-MF model is almost identical to the AllRank model, which was suggested in [12].

According to [10] and [12], AllRank was determined to be the most effective model for maximising the top-k hit ratio across a variety of data sets. When we set $s > 0$ and $g = 0$, we are adding social network information to the Voting-MF model on top of the Voting-MF model.

3) Voting + Group-MF: By setting $s = 0$ and $g > 0$, we add user-group matrix information to

the Voting-MF model, which is then combined with it. Fourth, by increasing the values of s and g above zero, we may include both social and group information in Voting-MF. UGUV metapath and UUV(mhop) metapath (with $m = 1, 2$) are evaluated, as are UNN and VNN mentioned; and the hybrid technique described by varying the weights in the NN-based RS is evaluated (14). We chose 80 percent of the data set as the training set and the remaining 20 percent as the test set using a random number generator. The random selection procedure was carried out five times separately, and the average data are shown below. Our trials were carried out on a Linux server equipped with four Intel Xeon E5640 processors. Each CPU has four cores running at 2.67 GHz, with a total of 12.3 MB of cache for each core. The total amount of shared memory is 36 GB.

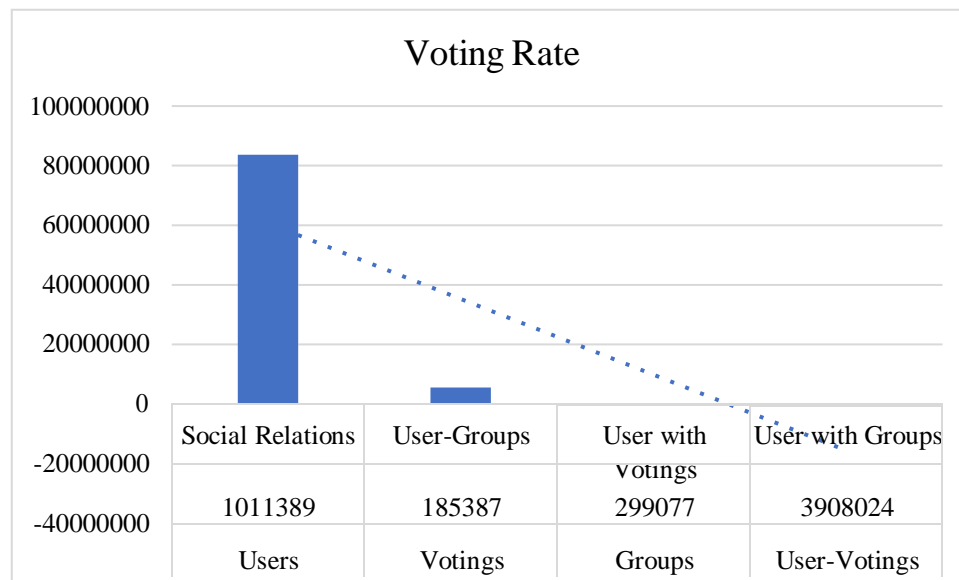
This shows that group knowledge is beneficial for making recommendations based on social voting. UGUV + UUV(2-hop) + UNN, on the other hand, performs nearly as well as UUV(2-hop) + UNN, with a top-20 hit rate of 0.175 compared 0.174; and UGUV + UUV (2-hop) + UVUV, on the other hand, performs nearly as well as UUV(2-hop) + UVUV, with a top-20 hit rate of 0.138 versus 0.139. As a result, we may infer that social network information outperforms user-group information in the endorsement of social voting methods.

IV. Results and Discussion

There are two methods presented in this section for efficient top-k PathSim similarity search for online queries, both of which produce precise top-k results for the given query. The techniques are Path Sim-baseline and Path Simpruning, both of which return exact top-k results for the given query. Detailed discussion of the method for multiple metapath combining with varying weights may be found in Appendix B of this document. It should be noted that the same technique may be used by other meta path-based similarity measures, such as RW and PRW, by using a different formulation of the commuting matrix in the appropriate case. In addition to being adaptable to accommodate varied inquiries, the definition of meta path-based similarity search involves costly calculations (matrix multiplications), which are not feasible for online query processing in large-scale information networks. To realise all of the meta routes within a specific period of time is one potential solution to this problem: Unfortunately, it would take an inordinate amount of time and space to materialise all of the conceivable meta pathways.

Table 1: Voting Details in different groups

Users	1011389	Social Relations	83636677
Votings	185387	User-Groups	5643543
Groups	299077	User with Votings	525589
User-Votings	3908024	User with Groups	723913



APCPA, which corresponds to a length-4 meta route in the DBLP network and is used to identify comparable authors who publish in the same venues, is a 710K710K matrix with non-empty entries totalling 5G and requiring storage space more than 40G. (up to 4T for longer meta path between authors). We present a way to partly materialise Commuting matrices for short length meta routes and concatenate them online to produce longer ones for a given query, which gives search results in a respectable response time while drastically reducing the amount of data stored.

The information gathering contains truly detailed information about the votes that each client participated in, the components that were chosen, as well as the moment that each poll was completed. In this case, we just identify user voting participation, not user voting results, which means that we do not recognise whatever ballot option that person selected. In addition, the information collecting includes social connections between consumers and also teams that a person has registered with. The information gathered just consists of bidirectional social web connections, i.e., A adheres to B and also B adheres to A, as well as no other information. As a result, the study presented in the next section is focused on the impact of social interactions

between persons who have essentially comparable social position. Table I contains a summary of the information gathering statistics collected thus far. The typical number of followers for each client is 82.7, and also the average number of votes cast by each user is 3.9.

V. Conclusion

In this script, I've supplied a collection of MF-based and NN-based RSs for use in a social ballot conducted over the internet. Based on our research into genuine information, we discovered that both social media network information and also team association information can significantly improve the precision of popularity-based ballot referral, particularly for chilly individuals, and that social media network information controls team association information in NN-based techniques. This article discovered that social and also team information is far more vital to improving recommendation accuracy for cool consumers than it is for heavy customers. The reason for this is due to the fact that cold clients have a tendency to vote in significant elections. In our research, simple meta path-based NN versions outperform computation-intensive MF designs in hot-voting referral, although customers' passions for non-warm ballots can be retrieved considerably more effectively by MF versions in our trials. This study is just the first step towards a fuller investigation of the social ballot concept. It is our intention to investigate how ballot site content information might be recovered for referral purposes, especially for cold ballots, as an immediate future work product. As a result of the accessibility of multichannel information on their social areas and also duties, we are also considering developing ballot RSs customised for certain clients.

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WEBSITE PRIVACY PROTECTION FOR ASSIGNING TASKS IN DEDICATED MOBILE NETWORK USING CLOUD COMPUTING

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Abstract: Mobile cloud computing is a new cloud computing paradigm that blends cloud computing and mobile computing to deliver a wide range of useful mobile apps. The broad adoption of MCC, however, is hampered by concerns about privacy breaches. This study will look at privacy issues in ad-hoc MCCs and propose a methodology for protecting privacy in the field when assigning tasks to mobile devices. Our strategy is based on geocast and privacy differentials, allowing mobile devices to contribute their own resources to the ad-hoc mobile cloud without having to share their location data. In an ad-hoc mobile cloud, we create analytical models and task-allocation algorithms that balance utility, privacy, and system overhead. We also conduct comprehensive research using real-world data sources, and our findings show that our framework can secure the privacy of location data on mobile devices while providing efficient services with little system resources.

Keywords: Mobile cloud computing, location privacy, task allocation, reputation.

I. Introduction

Two-tiered sensors have been extensively used for their capacity and energy efficiency. Many sensors [1] to [5] with a limited amount of storage and computing capacity, are placed in areas. Certain storage nodes, with massive storage capacity and large computing capacity, are used in conjunction with sensors to store measurement data from sensors that are

near as illustrated in Figure 1. Sinks function in the role of a terminal device that sends inquiries to these storage devices and then retrieves the sensor data that is of interest. Due to the significance of a two-tiered sensor network architecture, many traditional storage solutions, like StarGate [6] and RISE [7] and RISE [7, 8] have been designed.

The storage nodes provide two advantages when in comparison to the unstructured sensor network model. The first, they are in charge of the collection storage, transmission and storage of sensor data from sensor to the storage sink. Sensors can save a substantial amount of energy because they eliminate the sensor to relay transmissions to the sink and thus prolonging the lifespan that the system. The storage nodes have a greater capacity for storage and computing than sensors. Thus, the sink is able to create more complex

queries, like top-k or range queries, to retrieve several data items within a simple query. This can save the energy of the sensor nodes and bandwidth needed to respond to the sink's queries. However, due to their role in network functions, sensors are also more prone to hacking and compromise. The attackers are not just able to steal sensitive data from the storage node, but they can also use the query processing capabilities that the storage node provides to transmit false information to the sink.

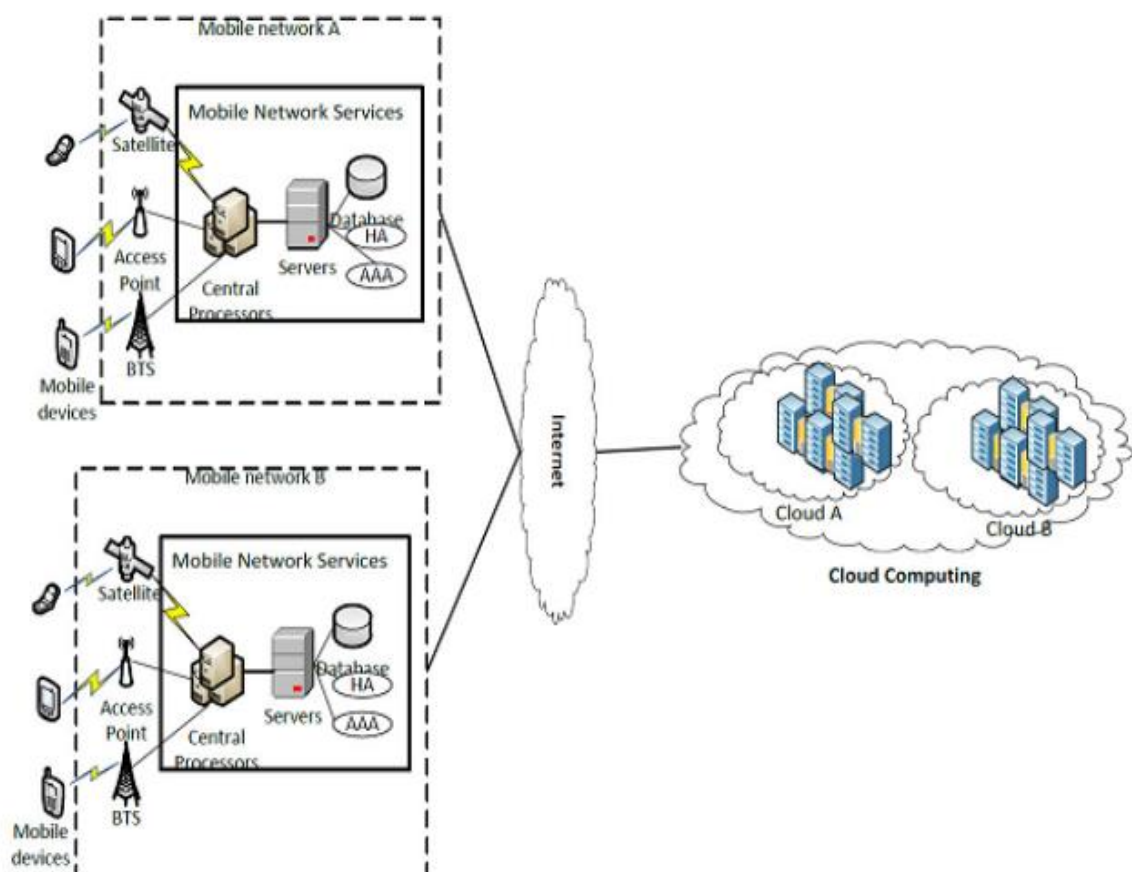


Figure 1 Structure of mobile cloud computing

Today, mobile devices like tablets and smartphones are gaining a lot of attention. They're usually fitted with an array of sensors including a camera microphone GPS as well as accelerometers and gyroscope, and even a compass. The information (e.g., location as well as speed, temperature, and even heart rates) produced by the sensors allow for a variety of beneficial mobile applications, such as the services that are based on location, such as mobile sensing, as well as mobile crowdsourcing. While they have improved significantly over the last several decades, mobile devices are still constrained in terms of resources, mostly due to the short battery time. However, cloud computing has been seen as the next computing model that offers "unlimited" Clouds are filled with resources that are available to users at any time. Cloud computing is a rich source of cloud-based resources. Cloud computing can be utilized to enhance, expand and enhance the capability of smartphones, which results in the idea for Mobile cloud computing. MCC is a cloud computing system that integrates cloud computing technology together with mobile devices to enhance the performance of mobile devices in terms of computing power storage capacity, memory, memory, energy consumption, and contextual awareness according to MCC.

Infrastructure-based and ad hoc mobile clouds are also part of MCC. An infrastructure-based mobile cloud is made up of fixed computer resources that provide services to mobile users over the Internet. A group of mobile devices (hereinafter referred to as "mobile servers") functions as cloud resources in the ad-hoc mobile cloud, providing other mobile users with access to cloud-based local or internet-based services (hereafter being referred to in the following paragraphs as "mobile users"). The alternative option, the ad-hoc mobile cloud, will be discussed in this article. The distributed and contextually aware capabilities of mobile cloud computing resources is an advantage. Mobile users use their smartphones to serve as servers for the ad-hoc cloud for mobile devices in accordance with the cloud computing mobile platform's feature. These mobile servers are used to complete specific tasks for a particular location like epidemic surveillance, monitoring traffic monitoring of epidemics, video recording, and price monitoring for mobile users. Although mobile cloud services that are ad-hoc offer numerous possibilities of use, however, they do have some shortcomings. One of these is that, in an ad-hoc cloud, cloud services for mobile devices constantly changing and evolving. As a consequence that certain mobile servers may be unable to complete their work and leave the

cloud. Certain mobile servers might be "spammers" that only want to make money and offer random responses, without taking into account the task at hand. In addition, some mobile servers may not be able to provide sensing data with the precision required. So, how to assign tasks to ensure the quality of service provided by these constantly changing mobile servers is a concern. Another reason is as demonstrated by the privacy and security concerns, as well as privacy mobile devices acting as a service provider is an essential problem for the mobile cloud. To be able to assign tasks and deliver a high-quality service, the mobile server within an informal cloud has to provide their location information to the CCP and reveal a variety of personal information, including name as well as address and health information and also private activities and political opinions. This is the reason it is necessary to provide privacy protections to enable users to use more mobile devices in the cloud. In addition, it is essential to keep in mind that cloud services come with privacy protection, however, there is a fundamental conflict between the service's quality (i.e., its utility) and security when it comes to assignments of work. If an ad-hoc cloud ensures the security of mobile servers, it's hard to verify the efficiency of the MCC service. Finding a solution that provides security and privacy, as well as the ability

to distribute tasks is a huge problem with these systems. There are a variety of solutions to privacy concerns in mobile applications that are being suggested. For instance, an aggregation is a commonly used method to concealing sensitive personal information when only statistics about users are needed. But this method does not calculate any statistics and can't be used to choose mobile servers within an ad-hoc mobile cloud. Another method is employed in services that use location that use precise locations. obscured in queries based on location which means that the company then returns results based on the obscured query. In our case, however, the private data is not an element in a location-based query rather, it's the outcome of a search that is based on location for the job. Certain papers look at queries regarding private locations within an external database, however, they protect private information from an intermediary service provider and assume a trust connection between the owner of the data and the entity querying. This is not the case in our case since mobile servers as well as the CCP do not necessarily have an implicit trust relationship. Recent research by To and is being proposed to safeguard the privacy of workers who participate in the field of spatial crowdsourcing. However, their method does not take into consideration the reputation of the worker

and therefore does not guarantee any quality control of the final product. In particular, aggregation is the most commonly employed method for hiding sensitive personal information for situations where only user statistics are required. However, this method doesn't provide any statistical data and therefore cannot be used to pick mobile servers in an ad-hoc mobile cloud. Another approach is used for services that utilize an exact location. places. It is hidden in queries that are based on location, which means that the business delivers results based upon the query that is obscured. In our situation, however, the private data isn't an element of the location-based query, but rather it's the result of a query that's dependent on location to perform the task. Certain studies examine queries regarding private locations in the external database. However, they safeguard private data by a third-party service and presume an implicit trust connection between the person who owns the information and the entity that is querying. This isn't the case for us as mobile servers and the CCP are not required to possess an implied trust connection. Recent research conducted by To and others is being considered to ensure the privacy of employees who take part in the area of spatial crowdsourcing. But their approach does not consider the credibility of the worker and does not ensure any level

of quality control for the product that is created.

II. Literature survey

(M. Spreitzer and M. Theimer) To fully utilize the possibilities in ubiquitous computing we need to utilize location-based data. However, users must be able to determine the people who are aware of their current location. We suggest a system that achieves these objectives through a wide range of intriguing applications. Personal information is managed through User Agents. Additionally, a partially centralized Location Query Service is used to facilitate the execution of tasks based on location. The structure grants the users access to data regarding their location however, it comes at the cost of creating more costly, specific queries, such as ones where the two factors of identity and location are closely linked. We also provide a variety of enhancements to our system which offer users more options in keeping privacy and security in check. We also provide metrics that ensure will ensure that the system is focused on the way in which the system can determine the identity of people. Our system utilizes two kinds of information regarding the location, which are able to give full and partial coverage.

(G. Bordello, B. Hemingway et al) Activity-aware systems have led to new

user interfaces, as well as new applications for surveillance, intelligent environments, emergencies, in addition to military missions. Systems that detect human activities through sensors on the body can provide an array of health-related apps such as monitoring of health status, eldercare long-term preventive and chronic care, and cognitive aid. Wearable devices offer the advantage of keeping in touch with users during the entire day. For instance, a fitness program can use real-time data about the workout to motivate users to take part in exciting actions. Additionally that, the general population is more likely to be impressed by these applications because they are usually easy to shut off and get rid of.

(R. A. Peterson, G.-S. Ahn, and A. T. Campbell) We present BikeNet which is a mobile sensing device that maps the experience of cyclists. It is based on the technology of the MetroSense architecture, it provides insight into the practical problems that human-centric sensors face. BikeNet utilizes various sensors that are housed inside the bicycle of a cyclist to gather data on the journey of the cyclist. BikeNet employs a dual-mode method of data collection making use of opportunistically-situated Wireless access points that operate in a delay-tolerant way by default, and using the data channel on

your cyclist's mobile phone for instant communication when necessary. BikeNet also provides an online portal for cyclists to access different forms of her data as well as to make it easier to share cycling-related data (for instance, your preferred routes to cycle) among cyclist groups and also information that is more general in significance (for instance, information about polluting) to the larger community. We offer an outline and a prototype of the system's design based on customized Moteiv Tmote motes, as well as sensors-equipped Nokia N80 mobile phones; an evaluation of the process of sensing and inferences to determine cycling performance as well as their environment; a summary of the effectiveness of networking in a world characterized by the movement of people and bicycle instability, and a review of BikeNet user interfaces.

(A. Schmidt, U. Kramer, and Z. Nawaz) The WWW and mobile phones are the main instruments to share explicit and implicitly generated data and also a communication tool for many users. Due to the increasing utilization of the ability to locate a location on mobile devices, it's now possible to look into the possibilities of mobile crowdsourcing that makes use of the real-world world. We look at how the concept of crowdsourcing built on content created by users and electronic coordination via

mobile devices can be used to bring crowdsourcing to the physical world and link it to activities that exist in the real world. To test our hypothesis we developed a crowdsourcing platform that utilizes the geographical location of users as a way of distributing the tasks among workers. In this post, we discuss the concept and the design of the platform. We also look at the results of two studies conducted by users. Overall, the findings show that the integration and integration of activities across physical environments is feasible and feasible. The results showed the case that (1) mobile workers are more inclined to do their own work instead of having their work done (2) the photographs were the most frequently requested tasks and (3) people prefer to complete tasks close to their homes. This is why we discuss the factors to take into consideration when developing mobile crowdsourcing apps.

(S. A. Madani, and S. U. Khan)

Smartphones have the capability to support a wide range of applications, which demand ever-increasing amounts of computing power. This is a problem since smartphones are resource-limited devices with a finite amount of storage capacity, memory, and energy. Cloud computing technology offers an almost limitless amount of computing power for computation, storage, and delivery of services. Researchers are

currently looking into expanding cloud computing capabilities to mobile phones in order to overcome smartphone limitations. The issue is that the traditional mobile applications models do not allow the development of apps that integrate cloud computing features and need special mobile cloud models that are specifically designed for cloud-based applications. This article provides mobile cloud computing models as well as offloading choices that affect the entities involved, the models for application classification as well as most recent mobile cloud applications models as well as their crucial analysis and the areas of future research.

III. Proposed Methodology

This paper describes a framework that can provide solutions to these problems, where both security of the location, as well as quality, are considered. Our model presumes that the CCP has a limited ability to cleanse location information that mobile servers collect in accordance with the differing data privacy (DP). Since every mobile server is connected to a mobile service provider (CSP) with which it already has an established trust relationship, the CSP can integrate the location of the mobile server and its reputation information, and give the information to CCP in a noisy format according to the DP. To generate noisy

mobile server data, we apply an algorithm known as the Private Spatial Decomposition (PSD) method we have suggested in order to create the new structure, known as reputation-based PSD (R-PSD). Since fake points have to be created inside the DP model, geocast is used for the transfer of work to the mobile server in order to stop them from the CCP in a position to identify these points.

We study the specific issues that arise in task assignment in mobile cloud environments that are ad-hoc and propose a solution that allows for the differential security of mobile server data, while also providing high-quality services. We introduce a new framework called R-PSD. It splits the cloud in accordance with how well the servers are regarded as well as their location. We also develop a search strategy that is scalable to find the most suitable R-PSD partitions that will provide the highest quality of service. We employ a geocast method in transmitting tasks to servers that are mobile in order to overcome the limitations of DP and the additional overhead associated with this method is integrated into our method to search. We run extensive tests using real-world data to prove how effective the system we have proposed is.

To allocate a task across mobile servers, the CCP uses the R-PSD. Then it calculates a

geocast area. Every mobile server within the zone is informed about the task assignment. The purpose of the CCP in making the decision to select the geocast region is to ensure the most effective acceptance rate for the assignment of tasks to satisfy the requirements for quality of service of the job and to reduce the cost of running the system.

In our situation, the mobile cloud is made up of local mobile computing units rather than remote cloud-based services. When the cost of travel or communication is factored in, a mobile server is more likely to take on a local work rather than a remote one²⁴. The probability that a mobile server will accept a job from a mobile service is calculated as a fraction of the distance between the mobile service and the task. We use a linear technique to find the link between the individual's acceptance rate and the mobile distance between the server and the job to make the procedure easier. Let p_a denote the likelihood of a mobile server accepting a notifying job, and d denote the distance between the mobile server's task and its destination.

Location Privacy: Many efforts are being made to protect security in the area. K-anonymity (Sweeney 2002) Caching aware dummy-selection algorithm [Niu et al. 2015] and LP-doctor, etc. These are only a few models utilized to guarantee security

in the area. The doctor LP is the most well-known model [Fawaz and co. (2015) (Fawaz and. al., 2015)]. The LP-doctor is an exact device for controlling access to a location that's utilized to guard privacy concerns when it comes to the area. It lets users use the operating system to control location access without altering the applications as well as the operating system. The LP-doctor is split into various parts, which include 1.) Application Session Management -- Monitors the launches and closings of application events to ensure a secure environment. 2.) Policies Manager does any one of three actions including block, allow, and secure an application that is defined by the users. These are also known as privacy guidelines (especially in relation to a current site and new applications). 3.) Place Detector The device monitors the user's present home address. 4.) Mobility Manager--It informs the user of' location when the user relocates their residence. 5.) Threat Analyzer - It determines whether the application has permission to have access to the site or not. It is determined by the decision of the policy administrator. 6.) Anonymization Actuator It is based in the threat analyser in the event that the threat analysis takes the decision to secure the location information

an anonymization actuator will take the appropriate actions by introducing an imaginary location in order to conceal the information about the location.

We provide an architecture that provides solutions to the above problems, which take into consideration both privacy of location and service quality are considered. In our model, we assume that CCP can only collect clean data on the location that mobile servers collect in accordance with the differential privacy (DP). Because each mobile server is a subscriber to the mobile service provider (CSP) with which it already has an established trust relationship and trust is a prerequisite, the CSP can integrate the location of mobile servers and reputation, and transmit the data to CCP in noisy format according to with the DP. In order to create noisy information about mobile servers, we employ the Private Spatial Decomposition (PSD) method, which was first proposed as a basis for constructing an entirely new structure called Reputation- Based PSD (R-PSD). Since fake points need to be generated within the DP model, Geocast is used to assign the task on mobile servers, preventing the CCP from locating these points.

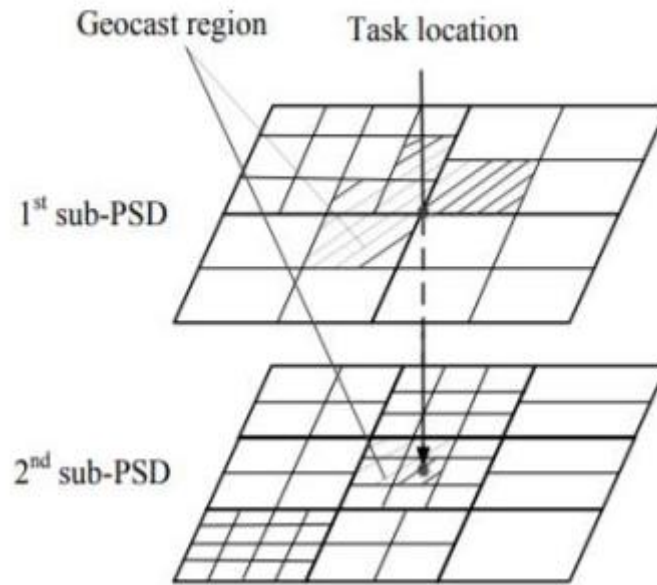


Figure 2: Illustration of a geocast region with RPSD.

Greedy Algorithm with PSD

Input: Task t , d_{\max} , AR_k , k Output:
Geocast region Ω

- 1: Initialize $\Omega = \emptyset$, $AR_k = 0$;
- 2: Let U denote the square of length $2 \times d_{\max}$
centred at the task location;
- 3: Let $AR(\cdot)$ denote the overall acceptance
rate
- AR_k of a region;
- 4: $Q \leftarrow \{\text{the level-2 cell that covers task } t\}$;
- 5: repeat
- 6: if $Q = \emptyset$ then

Geocast region Geocast region is a mix of
cells that are part of each subPSD of the
RPSD. A representative example of the

- 7: return Ω
- 8: else
- 9: $c^* \leftarrow \operatorname{argmax}_{c \in Q} AR (GR \cup c)$;
- 10: $Q \leftarrow Q \setminus \{c^*\}$;
- 11: $\Omega \leftarrow \Omega \cup \{c^*\}$;
- 12: $AR_k \leftarrow AR(\Omega)$;
- 13: $S \leftarrow (\{\text{neighbors of } c^*\} \setminus \Omega) \cap U$;
- 14: $Q \leftarrow Q \cup S$;
- 15: end if
- 16: until $AR_k \geq AR_k$
- 17: return Ω ;

Geocast Region can be seen in Fig. The
algorithm's input is task t R-PSD including
1 sub-PSDs and the parameters like d_{\max} ,

ARk, the r , and a_n . The variable that is used is the number of servers with a noise count in the geocast zone. GR is a component that belongs to the sub-PSD I. In addition, to the requirement that $AR_k > AR_k$ which is considered to be one of the elements of Algorithm 1, we add an additional constraint that guarantees the highest quality of service provided by the mobile servers selected. The geocast area GR is first initialized to an empty state, then extended in a series of iterative steps. Each time, a cell that is most improved in AR_k , and is certain to include the value $r(w_i | l_1)) = r$ is selected and is then included in the GR. The geocasting region stops expanding when no cells within an area from D_{max} are added, or until AR_k is higher than. Formula isn't a reliable method that always chooses the cell that has the highest acceptance rate, while also providing the best quality of service with each repetition.

IV. Performance Evaluations

The goal of this paper is to examine the effectiveness in our framework based on real-world data. Experimental Setup We use two datasets from the actual reality: Gowalla [16] and CrowdFlower [17]. The Gowalla dataset that is used to illustrate the distribution in the space of mobile servers in our studies and contains an overall total of 442,890 logins on a social network which is based on the location of

February. From 2009 until October. 2010. We use the history of check-ins for Gowalla users to establish their task allocation history on mobile servers. We consider Gowalla users as mobile servers. We believe that each check-in to Gowalla users, including the latest, is an activity that was performed by them and the location of check-in that was most recently used will be counted as the present residence. Because of the absence of data, the database does not contain information points in specific parts that comprise the information. This is why you overlay your data using the same collection situated across mobile server. The resultant spread of mobile servers is shown in Fig with every cross that are in this image portraying the current position of the mobile server. We determine our reputation score for mobile servers in the wake of an investigation conducted in [18] which required participants were asked to report the traffic incidents in Dublin. They created and assigned approximately 4000 tasks. They also determined the reputation scores of participants based on the actual results of the task as well as their performance on CrowdFlower previously. It assigns an undetermined number for reputation Gowalla users to ensure to get the data set which contains the performance history of the task and its reputation scores for the servers. The distribution of reputation is

illustrated in Fig. in Section 5. In this paper, the quality of service provided by the job can be assessed using functions of r . (*). In our research, we apply the findings in [19] to assess the level of service quality for the project, when the mobile servers k with different reputations accomplish the same task. In their research they discuss the accuracy rate of the accomplishment of the task, as described in ER is used to assess the quality of service. Let's suppose we choose to make use of the majority vote to combine the results of mobile servers in order to complete the task. In the [19 study that error rates needed a certain number of servers, as well as the aggregate quality Q , are all exactly in line with the following inequalities: $kQ^2 \leq \ln \frac{1}{1-ER}$. (9) The quality of the collective Q is calculated the following manner. Definition of X as a random variable in order to describe the moment when the mobile server gives the correct answer. It is $\Pr(X = \text{true}) = p_r$, and $\Pr(X \text{ is True})$ is $1 - p_r$ that p_r refers to the popularity score that represents the score of reputation for a mobile server in this instance. If the reputation scores for mobile servers aren't equally distributed and dependent, we get $Q = (2p_r - 1)^2$, (10) where the goal is to calculate depending on how distribution of the reputation scores. In the case of the requirement for error ER for a job and the number of mobile servers, " k ", you can deduce an equivalent requirement

to distribute reputation scores in the geocast area. In our case, we'll suppose that the mobile servers are divided into two groups, with reputation scores that are in the three categories $[0, 0.5(0.5, 0, 0)]$ or $(0.5 \ 1 - 0.5)$ each. Two servers are in each group, both W_1 as well as W_2 and w_2 . In a geocasting area, the quality of the area will be determined by the percentage of mobile servers within each group, i.e. the ratio is W_1/W_2 . If the reputation score at each level of fame has a similar distribution, The overall level of quality Q can be determined using (10) according to the following formula.

$$Q = E[(2p_r - 1)^2]$$

$$\int_0^{0.5} \frac{\omega_1}{\omega_1 + \omega_2} (2x - 1)^2 \frac{1}{0.5} dx$$

$$\int_0^{0.5} \frac{\omega_2}{\omega_1 + \omega_2} (2x - 1)^2 \frac{1}{0.5} dx$$

$$= \frac{\omega_1}{\omega_1 + \omega_2} \frac{1}{3}$$

Based on the requirement for ER together with K , the overall number of server mobiles, we are able to find a lower limit on Q and then determine a need for w_1 as well as the second. When creating the geocast zone, the CCP should ensure that the area meets this requirement. We randomly assign 1 000 tasks which are equally distributed across an area. We employ our algorithms to calculate GR areas for each

task. We also employ a baseline algorithm that is not disclosed to privacy. The algorithm that is the baseline can be used to gain access to the precise server's location. It always adds the closest servers to the setting until the acceptance percentage exceeds the threshold of acceptance ARk.

At the end of the day we ran further tests in order to verify that the dummy groups correspond to their own histories, i.e., when the user repeats his movements, each dummy group also has to replicate its previous actions. Initially, the 100 samples that are continuously collected samples are duplicated once to produce an input that includes 200 locations. i.e., that if there is a value of i greater than 100 then the position

(x_i, y_i) is the same as (x_{i-100}, y_{i-100}) . Then, the initial sample is multiplied to get 500, which means that the input contains 1000 locations. For each input, and the algorithm, one test with three k's is performed. The locations were recorded exactly as mentioned. In the first half of input, the first and second half are identical, however, it doesn't mean that it is the same for all records. Inconsistency is defined as the distance averaged between the locations within the first half and also identical counterparts in the second half and distinguish it with the letter D. In the case when the input is comprised of 200 locations,

$$D = \frac{\sum_{i=1}^{100} \sqrt{(x_i - x_{i+100})^2 + (y_i - y_{i+100})^2}}{100}$$

Queries	Scheme	Group 1	Group 2	Group 3	Average
200	Consistent	0	0	0	0
200	Imitational	33.79	32.13	24.37	30.1
1000	Consistent	11.51	7.5	3.1	7.37
1000	Imitational	20.38	14.05	32.78	22.4

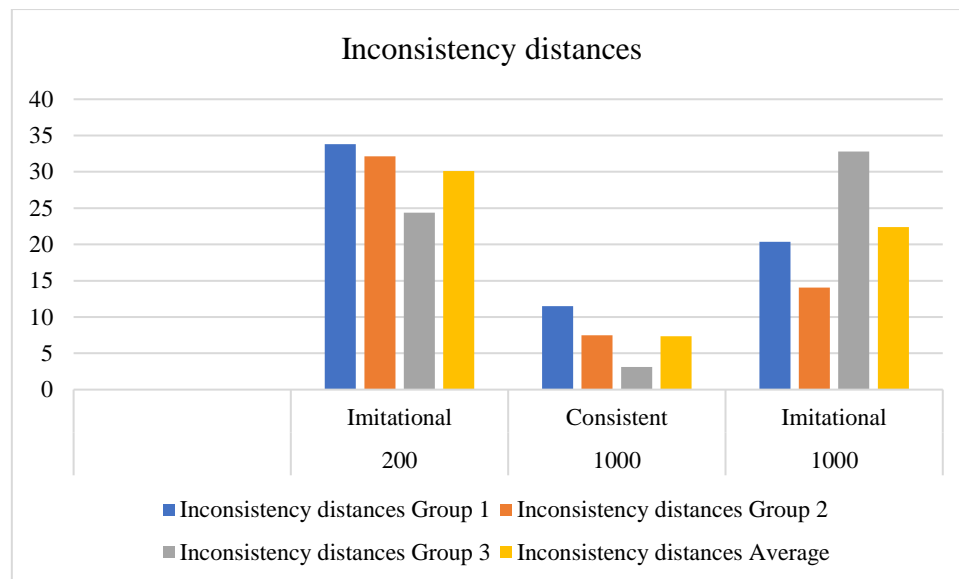


Figure 4: Inconsistency distances

V. Conclusion

In this paper, we describe the first top-of-the-line secure query-processing method that is secure within the IND CCA security model. The privacy of data is guaranteed through encryption and the carefully planned creation of indexes for data. Two major contributions are made in this paper. The first is to change an existing Top-K query to the top-range type of search. Additionally, we employ the test of membership to determine if an element of data is part of the results of the query or not. This transform allows the storage component to find k's largest or most tiny data values, without numerical comparisons. This is a crucial technique that lets the system remain secure within the INDCKA security model. The second element is information partitioning, index selection, and embedding interval information. This technique ensures that at minimum, one piece of every sensor's information is included in the query result. It also allows the sink to validate the validity of the result without the need for extra verification items. The tests show that the proposed method is extremely efficient in bandwidth and highly practical.

VI. Future Enhancement

The need for efficient emergency call techniques is essential to protect every person in the world because there are a variety of crimes. Modern methods of emergency calls will protect users of android devices and lower the risk for humans in a variety of situations and different locations.

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DISCOVERY AND INVESTIGATION OF MONEY FILTER VERSION IN SOCIAL NETWORKS USING MACHINE LEARNING

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Abstract: Virtual currency on social media is becoming more important in the support of different financial activities such as currency conversion, online commerce, and paid games. Virtual currency is often purchased with actual money. This is why attackers create a network of accounts to acquire virtual money in a fraudulent or criminal manner for free or at a low cost. They then benefit handsomely from the virtual cash they have amassed. These attacks not only inflict victims' significant financial losses, but they also jeopardise the ecosystem's long-term viability. As a result, it's critical to spot suspect OSN accounts that are participating in digital currency laundering. In this regard, I use operational data acquired from Tencent QQ, one of the world's largest OSNs, to investigate both benign and harmful account behaviour. Then, from three perspectives: account viability, transaction sequences, and account spatial links, I develop multi-faceted attributes that define accounts. Finally, I present a detection method that combines these features with a statistical classifier that has a 94.2 percent detection rate and a 0.97 percent false positive rate.

Keywords: online social networks (OSN), Virtual currency, viability, Money-Laundering.

I. Introduction

Social websites on the internet (OSNs) have been using virtual currencies as a means of connecting financial transactions across various platforms, including online gaming, shopping and reading online. Examples of virtual currencies on these OSNs include, but aren't the only ones: the Tencent Q

Coin, Facebook Credits¹ as well as Amazon Coin. A majority of users buy virtual currencies using real money, at a fixed cost. The user also has the ability transfer the funds to another person through various ways, like paying the account or making gifts [1]eleven. This feature lets attackers earn huge amounts of money by adhering to the procedures. At first

attackers could create virtual currencies at low cost. For example, she might hack into and take the control of an account that is legitimate or create a huge number of accounts to get prizes (in the form of virtual currency) in connection with online promotions. In addition, she can utilize accounts in her possession to move virtual currencies to other accounts in exchange for real currency, at rates generally lower than what is the actual rate. Attackers usually post advertisements on popular e-commerce websites (2) to attract prospective buyers. We are referring to OSN accounts that hacker use to gather and exchange virtual currency as money-laundering accounts. Money-laundering accounts have caused massive financial losses to the compromised accounts, which has hampered their effectiveness in online marketing actions, and could have led to possible conflicts with currency regulations. It is essential to identify money-laundering accounts within OSNs. thus, becomes crucial and, despite this faces new and significant issues. First, engaging in money-laundering actions doesn't It is necessary to use malicious content, such as spam, malicious executables, and malicious URLs. Although spamming is not used by hackers to advertise their products, neither methods nor accounts used for spamming are linked to the accounts used for money laundering. Another reason is that money

laundering does not rely on social behaviour and the patterns (e.g., "following" or "friend" relationships on prominent social networking sites) to work. This renders the current methods quickly ineffective as they are focused on detecting OSN-related spamming, phishing, and fraud, which involves harmful content or social structures [5] or social behaviour [6] or social actions (or social behaviours).

The recognition of the possibility of money laundering through conventional financial transactions has drawn many studies [77]. For example, Drezewski et al. [8] created an apparatus to detect frauds that involve money laundering, based on bank accounts and transactions. Paula et al. [9] utilized Paula et al. [9] to employ an Auto Encoder to classify exporters and to detect the money laundering involved in exports of goods and products in Brazil. Colladon et al. [10] developed predictive models that measure the risk factors that clients face in the process of factoring as well as suggested an approach to visual analysis to recognize potential areas of criminal activity and stop money laundering. In contrast to traditional money laundering problems that are detected in bank-related transactions the behaviour of accounts that allow laundering virtual currency on OSNs include financial transactions involving banks and social

media sites, as well as virtual recharging and expenditure actions. The aim of our research is to develop a reliable technique to identify accounts that are used to launder money. To achieve this objective, we conduct a thorough analysis of the actions of money-laundering accounts from the information gathered by Tencent QQ that is one of the largest OSNs in the world with over 861 million users registered. We have created multi-faceted features which analyse accounts from three perspectives, which include account viability, sequences of transactions, as well as the spatial relationships between accounts. Our experiments have demonstrated that our strategy is able to achieve the highest detection rate of 94.2 percent, with a false-positive rate in the range of 0.97 percent. According to our knowledge, this is the first effort to identify and detect accounts that facilitate money laundering in OSNs that have virtual currency at this level of scale.

II. Literature Survey

The identification of money laundering activity in traditional financial transactions has prompted the number of research projects. For example, Drezewski et al. developed a system to identify frauds that involve money from bank account transactions and bills. Paula and her colleagues utilized the Autoencoder

system to identify exporters and find cash-laundering activity when exporting goods and products in Brazil. Colladon et al. created predictive models that assess the risks for clients when factoring. They also suggested the use of visuals to determine the potential criminal groups and keep money laundering out of the system. In contrast to the conventional concerns about detection of money laundering with banking transactions, the behaviour of accounts used for laundering virtual currencies on OSNs encompasses financial transactions which are associated with banks as well as social media-related and also spending and virtual recharging operations. Our goal is to create an efficient method to identify accounts that are used to facilitate money laundering. To accomplish this aim, we perform an extensive study of the behaviour of money-laundering accounts, based on information obtained from Tencent QQ which is one of the largest OSNs with a vast database of over 861 million users registered. We've developed multi-faceted capabilities which distinguish accounts by using three different angles, including the viability of accounts, the types of transactions and the spatial relationship between accounts. Test results have demonstrated that our algorithm is able to attain an astonishingly high percentage that can detect accounts of 94.2 percent, and the possibility of a low

false-positive rate of 0.97 percent. We believe that we are the very first time to look into and identify money laundering accounts on OSNs that incorporate virtual currency in this magnitude.

Its aim is to spot activities that involve money laundering. It examines the obstacles facing the financial and banking institutions as well as current trends in the industry, and how the latest technologies can be used to track transactions and identify suspicious transactions. The system hides the origins and alters the way they are presented or relocates the money to a location more secure from being noticed. The main goal of these activities is designed to make an income for the person or group of people who carry out the crime. The primary goal of the research is to provide a current situation regarding the latest crimes of money laundering that occur and impact the economy in general. The aim is to create an effective detection system for detect fraudulent accounts who participate in online events for the collection of virtual currencies (at the point of collection) prior to the time awards are allocated.

The system currently in use it is possible to map and sort the data in the relational form and then create predictive models built on network metrics to analyse the risk profiles of customers involved in the business of

factoring. The system shows that risk profiles can be predicted by the use of social network metrics. The system demonstrates the importance of the network approach to look for fraud in financial transactions and criminals. The system is not based on Behaviour Analysis or Feature Extraction. There are no Vitality features to recognize malicious attackers.

The system finds that risk profiles can be predicted using the social networks' metrics. The riskiest social actors have to deal with larger than usual financial transactions and are less prominent within the transaction network; they are the intermediaries for transactions across different economic sectors and are active in countries that are riskier as well as Italian regions. The difficulty of identifying them demonstrates the importance of an approach based on networks when searching for suspicious financial activities and possible criminals. The issue of money laundering (ML) is a significant danger not just to financial institutions but also the nation. The growing amount of ML contributes to inflation and interrupts the entire flow of cash and the economy. But traditional investigation takes up a lot of man-hours.

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III. Proposed methodology

The system was designed to be a reliable method of identifying accounts that are a source of money laundering. In order to achieve this goal, it conducts an exhaustive study of the behaviour of money-laundering accounts, based on the data gathered from Tencent QQ one of the largest OSNs with an impressive database of more than 861 million registered users. The system was designed with multi-faceted tools that identify accounts on three levels, which include account viability, sequences of transactions, and spatial correlation between accounts.

We have gathered data labelled Tencent QQ, an eminent social network on the web in China that offers many options, including instant messaging that includes games on the internet, voice chat as well as online shopping. These services are linked to Q coin, a digital currency that is distributed and managed by Tencent QQ. Tencent QQ has a giant collection of active accounts with 861 million with a maximum of 266 million users concurrently on the internet. In addition, Tencent QQ is one of the most popular OSNs that are actively involved in services that utilize virtual currencies across the globe. Our database contains 381,523 fraudulent accounts and 114,891 fraud accounts that were currently in use in the first week of August, 2015. To label accounts that are used to launder

money We look for advertisements of virtual currencies that are cheap on the large e-commerce sites and buy digital currency through sellers in which QQ accounts utilized for these sales are categorized in the same way as money-laundering account. Because attackers usually control an extensive number of fraudulent accounts used for money laundering, we label accounts as fraudulent if they login via an IP address that is used by a money-laundering verified account within a day. While this process of labelling gives us the truth, however, applying it as a deterrent technique is a bit difficult. First, it needs an more amount of money to get money-laundering accounts involved in criminal operations. Additionally, the address used by the hackers to identify laundered accounts is usually outdated after a short period of time since attackers alter the IP addresses of logins frequently. Thus, this method of labelling data, when used to detect a threat is not able to assist OSNs in reducing the financial loss they sustain. For each account, we keep the following data of the activity. It is crucial to remember that all of this information is gathered from social networks that use virtual currency. Login activity that contains the ID of your account along with the date of your login and the login IP and amount of your account. The expenses include the ID of the account used for spending, and the

date on which you spent the amount that the service was purchased using the payment method, and the bank account ID used for the purchase. The recharging process

contains the ID of the account for recharging and the date for recharging as well as the amount charged and the payment method.

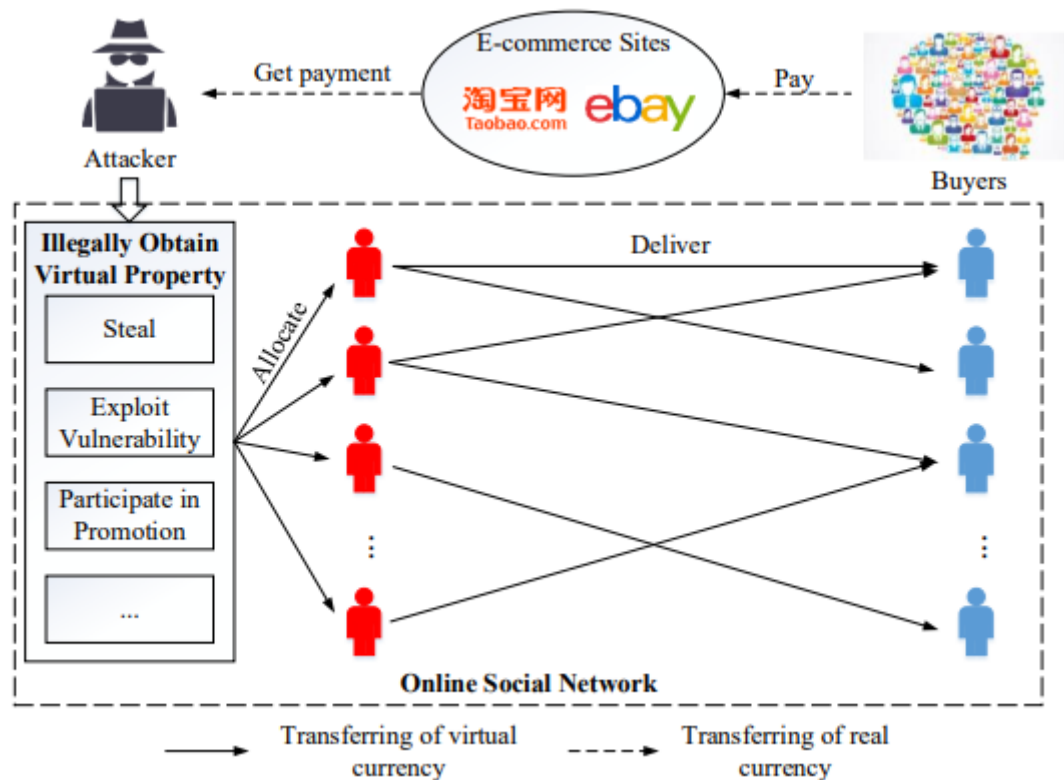


Figure 1: laundering process of virtual currency

Figure 1 illustrates the typical procedure of laundering virtual currency. The first step is to acquire virtual currency for free or at a very low cost. For instance, attackers could hack into accounts of users (and also manage their currency) or exploit the system's weaknesses, or engage in online promotions to collect virtual currency absolutely free or at significant discount prices [2]. In the next step, attackers lure prospective buyers with substantial discounts, using a variety of methods including spreading spam, making

advertisements, and then offering the digital currency through prominent e-commerce sites like eBay and Taobao. When a buyer makes an order (i.e., the buyer has to pay in actual money to an attacker using sites for e-commerce) the account will be able to receive digital currency (e.g., in the form of presents) through one of several malicious accounts that are managed by an attacker. Because OSNs could examine an account if it has been involved in a significant number of transactions within a short amount of time,

the attacker typically distributes her virtual currency over several accounts and utilizes the accounts to transfer virtual currency to buyers.

Currency Transfer's Geographical Characteristics Every money transfer transaction may be expressed as a tuple, denoted by s , as well as T , refer to the account that originated and the one that is destination respectively. For a given node is identified, we find an entire set of nodes to which each is transferring virtual currencies. We refer to the set of nodes by the letter $D(s)$ to represent this particular node s . We then construct graphs to provide an overall view of the behaviour of the transfer of currencies across all accounts. We define a graph with a weighted, undirected design $G(V \text{ and } E)$ with V and E are the vertex set and edge set, and edge set, respectively. Each vertex in the graph represents an account. An edge, for example, (i) is formed within two nodes, i j only when $D(i)$ and $D(j)$ are null. We also give the weight to $D(i)$ and $D(j)$. This will determine the number of commonly used transfer destinations for accounts i and j . The graph that we have created is able to effectively examine the actions of accounts that are coordinated in laundering. In particular, an attacker typically shares her virtual currency among several money-laundering accounts in order to minimize

the possibility of being found out and then exiled. In the event that the buyer buys virtual currency from an attacker, they usually need to set up a number of money-laundering accounts in order to transfer the currency to the account of the buyer. Since this process is repeated for a significant number of customers, these accounts will join together to form a massive collection of accounts for the destination creating a graph that is fully connected with high weights for the edges. An account that is benign can also move virtual currencies to just one or a handful of accounts (e.g., for birthday presents) and, as a result, form an entirely connected graph which edges will likely to be of low weights. Since an account could receive gifts from normal accounts (e.g., friend accounts) and money-laundering accounts, edges connecting both accounts be present. To sum up the graph, it is comprised Three types of connected subgraphs. This includes) subgraphs which are comprised of malicious accounts completely connected to each other,) subgraphs that are made up of benign accounts that are completely connected as well as three) subgraphs made up of both malicious and benign accounts. Figure 4 is the second type of subgraphs that are connected. Particularly, the fraudulent accounts C-E as well as A-D are transferred to a related account at the destination. Likewise, an account in the destination is

able to receive the virtual currency from both the malicious account E as well as the harmless account F. Furthermore, benign accounts F-I are able to transfer cash to the same bank account. The graph is composed of fraudulent accounts and benign accounts.

By analysing the behaviour of accounts with destination status We find that the majority of the accounts that are destination buyers are more likely to buy virtual currency or items from the launder account instead of getting gifts from innocent accounts and the other destinations account act differently. This is proven by looking at

neighbouring accounts of fraudulent as well as on the graph, there are several good accounts. It has been found that 80.1 percent of the accounts of malignant ones in the neighbourhood are troublesome, and 84.3 percent that of those who are neighbours to benign accounts appear harmless on average. Therefore, malicious as well as benign accounts are likely to share the same kind of vertices. They create a community structure with a lot of tightly connected the elements are made up of the same vertices, and the connections between them are shaky.

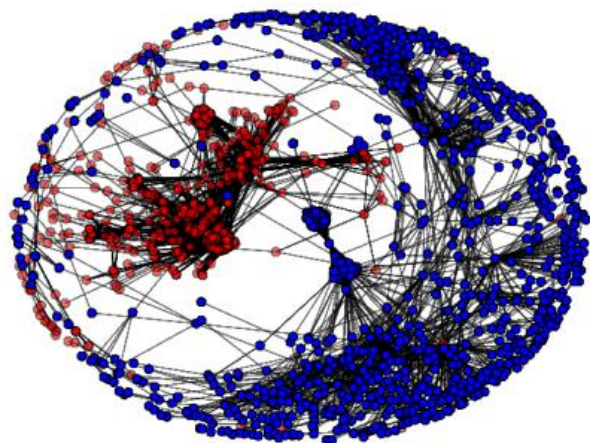
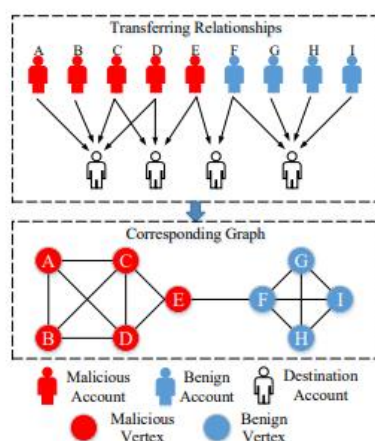


Figure 3: Analysis of transferring related graph

Detection and Evaluation Machine learning is a method used to incorporate all these capabilities to provide efficient detection. In particular, feature values derived from the labelled benign and malicious users are used for training a statistic classification. Once an unidentified user is represented as the feature value

vector that the classifier will detect the level of the malice of the user. A range of statistical classifiers can be used in our system to carry out detection. To assess the efficacy of our method of detection we utilize a total of 496,414 accounts, out of which 114,891 are malicious while 381,523 are harmless. In order to avoid the

limitations of the generalization, we employ Support Vector Machine, Random Forest along with Logistic Regression for the statistical classifier, in which we use the SVM classification algorithm was trained using a Gaussian Kernel. The Classifier trained by RF was built using 3000 trees. Three metrics are used to measure the efficacy of our approach, including the Detection Rate (same concept as the Truly Positive Rate) as well as the False Positive rate as well as the area beneath the ROC curve [15]. In particular, AUC is a widely-used measurement of the performance of a statistical classifier. It is the likelihood that a randomly selected sample of malicious accounts has an estimated higher chance of being fraudulent accounts than benign accounts. Because AUC is cut off-independent, and AUC's values vary between 0.5 (no predictive capability) and up 1.0 (perfect predictive capacity) An AUC that is higher of a classifier signifies higher accuracy of its prediction, regardless of the cut off choice.

1. Random Forest Algorithm

Prediction: A training set $S = (x_1, y_1), \dots, (x_n, y_n)$, features F , and number of trees in forest B

- 1: function Random Forest (S, F)
- 2: $H \leftarrow \emptyset$
- 3: for $i \in 1, \dots, B$ do
- 4: $S^{(i)} \leftarrow$ A bootstrap sample from S

5: $h_i \leftarrow$ Randomized tree learners $S^{(i)}, F$

6: $H \leftarrow H \cup \{h_i\}$

7: end for

8: return H

9: end function

10: function Randomized Tree Learners (S, F)

11: At each node

12: $f \leftarrow$ very small subset of F

13: split on best features in f

14: return learned tree

15: end function

The Support Vector Machine is a type of supervised algorithm that finely produces the identification of difficulties in real-world scenarios. The SVM output model is built utilising the data used for training and calculates the output values of the test results. The hyperplane that separates input components in the most space is detected using SVM. Training vectors are mapped to an internal product to complete the process. For SVM to work well, the function kernel must be chosen carefully. You may use the kernel function to turn the input space into the functional space.

Kernel Functions in SVM

Kernel function describes a dot product of input variables that are in space and connects them to the output space. The kernel functions define the internal function

of space as an item. The kernel's function is a key element to SVM performance. Below are the different kinds of functions utilized by kernels. The fundamental kernel function which is described through SVM as an internal vector can be described in the following equation.

$$(x, x') = \langle \phi(x), \phi(x') \rangle$$

The Polynomial Kernel Function is a well-known non-linear modelling technique. Second kernels are typically preferable since it eliminates problems that arise with Zero Hessian.

$$(x, x') = \langle x, x' \rangle^d$$

$$(x, x') = (\langle x, x' \rangle + 1)^d$$

Gaussian Radial Basis Function: It is most commonly with a Gaussian form

$$K(x, x') = \exp \frac{\|x - x'\|^2}{2\sigma^2}$$

The Exponential Radial Basis Function Its output is a linear piecewise solution that can be beneficial in cases where discontinuities are not an issue.

$$K(x, x') = \exp \frac{\|x - x'\|}{2\sigma^2}$$

Multi-Layer Perceptron: With a single hidden layer, a valid kernel representation is:

$$(x, x') = \tanh(\rho \langle x, x' \rangle + \varepsilon)$$

The ideal kernel to choose is RBF, and the linear kernel is a specific example of the RBF. Therefore, if the number of variables that impact classification is huge then it's possible to choose an RBF-like kernel. It may increase the complexity of design due to the fact that it has a bigger variety of hyperplanes to select from. Overfitting issues can be addressed by cross-validation. The mapping of nonlinear kernels in linear parameters can impact its performance. chosen kernel, but it's better than RBF in the event that it has a greater size.

Result and Discussion

The Ratio of Active Days: This is the ratio of active days for an account in the last year. Particularly, if an account is active at least once during a day, the day will be classified "active." "active" for this account.

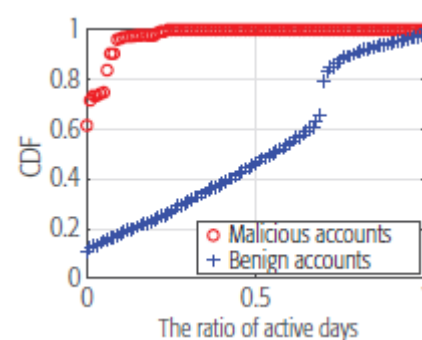


Figure 4: Active days ratio

Account Level: It is the OSN that assigns a number to every account to define the level of activity. The number of days the account

has been active since it was created is usually used to determine this.

Figures 4 and 5 demonstrate how benign accounts are greater active than malignant ones. In particular, the majority of malicious accounts (approximately 97 %) remain active less than 10% of the total days, while only a tiny percent from benign accounts (less than 20 percent) has the same amount.

We then look at the sources of virtual currency that is used by accounts that are not used for laundering or for use in the general public. A normal user typically recharges their account through wire transfer (often as mobile payments) and

may also receive presents (from acquaintances). Contrary to this, money-laundering accounts nearly solely rely on online advertisements to collect directly virtual currencies or transfer gifts to another account. This is why we have introduced the following feature to describe the behaviour of currency collection.

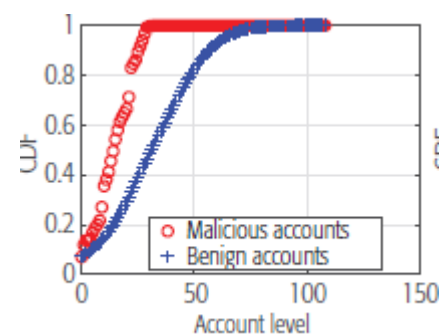


Figure 5: Account Level

Table 1: Analysis of the detecting method's performance

Classification technique	Features to be considered	False-positive rate	Detection rate	AUC
SVM	All features	0.97%	94.2%	0.966
RF	All features	0.22%	92.3%	0.960
LR	All features	4.56%	90.2%	0.928

The suggested detection technique's scalability, even though some of the vitality-related elements may not be applicable to all social networks (e.g., the percentage of recharges from mobile payment as none of the social networks accept mobile payments) Based on the performance study given in Table 1, the

geographical and sequential characteristics are accessible in practically all social networks that incorporate virtual money and can be successful enough to spot fake accounts. As a result, other social networks might improve and alter the approach presented for identifying accounts used to launder money. We also use information

gains to assess the influence of each piece, with a larger proportion of information gain indicating a more significant contribution. Table 2 shows the ranking of each characteristic in terms of information acquisition. Table 2 shows the top twenty attributes, which include seven spatial characteristics, eight sequential features, and five vitality characteristics. It is clear that these three characteristics can be effective in detecting fraud.

Conclusion & Future Enhancement

The technique of analysing and detecting money-laundering accounts on OSNs is discussed in this article. We looked at and contrasted the behaviour of benign and malicious accounts from three perspectives: account viability, transaction sequence, and account spatial linkages. We created a set of 54 characteristics to help us distinguish between malicious and benign accounts. Experiments using data labelled from Tencent QQ, a global significant OSN, showed that the suggested technique had high detection rates and exceptionally low false-positive rates.

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ANALYSIS AND PREDICTION OF CARDIO VASCULAR DISEASE USING MACHINE LEARNING CLASSIFIERS

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Abstract: Cardio Vascular Disease is, in the main part, an indication of ailments that have narrowed or blocked veins which can trigger heart attacks or chest pain (angina) as well as stroke. Machine learning classifiers predict the severity of the condition based on the severity of the adverse reaction experienced by the sufferer. This paper aims to examine the use of Machine classifiers that learn from trees in the prediction of Cardio Vascular Disease. The classifiers for machine learning trees for instance, Random Forest, Decision Tree, Logistic Regression and Support Vector Machine, K-nearest neighbour's, broke down in relation to their accuracy and AUC scores for ROC. In this study of predicting heart disease The Random woodland Machine learning classifier achieved a higher degree of accuracy of 85 percent, ROC AUC score of 0.8675 and a time of 1.09 seconds.

Keywords: Accuracy, Classifiers, Cardiovascular disease, Prediction.

I. Introduction

Cardio Vascular Disease (CVD) is the most well-known risky illness in the world. more of the population ingests each year to the ground from Cardio Vascular Disease (CVD) more than any other illness. An estimated 17.9 million people suffered in the course of Cardio Vascular Disease (CVD) in 2013, which is around 31% of each worldwide death. Of the deaths, 85 percent result from heart attack and heart

failure. Over three-quarters of CVD deaths are in depressed yield countries. In the 17 million below optimal closes (younger than 70) because of non-infectious diseases during the year 2015, 82% of them are in yield countries that discourage yields and 37% of them come from Cardio Vascular Disease (CVD). Most Cardio Vascular Disease (CVD) can be cured by adhering to a variety of risk causes, such as smoking cigarettes, poor eating habits, and weight gain physical and mental dormancy, as well

as excessive consumption of alcohol utilizing common-sense situations. People suffering from Cardio Vascular Disease (CVD) or those with high risk for cardiovascular illness (because of the closeness of at least one risk factor, such as hypertension and diabetes, hyperlipidaemia, or other well-controlled illnesses) require an early diagnosis and direction using brief prescriptions, which are outlined in separate. Overall, Cardio Vascular Disease (CVD) is characterized by the development of greasy deposits in these channels (atherosclerosis) and the formation of blood clusters. It is also linked to damage to organs like the heart, mind kidneys, eyes, and kidneys. CVD is among the primary causes of disability and death across the UK However, it can usually to a large extent be prevented through a well-planned lifestyle. Heart attacks and strokes usually occur due to extreme events and are in large part caused due to a blockage that blocks the circulation of blood to the brain or the heart. The most commonly recognized reason for this is the growth of greasy storage areas that are most within the veins' dividers. The cause of cardiovascular problems and strokes is typically due to the closeness of a mix of risk factors, such as smoking cigarettes or a bad eating routine, and weight.

II. Literature Survey

(Beunza, Juan-Jose) The purpose of this research is to evaluate the effectiveness of a variety of supervised machine learning (ML) algorithms to predict clinical events by assessing their accuracy and validity. The results, achieved through two software platforms for statistical analysis and compared. The information used in this study is from the database that is open to all users from the Framingham Heart Study, which began in 1948 Framingham, Massachusetts as a prospective investigation of risk factors for cardiovascular disease. Through data mining and data modelling, three models have been created as well as a comparative analysis of the various algorithms for ML - random forest, decision tree, as well as support vector machines neural networks, and logistic regression, was performed. The global selection criteria to select the appropriate set of hyperparameters, as well as the kind of manipulation that was used, is the amount under the curve (AUC).

(Zhao, Lina) Variation in the physiological signal can provide crucial insight into cardiovascular activity and the development of clinical cardiovascular conditions. Heart rate variability (HRV) and pulse transit time variation (PTTV) is a pair of crucial time-series variations. But, combining HRV with PTTV can improve the accuracy of classification for heart

failure, which is not known. In this paper, a simultaneous study of HRV and PTTV conducted on healthy subjects as well as people suffering from heart disease was conducted with the intention of examining the improvements in the detection of heart failure using HRV and the aid to PTTV analysis. Forty healthy subjects and forty patients with heart failure were included in the study. Electrocardiograms for the standard limb lead II as well as the radial artery pressure waveforms are recorded in synchrony. Analysis of PTTV and HRV was done on the recorded PTT and RR time-series employing the traditional time-based analysis (MEAN, SDNN, and RMSSD) and the frequency (LF, HF, and LF/HF) as well as not-linear (SD1, SD2, sample Entropy, and a fuzzy measure of entropy) domain indexes. The results revealed that all HRV indexes, except MEAN (P equals 0.1) as well as the LF/HF ($P + 0.9$) had significant variations (all of them $P < 0.01$) among the 2 groups, and the only one indices, MEAN within PTTV significantly reduces people suffering from heart disease ($P > 0.01$). Furthermore, when combining this HRV, PTTV indexes and probabilities predicted by using the matrix of distance-based convolutional network models, the top classifiers were able to achieve the best results using the support vector machine classifier that had a sensitiveness of 0.93 with the specificity of

0.88 as well as an accuracy rate of 0.90. This paper demonstrated the value of PTTV analysis to identify the presence of heart failure that is clinically evident.

(Chen, Rui) Dilated Cardiomyopathy (DCM) can be described as a well-known form of cardiomyopathy and is linked to poor outcomes. A low prognosis for DCM patients with low Ejection Fractions has been reported when examining the patients for short-term monitoring. Machine learning (ML) could assist healthcare professionals in risk stratification and management of patients when considering the relationship between various characteristics and the results. The current study sought to predict 1-year cardiovascular events of patients suffering from severe DCM by using ML. It also aimed to assist clinicians with managing risk stratification and patient care. The data used in the development of the ML model was gathered from 98 patients suffering from severe DCM (LVEF less than 35 percent) from two hospitals. In total, 32 clinical data were fed into the ML algorithm. the most significant features that were relevant to the heart events were identified by information gain (IG). A non-naive Bayes classifier was constructed and its performance in predicting was tested by calculating the area under the curve (AUC)

of the receiver's operating characteristics, using cross-validation of 10 times.

(Farooq, Kamran, and Amir Hussain)

This multidisciplinary research project will develop an innovative clinical decision-support mechanism (inspired by the ontology concept and machine learning-driven methods) through the combination of evidence, and data from the past to improve cardiovascular preventative care. This proposed clinical decision-support framework is comprised of two distinct key elements: (1) Ontology-driven clinical risk assessment and recommendation system (ODCRARS) (2) Machine learning-driven prognostic system (MLDPS). The most advanced machine learning techniques and feature selection are employed for prognostic prediction to aid in the prediction of future events. OSCARS OSCARS is a system based on knowledge built on expert knowledge of clinical specialists and is which is encoded as an engine that is used for carrying out an assessment of the risk of cardiac disease for various cardiovascular conditions. The MLDPS is a non-knowledge-based/data-driven system that is developed using state-of-the-art machine learning and feature selection techniques applied on real patient datasets. Case studies of clinical cases in the RACPC and heart disease and the breast cancer domains

are considered to be used for development and validation of the system. To support the objectives of this paper, a case from the RACPC/chest-pain domain will be reviewed in depth from a development and validation standpoint. The proposed framework for clinical decision support is confirmed by clinical case studies within the cardiovascular area. This paper provides an effective cardiovascular decision support system to deal with inaccuracies in risk assessment for the clinical risk of patients with chest pain. It also helps doctors effectively differentiate acute angina/cardiac chest discomfort patients from those suffering from different causes for chest pain. The models developed for the new clinical setting have been tested in clinical practice and resulted in extremely high predictive capacity, show general improvement in performance over the benchmark multivariate statistical classifiers. Different risk assessment models for chest pain prototypes have been created and are available for use in future clinical trials.

III. Proposed Methodology

In the beginning, the data is cleaned and processed with methods of pre-processing like Data Integration, Data transformation, Data reduction, and Data cleaning with the help of the panda's tools. The proposed framework is illustrated in a total of the

patient's records for 304 were displayed. Data visualization tools help the data scientist understand the potential of the data depicting the box plot relationships between the sex as well as the target attributes. The histogram and correlation matrix were displayed as born plots in depicts those statistical graphs that represent the attribute. The subplot and scatter matrix were depicted based on the split criterion, cleansed data is divided into training for 60% and 40% tests and the data is tested with five machine learning classifiers, including the Logistic Regression (LR), Support Vector Machine (SVM), Decision Tree (DT), Random Forest (RF), and K-Nearest Neighbors (KNN). The classifier's accuracy was determined by using the matrix of confusion. The classifier with the highest accuracy was identified as the most accurate classifier.

Dataset: Heart disease is a spectrum of ailments that impact the heart. The heart disease category includes blood vessel diseases like coronary artery disease and heart rhythm issues (arrhythmias) as well as heart problems that are inherited (congenital heart problems) and many more.

"Heart disease" or "heart disease" is often utilized interchangeably with "cardiovascular disease". The term

"cardiovascular disease" generally is a term used to describe conditions that result in blocked or narrowed blood vessels which can cause a heart attack or heart attack, chest pain (angina) as well as stroke. Other heart-related conditions like ones that affect the heart's muscle valves, rhythm, or valves are also considered to be forms of heart diseases.

Heart disease is among the most significant causes of morbidity and death in the world. The prediction of cardiovascular diseases is considered to be one of the most significant areas of data analysis for clinical studies. The amount of information available in the field of healthcare is massive. Data mining converts the massive amount of healthcare data into information that helps to make better decisions and forecasts.

According to a news report the heart disease is found to be the primary cause of death for men and women. According to the article, approximately 610,000 people die from cardiovascular disease within the United States every year-that's 1 out of 4 deaths.¹

It is the most common cause of death in both females and males. More than half of deaths caused by the heart condition in 2009 occurred for men.¹

Coronary Heart Disease (CHD) is the most frequent form of heart disease that kills over 370,000 people per year.

Every year, around 735, 000 Americans suffer heart attacks. Of those, 525,000 suffer the first to suffer a heart attack, and 210,000 occur in those who have had an attack on their heart.

This is why heart disease is a major problem that needs to be taken care of. It isn't easy to detect heart disease due to the many risk factors, including high blood pressure, diabetes and cholesterol levels, an abnormal pulse rate, as well as many other risk factors. Due to these constraints, researchers have turned to advanced methods such as Data Mining and Machine Learning for the purpose of predicting heart health issues.

Machine-learning (ML) has proven efficient in aiding in making predictions and decisions based on the huge amount of information generated by the health industry.

The dataset consists of 303 individuals' data. There are 14 columns in the dataset, which are described as, Age: displays the age of the individual. Sex: displays the gender of the individual using the following format: 1 = male, 0 = female

Chest-pain type: displays the type of chest-pain experienced by the individual using

the following format: 1 = typical angina, 2 = atypical angina, 3 = non — anginal pain, 4 = asymptotic

Resting Blood Pressure: displays the resting blood pressure value of an individual in mmHg (unit).

Serum Cholesterol: displays the serum cholesterol in mg/dl (unit)

Fasting Blood Sugar: compares the fasting blood sugar value of an individual with 120mg/dl.

If fasting blood sugar > 120mg/dl then: 1 (true), else: 0 (false)

Resting ECG: displays resting electrocardiographic results

0 = normal, 1 = having ST-T wave abnormality, 2 = left ventricular hypertrophy

Max heart rate achieved: displays the max heart rate achieved by an individual.

Exercise induced angina:

1 = yes, 0 = no, ST depression induced by exercise relative to rest: displays the value which is an integer or float.

Peak exercise ST segment: 1 = upsloping, 2 = flat, 3 = down-sloping, Number of major vessels (0–3) colored by fluoroscopy: displays the value as integer or float.

Thal: displays the thalassemia: 3 = normal, 6 = fixed defect, 7 = reversible defect.

Diagnosis of heart disease: Displays whether the individual is suffering from heart disease or not: 0 = absence, 1, 2, 3, 4 = present.

Its Support Vector Machine falls under the category of algorithms that are supervised that are able to produce precise identification of issues in real-world situations. SVM's SVM output model is built using the data from training and then determines the test results' output values. SVM detects the hyperplane which divides input elements in the most space. The process is carried out by mapping the learning vectors using the internal product. The selection to use the kernel function essential to ensure the performance of SVM. Kernel functions are a method to convert the input space to the size in the space of functions.

Kernel Functions in SVM

Kernel function describes a dot product of input variables in space that connects them to the output space. The kernel function is that defines the internal function of space as an item. The role of the kernel is an essential element of SVM performance. There are many kinds of functions utilized by kernels. The basic function of a kernel which is described in

SVM as an internal vector can be described by this equation.

$$(x, x') = \langle \phi(x), \phi(x') \rangle$$

The Polynomial Kernel Function is a well-known non-linear modeling technique. Second kernels are typically preferable since it eliminates problems that arise with Zero Hessian.

$$(x, x') = \langle x, x' \rangle^d$$

$$(x, x') = (\langle x, x' \rangle + 1)^d$$

Gaussian Radial Basis Function: It is most commonly with a Gaussian form

$$K(x, x') = \exp \frac{\|x - x'\|^2}{2\sigma^2}$$

The Exponential Radial Basis Function Its output is a linear piecewise solution that can be beneficial in cases where discontinuities are not an issue.

$$K(x, x') = \exp \frac{\|x - x'\|}{2\sigma^2}$$

Multi-Layer Perceptron: With a single hidden layer, a valid kernel representation is:

$$(x, x') = \tanh(\rho \langle x, x' \rangle + \varepsilon)$$

The most suitable kernel is RBF, and the linear kernel is a specific example of the RBF. Therefore, if the number of factors that affect classification is huge and complex, you can use an RBF-like kernel. It may increase the complexity of design

because it offers a greater variety of hyperplanes to pick from. The issue of overfitting can be resolved by cross-validation. The mapping of nonlinear

kernels in linear parameters can impact its performance. chosen kernel, but it's superior to RBF in cases where it has a greater dimension.

Table 1: classifiers and AUC scores

Classifier	ROC AUC Score
Random Forest	0.8675
Decision Tree	0.7179
Logistic Regression	0.7542
Support Vector Machine	0.7371
K-Nearest Neighbor	0.6431

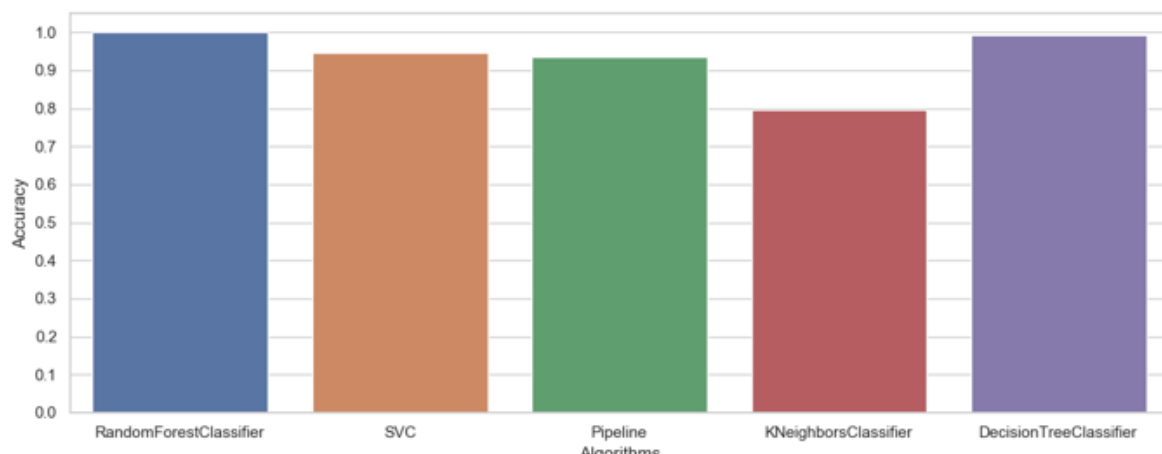


Figure 1: Algorithm wise accuracy

In the study, the random forest classifier had an accuracy of 85.71 percent, which is a mistake in classifying instances that are higher than other classifiers in the study. The decision tree was able to achieve 74.28 percent accuracy, which is equivalent to logistic regression's accuracy in categorizing the situations. The Support Vector Machine (SVM) achieved 77.14 percent while K-Nearest Neighbour (KNN) achieved 68.57 percent, which was the worst among the classifiers that were used in the study. KNN's ROC AUC value of this random forest was

0.8675 which was higher than the classifier for logistic regression which was 0.7542. The ROC AUC of the decision tree as well as logistic regression, support vector machine, and K-Nearest Neighbour and K-Nearest 0.7179, 0.7542, 0.7371, and 0.6431 respectively.

IV. Conclusion and future Enhancement

In this research machine learning classifiers like Random Forest, Decision Tree and Logistic Regression, Support Vector Machine, and K-nearest neighbours were employed in the analysis of Cardio Vascular Disease. The approach that was developed using the random forest machine-learning classifier has achieved a higher precision of 85.71 percent and a ROC AUC of 0.8675 which was greater than any classifiers tested in the identification of the patients who suffer of Cardio Vascular Disease. The area of the ROC curve indicates the extent to which a continuous parameter predicts the result of an event when the sensitivity grows dramatically when the threshold for diagnosis is relaxed and there is a gradual number of false positives, the area of the ROC curve will be significant and if the sensitiveness increases slowly when your threshold to diagnose becomes relaxed, with an accelerated number of false positives, then the area beneath the ROC curve will be smaller. The differences in the area can be examined to determine if the differences are significant statistically. This method has been used to evaluate the value of glucose at the time of the test and the value at 2 hours following an intake of oral glucose using different multivariate models to predict the future (Cardio Vascular Disease) CVD.

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Cloud Based Home Health Care Systems using IoT

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Abstract:- Today most of the applications based on IOT connected services. The ability to locate and connect the devices using sensors and communication protocols like RFID, the data stored in the cloud storage system. The stored data is processed and generate reports based on the present and past data. This will help the patients the relevant instructions to be following quickly cure health conditions and predict the future. The applications of IOT are discussed. We have presented one of the application is IOT cloud based health care system, in which the system collects the data from wearable sensor devices. These devices connected to the communication protocols to store the patient data in the cloud health care system. The system data is analyzes process, monitor, and report the results. These results help the patient's recommendations by doctors, guidelines, instructions to cure the diseases with reduced cost. In future IOT cloud health care system can be extended to intelligent health care monitor and control systems.

Keywords:- RFID, IOT, Intelligent, Cloud, Di Senses and Control Systems.

I. INTRODUCTION

Internet of things is inter- networking of physical devices(i.e connected devices) and other items using electronics, software, sensors, actuators and other network connectivity devices[7]. The evolution of IOT. Internet of Things broadly into five stages in year 1997 ARPANET In 1999 Auto-ID center founded in MIT., In the year 2000 demand for expedited logistic, using RFID tags for routing inventory and loss prevention, in year 2003- EPC Global founded in MIT, in the year 2005- Four important technologies of the internet of things, in 2008 IOT enable to reach real world physical objects, In 2010 used cost reduction applications used in surveillance, security, healthcare, transport, food safety, document management. Later the development of IOT ased applications.

In future by 2020 ability the devices are located indoors to receive geological signals, locating the people using every objects, and efficient tele-operation and monitor control, software agents and sensor controlled devices using web applications. Virtual personalities operating in smart spaces using connect, communication with social, environmental, and user contexts. IOT objects are sensor controlled network infrastructure. IOT with sensor and actuator, technologies use as smart home, smart grids, intelligent transportation and smart cities. [1,3] Internet of Things connecting every objects using smart phone, internet sensor to the internet. These are communicated to applications and people for further processing. Internet of

things world wise network of interconnected objects that are uniquely addressed using protocols. The system controls using wireless sensors, radio Frequency Identification (RFID) and other systems. [3]. Applications of IOT are 1) smart home 2) Wearable 3) smart city 4) Smart grids, 5) industrial internet 6) connected car 7) connected health(digital health) 8) Smart retail 9) Smart supply chain 10) smart farming[6] Applications of healthcare IOT are mobile medical applications for example wearable devices. These devices allow the patients to capture health data. The data is communicated protocols to cloud systems and further analyzed. The Heath monitoring system helps the patient's precautions, remedies and prescriptions. The rest of the paper is organized II. Related study, section III. Proposed Model, section IV. Implementation of IOT Application, Section V. Interpretations and Discussions. Section VI. Conclusion.

II. RELATED STUDY

A. Problem Identification

Internet of things using Smart connected devices are used sensor to collect the health data and communicated t the cloud data server and internet. Cloud processing and visualization. Software agents and processing analyze and visualization systems. Design and develop a solution Intelligent IOT based health care systems collect health data, communicate process, store and suggest the disease stage and give guidelines to the patients, prevention, cure diseases with reduced cost. To collect the patient data using IOT based medical devices and applications. These can be connected to Health care IT system through online network. The data is analyzed in cloud and health monitoring system that the system will give guidelines and instructions to the patients.

B. Literature Survey

IOT connected every device. IOT cloud based technology to perform efficient operations using sensing devices. IOT of things is a global network connected virtual objects with standard communication using wired or wireless telecommunication. Challenges build system, minimize energy consumptions. Communication software demand hardware, storage and maintenance and application services. [3] Sreekath,etl [5] studied IOT health care wireless sensor networks. Connected health care environment update clinician work, improve patient care, safety, reduce cost, and continuous monitoring. IOT Medical devices via gateway secure cloud Systems store, process, analyze and predict results for promoting medicines and cure health of patients. Healthcare devices used to patients. Continuous monitoring of health conditions and

correlates the physiological parameters and health data for perdition and analysis are:

- Use devices (Smart Phones or Tablets or Laptops/Desktops)
- Record the clinical data
- Provide treatment by doctor
- Reduce the healthcare cost by accuracy diagnoses using IOT devices.
- Patient monitoring system on IOT cloud architecture.

a) It has three layer approaches are:

- Data acquisition sensing and transmission: Record the patient data for examples Temperature, blood pressure. etc.,
- Data concentration and cloudlet processing: The collected data is communicated to Data storage and cloud data processing.
- The cloud data centers connected via internet to cloud processing analytics visualization Systems.

b) Cloud Processing Analytics are:

The processed data from layer two is further analyzed and predicted and reporting the information to doctor. Data acquisition: Sensors measure the patient information and communicated to data transmission components. Data Transmission components: These components are responsible for recording the patient house (or remote location) data with security and privacy and communicated via Smartphone Wi-Fi or IOT devices or Internet concentrator.

The storage processing device store the data and this is further analyzed data and reporting the condition of health to the doctor. The doctor will suggest the medical reports guidelines to the patients by IOT connected systems.[2] Sensors use by medical devices, remote and continuous monitoring of patients healthcare systems.

III. PROPOSED MODEL

The proposed IOT health care system has a sensor connected smart medical wearable devices. These devices connected to internet and cloud systems. The cloud systems store, process, aggregate, analyze and services to the patients time to time. The following are some connected technologies gained and strength the need of services to patients and control the cost of applications.

- **Patient safety:** To provide the safety to the patients in hospital
- **Reduce the cost:** The health care system provides the users with affordable cost
- **Store the millions of records of patients:** The system is to store and maintain the health records of patients.
- **Analysis of real-time data:** The system is applying intelligent prediction algorithms to predict and monitor the patient health condition.
- **Predictions of diseases and remedies:** The system automatically predicts the future Network of Sensors, Actuators, Mobile Devices, and Internet of things for safety of billion of people.

A. IOT Enabled Controlled Health Care Systems

- Sensors
- Actuators
- Computing Devices
- Data communication capabilities
- Data Transportation.

B. Health Management System is collected information following are:

- Patient Information
- Diseases and Emergency Cases
- Patient compliance and Treatment
- Medical devices and Diagnostic Devices
- IOT Sensors
- Mobile Users or Smart Phone Users

Optimize the operations and Functions [7][8] Applications of IOT-Health Care Systems to Connect Devices will utilize the resources and provide quality of care, better clinical outcomes, reduced visits, emergency admissions, reduction of bed days of care, patient at home. Supervision by IOT connected devices. For example some Devices are Blood pressure, EGC, Hearth measuring devices, and Activity monitor: Time spent rest or sleeping, step counting, walking measure device, calorie spent device, Safety monitors: Fall detection system, personal safety and tracking device, Medication Monitors: Smart pill dispenser, Medication adherence systems.

C. IOT Health Care Connected Medical Devices:

- Access real-time visibility of patient condition and activities
- Monitor compliance
- High performance computing
- Remote monitoring

IV. IMPLEMENTATION OF IOT APPLICATION

Internet of things is a wireless network between objects. Usually the network configuration is Household Applications. Mobile receivers are communication between people and things [6]. Internet to reach out into the real world of IOT, Microcontroller, Sensor, wireless connectivity, cloud based software/infrastructure and application development. IOT[8] the operations and functions dynamically controlled. Improve resource utilization; relationship between the human and nature dynamically control the operations - Intellectual entity by Human society, physical system. Transport, Internetworking Accessibility, usability.

Wearable devices, home health monitoring devices, and provide better service. Solution allowing for remote monitoring system. IOT health care monitoring system shown in Figure.3 Future of IOT are Traffic issue, Production, Logistics, Retailing, Resource and power control, Daily life, traffic issue.

The main three core sectors used IOT

- Enterprise
- Home
- Government

V. INTERPRETATIONS AND DISCUSSIONS

IOT Applications into various domains. The one of the most important section is IOT approach cloud based health care system is read the patient data using sensor controlled wearable devices. The devices communicated to cloud storage. The data is analyzed and reports, predictions by using the various techniques. The proposed model health care system has Clinical efficiency, Monitoring sensors and other applications. [7][8] Patient monitoring and reporting system collects the patient medical data using wearable sensor devices and the communicated using protocols like GSM/GPRS wired /wireless networks to cloud storage and computing system. The data is further monitored, analyzed and reporting results. These results helps the doctors give guidelines suggestions to the patients to recover health with affordable cost. Health monitoring system includes patient information, diseases prediction, medical diagnostic devices, IOT sensor, mobile devices and other software services.

VI. CONCLUSION

Internet of things various applications smart phone, smart cities, industrial internet, connected car, health care system and other applications. In future growth of IOT connected device in the world. As the study we have taken applications of IOT cloud based health care system provides data sensing and transmission, data storage and processing, and cloud process analysis proposed model shown in Figure.1 health care services, IOT based patient monitoring and reporting system, and Figure.3 shows the analysis process. In future we can extend the scope of the paper using data mining algorithms to classify the medical data and predict the future patterns based on the given present input and past data of the patient.

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Advanced Semiconductor Alloy $\text{Al}_x\text{In}_{1-x}\text{P}$ for Engineering and Medicine

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Abstract: *Doped Advanced semiconductor materials with different properties are useful for early diagnosis and improved treatment in medical research. This is essential for advanced medical technology and lower mortality rates. New research on impurity-doped nano crystals is important. These dopants can directly affect electron transport in semiconductors, tune the optical properties of nano materials in desirable ways, and impart specific properties to the host. In this research report, we first discuss the factors that need to be considered to systematically control the production of these doped semiconductor materials, then describe various doped materials and typical synthetic approaches and techniques. Innovations in nanotechnology and materials design and their application in early diagnosis and treatment are believed to minimize the number of new cases of related diseases and reduce mortality.^{1,2,3} From natural to man-made materials, Doped semiconductor nanostructures, including inorganic and organic semiconductors, are increasingly attracting the attention of researchers and scientists worldwide*

Keywords: *Advanced Materials, Semiconductor Alloy AlInP , Engineering and Medicine*

1. INTRODUCTION

The ability to non-invasively monitor physical and chemical parameters associated with human conditions is rapidly improving, and new means of continuously delivering interventions in various forms are of great potential to improve quality of life. It has potential. The development of functional materials and devices,

and some uncommon supporting features in technology design (flexibility, biocompatibility, dissolution, programmability) promise revolutionary advances in surveillance and intervention systems.

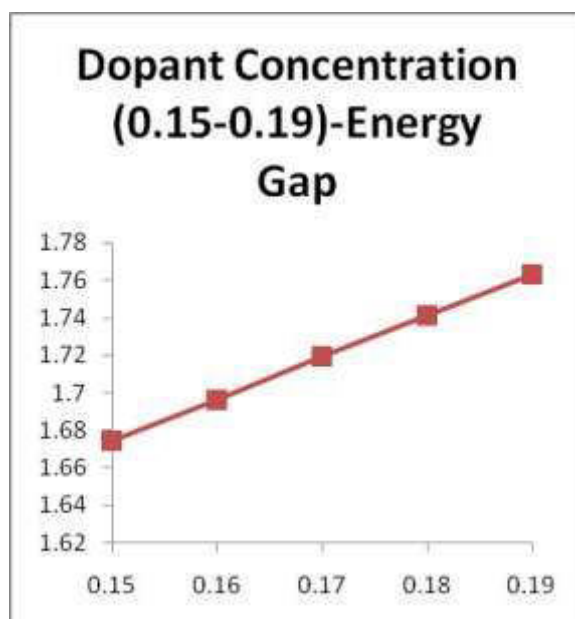


Sl.No	Dopant Concentration (X)	1-X	Energy Gap (Eg)
1	0.1	0.9	1.563
2	0.11	0.89	1.585
3	0.12	0.88	1.607
4	0.13	0.87	1.629
5	0.14	0.86	1.652

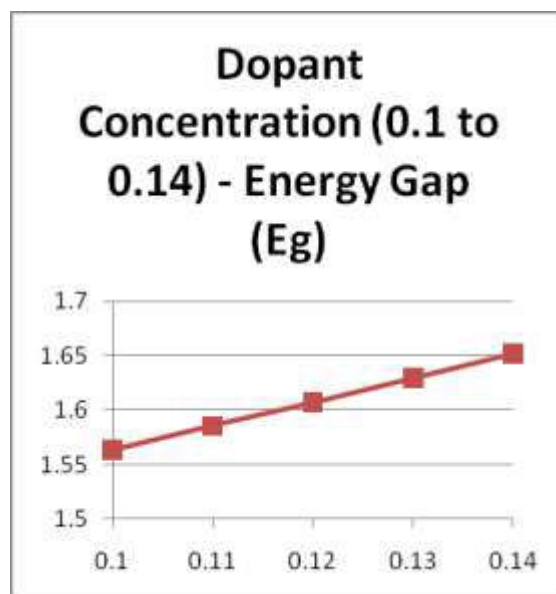
This special topic covers recent advances in functional materials and devices related to this. Dopant Concentration is increased from 0.1 to 0.14.

Materials development work for advanced surveillance and interventional capabilities using the device platform is especially welcome. Interdisciplinary research including materials science, physics, chemistry, medical and electrical engineering, etc. is also of particular interest

Sl.No	Dopant Concentration (X)	1-X	Energy Gap (Eg)
1	0.15	0.85	1.674
2	0.16	0.84	1.696
3	0.17	0.83	1.719
4	0.18	0.82	1.741
5	0.19	0.81	1.763



Dopant concentration is increased from 0.15 to 0.19. Energy gap is Increased from 1.674 ev to 1.763 ev



Aluminum Indium phosphide (AlInP) is an inexpensive, effective and commonly used insecticide. Unfortunately, it is one of the most common causes of pesticide poisoning today. Upon contact with moisture in the air or hydrochloric acid in the stomach, it releases lethal phosphine gas. Mechanisms of toxicity include cellular hypoxia through its action on mitochondria, inhibition of cytochrome c oxidase, Includes high hydroxyl radical formation. Signs and symptoms are non-specific and present quickly. AlInP toxicity specifically affects cardiac and vascular tissues, manifesting as deep and refractory hypotension, congestive heart failure, and electrocardiogram abnormalities. Diagnosis of AlInP usually depends on clinical suspicion or medical history, but can be readily made by a simple silver nitrate test of gastric



contents or exhaled breath. Treatment remains primarily symptomatic as no specific antidote is known.

Early arrival, resuscitation, diagnosis, reduction of toxin load (by gastric lavage with KMnO_4 , coconut oil), intensive monitoring, and supportive care lead to good outcomes. Rapid and adequate cardiovascular support is critical.

It is central to management to achieve adequate tissue perfusion, oxygenation, and a life-compatible physiological metabolic environment until tissue toxin levels are reduced and spontaneous circulation is restored.

Acidosis and shock were poor prognostic factors in most studies. Overall outcomes have improved over the past decade as critical care management has improved and become more sophisticated.

Aluminum Indium phosphide (ALP) Semiconductor Alloy is one of the most effective rodenticides used to protect grain bunkers from animals and rodents. ALP poisoning leads to death every year. This Semiconductor Alloy is used in both Engineering and Medicine.

The aim of this study was to evaluate the characteristics and predictors that influence mortality from ALP poisoning.

In this study, from 2014 he investigated a patient with ALP addiction who was referred to Imam Khomeini Hospital in Kermanshah in 2015. Several data were collected from the patients, including age, gender, number of pills taken, number of suicide attempts, elapsed time from dose to treatment, blood pressure, PH, HCO_3 , and PCO_2 .

The study will also evaluate survivors (recovery) and non-survivors (death) of ALP poisoning. Univariate logistic regression and multivariate analysis were used for data analysis.

In this study, 48 patients were male and 29 were female with 77 patients in total.

The average age of survivors and non-survivors was 28.69 years and 31.34 years for him, respectively.

Suicide was attempted in all cases (100%) of ALP poisoning. Results showed that the most important predictors of mortality from ALP poisoning were blood pressure, PH, and elapsed time from ingestion to treatment.

The prognosis of death in ALP-poisoned patients can be determined by knowing several important characteristics or factors such as blood pressure, pH, and elapsed time from ingestion to treatment. This may give medical institutions an opportunity to consider further interventions for her ALP-addicted patient.

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Emerging Trends in Transmission Electron Microscopy for Medical Applications

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Abstract- This paper is an overview of imaging methods used for research and diagnosis that appear in the literature. There are several types of scientific research and imaging modalities, including photography, microscopy, ultrasound, X-ray, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET). The type of images used will depend on the part of the body the researcher wants to see in the image and the types of images readily available to the patient. For many years, medical imaging has played an important role in the early detection, diagnosis, and treatment of cancer and other diseases. In some cases, medical imaging tests are the first step in preventing the spread of cancer by detecting it early, and in many cases the cancer can be cured or eliminated. CT scans, MRIs, ultrasounds and X-ray imaging are very important tools in fighting various diseases. Medical imaging is also used to create accurate computer models of body systems, organs, tissues, and cells used in anatomy and physiology classes in medical school.

Keywords: *medical physics, TEM, imaging, acceleration voltage, vacuume and medical imaging.*

GJSFR-A Classification: *DDC Code: 621.388 LCC Code: TK6630*



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Emerging Trends in Transmission Electron Microscopy for Medical Applications

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Dr. A Raghavendra [§] & Dr. G Krishna Kumari ^x

Abstract- This paper is an overview of imaging methods used for research and diagnosis that appear in the literature. There are several types of scientific research and imaging modalities, including photography, microscopy, ultrasound, X-ray, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET). The type of images used will depend on the part of the body the researcher wants to see in the image and the types of images readily available to the patient. For many years, medical imaging has played an important role in the early detection, diagnosis, and treatment of cancer and other diseases. In some cases, medical imaging tests are the first step in preventing the spread of cancer by detecting it early, and in many cases the cancer can be cured or eliminated. CT scans, MRIs, ultrasounds and X-ray imaging are very important tools in fighting various diseases. Medical imaging is also used to create accurate computer models of body systems, organs, tissues, and cells used in anatomy and physiology classes in medical school.

Keywords: medical physics, TEM, imaging, acceleration voltage, vacuume and medical imaging.

I. INTRODUCTION

Scientific and diagnostic imaging is medical imaging used to create images of parts or the entire human/animal body for various clinical purposes, such as: B. Medical procedures and diagnostics or medicine, including the study of normal anatomy and function. Medical imaging in a broader sense is the subset of biological imaging that includes photography, microscopy, ultrasound, radiography, computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET) included. Detailed anatomical and physiological images of various Medical organs and tissues of the body for research, diagnostic and therapeutic purposes are used.

This post provides a detailed overview of medical imaging to outline past, present, and future aspects of the field.

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II. METHODOLOGY

Acceleration Voltage is determined from 8 KV to 16 KV at different vacuum conditions for Advanced Materials

Sl.No	Vacuume (Kv)	Accelerating Voltage (Kv)
1	7	8
2	8	10
3	12	14
4	14	16

The overall structure of an electron microscope is similar to that of an optical microscope.

Sl. No	Vacuume (Kv)	Accelerating Voltage (Kv)
1	7	8
2	8	10
3	12	14
4	14	16

Light is replaced by electrons, and glass lenses are replaced by electromagnetic and electrostatic lenses.

Electron microscopes have an electron optical lens system similar to the glass lens in an optical microscope.

Mainly he has two types of electron microscopes. Between Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM), TEM is the most commonly used. Electron microscopy allows the visualization of structures that are normally invisible to light microscopy. Electron microscopy can be used to visualize microorganisms, cells, large molecules, biopsy specimens, metals, and crystals. Modern electron microscopes use special digital cameras and frame grabbers to take electron micrographs and capture images.

Transmission electron microscopy is a technique developed to obtain much greater magnification, or detail, of specimens than conventional light microscopy. At the specimen it passes through, an image is formed from the interaction of electrons transferred through the sample. The image is magnified and focused onto an imaging device such as a

fluorescent screen, a sheet of photographic film, or a sensor such as a CCD camera. , which is roughly analogous to a biological optical microscope.

TEM consists of an illumination system, a sample stage, an imaging system, and a vacuum system. Transmission electron microscopy is an important analytical method in physical, chemical and biological sciences.

TEM has applications in cancer research, virology, materials science, pollution, nanotechnology, and semiconductor research.

The seven most commonly used medical imaging modalities today are X-ray (that is, conventional radiography), CT, PET, SPECT, OI, US, and MRI. The first two (X-ray and CT) use high-energy photons to create 2D or 3D image sets of biological anatomy.

In contrast, nuclear medicine procedures such as PET and SPECT use small amounts of radiotracers involved in metabolic and signaling pathways in vivo and their distribution and abundance can be measured by the emitted radiation.

Finally, MRI, OI, and US use non-ionizing radiation for diagnostic purposes. H. Mechanical waves (US) in the MHz range, optical (OI), or magnetic fields (MRI) oscillating in the MHz range.

In general, most of the imaging modalities mentioned above, as well as therapeutic approaches, use electromagnetic radiation over a wide range of frequencies or energies. These parameters partially determine penetration depth, spatial resolution, specific absorption rate, etc. This affects the sensitivity and specificity of the medical imaging modalities used.

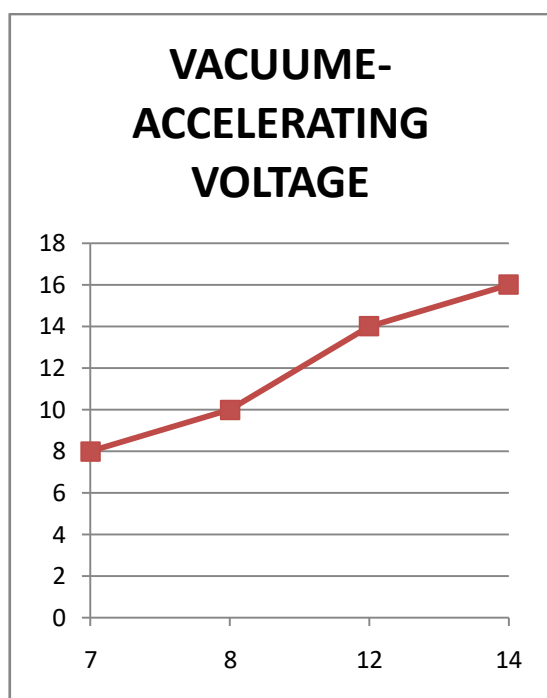


Fig. 1

III. CONCLUSION

Optical imaging (OI) often uses light from lasers or LEDs and allows imaging with high spatial resolution and good contrast, but the depth of tissue penetration is very limited. For these reasons, many optical imaging applications target cultured or fixed cell samples.

light microscopy is not only the method of choice in histopathology, but also the study of cell development and cell fate, gene expression analysis, cell-pathogen.

Interactions, cellular and intracellular signaling, metabolism, intercellular Also used for interaction analysis. Routine medical applications of optical imaging of target surfaces and transparencies of the human body (eg, dermatology, ophthalmology, various endoscopic procedures and dentistry).

Nevertheless, a number of additional optical imaging modalities have been developed to image normal and diseased patients and animals in clinical and pre-hospital settings. The OI is primarily used to image human skin, eyes, and other accessible parts of the body such as teeth, mucus, throat, and colon.

For this purpose, multi photon imaging and optical coherence tomography (OCT) are the most commonly used OI techniques. Moreover, the use of highly specific markers such as fluorescent tags and novel imaging probes facilitates the adoption of His OI for in vivo imaging.

3D optical imaging techniques include two-photon microscopy, OCT, light field microscopy, diffuse optical tomography, optical projection tomography, light sheet microscopy, and optical imaging. Acoustics is included. An approach that uses laser light for illumination and contrast is used in conjunction with ultrasonic detection. Super-resolution microscopy of OI was recently proposed, allowing non-invasive interrogation with a spatial resolution of less than 10 nm.

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SINGULARLY PERTURBED TWO- POINT BOUNDARY VALUE PROBLEM BY APPLYING HYPERBOLIC DECENT DYNAMIC METHOD

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Abstract: We are proposed to introduce and describe an exponential decent factor (shift operator) in this research paper to resolve a specifically defined two point boundary value problem with end limit layer in the vicinity $[0,1]$. Here, we've applied the finite difference related method with suitably selected hyperbolic fitting factor for the convergence of the numerically computed solution in accordance with the analytical solution. Due to the selected fitting factor method the numerical solution will give us a stable, consistent and convergent approximate solution in the regular region and more particularly in the boundary layer region also. We are also observed that the error bounds in the proposed numerical method were considerably lower.

Also we have investigated the aptness of the defined mathematical model, difference between computed and analytical solution. we have applied the suitable numerical algorithm called as a technique on defined mathematical model with a right/left end boundary layer that was tested and incredibly good arrangement with the exact solution which is available in the literature. Meanwhile the numerically computed results were compared with the analytical solutions for exactness and to evaluate the error bound throughout the domain. For the assembly of the proposed method the differential equation is transformed into a difference equation with suitable multiplication factor.

Computational results are closely associated with the analytical solutions available in the literature. By enlarge this method is subsidiary method to solve two

point boundary value problems with reasonable accuracy.

Keywords: Singular Perturbation problem; Ordinary Differential Equation; Boundary Layer; Two-Point Boundary Value Problem; Exponential fitting factor, Convergence analysis, Error Bound.

I. INTRODUCTION

In the mathematical model of a target system, as in control systems, the presence of parasitic short-time hyperbolic fitting factor consists some parameters such as moments of inertia, resistances, inductances and capacitances increases the order and rigidity of these systems. The suppression of these small constants results in the reduction of the order of the defined system. Such systems are called singular perturbation systems and when these systems take into account both the past history and the current state of the physical system, they are called singularly perturbed delay differential equations. Differential delay equations have arisen in the past in neuro-biology problems and in the mathematical formulation of various practical phenomena in bio-sciences. The study of differential difference equations, with the presence of displacement terms, which induce large amplitudes and exhibit oscillations, resonance, inflection point behaviour. Means due to small parameter the solution nature is stable at some region and Unstable or oscillatory in the boundary layer region. Such kind of qualitative analysis and error bounds are studied.

In this research work, the numerical process is studied with a cumulative hyperbolic exponential adjustment factor for



the solution of singularly perturbed differential equation latter on converted as difference equation with a hyperbolic displacement called the one-sided delay differential equation, with layer behaviour. A layer is one that is a narrow region where the nature of the solution changes as rapidly as a two sided exponential curve. Initially we have considered that the negative displacement in the derivative term is approximated using the Taylor series for a variable function as long as the displacement is $O(\varepsilon)$. Subsequently, the differential delay equation is replaced by an asymptotically comparable first-order neutral delay differential equation. An Hyperbolic integration factor is introduced into the first order delay equation. Then, the Weddels rule has been used together with linear interpolation to obtain a three-term recurrence relation. The resulting tri-diagonal system is solved by using the efficient Thomas algorithm. The selected technique is implemented in some selected problems, for different values of the delay parameter δ and the perturbation parameter ε . The maximum absolute errors are tabulated and compared to validate the technique. The convergence of the proposed method has also been discussed. About the oscillatory nature of the problem we have taken literature on boundary and interior layers was carried out by Lange and Miura [4]. Extensive numerical work has been initiated by N. Srinivasacharyulu [12], P.B. Patil [4], and J. B. M.C . Cartin [9], Bender [2] carried out so many related proposed a numerical methods comprising an finite difference approximation on an selected grid with an curved type monitor function, to approximate the solutions of singularly perturbed differential-difference equations with small delay and shift terms. Geng and etal. [6] presented an improved kernel method to obtain an accurate approximation of solutions for singularly perturbed differential-difference equations with small delay. With this motivation, in this paper we employed a numerical technique with the exponential integrating factor for the solution of singularly perturbed delay differential equations, with layer behaviour. A numerical scheme for the solution of a singularly perturbed delay differential equation with the left-end boundary layer and the right-end boundary layer is described .convergence of the proposed method is analyzed. To demonstrate the efficiency of the method, numerical experiments are carried out for several test problems and the results are tabulated and compared in the discussion. Finally, the advantages and pitfalls and conclusion are given in the last section.

II. MATHEMATICAL FORMULATION & NUMERICAL ALGORITHM :

Let us define the delay proposed differential equation with layer behaviour

$$\varepsilon y''(x) + a(x)y'(x - \delta) + b(x)y(x) = f(x) \quad (1)$$

in the interval $(0, 1)$ with the prescribed conditions

$$y(x) = \varphi(x) \text{ for } -\delta \leq x \leq 0 \quad (2)$$

$$y(1) = \beta, \quad (3)$$

where ε is a small positive parameter $0 < \varepsilon \ll 1$, $a(x)$, $b(x)$, $f(x)$ and $\varphi(x)$ are sufficiently smooth functions and β is a positive constant. Furthermore, $\delta = o(\varepsilon)$, where δ is a delay parameter. When δ is zero, equation (1) reduces to a singular perturbation problem, where as small ε reveals boundary layer and turning points depends upon the coefficient of convection term. The layer behavior of the problem under consideration is maintained only for δ when f becomes nullity means sufficiently small, i.e., δ is of (ε) . When the delay parameter exceeds the perturbation parameter, i.e., δ is of $O(\varepsilon)$, then layer behavior of the solution is no longer maintained, rather the solution exhibits an oscillatory behavior or diminished behavior Lange and Miura [7].

2(a) Negative end boundary layer problems:

The solution of the problem (1)-(3) exhibits a boundary layer at one end of the interval depending on the sign of $a(x)$. We assume that $a(x) \geq M > 0$ through- out the interval $[0, 1]$, for some positive constant M . This assumption implies that the boundary layer will be in the vicinity of $x=0$.

By using a Taylor series expansion of the retarded term $y'(x - \varepsilon)$ in the neighbour- hood of the point x , we have

$$y'(x - \varepsilon) \approx y'(x) - \varepsilon y''(x) \quad (4)$$

as a result, equation (1) is replaced by an asymptotically equivalent first order delay neutral type differential equation

$$y'(x) + b(x)y(x) = f(x) + y'(x - \varepsilon) - a(x)y'(x - \delta) \quad (5)$$

with $y(0) = \varphi(0)$; $y(1) = \beta$. Since $0 < \delta \ll 1$, the transition from (1) to (5) is accepted. This replacement is significant from the computational point of view. For more details on the validity of this transition, one can refer to El'sgolts and Norkin [2]. Thus, the solution of equation (5) provides a reasonable approximation to the actual solution. of equation (1). Here, for consolidation of our ideas, we assume $a(x)$ and $b(x)$ to be constants.

By applying an integrating factor e^{bx} to equation (5)

$$\frac{d}{dx}(e^{bx} \cdot y(x)) = e^{bx} \cdot \{f(x) + y'(x - \varepsilon) - ay'(x - \delta)\} dx \quad (6)$$

Discrediting the interval $[0,1]$ into N equal subintervals of mesh size $h = 1/N$, let $0 = x_0, x_1, \dots, x_N = 1$ be the mesh



points. Then we have $x_i = ih$, for $i = 0, 1, \dots, N$. Integrating (6) with respect to the independent variable x from x_i to x_{i+1} after multiplying both sides with a permissible hyperbolic natured fitting factor (b is real) i.e.,

$$\int_{x_i}^{x_{i+1}} a \frac{dy}{dx} \exp^{(bx)} dx = a \int_{x_i}^{x_{i+1}} \exp^{(bx)} \cdot \{f(x) + y'(x - \varepsilon) - ay'(x - \delta)\} dx \quad (7)$$

$$ae^{bx_{i+1}y_{i+1}} - e^{bx_i y_i} = a \int_{x_i}^{x_{i+1}} e^{bx} \cdot \{f(x) + y'(x - \varepsilon) - ay'(x - \delta) + ebxi + 1 - \varepsilon - ebxi y_i - \delta + a ebxi y_i - \delta\} dx \quad (8)$$

Here a is a parameter. Term by term integration is admitted because $e^{bx} \cdot f(x)$ and the derivatives are continuous. Performing the integration we have.

using Weddles rule the number of sub intervals should be taken as multiple of $3n$ i.e always select the interval of the type (x_0, x_{3n}) , $n=2, 4, 6, \dots, 2m$ ($m=1, 2, 3, \dots$)

$$ae^{bx_{i+1}y_{i+1}} - e^{bx_i y_i} = 3h/10 \{ e^{bx_i} \cdot \{f(x_i) + y'x_i - \varepsilon - ay'x_i - \delta + 5ebxi - 1. fxi - 1 + y'xi - 1 - \varepsilon - ay'xi - 1 - \delta + 2ebxi + 1. fxi + 1 + y'xi + 1 - \varepsilon - ay'xi + 1 - \delta\} \} \quad (9)$$

further, since $0 < \varepsilon \ll 1$ and $\delta = o(\varepsilon)$, to tackle the terms containing delay, the virtue of Taylor series approximations, approximating $y'(x)$ by linear interpolation, we get

$$y(x_i - \delta) = y(x_i) - \delta y'(x_i) = (1 - \frac{\delta}{h}) y(x_i) + \frac{\delta}{h} y_{i-1} \quad (10)$$

$$y(x_{i+1} - \delta) = y(x_{i+1}) - \delta y'(x_{i+1}) = (1 - \frac{\delta}{h}) y(x_{i+1}) + \frac{\delta}{h} y(x_i) \quad (11)$$

$$y(x_i - \varepsilon) = y(x_i) - \varepsilon y'(x_i) = (1 - \frac{\varepsilon}{h}) y_i + \frac{\varepsilon}{h} y_{i-1} \quad (12)$$

$$y(x_{i+1} - \varepsilon) = y(x_{i+1}) - \varepsilon y'(x_{i+1}) = (1 - \frac{\varepsilon}{h}) y_{i+1} + \frac{\varepsilon}{h} y_i \quad (13)$$

using equations (10) - (13) in equation (9) and simplifying, we get

$$\exp^{(bh)} \left[\left(\frac{\varepsilon}{h} + \frac{hb}{2} \left\{ 1 - \frac{\varepsilon}{h} \right\} + a \left[1 - \frac{\delta}{h} \right] + hab/2 \left[1 - \frac{\delta}{h} \right] y_{i+1} - e^{bh} \left[1 + \frac{\varepsilon}{h} - 0.5b\varepsilon - \frac{a\delta}{2} \right] - (1 - \frac{\varepsilon}{h})(1 + bh/2) + a(1 - \frac{\delta}{h}) + 0.5hba \right] y_i + \left(\frac{\varepsilon}{h} + 0.5b\varepsilon - \frac{a\delta}{h} + \frac{ab\delta}{2} \right) y_{i-1} = 0.5h [f_{i+1} + \exp^{(bh)}] \quad (14)$$

The resulting three-term recurrence relation of (14) is of the form

$$E_i y_{i-1} - F_i y_i + G_i y_{i+1} = H_i; i = 1, 2, \dots, N-1 \quad (15)$$

Subject to the boundary conditions

Where

$$E_i = \frac{\varepsilon}{h} + 0.5b\varepsilon - \frac{a\delta}{h} + \frac{ab\delta}{2} \quad (16)$$

$$F_i = -e^{bh} \left[1 + \frac{\varepsilon}{h} - 0.5b\varepsilon - \frac{a\delta}{2} \right] - (1 - \frac{\varepsilon}{h})(1 + bh/2) + a(1 - \frac{\delta}{h}) + 0.5hba \quad (17)$$

$$G_i = \exp^{(bh)} \left[\frac{\varepsilon}{h} + \frac{hb}{2} \left\{ 1 - \frac{\varepsilon}{h} \right\} + a \left[1 - \frac{\delta}{h} \right] + hab/2 \left[1 - \frac{\delta}{h} \right] \right]$$

$$H_i = 0.5h [f_{i+1} + \exp^{(bh)}] \quad \{ 18 \}$$

Unknowns y_0, y_1, \dots, y_n which will be the sufficient to solve for these unknowns. The matrix problem associated here is a tridigonal algebraic system whose solution can easily be determined by an efficient algorithm is called Thomas algorithm. The idea of this algorithm is very simple. We shall briefly describe it in the following. In this algorithm we start with a difference relation of the form

$$y_i = W_i y_{i+1} + T_i, \quad i = 0, 1, \dots, n-1 \quad (19)$$

Where W_i and T_i correspond to $W(x_i)$ and $T(x_i)$ are to be determined. By using (19) in (15), we see that the recurrence relations W_i and T_i for $i = 0, 1, \dots, n-1$ are obtained as

$$W_i = \frac{G_i}{F_i - E_i W_{i-1}} \quad (20)$$

and

$$T_i = \frac{E_i T_{i-1} - H_i}{F_i - E_i W_{i-1}} \quad (21)$$

To solve these recurrence relations W_i and T_i for $i = 0, 1, \dots, n-1$, we need to know the initial conditions

verified from (2), (5) & (15) here $x = ih$ ($i=1, 2, 3, \dots$)

$$W_0 = \frac{S_1}{S_0}, \quad (22)$$

$$T_0 = \frac{S_2}{S_0} \quad (23)$$

The numerically computed results are tabulated and compared with the exact solutions available in the literature.



III. ERROR ANALYSIS

Let y and Y be the exact solution of (1) and the approximate solution of the same governing equation (1) respectively. For adequate upper value N , we can estimate the ε - Uniform error bound.

$$\sup_{0 < \varepsilon \leq 1} \|y - Y\| \leq CN^{-1}(\ln N)^2, x \in R \quad (24)$$

K is suitable positive integer.

In order to get the inequality let decompose the solution $y(x)$ of governing equation (1) into regular and singular segments as :

$$y(x) = re(x) + sp(x)$$

for $0 \leq k \leq 3$ the regular component $re(x)$ satisfies the inequality as

$$|r^k(x)| \leq C[1 + \varepsilon^{2-k}e(x, a)], \forall x \in [0, 1] \quad (25)$$

Also the singularly oscillatory component $sp(x)$ follows the inequality as

$$|r^k(x)| \leq C\varepsilon^{-k}e(x, a) \quad \forall x \in [0, 1]$$

Where $e(x, a)$ is the hyperbolic component have two parts viz.,

$$e(x, a) = e^{\frac{-a_0(x)}{\varepsilon}} + e^{\frac{-a_0(1-x)}{\varepsilon}} \quad \text{coined by Miller, J.J.H etal [10] \{ In Mahapatra \}}$$

subsequently decompose the associated Numerical solution $Y(x)$ of the defined problem (1) into Regular ($R(\varepsilon)$) and singularly perturbed $S(\varepsilon)$ components i.e $Y(x) = R(\varepsilon, x) + S(\varepsilon, x)$. Here $R(\varepsilon, x)$ & $S(\varepsilon, x)$ are the approximate solutions of the defined problems as below

$$L^N R(\varepsilon, x) = f(x), \quad R(\varepsilon, 0) = r(0), \quad R(\varepsilon, 1) = r[1]$$

$$L^N S(\varepsilon, x) = 0, \quad S(\varepsilon, 0) = s(0), \quad S(\varepsilon, 1) = s[1]$$

$$\text{So that } \|y(x) - Y(x)\| \leq \|r(x) - R(\varepsilon, x)\| + \|s(x) - S(\varepsilon, x)\|$$

Afterwards we have a necessity to calculate the errors occurred in the linear (regular) and singularly perturbed components respectively

First evaluate the error in the regular region component

The local Truncation error defined as

$$L^N[R(\varepsilon, x) - r(x)] = (L - L^N)r(x) = f(x) - L^N[r(x)] = \varepsilon [D^2 - \Delta^2]r(x) + a(x)[D - D^0]r(x) \quad (C) \quad (23)$$

With the virtue of Taylor's series expansion by omitting the higher order terms after third order, one can obtain the expansions for

$$y(x_i + h) \text{ and } y(x_i - h) \text{ as}$$

$$y(x_i + h) = y(x_i) + hy'(x_i) + \frac{h^2}{2}y''(x_i) + \frac{h^3}{3!}y'''(\xi_1^{(i)})$$

also

$$y(x_i - h) = y(x_i) - hy'(x_i) + \frac{h^2}{2}y''(x_i) - \frac{h^3}{3!}y'''(\xi_2^{(i)})$$

$$\text{where } \xi_1^{(i)} \text{ \& } \xi_2^{(i)} \in (x_{i-1}, x_{i+1})$$

From the above two converging expansions in the given region R we have

$$(\Delta^2 y)(x_i) = y''(x_i) - \frac{h}{6}[y'''(\xi_1^{(i)}) - y'''(\xi_2^{(i)})]$$

$$\text{Whence } \left\| \left(\Delta^2 - \frac{d^2}{dx^2} \right) y(x_i) \right\| \leq C \|y'''\| \quad \text{where } \|y'''\| = \sup_{x_i \in (x_0, x_N)} |y'''(x_i)|$$

Again by using the Taylor's expansion restricting the terms upto second order one can get

$$\left\| \left(D^0 - \frac{d}{dx} \right) y(x_i) \right\| \leq C \|y''\|$$

By using the bounds of $r^k(x)$, $s^k(x)$ and the validity of the assumption

$$\varepsilon \leq CN^{-1} \text{ the equation (23) reduced as}$$

$$\|(L^N(R_\varepsilon - r)(x_i))\| \leq CN^{-1} \quad (26)$$

Also using the approximate discrete maximum principle one can reach the inequality

$$\|(R_\varepsilon - r)\| \leq CN^{-1} \quad (27)$$

Finally we required to calculate the error bound in the singular perturbed component. The local truncation error exists in the singular component is bounded in the regular way as derived for the regular analytical part and is

$$\|(L^N(S_\varepsilon - s)(x_i))\| \leq CN^{-1}\varepsilon^{-2} \quad (28)$$

Which completes the convergence analysis and upper error bound can be calculated. Using the inequality [28].

IV. ILLUSTRATED PROBLEMS

Example 1. Consider the singularly perturbed differential difference equation exhibiting left-end boundary layer [4]:

$$\varepsilon y''(x) + y'(x) - y(x) = 0 \quad ; \quad 0 < x < 1, \quad y(0) = 1, \quad y(1) = 1 \quad (A)$$

The exact solution of (A) with the given boundary conditions is

$$y(x) = \frac{(\exp(r_2 - 1)\exp(r_1 x) - (1 - \exp(r_1))(\exp(r_2 x))}{\exp(r_2) - \exp(r_1)}$$

(B)

$$\text{In equation (B) } r_1 = \frac{-1 + \sqrt{1 + 4\varepsilon}}{2\varepsilon} \quad \text{and} \quad r_2 = \frac{-1 - \sqrt{1 + 4\varepsilon}}{2\varepsilon}$$

This selected boundary value problem has a boundary layer at left end at $x=0$. It is clearly understood by drawing its patterns as well as the numerical results computed in the below table with Maximum point-wise error & the rate of convergence E_ε^n and r_ε^n respectively.



Table -1

ε	Number of Intervals N					
	16	32	64	128	256	512
$1e^{-2}$	$7.585e^{-3}$ 0.9765	$3.8543e^{-3}$ 1.01108	$1.9127e^{-3}$ 1.0461	$9.2599e^{-4}$ 1.0183	$4.5788e^{-4}$ 1.0637	$2.1880e^{-4}$
$1e^{-4}$	$1.1138e^{-2}$ 0.982918	$5.6348e^{-3}$ 0.9994	$2.8188e^{-3}$ 1.01445	$1.3953e^{-3}$ 1.0366	$6.8264e^{-4}$ 1.07413	$3.2408e^{-4}$
$1e^{-8}$	$1.11708e^{-2}$ 0.9786	$5.67709e^{-2}$ 0.989618	$2.8564e^{-2}$ 0.9959	$1.42359e^{-3}$ 0.9979	$7.1809e^{-4}$ 0.9939	$3.64488e^{-4}$
E^N	$1.11729e^{-2}$	$5.679e^{-2}$	$2.8564e^{-2}$	$1.4326e^{-3}$	$7.1795e^{-4}$	0
r^N	0.9784	0.9898	0.9960	0.9979	0.9940	1

Example -2: Select the Non linear singularly perturbed problem

$$\varepsilon y''(x) + 2y'(x) + \exp(y(x)) = 0; \quad 0 < x < 1, \quad y(0)=0, \quad y(1) = 0$$

The uniformly convergent validity solution after linearization by using quasi linearization due to Bellman and Kalaba [1] is

$Y(x) = \ln\left(\left(\frac{2}{1+x}\right) - (\ln 2)\exp\left(-\frac{2x}{\varepsilon}\right)\right)$ which reveals a boundary layer of thickness $O(\varepsilon)$ in the neighbourhood of $x=0$. The numerically computed results are presented in Table-2.

Table -2

ε	Number of Intervals N					
	16	32	64	128	256	512
$1e^{-4}$	$1.9276e^{-2}$ 0.9265	$1.0135e^{-2}$ 0.9645	$5.28487e^{-3}$ 0.9825	$2.599e^{-3}$ 0.9937	$1.34788e^{-3}$ 1.0008	$6.7540e^{-4}$
$1e^{-4}$	$1.1138e^{-2}$ 0.982918	$5.6348e^{-3}$ 0.9994	$2.8188e^{-3}$ 1.01445	$1.3953e^{-3}$ 1.0366	$6.8264e^{-4}$ 1.07413	$3.2408e^{-4}$
$1e^{-8}$	$1.96708e^{-2}$ 0.9286	$1.03119e^{-2}$ 0.969618	$5.2843e^{-3}$ 0.9859	$2.6755e^{-3}$ 0.9929	$1.344e^{-3}$ 0.9939	$6.7547e^{-4}$
E^N	$1.9629e^{-2}$	$1.0311e^{-2}$	$5.28564e^{-3}$	$2.671795e^{-3}$	1.344	0
r^N	0.9284	0.9698	0.9820	0.9930	0.9939	1

V. DISCUSSIONS AND CONCLUSION

We have defined, described and demonstrated the methodology of the proposed method for solving singular boundary value problems. We have defined the Hyperbolic type fitting factor and its validity on the real line, constructed this method by using the principle of Newton-quotient term by term integration approximation and finally designed a discrete three term recursive relation. Such three term recursive difference equations are solved using efficient Gauss elimination type Thomas algorithm. This method is simple, accurate and user friendly to implement on computer. It is a practical method and can be easily implemented on computer to solve such

problems. We have implemented this method with examples – a linear singular perturbed boundary problem, and non-linear singularly perturbed boundary value problem. The obtained computational results are tabulated and the numerical results compared with the exact solution and done the error analysis. The numerically computed results are in good agreement with the exact solutions available in the literature. The convergence of the solution is uniform throughout the specified region which can be observed in the numerically computed results.



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A STUDY ON EFFECTIVENESS OF SALES AND DISTRIBUTION CHANNEL OF TATA MOTORS LIMITED

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ABSTRACT:- Exchanging goods or services for money or another kind of payment results in making a sale. It involves bringing an undertaking to a conclusion.

The completion of a sale by the seller or the provider of the goods or services in response to an acquisition, appropriation, or request includes the transfer of ownership (titre), the application and prompt payment of a price, the obligation for which arises from the seller's need to transfer ownership and which is a price.

On an intangible scale, a service is a good's corresponding counterpart. Unless expressly mentioned in an exclusive contract, the customer often does not acquire exclusive ownership of the product they have acquired when getting services. If such a service has a cost, the buyer's willingness to pay for it indicates that the advantages are apparent. Taxes and other financial sources are used to provide public services on behalf of the entire community.

Service providers operate in an economy free from the constraints of maintaining stock (inventory) or the need to worry about bulky raw materials by combining and organising the necessary degree of resources, creativity, innovation, and expertise for producing particular advantages for service consumers.

Key words:

Advertising effectiveness, Advertisement, Automobile Industry Advertising

INTRODUCTION

Distribution (business)

One of the four components of the marketing mix is physical distribution (also known as location). a firm or group of businesses that aids in making a good or service accessible to consumers or other users for usage or consumption.

The marketing mix's other three components are the product, pricing, and promotion.

The distribution strategy

A product must first pass through a number of intermediaries, each of whom transfers the product to the succeeding organisation, before it may finally reach a consumer or end-user. This process is referred to as the "distribution chain" or "channel." The maker must keep in mind that each link in these chains will have unique needs in addition to those of the primary end-user.

Channels

A number of alternate 'channels' of distribution may be available:

Manufacturer → Distributor → Retailer → Customer → ▶

Manufacturer who manufactures products

Distributor who sells products to retailers

Retailer (also called dealer or reseller), who sells products to end customers

Customer who buys product from retailer
Advertisement typically used for consumption goods.
Distribution channels may not be restricted to physical products alone. They may be just as important for moving a service from producer to consumer in certain sectors, since both direct and indirect channels may be used. Hotels, for example, may sell their services (typically rooms) directly or through travel agents, tour operators, airlines, tourist boards, centralized reservation systems, etc.

There have also been some innovations in the distribution of services.

Managerial concerns

The channel selection is very important. There is a theoretical trade-off since using intermediaries to get a bigger distribution is assumed to be less expensive. In reality, aside from mail order, the majority of manufacturers of consumer goods were never able to make the cost of selling directly to their customers worthwhile. Many suppliers seem to think that their job is over once their product has entered the channel at the beginning of the supply chain. In order for a supplier to be market-oriented, their role should be expanded to encompass overseeing every stage of the supply chain, up until the point at which the good or service is delivered to the consumer. In order to do this, the provider might have to select from the following possibilities:

channel participation

Use your imagination while monitoring and managing the channels.

Marketing channel type

There may be pricing competition (with benefits to items and particularly the market leaders in consumer goods) if the majority of resellers carry the "product".

Selective distribution: This is the typical pattern, which applies to both the consumer and the industrial sectors, where "appropriate" resellers stock the products.

Exclusive distribution: The "product" may only be sold by fully validated resellers or authorised dealers (usually just one per region).

Utilize imagination

Getting direct staff to offer the essential sales and service help is challenging enough. It takes a lot more work to inspire the proprietors and personnel of the several businesses involved in a supply chain. There are several methods available to achieve this motivation. The most typical type is undoubtedly "incentive," when the supplier pays money to distributor sales personnel or bribes channel owners with higher profits to promote their product over that of rivals. Through this incentive, which Dent refers to as a "Channel Value Proposition" or "business case," the supplier persuades the channel member of the financial benefits of working with them. He claims that rather than the sale of goods, this is the sale of business.

Monitoring and controlling channels

Both internal sales and distribution within the company as well as supply chain management must be monitored and managed.

Actually, a lot of companies use a number of channels. For instance, they could add representatives to a direct sales group that calls on larger accounts but deals with smaller customers and prospects. These platforms showcase the marketing strategies employed by a company. For the distribution channel to be managed successfully, several decisions must be made and implemented. Recruiting, educating, inspiring others, and serving are the first three. Compensation evaluation and replacement of channel members

NEED FOR THE STUDY

Since effectively selling items is the main goal of every manufacturing firm, customer happiness comes first. Penna wants to evaluate customer satisfaction levels and identify any potential improvement areas.

This procedure has moved slowly forward. As a result, the study in this field has been selected. Without sales of its products, a manufacturer of goods cannot compete and cease to exist. Therefore, in order for a manufacturing firm to be profitable, sales are crucial. solely increasing money through sales, if at all practicable.

An crucial marketing duty is distribution. A single business may distribute its goods. Dealers may be located in this location's distribution networks. They serve as a bridge between businesses and are located close to their clientele. It is essential to research distribution and sales tactics.

Distribution systems, which are collections of unaffiliated businesses engaged in the process of making a good or service useable, have distribution channels as a part. A distribution network is required for efficient product flow.

SCOPE OF THE STUDY

To gather the primary data for the study, customers in Telangana, where the survey was performed, were given a questionnaire. The purpose of the study is to ascertain how satisfied dealers are with Tata Motors Limited. The primary objective of the initiative was to increase "EFFICIENCY of SALES and DISTRIBUTION CHANNEL" for Telangana consumers of Tata Motors Limited.

OBJECTIVES OF THE STUDY

Essential purpose

To assess the role that dealers play inside tata motors limited.

Secondary Objective

1. To evaluate the efficiency of Tata Motors Limited's channels.
2. To increase channel effectiveness and learn what customers think about many aspects of the current market environment.
3. Providing guidance to Tata Motors Limited on how to create a successful channel strategy.

RESEARCH METHODOLOGY

The investigation's goals have guided the choice of an exploratory design. To link numerous components, the researcher also used causal analysis and a descriptive researcher design. Exploratory research mostly examines what is already known about a subject and concentrates on the analysis and interpretation of information that is currently accessible and readily available. When we utilise the data from three different sources—studying secondary texts, speaking with people, and thinking about a particular issue—this research is typically beneficial.

Sources of Information:

The following information was gathered for the researcher's study:

Primary Data:

In Telangana, this information was gathered via speaking with and questioning clients.

Secondary Information:

The firm is directly contacted for brochures, graphs, charts, papers, and other supplementary materials.

Data Collection Tool:

One tool for gathering data is this one. It enjoys some popularity, particularly for important inquiries. Businesses, researchers, public and private organisations, even the government, are embracing it. This procedure entails issuing a questionnaire to the relevant parties, asking them to complete it, and then requesting that they send it back. A questionnaire is a form or group of forms with a number of questions written or typed on them in a certain order.

The researcher utilised a structured questionnaire that included the following items on it:

Open-ended inquiries

Closed-ended inquiries

multiple-choice questions with a dichotomy

DESIGNING OF SAMPLING

To learn about their current satisfaction with and expectations for this brand, the researcher spoke with customers of Tata Motors Limited. The researcher chose the Tata Motors Limited customer base in Telangana.

Statistical Organize a sample size. The sample includes 100 consumers.

sampling technique: Every customer of Tata Motors Limited who purchases goods in Telangana is represented in the sample unit.

Sampling approach: A non-probabilistic simple random sampling approach is used to get information from clients.

TOOLS REQUIRED FOR ANALYSIS

The survey data have been thoroughly and thoughtfully examined using known and accurate statistical methods. The percentage approach is a crucial statistical method.

HYPOTHESIS

An element of study known as a hypothesis enables the researcher to forecast the future based on existing patterns. Any research endeavour must involve the creation of regulations for the system's enhanced performance. The researcher built the study's hypothesis based on the aforementioned idea across several phases of investigation.

LIMITATIONS OF THE STUDY:

The individuals in the sample that was selected are both overt and covert. As a result, there's a chance that the survey courts will have some errors.

The following errors might happen:

The respondents couldn't give correct information because the researcher is an absolute stranger to them.

Even if respondents' answers are ultimately erroneous, they may provide researchers with comforting information.

When completing the questionnaire, perceptions of values like status, omission of factual information, and difficulty expressing one's inner sentiments to an unknown researcher might lead to inaccurate findings in the opinion poll.

Because the sample size is tiny, the researcher might not have access to a perfect mix of respondents when conducting the opinion poll.

REVIEW OF LITERATURE

Philip Kotler is an American marketing author, consultant, and professor emeritus; the S. C. Johnson & Son Distinguished Professor of International Marketing at the Kellogg School of Management at North-western University.

The present day Indian economy is viewed a highly competitive and market oriented. At this state the success of any organization is totally depends on customer and his satisfaction only. So, every business organization should see that the customer "as sovereign of the market" who decides the fate of it. Hence, it is the responsibility of any concern to meet the requirements of customers from time-to-time with greater dynamism.

Customer satisfaction is totally intangible and its management is very crucial aspect on the part of the business entrepreneurs. Making such an intangible property in to tangible is great challenge among the various organizations. This depends on customer orientation, customer dynamism, tapping new avenues by the business unit, quality of the product, price of the product, proper supply of materials, timely ness in supply, effective channel of distribution, customer treatment, after sale service, product chi queens professionalism in marketing strong grand image, effective packing system, and continuous improvement in business and so on.

Market:-A market, in general, may be described as a place or geographical area where buyers and sellers meet and function, goods of services are offered for sale, and transfers of title of ownership occur. From the point of view of economics, a market is defined as "an aggregate of the potential buyers for a product or service". But, in practice, the term market is used to denote "anybody of persons who are in intimate business relation and carry on any extensive transaction in any commodity".

INDUSTRY PROFILE

The automobile industry is one of India's most vibrant and growing industries. This industry accounts for 22 per cent of the country's manufacturing gross domestic product (GDP). The auto sector is one of the biggest job creators, both directly and indirectly. It is estimated that every job created in an auto company leads to three to five indirect ancillary jobs.

India's domestic market and its growth potential have been a big attraction for many global automakers. India is presently the world's third largest exporter of two-wheelers after China and Japan. According to a report by Standard Chartered Bank, India is likely to overtake Thailand in global auto-export market share by the year 2020.

The next few years are projected to show solid but cautious growth due to improved affordability, rising incomes and untapped markets. With the government's backing, and trends in the international scenario such as the decline in prices of natural rubber, the Indian automobile industry is slated to witness some major growth.

Market size

For the calendar year (CY) 2021, all segments showed growth, and total sales increased by 5.8% to 18.49 million units, compared to 17.47 million units in January-December 2020. In CY21, passenger vehicles sales increased by 26.6% to 3.08 million units, up from 2.43 million units in CY20. The total number of commercial cars sold was 677,119, up 34% from 505,102 in the previous year. In FY21, the total passenger vehicles production reached 22.65 million vehicles. Two wheelers and passenger vehicles dominate the domestic Indian auto market. Passenger car sales are dominated by small and mid-sized cars. Two wheelers and passenger cars accounted for 81.21% and 14.56% market share, respectively, accounting for a combined sale of over 17.8 million vehicles in FY21. In January 2022, total production of passenger vehicles, three-wheelers, two-wheelers and quadricycles reached 1,860,809 units.

COMPANY PROFILE

The Tata group comprises over 100 operating companies in seven business sectors: communications and information technology, engineering, materials, services, energy, consumer products and chemicals. The group has operations in more than 100 countries across six continents, and its companies export products and services to 150 countries.

Founded by Jamsetji Tata in 1868, the Tata group is a global enterprise headquartered in India, and comprises over 100 operating companies, with operations in more than 100 countries across six continents, exporting products and services to over 150 countries. Tata Motors was established in 1945 under the Tata Group. It is among the world's leading manufacturers of automobiles with an employee strength of around 81,090. It was the market leader in commercial vehicles segment with about 36.32% market share in FY21. It is present in multiple segments like cars and utility vehicles, trucks and buses, defence vehicles, and electric vehicles. The company has extended its presence internationally through joint ventures (JV) like the strategic alliance with Fiat and Marco polo. Tata Motors is present in about 175 countries with research and development (R&D) centres in UK, Italy, India and South Korea. Tata Motors sold 30,079 commercial vehicles in January 2022. Every Tata company or enterprise operates independently. Each of these companies has its own board of directors and shareholders, to whom it is answerable.

TataSons is the principal investment holding company and promoter of Tata companies. Sixty-six percent of the equity share capital of Tata Sons is held by philanthropic trusts, which support education, health, livelihood generation and art and culture.

In 2020-21, the revenue of Tata companies, taken together, was \$103 billion (INR 7.7 trillion). These companies collectively employ over 800,000 people.

Each Tata company or enterprise operates independently under the guidance and supervision of its own board of directors. There are 29 publicly-listed Tata enterprises with a combined market capitalisation of \$242 billion (INR 17.8 trillion) as on March 31, 2021.

Companies include Tata Consultancy Services, Tata Motors, Tata Steel, Tata Chemicals, Tata Consumer Products, Titan, Tata Capital, Tata Power, Tata Advanced Systems, Indian Hotels and Tata Communications.

Sample Size

The researcher has done his research study on the dealers of Tata Motors Limited to know their present satisfaction and expectation from this brand. The researcher selected the dealers of Tata Motors Limited at Telangana for my research study.

Sampling Plan

Sample size: Sample size consists of 100 Customers

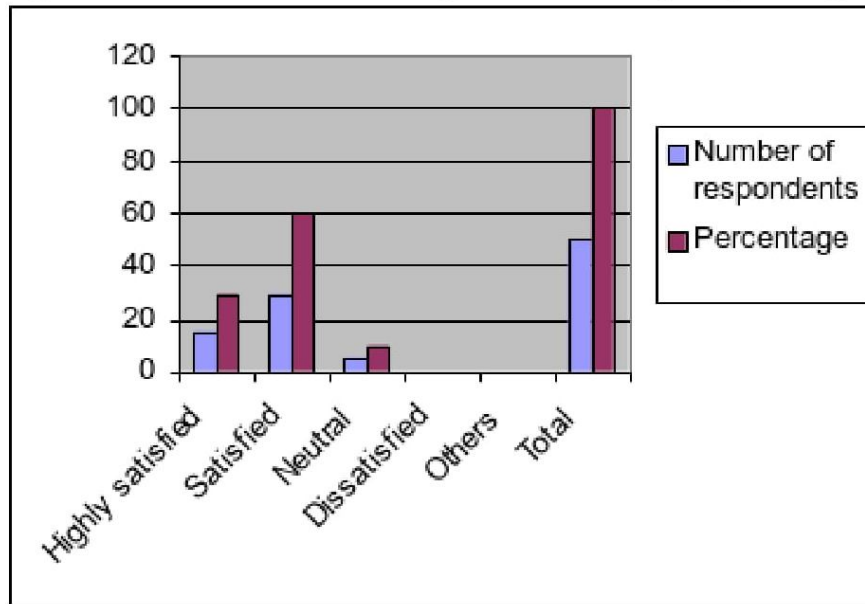
Sampling unit: The Sampling unit includes all the dealers of Tata Motors Limited products present in Telangana.

Sampling method: For collecting information from dealers and customers, simple random sampling method is used.

DATA ANALYSIS & INTERPRETATION

Table-1 Customers feeling about Company Image

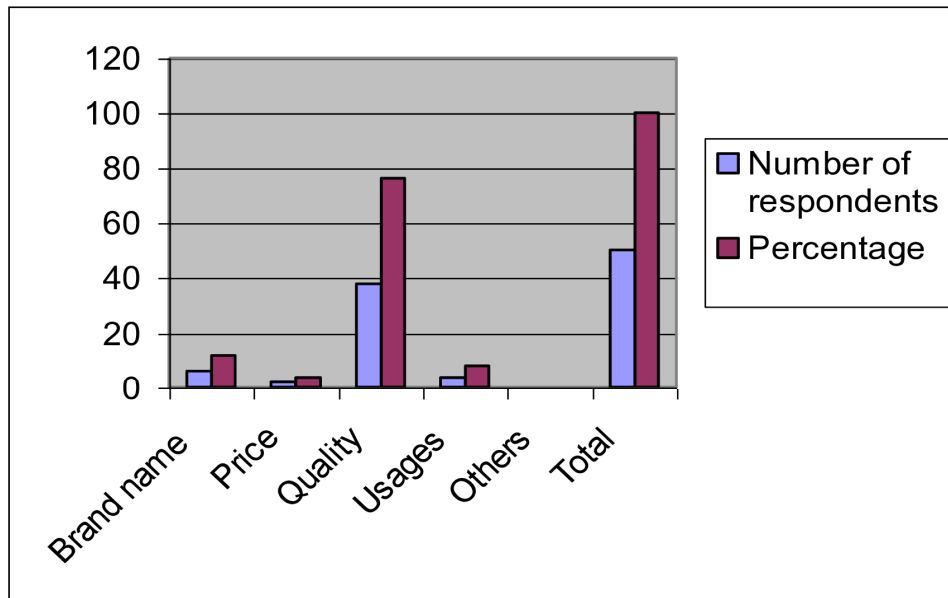
Customers Opinion	Number of respondents	Percentage
Highly satisfied	30	30
Satisfied	60	60
Neutral	10	10
Dissatisfied	0	0
Others	0	0
Total	100	100

Graph 1: Customers feeling about company image

INFERENCE: While 30% of dealers expressed tremendous joy with the company's image, 60% of dealers expressed moderate happiness. Only 10% of dealers said they were happy with the company's image.

Table2: To know on which aspects the customer gets more satisfaction

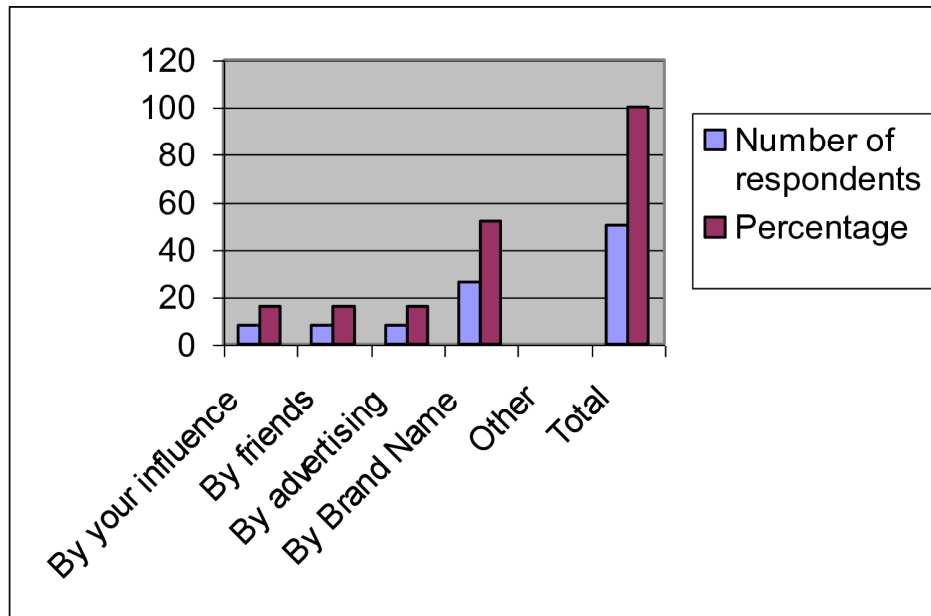
Customers Opinion	Number of respondents	Percentage
Brand name	12	12
Price	4	4
Quality	76	76
Usages	8	8
Others	0	0
Total	100	100

Graph 2: Knowing on which aspects customer gets more satisfaction

INFERENCE: The majority of respondents choose quality first, followed by brand name, product, usage, and price.

Table-3 Customers come to Shore-room

Customers Opinion	Number of respondents	Percentage
By your influence	16	16
By friends	16	16
By advertising	16	16
By Brand Name	52	52
Other	0	0
Total	100	100

Graph 3: Customers come to Shore room

INFERENCE: According to the aforementioned chart, dealers and advertising come in second and third when it comes to how many people enter retail outlets as a consequence of the impact of the Tata Motors Limited brand.

FINDINGS

- Compared to dealers, who generally have between 7 and 8 years of experience, fewer merchants have more than 12 years of experience.
- The majority of clients are merely satisfied with the company's reputation; the rest are either unconcerned or extraordinarily pleased.
- Most consumers are satisfied with the product's quality, however brand preference, applications, and cost come in second and third place, respectively.
- Most people claim to exclusively purchase from specific brands. Advertising, his business partners, and friends all had an effect.
- All the merchants claim that it is easy for them to deal with clients and sell the goods.
- The vast majority of consumers claim they have never experienced supply scarcity issues.

SUGGESTIONS

Fewer merchants have more than 12 years of experience compared to dealers, who typically have between 7 and 8 years.

The majority of customers are normally happy with the reputation of the business; the rest are either uninterested or highly happy.

Even if pricing, applications, and brand preference stand in second and third place, respectively, most consumers are happy with the calibre of the product.

Most consumers assert that they only buy from particular brands. His friends, business associates, and advertising all had an impact.

All of the business owners believe that marketing their products and doing business with customers come naturally to them.

Supply constraints, according to the great majority of clients, have never been a problem for them.

CONCLUSION

Majority of the Customers satisfying with the supply from the company and very few members satisfied, dissatisfied.

All the Customers were saying the entire floor space were providing only for goods storing purpose.

Majority of the Customers satisfied with the mode of dispatch by the company. And few members were moderately satisfied, highly satisfied.

Majority of the Customers they estimate the demand for various products by the orders and followed by seasonal base and past sales.

All the dealers were saying they do not face any difficult in dealing with the company.

Majority of the dealers were saying about the fright it incurs 2% to receive goods from company to your stock point.

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A STUDY ON COMPETENCY MAPPING HARSHATOYOTA

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ABSTRACT:- The essential competences of an organisation or business, as well as the roles and responsibilities within it, are identified through the competency mapping process. It is a duty that demands the greatest amount of importance inside the organisation. In a well-managed organisation, there should be a list of competences needed to carry out each clearly defined function. Competency mapping examines a worker's benefits and drawbacks to aid employers in understanding him and fostering his professional development. The future will see a skilled personnel as a company's most important asset. Although competency modelling dates back to the early 1900s, it has gained prominence recently. The skills required to perform well in a particular job, work family, organisation, function, or process are identified in a hierarchy called a competency model. Individual competencies are structured into competency models to aid individuals in a profession or organisation in understanding, discussing, and applying the abilities to worker performance. The following study report was created using data from a poll of employees at an IT organisation. The main conclusion drawn from this inquiry was that the workers had a certain level of knowledge. The staff's communication skills, level of competency, and sense of teamwork have room for improvement. To increase the achievement-oriented of the employees, the organisation must create more precise targets. In order to express their opinions, employees must graciously accept the organization's feedback procedure. A method for locating the most important abilities for a company, its positions, and its procedures is competency mapping. It may not be as straightforward as it initially appears, yet competency mapping is a term used often across various industries. Every successful endeavour starts with a talent or aptitude. Many thought leaders in business strategy have emphasised the necessity of identifying the competences an organisation requires in order to succeed in a certain environment in recent years. This article explains the reasons why a company needs certain skills from its personnel as well as how those abilities are assessed.

Key words: communication skills, competency modelling, teamwork.

INTRODUCTION

Through the process of competency mapping, critical capabilities for a business or a role are identified and integrated into the various business processes (such as job evaluation, training, and recruitment). We would define competence as a behaviour so that we are both on the same page (such as leadership, communication, etc.). Specification determination is the process that results in the firming up of the characteristics and skills necessary for each function in the organogram. The performance review's evaluation criteria are the competencies listed in the relevant job description. The talent inventory offers details on the kinds of competences needed for the various jobs inside the firm. The following stage involves conducting a competency-based interview to assess the candidate's qualifications in relation to those needed for the post. The competency mapping technique seeks to identify both fundamental character traits and capacities particular to the client company. A competency map may be used to find, manage, assess, and develop individuals for the positions selected by the organisation design process once it has been established and verified. Additionally, it can be used in compensation management and succession planning. Understanding the competencies required

for each job in the organogram is frequently facilitated by the specification determination step of the process. A preliminary project plan is created to make sure that all significant stakeholders are included in the process and that the appropriate activities and communication strategies are designed to support the construction of the maps. The maps may be checked by customers to make sure they meet their needs both now and in the future. By contrasting a skill or trait with the strategic business objectives, it is feasible to establish whether it accurately fulfils a performance demand.

NEED OF THE STUDY

1. The main goal of the research is to assess the knowledge, skills, and talents that directly impact employees' performance.
2. To better understand the uncertainty of employment and job experience.

knowing how competency mapping aligns behaviour with organizational strategy and flexible ideals.

SCOPE OF THE STUDY

The primary goal of the study is to get more knowledge about competency mapping for HARSHA TOYOTA employees and how it may benefit the business. We now have a better understanding of how the competency instrument will benefit the workforce and the employees of the organisation as a result of doing the research at the end. to see if there are any further traps there. This enables us to provide guidance when required and provide fresh ideas to further guard the company from issues in the future.

OBJECTIVE OF THE STUDY

1. To appreciate the impact and function of competence mapping on HR Deliverables.
2. To recognise and comprehend the role that competency mapping plays in the performance evaluation process.
3. Understanding the significance of competencies in the recruiting and selection process.
4. Recognizing the necessity of anticipating and controlling the abilities needed for future proficiency transformation.

METHODOLOGY

RESEARCH DESIGN

An method known as descriptive research was used to conduct this study. The researcher is using a descriptive study design in an effort to thoroughly grasp competence mapping and its function in HR deliverables.

SAMPLE SIZE

For the purpose of this study, the size of the sample is 50.

UNIVERSE:

The collection of all the elements from which a sample is drawn or created is known as the universe. The study's primary areas of interest are competency mapping and HR deliverables in the larger business community.

SOURCE OF DATA COLLECTION

For the inquiry, the researcher used both primary and secondary data sources.

Main Information

Each respondent was individually surveyed for the primary data.

Principal Data

Secondary data was gathered from associated books, journals, periodicals, and websites.

TOOL OF DATA COLLECTION

The researcher decided to use a questionnaire to collect the data. It has to do with a technique for collecting information that uses a form that each responder completes independently. This strategy is employed because: - The experts have the expertise and capacity to understand the questions.

LIMITATIONS

1. There can be restrictions in place when collecting data.
2. Human bias and prejudice may influence how individuals behave.
3. Employees aren't actually cooperating to learn more since they are so intent on their assignment.
4. It is clear from the overview that the Hyderabad area is constrained.

The information provided by the responder may not always be accurate because some people will not disclose their true needs and because their viewpoints may change as a consequence of new experiences.

THEORETICAL FRAME WORK

There are several important advantages in competency based employee hiring and selection.

First, competency based selection is results oriented. They make it easier to concentrate on the results expected of a successful or exemplary performer. They focus less on approximations of competence – such as educational level or years of experience – that have little connection to verifiable results.

Second, competency based selection plays an important role in attracting individuals who possess characteristics that might be difficult, if not impossible, to acquire by training or development efforts.

Third, a competency based selection process provides applicants with opportunities to outline, explain and demonstrate their qualifications in competency-based terms.

Fourth, competency based selection are readily transferable across work situations, competency based selection may help the organization to function effectively even during times of rapid or unanticipated change.

Fifth, competency-based selection processes give HR practitioners an opportunity to plan for developing competencies for new hires and for experienced workers who must be reassigned.

Sixth, competency based selection methods do not discriminate. They encourage managers to clarify the desired work results and to find individuals, who can achieve those results regardless of age, race. Gender, sexual orientation, ethnic background or other considerations that have little or no bearing on their ability to perform.

REVIEW OF LITERATURE

DEFINITIONS:

Arya Chanakya, a well-known royal adviser and prime minister from Vedic India, penned a famous book known as the Arthashastra, which is probably the first book on competency mapping. The book contains competency mapping models, the thesis and theories of human aptitude, intelligence quotient, emotional quotient and in general everything that is related to human behavior regarding work, logic and emotions. This book is an excellent leader and management book and is more than 3000 years old.

John Flanagan (1954) grounded Critical Incidents Technique as a precursor to the key methodology used in rigorous competency studies.

The idea of testing the competencies, required for efficient performance at a position, was proposed by David McClelland in the early 1970's. The term competency has been interpreted by various authors/researchers with their unique way of giving meaning to it. Some of the definitions are given below.

Boyatzis (1982) described competencies as underlying characteristic of an individual, which are causally (change in one variable cause change in another) related to effective job performance.

Albanese (2019) Competencies are personal characteristic that contribute to effective managerial performance.

4.COMPANY PROFILE

The Toyota Motor Corporation was founded in September 1933 if Toyoda Automatic Loom created a new analysis Devoted to the assembly of automobiles beneath the administration Of the founder's son, Kiichiro Toyoda. Soon thereafter, the

Division produced its aboriginal Type a Engine in 1934, which Was acclimated in the aboriginal Model A1 commuter car in May 1935 And the G1 barter in August 1935. Assembly of the Model AA commuter car started in 1936. Early cars buck a Striking affinity to the DodgePower Wagon and Chevrolet, with some locations in fact interchanging with their American originals

Toyota is a Japanese agglomeration and the world's added bigger automaker accurate automobiles, trucks, buses, robots and accouterment cyberbanking casework through its assay Toyota. Based in Toyota, Aichi, Japan, the accession boasted a complete car accumulation of 9.018 amateur cars in 2006. It is the world's eighth bigger accession by accomplishment of \$179 billionas of 2006. Toyota is the world's a lot of acceptable automaker with net assets of \$11 billion on year 2006. The accession is allocation of Toyota Group and is it's largest. Toyota encompasses Toyota, Lexus, Scion, and locations of Daihatsu brands, accommodation and companies

The accession was founded in 1933 by Kiichiro Toyoda as a ambit off from his father's accession Toyota Industries to accomplish automobiles. It created its ancient satisfaction Type an engine in 1934 and its ancient driver car in 1936.

INDUSTRY PROFILE

The auto industry is one of India's a lot of active and growing industries. This industry accounts for 22 per cent of the country's accomplishment gross calm artefact (GDP). The auto breadth is one of the bigger job creators, both anon and indirectly. It is estimated that every job created in an auto aggregation leads to three to 5 aberrant accessory jobs.

India's calm bazaar and its advance abeyant accept been a big allure for abounding all-around automakers. India is anon the world's third bigger exporter of two-wheelers afterwards China and Japan. According to a address by Accustomed Chartered Bank, India is acceptable to beat Thailand in all-around auto-export bazaar allotment by the year 2020.

The next few years are projected to appearance solid but alert advance due to bigger affordability, ascent incomes and beginning markets. With the government's backing, and trends in the all-embracing book such as the abatement in prices of accustomed rubber, the Indian auto industry is slated to attestant some aloft growth.

Market size

The accumulative adopted absolute investment (FDI) inflows into the Indian auto industry during the aeon April 2000 – August 2014 was recorded at US\$ 10,119.68 million, as per abstracts by Department of Automated Policy and Promotion (DIPP). Data from industry physique Society of Indian Auto Manufacturers (SIAM) showed that 137,873 commuter cars were awash in July 2014 compared to 131,257 units during the agnate ages of 2013. Among the auto makers, Maruti Suzuki, Hyundai Motor India and Honda Cars India emerged the top three gainers with sales advance of 15.45 per cent, 12 per cent and 11 per cent, respectively.

DATA ANALYSIS AND INTERPRETATION

Sl.no	Statement	Response
1.	Alteration of behaviour to cope up the situation	Everyone has the positive response
2.	Services to client	70% agree and 27% strongly agree
3.	Reaction of employees towards clients needs	97% of employees are favourable
4.	Problem solving mentalities of employees	According to survey 67% of them are capable of it
5.	Alteration towards others sayings	According to survey 17% agree and 23% disagree
6.	Factors considered for assessing viability of new idea initiatives	41% are flexible and 4% are responsive
7.	Employees judgement capacity after the identification of the real cause of the problem	57% say Yes and 43% say No for it
8.	Employees attitude towards improve performance	100% says Yes, According to survey.
9.	Employee performances as team members	93% of employees are successful of becoming team members.
10.	Employees feedback to other employees regarding their performance	60% of employees give feedback and 30% consistently.
11.	Employees innovative skills	77% of employees are having innovative skills.
12.	Capacity of employees to influence others on for important issue in the organization	83% of employees influence sometimes and 3% of employees never.

FINDINGS

- ☐ Everyone is ready to adjust their actions and perspectives as needed.
- When questioned about the types of client assistance they could offer, 3 percent of salespeople couldn't help but disagree, while 27 percent totally agreed.

- Almost always, agents are skilled at meeting client needs.
- In 67 percent of cases, employees respond to client complaints as a boost.
- 60% of workers agree, 17% of representatives strongly agree, and 23% of representatives modify their minds in reaction to comments made by others.
- Employees are selected based on their ability to adapt in 41% of cases, representatives are selected based on accuracy in 36% of cases, employees are selected based on responsiveness in 14% of cases, employees are selected based on legitimacy in 5% of cases, and employees are selected based on all of the aforementioned factors in 41% of cases.
- The true source of the issue is unknown to 57% of the workforce.
- Each employee wants to go above and beyond to increase productivity.
- Thirty percent of legislators, sixty percent of workers, and ten percent of employees "rarely" criticise how things are done on their behalf.
- Only 43% of employees are frequently prepared to perceive their coworkers, as opposed to 57% of employees who are always ready to do so.
- 77% of employees have finished unique and distinctive tasks for the company.
- 3 percent of employees, 14% of workers, and 83% of representatives have never been successful in persuading someone else to agree with them.

SUGGESTIONS

- Each employee is ready to change their behaviour and perspective in reaction to the situation.
- Employees strongly agree with how they can serve a client in 27% of cases, agree with it in 70% of cases, and disagree with it in 3% of cases.
- The ability of employees to fulfil client demands is at 97%.
- 67 % of employees utilize promotion to understand consumer problems.
- Organizations should employ a range of tactics to enhance the critical thinking skills of their employees.
- Boost the representative's capacity for judgement.
- Official instruction must be provided to representatives.
- The business should support the representative's career advancement.
- by taking part in enjoyable activities, lowers tension in a social context.
- To develop the skills of its agents, the company should offer educational possibilities.
- Businesses should provide online learning programmes and efforts to boost staff knowledge.
- To promote employee skill development, it's critical to provide awards based on displays.
- If a business can, it should provide employees the chance to watch other people in action.

CONCLUSION

Without a question, competence mapping is a popular HR practise right now. By offering the best activity for the person, it enables effective utilisation of the most precious asset, human capital. Additionally, it ensures personal growth. It is feasible to find a career that best suits one's skills and qualities.

It makes obvious that competence mapping helps organisations extend smaller rounds and choose the right round pegs for round gaps. In other words, it makes sure that the best job is chosen for the candidate who is the most qualified while simultaneously supporting the less qualified candidate in honing their skills through testing and preparation.

Research on competence mapping is more critical than ever because employees are frequently a crucial and necessary component of any organisation. Due to the fact that the automobile sector is presently taking itself more seriously, we looked at Best Motors' competency mapping. In spite of the organization's need to establish policies and processes to improve performance and manage the hazardous situation they are now in, this study demonstrates that association executives take their work seriously.

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A STUDY ON TALENT ACQUISITION AT DOLPHIN –V LIFT TECHNOLOGIES –VISHAKAPATNAM

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ABSTRACT

Talent acquisition implies recognizing a person's inherent skill traits, personality and offering him a right task. Every person has a unique talent that suits him to a particular job profile and any other position will cause discomfort. It is the job of the Management, particularly the HR Department to place candidates in various positions in terms of their interest and qualifications Talent Management takes all efforts to boost up the morale of the work force to retain them and reduce the labour turnover. A platform is laid up for the potential career growth of the talented employees in every organization. It is imperative to study the importance of Talent Management Practices followed by the companies. It needs a critical and in-depth analysis. The effective practices of talent acquisition strive to develop and retain potential workforces and improve organizational performance. The present study has highlighted the Talent Management Practices prevailing in the Dolphin Elevators. Accordingly, the positive results gathered from the study will certainly be useful for the organization, as it will help the management to create effective strategies for developing and retaining talented employees. The study was carried out with data collection of 50 employees to find out the results, which helps employees, as management explores hidden qualities and lays focus on developing the talent of their employees.

KEYWORDS: Talent acquisition, labour turnover, organisational performance, Talent management

1. INTRODUCTION

Human Resource Management (HRM) is concerned with managing the people resources of an organization. In fact, managing human resources is the most crucial and challenging task that management has to perform, crucial because it is key to sustainability in the present competitive world and challenging because no two individual are same. Human resources management is the only resources that are living part of the organization. It is this living part which vibrates positive energy and leads to the planning, organizing, controlling, coordinating and directing of the rest of the resources within the organization. It is this sub system which will ultimately lead to the overall growth of the organization. Thus, human resource is a crucial sub system in the process of management.

According to M L Cuming, "Human resource management is concerned with obtaining the best possible staff for an organization and having got them looking after them, so that they want to stay and give their best to their jobs."

According to Leon C. Megginson, the term human resource can be thought of as, "the total knowledge, skill, creative abilities, talents and aptitudes of an organization's workforce as well as the values, attitudes and beliefs of the individual involved."

Objectives of Human Resource Management

1. Advising management on the HR policies required to ensure that the organization has a highly motivated and performing workforce, has people equipped to cope with change and meet its legal employment obligation.
2. Attracting, hiring, rewarding, maintaining and developing the human resource of an organization.
3. Handling crises and difficult human relations situations to ensure that they do not get in the way of the organization achieving its objectives.
4. Providing a communication link between the work force and organization's management.
5. Acting as a custodian of organizational standards and values in the management of human resources .

Talent acquisition is the process of finding and acquiring skilled human labour for organizational needs and to meet any labour requirement. When used in the context of the recruiting and HR profession, talent acquisition usually refers to the talent acquisition department or team within the Human Resources department. The talent acquisition team within a company is responsible for finding, acquiring, assessing, and hiring candidates to fill roles that are required to meet company goals and fill project requirements.

Talent acquisition as a unique function and department is a relatively new development. In many companies, recruiting itself is still an indistinct function of an HR generalist. Within many corporations, however, recruiting



as a designation did not encompass enough of the duties that fell to the corporate recruiter. A separate designation of talent acquisition was required to meet the advanced and unique functions. Modern talent acquisition is a strategic function of an organization, encompassing talent procurement, but also workforce planning functions such as organizational talent forecasting, talent pipelining, and strategic talent assessment and development.

Talent acquisition is quickly becoming a unique profession, perhaps even distinct from the practice of general recruitment. Talent acquisition professionals are usually skilled not only in sourcing tactics, candidate assessment, and compliance and hiring standards, but also in employment branding practices and corporate hiring initiatives. Talent acquisition as a function has become closely aligned with marketing and PR as well as Human Resources. As global organizations need to recruit globally with disparate needs and requirements, effective recruiting requires a well thought out corporate messaging around hiring and talent development. Talent acquisition professionals often craft the unique company message around the approach the company takes to hiring and the ongoing development of employees. The employment brand therefore encompasses not only the procurement of human capital, but the approach to corporate employee development. The unique needs of large companies especially to recruit and hire as well as attract top talent led to the development of a unique talent acquisition practice and career.

Recruiting professionals often move between agency recruiting and corporate recruitment positions. In most organizations, the recruitment roles are not dissimilar: the recruitment role is responsible for sourcing talent and bringing qualified candidates to the company. However, modern talent acquisition is becoming a unique skill-set. Because talent acquisition professionals many times also handle post-hire talent issues, such as employee retention and career progression, the talent acquisition role is quickly becoming a distinct craft. Some recruitment industry advisors even advocate for a talent department unique from the HR department, because talent acquisition and development is so intertwined with a company's ultimate success and effectiveness.

As a craft, talent acquisition is of course not new; it is the simple process of recruiting good talent to meet company needs. As a profession, however, talent acquisition is quickly evolving into a unique and important job function.

Defining Talent Acquisition

Recruiters, sources, HR professionals, hiring managers. Combined, these powerhouse functions make up Talent acquisition (TA) — the organizational task of, quite simply, finding the right person for the job. In a corporate setting, it's often placed under the human resources (HR) umbrella, and involves sourcing, attracting, interviewing, hiring, and on boarding employees.

Recruiters in Talent Acquisition

Since the bulk of a successful TA team relies on

recruiters, let's break down what it takes to be a rock star one. First, it helps to be a people person. You're comfortable cultivating and maintaining relationships, especially across jobs, industries, and personality types. People who tend to do well in this role are also good at thinking big-picture about the needs of their company, and how to fulfill them. And since you want to always be signing top talent, a background in sales can be tremendously helpful, as you're ultimately in the business of selling jobs to promising candidates—and promising candidates to top stakeholders.

But maybe most importantly, talent acquisition professionals need to think like hunters: always on the prowl for top talent and relentless in their pursuit.

Talent Acquisition vs. Recruiting: What's the Difference?

It's easy to confuse these two. In many ways, they share the same goals: placing people into open positions.

But, there are differences. Job recruiting addresses a company's short-term headcount needs. Talent acquisition, on the other hand, is an overall business and HR strategy that factors in an organization's long-term goals, and acknowledges that people (or talent) can play a huge role in a company's future successes. Unlike simply filling seats, talent acquisition is an ongoing process that tends to identify and vet appropriate candidates for executive-level positions, leadership roles, and jobs that require specialized training.

1.2 NEED OF THE STUDY

Talent acquisition implies recognizing a person's inherent skill traits, personality and offering him a right task. Every person has a unique talent that suits him to a particular job profile and any other position will cause discomfort. It is the job of the Management, particularly the HR Department to place candidates in various positions in terms of their interest and qualifications. Talent Management takes all efforts to boost up the morale of the work force to retain them and reduce the labour turnover. A platform is laid up for the potential career growth of the talented employees in every organization. It is imperative to study the importance of Talent Management Practices followed by the companies. It needs a critical and in-depth analysis.

1.3 SCOPE OF THE STUDY

The effective practices of talent acquisition strive to develop and retain potential workforces and improve organizational performance. The present study has highlighted the Talent Management Practices prevailing in the Dolphin Elevators. Accordingly, the positive results gathered from the study will certainly be useful for the organization, as it will help the management to create effective strategies for developing and retaining talented employees. It will also help employees, as management explores hidden qualities and lays focus on developing the talent of their employees.

1.4 OBJECTIVES OF THE STUDY

1. To understand the Talent acquisition procedure or process at Dolphin elevators
2. To understand how the organisation (Dolphin Elevators) identifies the talent of employees



3. To know the more acceptable sources of recruitment for Dolphin Elevators
4. To analyse the recruiters expectations from the interviewees in Dolphin Elevators
5. To suggest possible improvements of Talent acquisition process in Dolphin Elevators

1.5 RESEARCH METHODOLOGY

A. Tools used

- i. Tools used for data collection is both Primary Data and Secondary Data.
 - a. Primary Data includes the data collected through questionnaire.
 - a. Secondary Data includes the data collected through libraries, books, news papers, magazines and Internet.
- ii. Tools used for Data Analysis is Percentage analysis

B. Data collection methods

Collection of data was done through questionnaire method; employees were requested to fill the questionnaire to meet the following objectives of the research.

1. To understand the Talent acquisition procedure or process

1.7 DATA ANALYSIS AND INTERPRETATION

1. Do you consider the reference check as an internal part of recruitment?

Parameter	Response	% of response
a) Yes	4	80
b) No	1	20
c) Can't say	0	0
Total	50	100

2. To understand how the organisation identify the talent of employees

3. To know the more acceptable sources of recruitment

4. To analyse the recruiters expectations from the interviewees

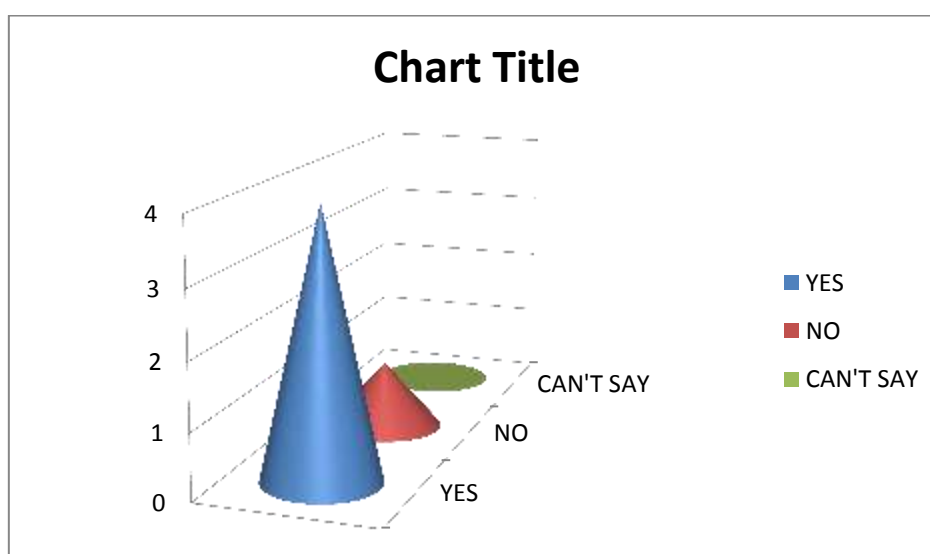
The information collected about Dolphin Elevators consists of both primary and secondary data. We have collected information by the interviews of employees through questionnaire survey and the information is also gathered from libraries, books, news papers, magazines and Internet.

C. Sample description

Sample consist of a about 50 employees of a Dolphin Elevators of various department Data analysis procedure Data analysis is done using the Percentage analysis.

1.6 LIMITATIONS OF THESTUDY

- Due to constraints of time and many other resources this study is confines to the employees of Dolphin Elevators..
- The opinions, behavior and attitudes of the respondents reflected in this study are restricted to the duration of the research and are subject to change with the passage of time.
- The sample size is 50. The study was confined to it.



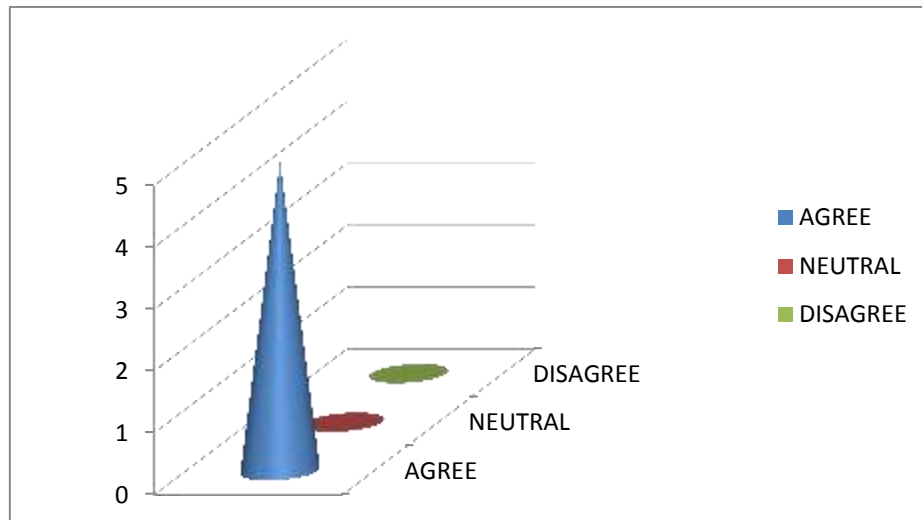
Interpretation

From the above graph, we can clearly say that 80% of HR employee respondents (4 HR employees) agreed that they consider reference check as an integral part of recruitment. 20% of HR employee respondents (1 HR employee) did not

agree that they consider reference check as an integral part of recruitment. From the above analysis we can say that reference check is an integral part of recruitment in Dolphin Elevators.

2. During the time of recruitment, do you think external source more acceptable than internal source?

Parameter	Response	% of response
a) Agree	50	100
b) Disagree	0	0
c) Neutral	0	0
Total	50	100



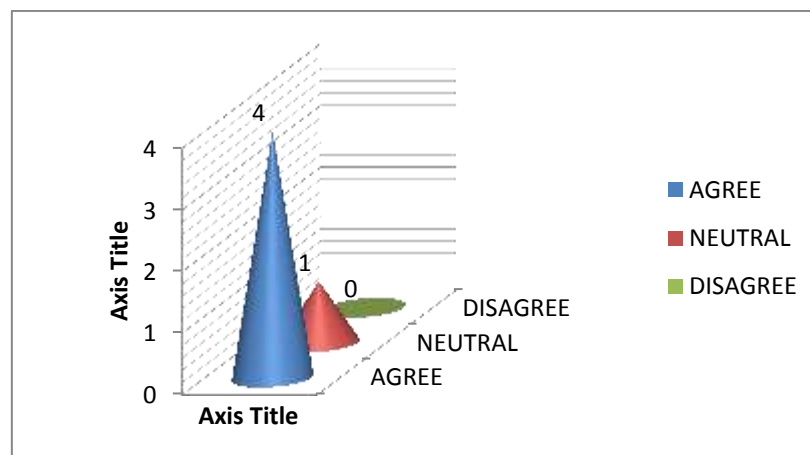
Interpretation

From the above graph, we can clearly say that 100% of HR employee respondents (5 HR employees) agreed that external source is more acceptable than internal source during the time

of recruitment. From the above analysis we can say that external source is more acceptable than internal source during the time of recruitment at Dolphin Elevators.

3. Do you consistently appoint high caliber employees?

Parameter	Response	% of response
a) Agree	4	80
b) Disagree	1	20
c) Neutral	0	0
Total	50	100





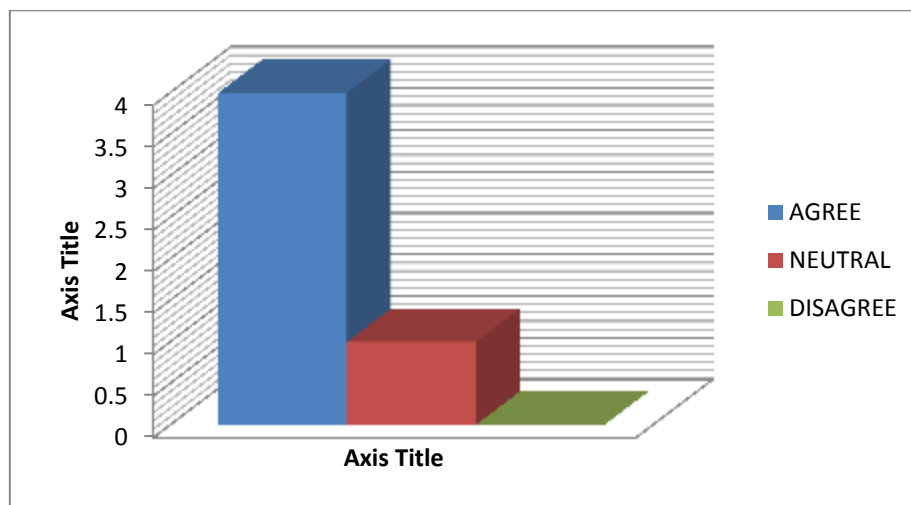
Interpretation

From the above graph, we can clearly say that 80% of HR employee respondents (4 HR employees) agreed that they consistently appoint high caliber employees. 20% of HR

employee respondents (1 HR employees) did not agree that they consistently appoint high caliber employees. From the above analysis we can say that they consistently appoint high caliber employees at Dolphin Elevators.

4. Do you ensure that salaries being set are according to the market scenario?

Parameter	Response	% of response
a) Agree	4	80
b) Disagree	1	20
c) Neutral	0	0
Total	50	100



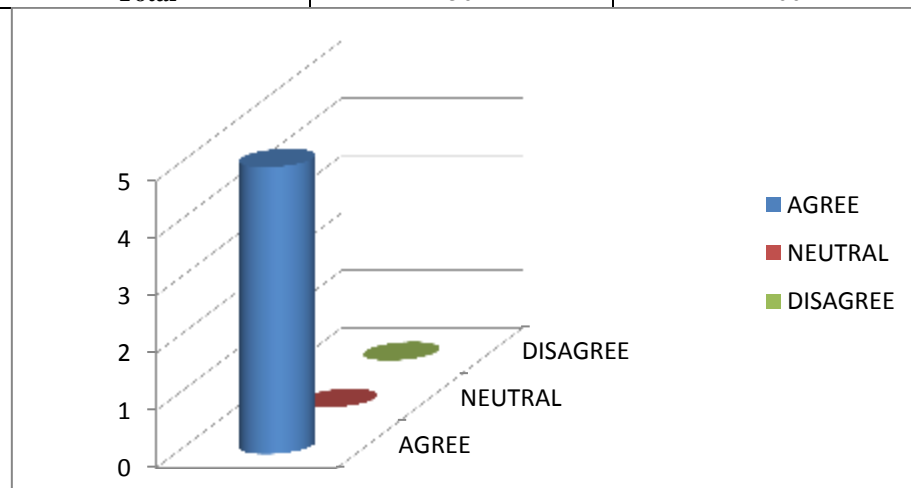
Interpretation

From the above graph, we can clearly say that 80% of HR employee respondents (4 HR employees) ensured that salaries are set according to market scenario. 20% of HR employee

respondents (1 HR employees) did not ensure that salaries are set according to market scenario. From the above analysis we can say that salaries are set according to market scenario.

5. Do you ensure that vacancies do not remain open for long period of time?

Parameter	Response	% of response
a) Agree	5	100
b) Disagree	0	0
c) Neutral	0	0
Total	50	100





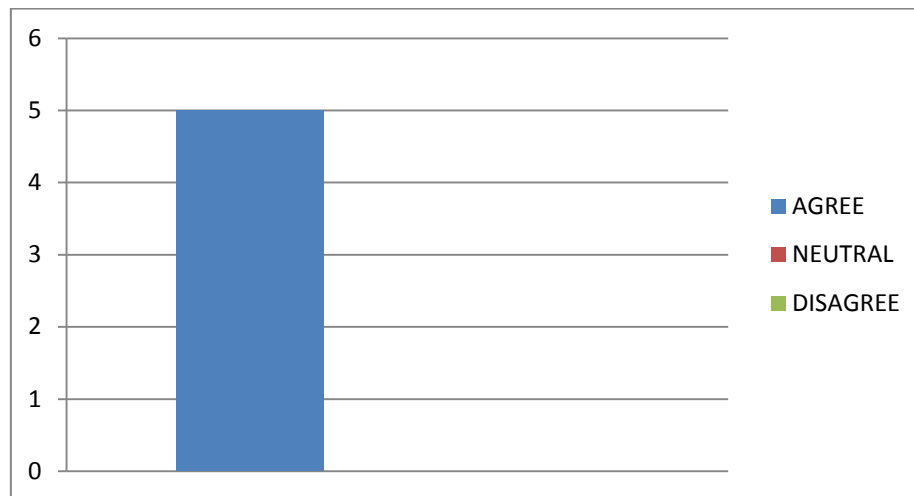
Interpretation

From the above graph, we can clearly say that 100% of HR employee respondents (5 HR employees) agreed that

vacancies don't remain open for long period of time. From the above analysis we can say that vacancies don't remain open for a long period of time at Dolphin Elevators.

6. Do you possess a good overall knowledge of HR recruitment process and policies?

Parameter	Response	% of response
a) Agree	5	100
b) Disagree	0	0
c) Neutral	0	0
Total	50	100



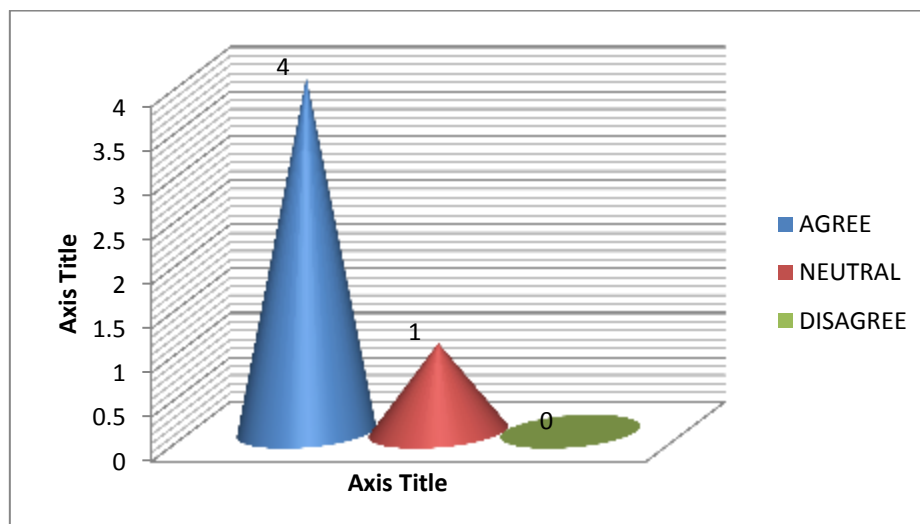
Interpretation

From the above graph, we can clearly say that 100% of HR employee respondents (5 HR employees) agreed that they possess good overall knowledge about recruitment process

and policies. From the above graph we can say that all HR employees possess good overall knowledge about recruitment process and policies at Dolphin Elevators.

7. Is a person's character is more important compared to their job skills, when it comes to being a good employee in your company?

Parameter	Response	% of response
a) Agree	4	80
b) Disagree	1	20
c) Neutral	0	0
Total	50	100





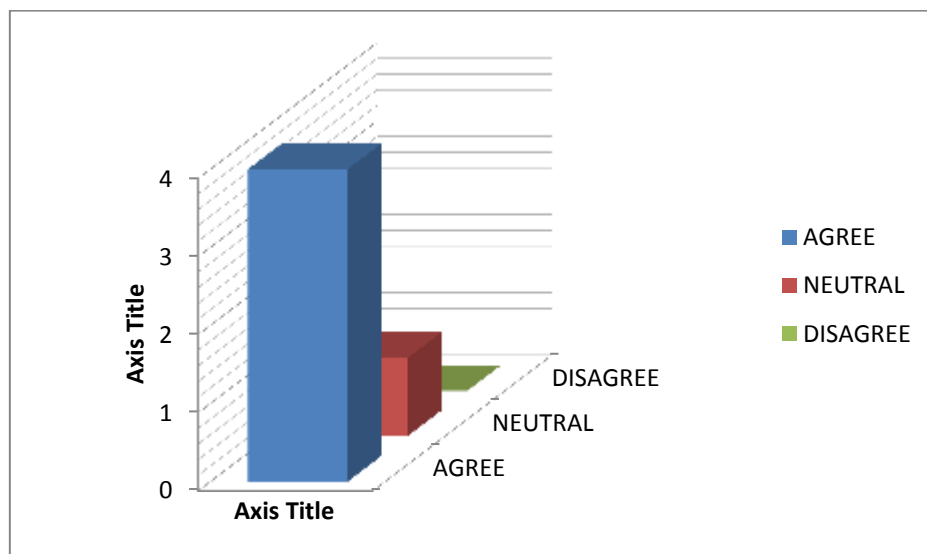
Interpretation

From the above graph, we can clearly say that 80% of HR employee respondents (4 HR employees) agreed that a person's character is more important compared to their job skills, when it comes to being a good employee in their company. 20% of HR employee respondents (1 HR

employees) did not agree that a person's character is more important compared to their job skills, when it comes to being a good employee in their company. From the above graph we can say that a person's character is more important compared to their job skills, when it comes to being a good employee at Dolphin Elevators.

8. Do you believe that transfer, demotion, suspension and dismissal are based on performance appraisals?

Parameter	Response	% of response
a) Agree	4	80
b) Disagree	1	20
c) Neutral	0	0
Total	50	100



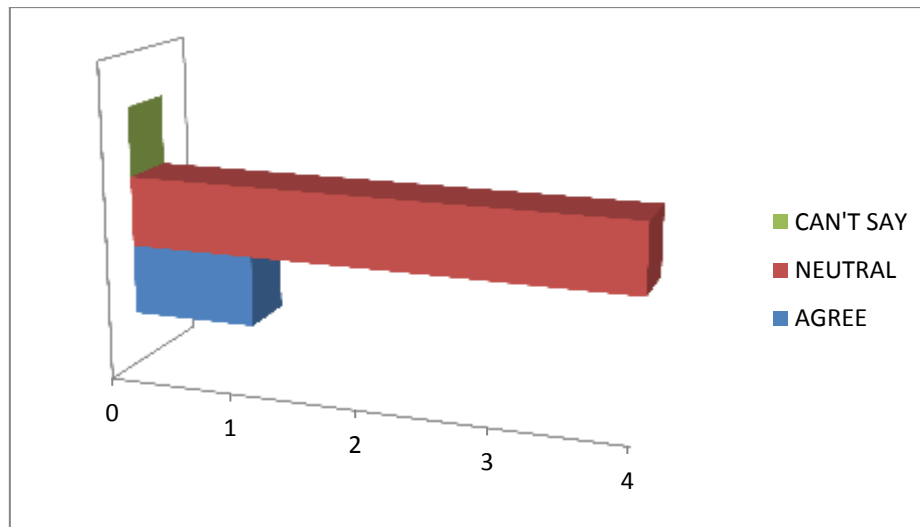
Interpretation

From the above graph, we can clearly say that 80% of HR employee respondents (4 HR employees) agreed that transfer, demotion, suspension and dismissal are based on performance appraisals. 20% of HR employee respondents (1 HR

employees) did not agree that transfer, demotion, suspension and dismissal are based on performance appraisals. From the above graph we can say that transfer, demotion, suspension and dismissal are based on performance appraisals at Dolphin Elevators.

9. Does salary factor attract most of the potential employees than career growth and development?

Parameter	Response	% of response
a) Agree		
b) Disagree		
c) Neutral		
Total	50	100



Interpretation

From the above graph, we can clearly say that 80% of HR employee respondents (4 HR employees) neither agreed nor disagreed that salary factor attracts most of the potential employees than career growth and development. 20% of HR employee respondents (1 HR employees) agree that salary factor attracts most of the potential employees than career growth and development. From the above graph we can say that salary factor attracts most of the potential employees than career growth and developments.

1.8 FINDINGS SUGGESTIONS & CONCLUSIONS

Objective based findings

Objective 1 : To understand the talent acquisition process at dolphin elevators.

The organization practicing well defined talent acquisition process by the following essentials.

- Lead generation
- Recruiting and attracting top candidates
- Interview and assessment
- Evaluating references
- Selecting the best candidates
- Hiring and on boarding

The above process is excellently implemented in acquiring the best talent from the world.

Objective 2: To understand how the organization (Dolphin Elevators) identifies the talent of employees.

The organization is following well defined practices in acquiring a new talent in four ways.

- Organization is aligning acquisition strategy with business goals to meet the objectives for upcoming 5 years.
- Using data and marketing to create better acquisition of people to join organization i.e., to ensure that the candidates meet the job requirements.
- Organization is expanding sourcing strategies by spending a lot of time on social media to acquire a pool of potential candidates.

- Organisation is focusing on better employer branding to create a best pool of talent.

Objective 3: To analyse how organisation embraces the employees who attended for the interview.

- The interviewees are so much satisfied that 82% interviewees agreed that the interview was properly conducted and co- ordinate.
- 30% of the respondents felt that arrangements, courtesy of security and front office were excellent and none of them reported very poor.
- It was found that 66% respondents waited for 1-3 hours for interview process.
- It was observed that 80 % of the respondents felt the questions which were asked in the interview are relevant enough.
- It was found that 44% & 42% of respondents felt highly satisfied and satisfied with the overall interview process.

Objective 4: To know the more acceptable source of recruitment for dolphin elevators.

- It was found that the best recruitment sources for the organization are job portals followed by advertisements, consultancies then referrals and websites.

Objective 5: To analyse the recruiters' policies and procedures.

- It was found that transfer, demotion, suspensions are purely based on performance of the employees
- It was found that employee's character is more important when compared to skills.

Suggestions

1. Organisation should concentrate and must give priority in selection of women employees because there is a clear gender parity
2. Organisation should maintain retention policies so that experience employees not leave the organisation



because very few percentage of employees with 5 plus years of experience in the organisation

3. Organisation should focus more on social media than the traditional talent acquisition process which saves money and time
4. Organisation should focus on to improve better prospects to employees
5. Organisation can still improve in proper co-ordination and conduct of interview
6. .Organisation should focus in decreasing waiting time for the interview
7. .H.R personnel should also make a choice to get more talent employee applicants through consultancies, referrals and companys website
8. .H.R personnel must focus on 360 degree performance appraisal for transfers, promotions and demotions.

Conclusion

It is known to all that reality is very different from what we have learnt from our theory books. A person can only understand and get the idea of the world when he/she actually tries to get involved in the processes. Here in the internship, the situation is same. After getting involved with the processes and people of the organization, I could visualize many things which were not possible only reading books. In the report both the general recruitment guideline along with the structured recruitment process at Dolphin elevators has been elaborated. While preparing the report, I personally could understand where the differences and similarities lie.

Recruiting and hiring the right people is by far the most important part of any organization's business plan. People are the largest investment any company will make into its future. Talent acquisition is not only about filling open positions; it's about taking a long-term strategic view for filling future positions as well. It's about collecting relevant data and keeping in touch with candidates until the right positions open up. It's more about building relationship with top talent in the industry than it is about simply recruiting for current job opportunities. On a concluding note it can be mentioned that the talent acquisition process at Dolphin elevators' is quite effective and efficient. Almost all the needed steps of the process are done in a systematic manner maintaining some structured methods. The Talent Acquisition team is continuously working on the process to improve it as much as they can. The Organization has a target to make their recruitment process the best among all the existing organizations in that industry.

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IMPACT OF ADVERTISEMENT ON SALES AND SERVICES OF AIRTEL TELEMARTETING IN HYDERABAD

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ABSTRACT:- The study emphasised the significance of this position for customer happiness and loyalty. Customers are essential to the operation of a successful business. Since a company should place a high priority on its consumers, customer loyalty and satisfaction should be addressed in addition to long-term objectives. This thesis looked at the relationship between customer relationships and customer happiness. This study's goal is to look at the ideas of customer pleasure and loyalty, as well as the connections between them. The factors that affect consumer loyalty and satisfaction are also examined in this thesis. The thesis study examines trivets and customer satisfaction.

KEY WORDS: Customer Satisfaction, Marketing, Relationship, Service Quality, Value Creation.

INTRODUCTION

ACTIVITIES FOR PROMOTING SALES

It is true that businesses produce products in order to satisfy consumer needs. This, however, falls short. No of the type of product, businesses have obligations that go beyond simple physical production. The customer is the focus of modern marketing, thus it is the producers' obligation to understand where, when, how, and at what price their products will be advertised. The secret to effective marketing is to provide the ideal product at the ideal price, at the ideal location (and at the right time), with the ideal promotion.

Over time, a variety of pastimes gained popularity, all of which made it simpler to simply sell items. The advertising mix makes reference to these activities. The "promotion mix," sometimes referred to as the marketing communication mix, is built up of following

1. Advertising.
2. Promotion of Sales
3. Publicity
4. Individual Selling

PROCESS OF MARKETING COMMUNICATION

The general goal of marketing communication is to inform the target market about a promotion or item. As a result, there are three steps to this process.

IMPORTANCE OF ADVERTISING:

Advertising's main goal, whether it's for a hotel, a service, or a product, is to convince customers to make a purchase. The main goal of advertising is to facilitate business-to-consumer communication. In other words, "raising awareness" is the ultimate objective of all advertising. Below is a list of several advertising objectives.

- Adopting quick action airtel will start discounting and raise initial demand.
- To inform clients when a product is available
- Salespeople will benefit from a bigger market share since it will help retailers promote the product.
- To enhance the amount of times a product is utilised.
- To enhance brand awareness among customers

NEED FOR THE STUDY

Customers' needs must come first for every manufacturing business that wishes to successfully promote its goods. Airtel continuously evaluates customer satisfaction ratings to pinpoint areas that might have improvement. As a result, we have chosen to carry out this particular research project. A manufacturing business won't be able to compete if no items are sold. Sales therefore have a significant impact on a manufacturing company's ability to turn a profit. The best approach to maximise wealth, if it is feasible, is through sales.

The role of advertising in marketing is one of the most important. Advertising is only used by one firm to advertise its products. The distribution channels are filled with retailers. They serve as a conduit between the manufacturer and the customers since they are close to them.

SCOPE OF THE STUDY

The study's objective is to gauge the level of satisfaction among Bharti Airtel Limited's dealers. Distributing a questionnaire to traders in the Rangareddy region allowed for the collection of the main data needed to determine the study's geographic scope. The main objective of the study was to assess Bharti Airtel Limited's "EFFICIENCY of SALES and Advertising" in the Rangareddy district during a certain time period.

OBJECTIVES OF THE STUDY

- In order to find out what customers think about airtel's pricing policies (sales).
- To gauge how devoted airtel's customers are.
- To comprehend the pressures that airtel experienced (service of airtel).
- To determine the market share of airtel.
- To determine the source of the clients' awareness.
- To measure the network's consumers' happiness with airtel.
- To ascertain the degree of consumer satisfaction with airtel's services.
- To assess the level of customer satisfaction across rival recharge and top-up card providers.

RESEARCH METHODOLOGY

One of the most important tools for doing marketing research is the availability of topical and important data. Marketing research procedures are a type of data gathering technique, despite the fact that data collection is more of an art than a science. There are two categories of information sources.

Internal sources: Every firm is required to maintain records, including accounts, records, and reports. Examples of the data that firms routinely collect while conducting business are included in these publications.

External sources: Organizations will need to rely on external sources if internal records are insufficient and important information is missing. The external data sources include:

APRIORITY DATA

Information that was acquired expressly for a project or a research report is referred to as "primary data."

Using a closed-end questionnaire, data is systematically collected. The questionnaire, which asks questions on many research components, is divided into two parts for the optimum data collecting. These two components will only utilise the response.

Secondary data:

Secondary data is knowledge that has already been acquired for another purpose and is in the public domain. You may read the company's periodicals, catalogues, and website to find out more information. The company's business profile also provides further details and detailed descriptions of all of its products.

METHOD OF RESEARCH**SURVEY METHOD**

An extensive task like surveying calls for a specific level of technological expertise. **STUDY METHODS** The vast majority of survey methods have been created by people. When conducting surveys, the raw data should preferably not be taken into account. By interviewing the respondents, the researcher gathers data from them.

SAMPLING

The entire galaxy need not be used to gather data. It may be sufficient to use a small representative sample. A sample is a modestly sized group of individuals who ought to be highly "representative" and diversified across the board. This process of selection is known as sampling.

SAMPLE SIZE

Samples are tools that let you monitor a small number of individuals to learn more about larger populations. The sample consists of 100 individuals.

SAMPLING PLAN

1. **SAMPLING UNIT** - The business owners and professionals are still around.

2. The stratified random sampling method is used in the sampling procedure.

Prior to classification and interpretation, the data collected from both primary and secondary sources is summed and displayed in a systematic fashion.

METHOD OF SAMPLING

A random sampling strategy has been applied in this case. Any item in the cosmos has an identical chance of being chosen in a random sampling.

INSTRUMENT FOR RESEARCH**QUESTIONNAIRE**

A questionnaire is a purposefully created, coherent collection of questions. It provides both the framework and the direction for the data collection. Given how frequently they are used to gather market data, questionnaires must be created with the highest expertise and attention.

QUESTION FORMS**OPEN FORM OF QUESTIONS**

They speak in an explanatory manner. **A TON OF QUESTIONS.** Participants are free to respond on their own. These questions elicit the respondent's real thoughts about a certain product.

CLOSED FORM OF QUESTIONS

THE QUESTIONS HAVE BEEN CLOSED AND ANSWERED. They nearly seldom provide descriptions. They will be presented with a range of options from which to choose, and they must decide. They could limit respondents' options, but they also make analysis simpler.

CLOSED, ENDED Question Types:

- Dichotomies are questions with just two options.
- An inquiry with three options is referred to as a **MULTIPLE CHOICE** inquiry.
- The ratings for various qualities range from "poor" to "outstanding."

LIMITATIONS

1. . The primary restriction on the research was a 45-day time frame.
2. This study's conclusions couldn't be entirely accurate and compelling because it relied on random sampling techniques.
3. The research focused only on 100 Airtel customers, as opposed to the millions of consumers that interact with a variety of products from different manufacturers all around the world.
4. The study only asks closed-ended questions, which are designed to make it easy for crucial information to be missed or even constrained by poor communication.
5. Only Airtel customers were analysed for the experiment.
6. Communication issues or variations in how the organization's staff members articulated the circumstance during research with some of the dealers might result in the true information being overlooked.
7. Because the dealers who responded to the survey only had a basic education, their opinions lacked the crucial information.

REVIEW OF LITERATURE

Advertising is a form of communication intended to persuade an audience (viewers, readers or listeners) to purchase or take some action upon products, ideas, or services. It includes the name of a product or service and how that product or service could benefit the consumer, to persuade a target market to purchase or to consume that particular brand. These messages are usually paid for by sponsors and viewed via various media. Advertising can also serve to communicate an idea to a large number of people in an attempt to convince them to take a certain action.

Commercial advertisers often seek to generate increased consumption of their products or services through branding, which involves the repetition of an image or product name in an effort to associate related qualities with the brand in the minds of consumers. Non-commercial advertisers who spend money to advertise items other than a consumer product or service include political parties, interest groups, religious organizations and governmental agencies. Nonprofit organizations may rely on free modes of persuasion, such as a public service announcement.

Modern advertising developed with the rise of mass production in the late 19th and early 20th centuries. Mass media can be defined as any media meant to reach a mass amount of people. Different types of media can be used to deliver these messages, including traditional media such as newspapers, magazines, television, radio, outdoor or direct mail; or new media such as websites and text messages.

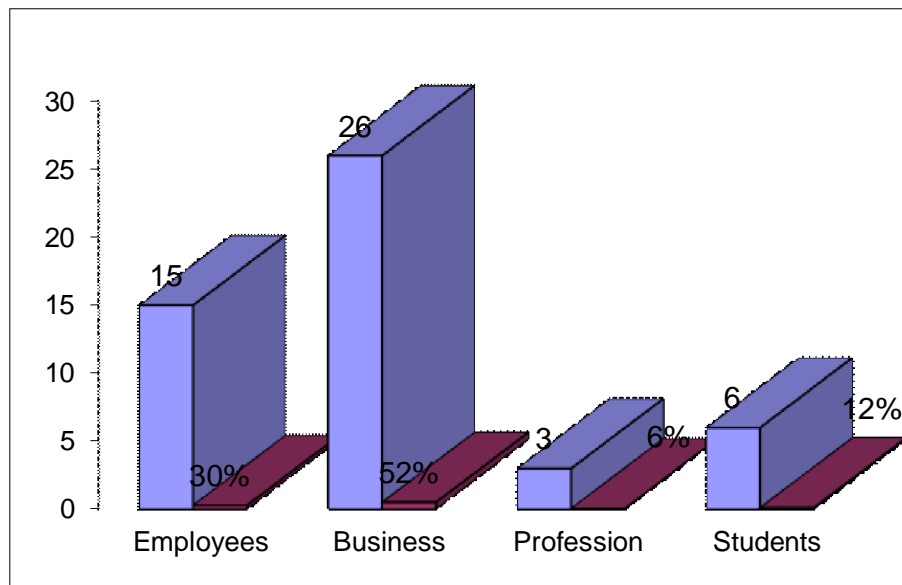
In 2010, spending on advertising was estimated at more than \$300 billion in the United States and \$500 billion worldwide.

Internationally, the largest ("big four") advertising conglomerates are Interpublic, Omnicom, Publicis, and WPP.

DATA ANALYSIS AND INTERPRETATION

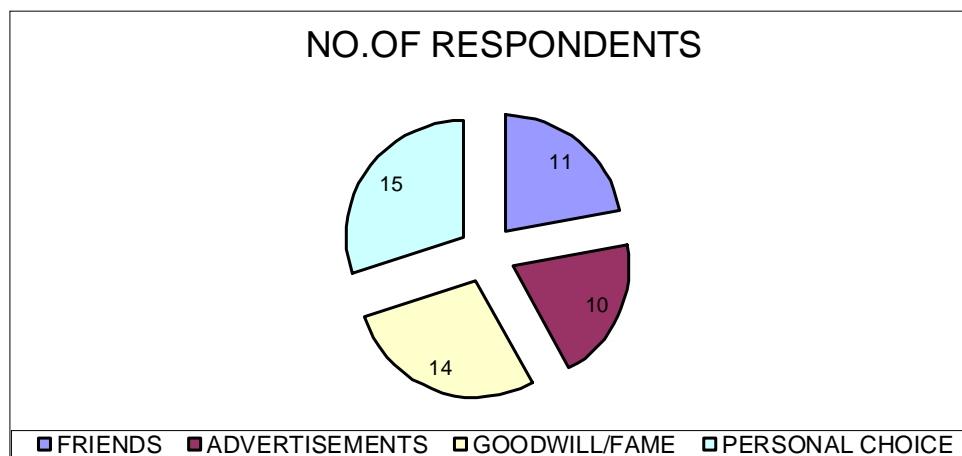
FACTORS	NUMBER OF RESPONDENTS	PERCENTAGE
EMPLOYEES	15	30%
BUSINESS PERSONNEL	26	52%
PROFESSION	3	6%
STUDENTS	6	12%
TOTAL	50	100%

According to my survey, it can be seen from the above table that indicates Employees 15 (30%), Business Personnel 26 (52%), Profession 3 (6%) and Students 6 (12%), are preferring to purchase AIRTEL.



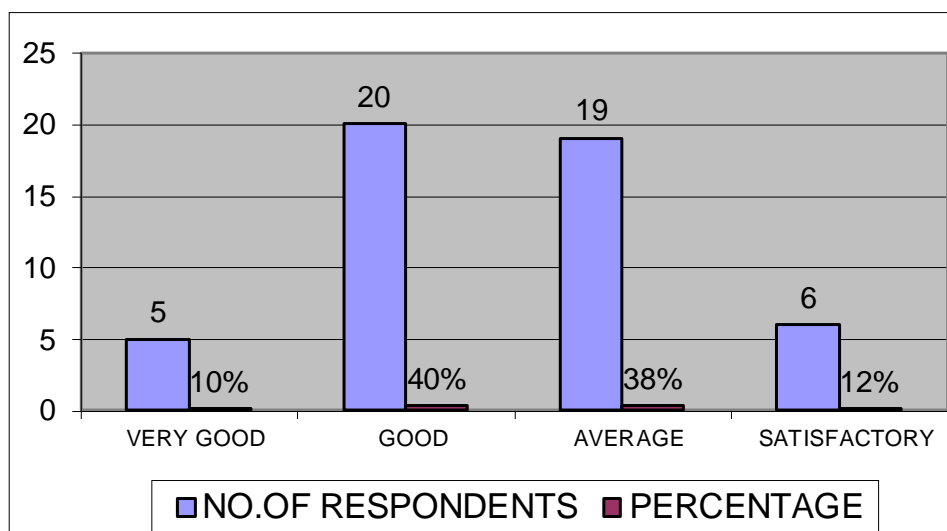
INFLUENCING FACTORS TO PURCHASE OF AIRTEL

As per my survey, the above table reflects that Friends 11 (22%), Advertisements 10 (20%), Goodwill/Fame 14 (28%), Personal Choice 15 (30%) are the factors influencing to purchase of AIRTEL.



PIE EXPLOSION GRAPH REPRESENTING THE LEVEL OF SATISFACTION OF CONSUMERS IN VIEW OF PRICE

ATTRIBUTES	NUMBER OF RESPONDENTS	PERCENTAGE
VERY GOOD	5	10%
GOOD	20	40%
AVERAGE	19	38%
SATISFACTORY	6	12%
TOTAL	50	100%



FINDINGS

- AIRTEL needs to train the staff employees that work directly with customers in order to improve product expertise.
- Understanding the advertisement is challenging.
- AIRTEL's primary objective is not to advertise to clients and businesses.
- AIRTEL does not provide gifts to customers.
- The company doesn't concentrate on any fresh advertising channels.
- Since the packaging is neither visually beautiful nor efficient at communicating, colour and packaging design must complement one another to enable package communication.
- The network does not extend to the edges.
- Prepaid cards have a very constrained amount of speaking time.
- The business doesn't hold road shows to promote its goods and services.

SUGGESTIONS

- Airtel contends that in order to increase sales, incentives must be more alluring and new SIM cards must be designed. Airtel may provide top-up cards with a starting price of 10 rupees.
- If Airtel offered cards for new groups like employees, women, and girls, sales would soar.
- The corporation does not place a high premium on using alternate media for advertising. A box's layout and colour scheme need to work well together to convey. The text on the box needs to be legible and aesthetically attractive.
- In rural areas, Network coverage should be present.
- Prepaid cards should offer more conversation time.
- In order to gain market share, lower your tariff costs.
- The company should host road shows to increase awareness of its products and services.
- Customers and retailers alike must be well-informed, and the marketing staff must be strengthened.

CONCLUSION

I've come to the conclusion from this study that any service's marketing may be successfully executed by raising awareness through word-of-mouth recommendations and by keeping the service in line with advertising and sales promotion activities.

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A STUDY ON EMPLOYEE WELFARE MEASURES AT HERO MOTOCORP (with reference to selected dealer outlets in hyderabad)

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ABSTRACT:- Unquestionably, an industry is not a place where employers and employees compete with one another to get the greatest bargain. The main problem with employee welfare is that it may be far more beneficial for management and staff to work together as partners in the company and to be aware of one another's challenges. It is sincerely believed that the welfare idea would help the business community handle social challenges and improve human wellbeing. It will support it in maintaining friendly working relationships and a more durable industrial harmony. Retention, motivation, and a decrease in social evils are among the beneficial consequences of employee health that are most prevalent. In the contemporary world, HR is the most important department. The health and safety of the employees inside the firm used to be the responsibility of the HR managers, but as competition has increased, the staff at HERO MOTO has taken on the duty of providing ideas and business development for a range of enterprises in order to assist them flourish. Success in the human resources industry, which mostly depends on the wellbeing of the organization's employees, requires having easy access to information. The relevance of welfare policies has increased inside a company and they now serve as a social responsibility for the company. Because of the intense rivalry brought on by liberalisation and free trade, a company's basic survival is put in peril.

Key words: Human welfare; industrial peace; liberization; free trade.

INTRODUCTION

Government assistance to the employee and his family is a possible purchase and also a means of obtaining appreciation and consistency from representatives. Help from labor authorities is an extended term with administrative agencies, blessings and special offices provided by the business enterprise. The main motivation behind helping labor agencies is to improve the lifestyle of the representatives and keep them happy and cheerful. Government-supported workplaces allow employees to lead a more enjoyable and luxurious life. It increases the accommodation expectations of participating workers by easing the burden on their pockets. Government aid involves being admirably better, more progressive, or attuned. It is a complete period and alludes to a person's deep physical, mental, moral and

deep prosperity. Furthermore, the term government assistance is a relative, relative term in terms of lifestyle. Therefore, it varies over time, from region to region and from US to US. The help of agencies is a great attitude in each branch because some additional motivation allows professionals to pursue a respectable way of life. There are a number of workplaces that are tied to government representative support, particularly focal agencies, corporate employee businesses, and other welfare organizations. Government aid agencies can also be classified into two categories:- Internal Appearance

In order to get the first class of workers in the creative problem, the working conditions need to be strengthened to a large extent. The workplace must provide amenities that are appropriate to the essential needs of workers.

NEED FOR THE STUDY

- ✧ The reason for the review is to understand the help of Hero Motocorp government representatives in some branches of Hyderabad.
- ✧ Human resource management facilitates understanding between representatives and management, thus providing better benefits to the government assistance to employees.
- ✧ The management of human resources facilitates the achievement of masculinity or femininity and hierarchical goals.
- ✧ This approach has attracted the attention of today's professional executives or the like.
- ✧ Through familiarity with measurement support agencies, this project was able to make relationship and harmony today.

OBJECTIVES OF THE STUDY

- ✧ Focus on the idea of support from agencies/artists and recognize unique estimates of support from prison and non-judicial authorities within organisations.
- ✧ Focus on Government Aid Offices issued to Representatives through HERO MOTOCORP.
- ✧ Focus on how unions empower workers by identifying and responding to their unsatisfactory needs.
- ✧ Offer attractive proposals and measures to move forward.

SCOPE OF THE STUDY

- ◆ The review includes a dissection of government-supported consulting assignments in HERO MOTOCORP Pvt. Ltd. The scope of the overview is limited to the statistics collected from the original company.
- ◆ Evaluation is done by obtaining a complaint form from Human Resources and representatives of HERO MOTOCORP
- ◆ Consulting Agency Aid Study conducted in Dilsukhnagar, Madhapur, and Erragadda at HERO MOTOCORP Hyderabad's workplace
- ◆ Optional research and exploration carried out will provide information about the sports authorities within the company as well as to the workers
- ◆ This quiz is intended to provide valuable insights to HERO MOTOCORP management on employee empowerment to help win the company.

RESEARCH METHODOLOGY

To stop the test, important and ancillary data have been accumulated. Observational and evaluative research approaches were applied to obtain the essential data. Significant facts have also been accumulated from relevant records and various attribution sources. The accumulated information is later characterized, classified, studied, and deciphered. Information collection:

There are many types of statistics first.

1. Main profile
2. Secondary information
- Essential stats

Essential facts are generated by statistics and provide the most up-to-date data and provide much greater accuracy and reliability. • There are special access points to get important logs, such as message previews, character reunions,

Field assessment, chart exploration and sensing methods, etc. • The big picture involves the highest level of critical information, accumulated through male or female customer-facing structures. Strategies that can be applied to a wide range of key statistics are:

Ancillary statistics

The supplementary facts are the records that have been delivered. It is now convenient for its use and recovery time. Supporting data sources in the letter are distributed market reviews, government distributions published research papers, and domestic sources, for example, offers, record orders, feedback customer statements and other company reports, etc. The overview is also less based on optional statistics. degrees, accumulated through incoming supply. Techniques that can be used to collect elective records are:

Distributed assets: There are many public institutions and global corporations, which collect and distribute measurable records related to business, changes, paintings, fees, usage, referrals, etc. The distributions of these specific associations are valuable sources of information about choice. Unpublished assets: Information recorded by proprietary companies or trading companies that prefer not to provide their statistics to an outside company is known as an undisclosed source. Mandatory not yet announced.

TECHNIQUES OF ANALYSIS

Ancillary sources are taken into account:

- ✓ Location
- ✓ Diary
- ✓ Annual report
- ✓ Design check:

An instance configuration is a limited association to get an instance from a given set. Simple anomaly test used for this review

Test scale:

The number of test devices selected from the set is called the instance size. For this preview, an example of 50 respondents was evaluated by Hero Motocorp customers at select stores. Search Results:

A lot of time was spent collating the review's findings. Findings must be expressed. These findings were also reviewed with Hero Motocorp's monitoring team at selected stores for a side view.

PERIOD OF THE STUDY

Each study has its very own limits concerning method and on hand property for its direct. For the formerly noted observe, the period of 45 DAYS have been handling it from the date 15-April- 2022 to 30-May-2022.

LIMITATIONS

- The exam changed into confined to simply HERO MOTOCORP vicinity of Hyderabad locale.
- The respondents might not have communicated regions of strength for them sentiments about the strategies, which brings approximately the mistake of focal propensity

- A part of the representatives had been hesitant to present the unique facts anticipated to the mission
- Scarcely any respondents were hesitant while addressing the inquiries □ The time was additionally one of the preventions within the examination
- A large records changed into now not there because of privateness engaged with it.
- Precision of the overview is restrained due to the workable inclination of the respondents

REVIEW OF LITERATURE

- A Saravanakumar and DR.S.

In their 2020 publication,

It is crucial to do research on the health, safety, and welfare of employees in private sector. The company has sufficiently ensured health and safety, according to Coimbatore City. But some other points have been identified that some employees are satisfied and some are not satisfied with the present welfare measures.

The term "welfare" refers to a person's state of mind, body, and emotions.

In order to improve welfare in the future, management will need to consider the demands of the workforce.

- P.V.Satyanarayana (1997)

According to the Satyanarayana, the employee welfare and their Impact on QWL provided by the Sugar companies declared that improved quality of work-life in the organization among the employees increases their involvement in the job and results in increased productivity of the organization. To Maintain a smooth relationship between workers and management employee welfare is important.

- Harikrishnan (2014)

An employee who is wellfed, well clothed, and content is a valuable asset to the company, according to Harikrishna's research

Employee Welfare with the Special Reference to Rubber Board of India. He doesn't lose manhours due to absences, strikes, etc., and he has a strong sense of loyalty to the company where he works. Other resources become significant when employees are happy. This study's findings support the notion that Rubber Board is keen to offer social services to the people who work on its plantations. Group Insurance Cum Deposit Scheme, Medical Attendance Scheme, Sanitary Subsidy Scheme, and Housing and Sanitary Subsidy Scheme must all be offered by every organisation.

- David, A Decenzo (2001) and Stephen P.Robbins

Concurring to them, the legitimately required benefits and administrations incorporate social security premiums, unemployment recompense, workers' remuneration, and state inability programs. They felt that the fetched of the deliberate benefits advertised shows up to be expanding.

- Michael (2001) in his book, "Human Asset Administration and Human Relations" said that the arrangement of intra-mural and extra-mural welfare offices offer assistance in progressing the quality of worklife of employee's subsequently great human relations will create among diverse cadres of workers.

DATA ANALYSIS AND INTERPRETATIONS

To analyze employee welfare measures at Hero MotoCorp percentage analysis has been done, according to the respondent's responses following is the table of summarization responses

Table representing the statement and responses of employees

Sl.no	Statement	Response
1	Respondent's Age	44% of the employees are age group between 29 to 32.
2	Work experience	40 % of the employees are 5 years of experience
3	What is your first objective in the company?	60 % of employees are from 0 to 1 year experience
4	Mainly the company is focusing on which welfare activity?	60 % of the employee's income 10,000 to 20,000
5	Are you satisfied with the welfare activities conducted by company?	40 % of high productivity in output
6	Does the welfare activity will affect the productivity of organization?	56% of employees, company is providing good allowance
7	What is your opinion regarding working conditions in the organization?	70% of employees are satisfied with their work
8	What according to you can be done to increase productivity?	84% of employees are affective with the organization
9	What is your opinion regarding the leave structure in the organization?	44% of the employees responding excellent
10	How frequently you take rest in between working hours?	44% of employee opinion is organization is providing good working environment
11	Do you move out of work place due to suffocation or other disturbance?	44% of the employees respond excellent leave structure
12	What do you opinion about uniform in your organization?	62% employees are choosing for 5-15 mins
13	What is your opinion about recreational facilities in your organization?	30% employees' option is "Yes"
14	How actively workers participate in workers participation programs?	56% employees respond with excellent.
15	Why would you select this organization to work?	40% employees respond with excellent.

FINDINGS

- Greater part of the respondents as an example people are in the age amassing of 29-32 years Greater part of the respondents (40%) are with an stumble upon of over five years and 36% are 3- 5 years of involvement
- 60% of respondents feel that there have to be a 0-1 years revel in for gambling out a venture in HERO MOTOCORP
- 60% of the respondents are in the higher pay accumulating of greater than Rs. 10,000 pay eachmonth
- 40% are saying that the High efficiency is the aim of the corporation
- 56% are pronouncing that agency is zeroing in on giving extraordinary recompenses, 28%experience that Good work area
- 70% of representatives are happy with the authorities help physical activities led by theorganization
- 86% are announcing that representative government help will influence the performance ofassociation
- Greater part of the representatives experience that the functioning circumstances are first-rateinside the business enterprise
- fifty six% of respondents, addressing 28 people, stated that that leave structure is incredible inthe organization environment

SUGGESTIONS

- As indicated in the overview presented, the association must pay attention to the proposed angles with the help of consultants. Next are the upgrades the association needs to make in order for the consultation to be successful.
- There must be a permanent presentation of government relief measures for number one departments, in such a volume that each department will recognize relief measures by the competent authorities
- Inspirational plans must be created, to excite workers
- The instructional workplace needs to take it to the next levelMust legally mark parts
- The sports workplace needs to take it to the next level
Some additional benefits should go to women's groups
- The association's ideal, spotless and quiet time allows tracking of performance and performance strength among representatives
- The most common way to leverage work in support of special authorities is extremely importantand therefore it tends to be leveraged in the next major cycle
- Seasonal approvals from specific authorities supporting the office should be reduced.
- New workplaces must be moved to the highest places through an early pass initiated by theoperator.

CONCLUSION

Image caption MOTOCORP is a business enterprise of money regulators located in Hyderabad, India and began its mission in 2007. The organization has an impressive group of academics to lead the public. and make advanced agreements. He has a large organization and contacts in various companies across India. Here, the representatives are treated with more respect and manage their workers remarkably. In any case, when it becomes useful, some hits are no longer enough to perform. In any case, the company is very satisfied. After completing my test, I came here and found that some citation reps were not happy with the desks hosting them. Either way, they really want an ever-increasing amount of office space. Because of this explanation, when they have been charged for the past two years, they can hope for something else and more places to work. With the actual association potentially absorbing the ideas put forward by the representatives and implementing some of the smartest thinking, worker frustration levels can be reduced. Affiliates must fulfill additional orders in connection with the help of the competent authorities of the representatives and ideas that are put forth using them. There should be a periodic review of the implementation of government aid measures for alignment.

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A STUDY ON CASH MANAGEMENT AT RELIANCE SUPER MARKET

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Abstract:- "A research on cash management of RELIANCE SUPER MARKET.s limited" is the title of the project. Finding the RELIANCE SUPER MARKET's cash position is the key goal. Secondary data serve as the foundation for the research. It is impossible to overstate the importance of cash to maintaining seamless corporate operations on a daily basis. There aren't many businesses that don't demand cash payments. Actually, the Cash needs vary depending on the company. A company should make efforts to boost its wealth. A company that makes enough money to support its operations should be able to achieve this goal. To generate sales, the company must make enough investments in its present assets. Since sales don't always generate cash, current assets are needed. There is always an operational cycle involved in the conversion of revenues into cash. The objectives are to evaluate inventories, debtors, creditors, and cash effectiveness as well as cash management. to better understand the firm's profitability and liquidity condition. These objectives are achieved by using ratio analysis to provide results that are essential for comprehending the effectiveness or ineffectiveness of Cash. The business has been running inadequately for the past five years. The company boosts performance as a result and concentrates on the neighbourhood. Due to its limited financial resources, the firm must borrow money from the public and other parties. Creating liabilities for the firm. Each year, the working capital decreases. Therefore, they should take the required actions to increase working capital.

Keywords: Cash Management, Ratio Analysis, Trend Analysis.

INTRODUCTION

INTRODUCTION TO CASH MANAGEMENT

1.1. Management of cash

One of the main areas of trendy working capital management is because money is the most versatile form of resource available today. Thus, the responsibility of the cash function is far-fetched and far-fetched to ensure that the business enterprise's particular profitable location has sufficient liquidity whenever it needs something very profitable.comparable. At the same time, it must also be ensured that the asset is not impeded in this set of idle money ideas, as the remaining idle money also includes fees such as revenue costs and opportunity fees.

1.2. Nature of Cash

Money is an alternative to buy back products and hard work and to release debts. In true cash leaders, the time period is applied to two findings:

(a) Narrow sense - Under this currency, money is insured and recognized major money counterparties are used, namely appraisal money, bill of exchange, and bank collectors' stores.

(b) Broad Meaning - Here coins carry the resources presented above as well as close to the coins. These are bank time stores and attractive protections.

1.3. Objectives of Cash Management

The primary goal of board cash is to move funds from add-ons to scarce utilities in order to maintain the association's ideal liquidity position. Furthermore, the board cash dream can be split into two ends - tracking cash inflows and outflows and supporting the affiliate-owned cash function to meet ongoing commitments. Other mega monetization goals executives talk about the following:

I. Cash Flow Scheduling - Refers to scheduling the inflow and outflow of money from an association over an indefinite period. By maintaining a sufficient level of funding, the earnings control allows the normal elements of the link to be reduced.

II. Synchronization of cash flow - Refers to the development of the balance between cash inflow and cash inflow in the business enterprise. Assuming that a large amount of cash inflows (inflows) are equal to inflows (spikes), then no additional cash protection will be required at that point.

REVIEW OF LITERATURE

. **Amalendu & Sri (2011)** The concern of business owners and managers all over the world is to devise a strategy of managing their day-to-day operations in order to meet their obligations as they fall due and increase profitability and shareholder's wealth.

Liquidity management, in most cases, are considered from the perspective of working capital management as most of the indices used for measuring corporate liquidity are a function of the components of working capital. Working capital management is defined as the management of the component of current assets (Inventory, Receivables, Short term securities, bills receivables and cash) and current liabilities (Payables).

(Raheman and Nasr,2007). The importance of liquidity management as it affects corporate profitability in today's business cannot be over emphasis.

The crucial part in managing working capital is required in maintaining its liquidity in day-to-day operation to ensure its smooth running and meets its obligation

(Eljelly, 2004). Liquidity management is very important for every organization that means to pay current obligations on business, the payment obligations include operating and financial expenses that are short term but maturing long term debt. Liquidity ratios are used for liquidity management in every organization. That greatly effect on profitability of organization.) argues that profit can be potentially maximized by the way working capital is managed.

NEED FOR THE STUDY

- a) The importance of Cash to operators in any modern challenge cannot be overstated. Under prevailing inflationary conditions, cash leaders are perhaps even bigger than earnings management, requiring considerable attention and effort.
- b) He wants special attention because each of its elements requires different forms of processing, and he always pays attention to the training of potential and judgment, familiarization with economic models , etc., due to the seriousness and complexity of the important issue. the importance of money.
- c) With The anti-inflation measures taken to create a good cash position placed working capital in the maximum area of the board and required unique knowledge to manage it.
- d) Nowadays, the difficulty of monitoring Cash has an unbiased element, so its examination and consultation is essential for internal and external investigators to ignore judgments. Predictions on the trading area are continuing to worry. So today's review titled "Attention to Cash Management" has continued.

SCOPE OF THE STUDY

- ✧ Span of the assessment: 45 days April fourth 2022 to May twentieth 2022.
- ✧ Test size: 5Yrs (2017-2022)
- ✧ Information investigation units: Cash circulate proclamation exam
- ✧ * Assets from sports
- ✧ * Proportion Analysis
- ✧ * Pattern exam
- ✧ Optional records gathered from dispensed assets: yearly reviews and articulation of information reached out from the 12 months 2017-to 2022

OBJECTIVES OF THE STUDY

- Understand the pre-board framework in the Reliance Super market.
- To realize cash inflow and use outflow in Reliance Super Market.
- Determine how to meet the Company's current peak/second commitments.
- Make short solvency placement.
- Give ideas and suggestions to enhance cash function at Reliance Supermarket.

RESEARCH METHODOLOGY

Research plan

The exam approach applied for the review is awesome. The sort of the review is at the cash the board typical and supposed for the financial function.

Information collection

Essential records

The evaluation has been made utilizing auxiliary information, that are obtained from yearly reviews and articulations of information.

Auxiliary facts

The assessment is duration for the every year reports and explanation of statistics reached out from the yr 2017-to 2022

Information Analytics for the evaluation

Throughout research for the analyst for examination and know-how of statistics is given beneath has applied specific apparatuses.

Income proclamation exam

Assets from duties

Proportion research.

Pattern research

LIMITATIONS OF THE STUDY

- Problems accessing a large index due to its reactivity and enigmatic nature.
- The inconsistency in the accounting cases of the studied years makes it difficult to decipher the information rigorously.
- Investment is required to accumulate data of treasury divisions.
- Collecting information about the length of the case has been counted for 5 years, it has been a race to collect data
- The process of categorizing optional data is a long and complicated cycle in tracking the relevant statistics.

CONTROL OF DISBURSMENT

a) Stretching Accounts Payable

A firm should pay its accounts payables as late as possible without damaging its credit standing. It should, however, take advantages of the cash discount available on prompt payment.

b) Centralized Disbursement

One procedure for rightly controlling disbursements is to centralize payables in to a single account, presumably at the company's headquarters. Such an arrangement would enable a firm to delay payments and can serve cash for several reasons. Firstly, it increases transit time. Secondly, if a firm has a centralized bank account, a relatively smaller total cash balances will be needed.

c) Bank Draft

Unlike an ordinary cheque, the draft is not payable on demand. When it is presented to the issuer's bank for collection, the bank must present it to the issuer for acceptance. The funds then are deposited by the issuing firm to cover payments of the draft. But suppliers prefer cheques. Also, bank imposes a higher service charge to process them since they require special attention, usually manual.

d) Playing the float

The amount of cheques issued by the firm but not paid for by the bank is referred to as the "payment float".

The differences between "payment float" and "collection float" are the net float. So, if a firm enjoys a positive "net float", it may issue cheques even if it means having an ever down account in its books. Such an action is referred to as "playing the float", within limits a firm can play this game reasonably safely.

Thus, management of cash becomes essential and it should be seen to, that neither excessive nor inadequate cash balances are maintained.

CASH FLOW STATEMENT

An analysis of cash flows is useful for short-run planning. A firm needs sufficient cash to pay debts maturing in the future, to pay interest and other expenses and to pay dividends to shareholders. The firm can make projections of cash inflows and outflows for the near future to determine the availability of cash. This cash balance can be matched with the firm's need for cash during the period, and accordingly, arrangements can be made the deficit or invest the surplus cash temporarily. A historical analysis of cash flows provides insight to prepare reliable cash flow projections for the immediate future.

A statement of changes in financial position on cash basis. Commonly known as the cash flow statement, summarizes the causes of changes in cash position between dates of the two balance sheets. It indicates the sources and uses of cash. The cash flow statement is similar to the funds flow statement except that it focuses attention on cash (immediate or near term liquidity) instead of working capital or funds (potential or medium term liquidity). Thus, this statement analyses changes in non-current accounts as well as current accounts (other than cash) to determine the flow of cash.

Utility of cash flow analysis

A Cash flow analysis is an important financial tool for the management. Its chief advantages are as follows.

1. Helps in efficient cash management

Cash flow analysis helps in evaluating financial policies and cash position. Cash is the basis for all operation and hence a projected cash flow statement will enable the management to plan and co-ordinate the financial operations properly. The management can know how much cash is needed from which source it will be derived, how much can be generated, how much can be utilized.

INDUSTRY PROFILE

A supermarket is a self-service shop offering a wide variety of food, beverages and household products, organized into sections. This kind of store is larger and has a wider selection than earlier grocery stores, but is smaller and more limited in the range of merchandise than a hypermarket or big-box market. In everyday U.S. usage, however, "grocery store" is synonymous with supermarket, and is not used to refer to other types of stores that sell groceries.

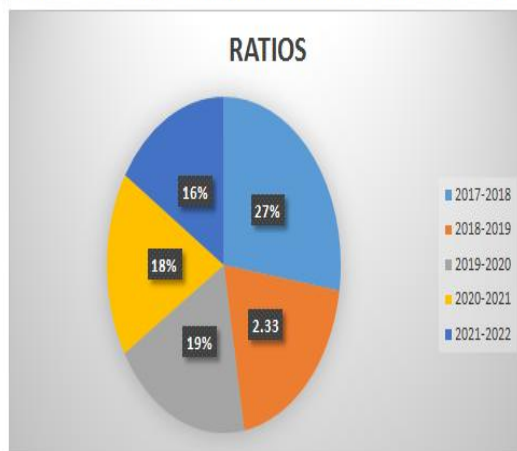
EMPIRICAL RESULTS

CURRENT RATIO

Table Number: 4.1.1- Tabular representation of current ratio 2017-2022

YEAR	CURRENT ASSETS	CURRENT LIABILITIES	RATIOS
2017-2018	65,84.62	20,32.27	3.24
2018-2019	68,99.66	29,61.12	2.33
2019-2020	58,71.06	26,16.37	2.24
2020-2021	56,48.37	26,84.73	2.1
2021-2022	60,09.83	45,36.09	1.89

Graph No 4.1.a Graphical representation of current ratio 2017-2022



The above ratio shows the position of the firm. The standards norm for this ratio is 2:1. From the above table the current ratio for the year 2017-2018 is normally 3.24 and 2021-2022 it was 1.89. It is not good position.

\

COMPANY PROFILE

Reliance Fresh Kondapur. Get Reliance Fresh Kondapur Hyderabad Address, Map, Location, Number, and Email From Search Hyderabad

Name:- Reliance Fresh Kondapur, Hyderabad.

Address:- Reliance Fresh, Ravi Enclave, Plot No 132 & 133, near Aparna towers, Kondapur, Hyderabad - 500084

Number:- 1800 102 7382

Email:- customerservice@ril.com

Timings:- Monday to Sunday 10 Am to 10 PM

Reliance Fresh Information

Reliance Fresh started in 2006 by MukeshAmbani with headquarters in Mumbai, India. Reliance Fresh private Limited operates food retail outlets across India. They offer Vegetables, processed foods, groceries, fruits, Spices, dairy, cereals, and personal care products.

Reliance Fresh is one of the leading retail chains in India and their moto is freshness and savings. Their core promises are Fresh Amesha, Available Hamesha, and Savings

Hamesha, Reliance Fresh stores in Hyderabad are a one-stop-shop for fresh shopping, fresh shavings, and fresh happiness. From 2006, Reliance Fresh present in over 80 markets, with more than 600 stores and 3 million active customers and counting. Reliance Fresh directly partners with a large number of farmers and small vendors.

Service Overview

Reliance Fresh Kondapur Hyderabad sells all kinds of fresh Fresh Fruits, Vegetables, Cereals, Pulses, Oil, Sugar, Milk, and other dairy products, Packaged food items, beverages, home and personal care, health and beauty products, limited range of kitchen/ home improvement items and footwear. Accepts payments via, cash, credit card, Debit card, and digital wallets. Timings Monday to Sunday 10 Am to 10 PM

Tags:- Reliance Fresh Kondapur, Reliance Supermarket Kondapur, Reliance Fresh Hyderabad, Reliance Supermarket Hyderabad.

Reliance Retail is an Indian retail company and a subsidiary of Reliance Industries Limited. Founded in 2006, it is the largest retailer in India in terms of revenue.[4] Its retail outlets offer foods, groceries, apparel, footwear, toys, home improvement products, electronic goods, and farm implements and inputs. Apart from physical outlets, the company also sells products on its e-commerce channels.

Financial position

SUBSIDIARIES AND DIVISIONS

A Reliance Trends Woman store in Kollam.

There are over 45 subsidiaries and divisions of Reliance Retail. Following is a list of major divisions:

1 Reliance Fresh Retail outlets of fruits, vegetables and groceries.

2 Reliance Smart Reliance Smart offers a one-stop shopping experience by offering fresh produce, bakery, dairy products, home, and personal care products, general merchandise, fruits, vegetables, and groceries.[18]

3 Reliance Digital Consumer electronics retail stores. It had 689 stores in October 2014.

4 Reliance LYF 4G mobile handset manufacturer based in Mumbai, founded in 2015.

5 Reliance JewelsJewelry retail; it had revenues of about ₹8 billion in financial year 2012–13.[19]

6 Reliance Trends Apparel and clothing. It had revenues of about ₹16 billion in financial year 2012–13 with a store count of 287.[19]

7 Reliance Footprint It had revenues of about ₹1.6 billion in financial year 2012–13.

8 AJIO E-commerce, fashion shopping website, officially launched at the Lakme Fashion Week SS16

9 Hamleys, one of the oldest and largest toy retailers in the world, was acquired by Reliance Retail in 2019.

10 JioMart is the e-commerce venture of Reliance Retail that provides grocery delivery from neighbourhoodKirana stores. It operates in 200 cities in India and was started as a joint venture between Reliance Retail and Jio Platforms.

FINDINGS

- ❖ The standards norms for the current ratio are 2:1. But in **RELIANCE SUPER MARKET** the current ratio is not efficient manner. So the short term solvency position of the company is not good position.
- ❖ The standard norms for the quick ratio are 1:1. The **RELIANCE SUPER MARKET** limited quick ratio is below standard norms. So, the financial soundness of **RELIANCE SUPER MARKET** is not effective one.
- ❖ The company does not utilize the inventory in proper manner. The company should concentrate on sales.
- ❖ The debt-equity ratio is decreasing position in each the past five years. It shows the unsoundness of the long-term financial position of the **RELIANCE SUPER MARKET**.
- ❖ The cash to sales has been decreased gradually from each year. In the year 2021, it is low (0.32). It shows the inefficiency and performances of the firm.
- ❖ From the analysis of Trend Analysis tools, we found that,
 - The current assets are decreased when compared to base year.
 - The fixed asset increased in the year 2019(106), when compared to the base year and the continuous several years.

SUGGESTIONS

1. **RELIANCE SUPER MARKET** may try to reduce its level of inventories to a reasonable level. It will create liquidity position and also the increase in profitability of the concern.
2. The concern may try to maximize the sales through new design and high promotional activities. It will create good results.
3. The company may try to improve its working capital position through long term sources. It will create free flow of funds. So that the cash management and the company performance will be in a good position.
4. The company should provide more credit facilities to the customers. It will create good sales and also to yield a good profit.
5. The company should concentrate on local sales over sales by export. It will improve the sales and profitability of the concern.
6. The current ratio below 2:1. Incase of inadequacy, arrangement can be made for improving the working capital position. It will create good result.
7. The company can try to utilize the fixed assets in efficient manner. It will create a higher productivity and also create profit.

CONCLUSION

From the critical analysis depicted through out of the study. It is evident that the overall cash management of the company with regard to profitability is not satisfactory but still, the company can be maximizing through stringent measures which will enhances the operating of the company.

Since the company faces losses management has to take several steps in order to improve the profitability. The clothes are one of the basic needs of human beings; I deduce that **RELIANCE SUPER MARKET**. sickness is not terminal. The cure for such sickness is if the company adopts the prescription and if it applies recommendation of the study towards its management of the company will be back on to a profitable position within no time.

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A STUDY ON WORKLIFE BALANCE AT ISPATIAL TECHNO SOLUTIONS –HYDERABAD

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ABSTRACT

Work and life remain the two most principal areas in the life of a used single individual. There is a developing readiness in today's workplaces that employees don't surrender their lives just because they work. With the increasing differences of family structures spoke to in today's workforce, especially with the creating standard of twofold profession families, the imperativeness of managing an employee's work-life balance have expanded prominently in recent years. Managements understand that the possibility of an employee's close to home and family life effects work quality and that there are solid business motivations to advertise work and non-work coordination. In this project, we battle that helping employees to achieve a work-life balance should transform into an essential bit of HR policy and system if it is to truly get the best from the association's kin without forsaking them unsatisfied, exhausted and unfulfilled.

KEYWORDS-Work quality.HR Policy, work life Balance

INTRODUCTION

When an individual keeps up a balance between his personal and professional life, the situation is called Work-Life Balance. This expression holds worth very much since it is imperative to have a balance between personal and professional life. Work-life balance is at the cutting edge of the world of work. The balance among personal and professional life differs from person to person and the organization where he or she is working. When an individual doesn't keep up a balance and works a lot in the organizational setting, this may cause him some medical, psychological and behavioral outcomes, thus, their productivity will likewise beneath. Studies have indicated that work-life stress is harmful to employees.

Late sitting and working an excess of can cause an imbalance in a person's personal and professional life; nonetheless, there are a few strategies to deal with the work-life stress for example time management, task management, relaxation, adaptable working hours, working from home and exercise, and so forth. Work-life balance improves a person's health, job satisfaction, responsibility, inclusion and diminishes absenteeism and presenteeism (condition of physical nearness however not profitable). Regardless of the betterment in the improvement of maintaining work-life balance, there is still more to be finished.

One significant factor is how much work-life balance is common material over the whole hierarchy of the organization. Those lower down the organizational hierarchy is a few times not qualified for certain benefits or uniformed about important company arrangements. Work-life balance can help

SCOPE OF THE STUDY

The study covers the different various aspects of employee work-life Balance and estimated an increase in productivity accountability, commitment better teamwork and communication and coordination made better morale, more positive organizational stress.

OBJECTIVES OF THE STUDY

1. To find out work-life balance of employees in ispatial tech solutions.
2. To increase an understanding of current work time policies and practices, as well as work-life balance issues.



3. To know the effectiveness of the work-life balance of employees in ispatial tech solutions.

RESEARCH METHODOLOGY

Research methodology is the process of collection of information and obtaining solutions for a specific collected data. Data has been classified into two types based on the source and type of collection.

1. Primary Data
2. Secondary Data

Primary Data

Primary data is the data which is collected for the first time by through different means of collection. There are different types of collection of primary data. They are

- Survey Method
- Questionnaire Method
- Personal Interview Method
- Focus Group Method
- Delphi Technique
- Email Survey Method, etc.

Secondary Data

Secondary Data is the data which is already collected by someone or which already existed on various sources. Secondary data collected from different sources. Those are

- Textbooks
- Journals
- Websites,
- Newspapers...etc.

For my study it is mostly depends upon the primary data.

Research Tools

A survey has been conducted to get the significant data from the employees. This survey includes different questions based upon their work experience, working hours, personal life, balance between the work and life and satisfaction from both the ends. The questionnaire includes different forms of questions such as

- Open-ended questions
- Closed ended questions
- Multiple choice questions.

SAMPLING

The Total samples taken for the research study are 100 and it includes HR executives, HR professionals, trainers and employees from different departments.

Sampling Technique

Random sampling has been used to have a better productivity from the questionnaire given to every individual.

STATISTICAL TOOLS

All opinions collected and obtain the results from that with the help of different statistical tools. They are

- 1) Bar graphs
- 2) Pie charts
- 3) Chi-square test.

HYPOTHESIS

H0- There is no relation between Work and life of an employee.

H1- There is a relation between Work and life of an employee.



REVIEW OF LITERATURE

Mesmer-Magnus & Viswesvaran (2006). In his study he stated that, it was found that family support will helps to manage work-life balance. The support from Superiors, flexibility of working hours, co-worker's behavior, maternity leaves etc. motivates the employee and makes them to reduce the dark side of work life balance. This contributed significantly work life conflicts.

Kulkarni and Kulkarni (2012). In his study he stated that, he shared his opinion that successful employees are recognized for their works and they feel positive for their work life balance. Challenging work and career development are the key ingredients to employees and employer for a successful business strategy.

Parida (2012). In her study she stated about the importance of employees to recognize the work life balance with the help of analyzing the family, other responsibilities and interests. In order to retain employees. The company should recognize the one individual work life balance and schedule the work and craft the work culture according to them.

DATA ANALYSIS

1. How many days in a week do you normally work?

Table 1: Number of working days in a week

Attributes	No of Respondents	Percentage
Less than 5 days	0	0
5 days	65	65
6 days	18	18
7 days	17	17
Total	100	100

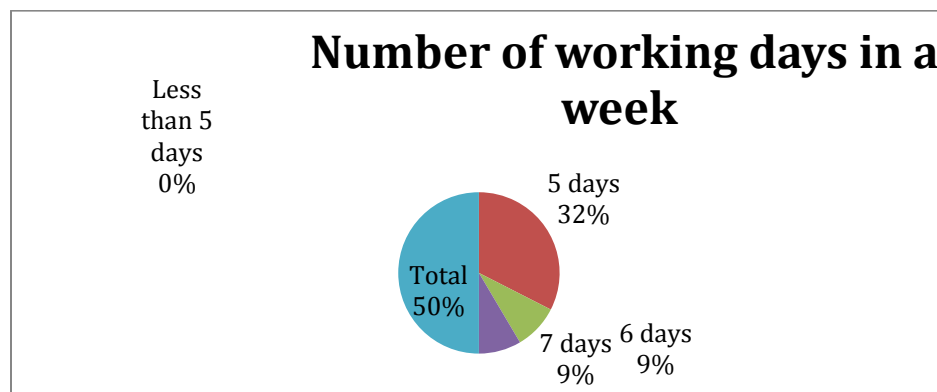


Chart 1: Graphical presentation of Number of working days in a week.

Interpretation:

From the above analysis we can see that no one is working less than 5 days in a week, most of the people are working for 5 days that comprises 65% of the total employees i.e., 65 members. Some are working more than usual weekdays and that comprises 35% of the employees.

2. Do you generally feel you are able to balance your work-life?

Table 2: Employees balance between work-life

Attributes	No of Respondents	Percentage
Yes	80	80
No	20	20
Total	100	100



Employees balance between work-life

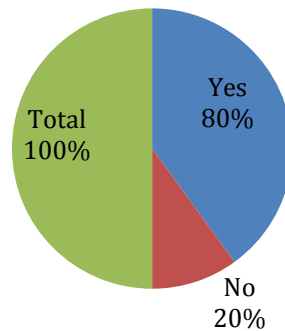


Chart 2: Graphical presentation of employees between work - life

Interpretation:

From the above analysis we can see that most of the people said their opinion that they are balancing their work and life. 80 persons from 100 people said that they have work-life balance and 20 employees are not balancing their work-life effectively.

3. How do manage if stress arising from your work?

Table 3: Managing of stress arising from work

S.NO	ATTRIBUTES	RESPONDENTS	PERCENTAGE
1	ENTERTAINMENT	77	77
2	YOGA	15	15
3	READING BOOKS	8	8
	TOTAL	100	100

Managing of stress arising from work

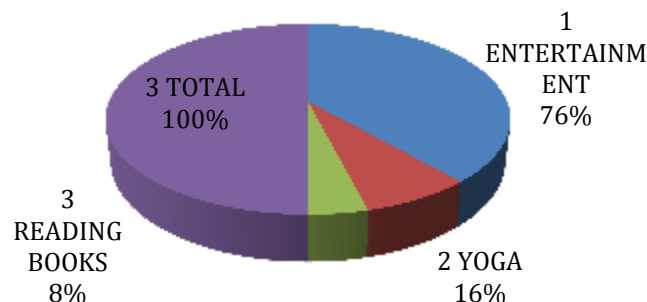


Chart 3: Graphical presentation of stress relieving techniques by employees at work

Interpretation:

From the above analysis we can see that people who feel stress while in job they do several stress relieving activities like entertainment, yoga, reading books. Most of the respondents selected entertainment as their stress relieving option and some people do yoga and less people read books to get the rid of stress.

4. Does your company have a separate policy for work-life balance?

Table 4: Company have a separate policy for work – life balance

S.NO	ATTRIBUTES	RESPONDENTS	PERCENTAGE
1	YES	24	24
2	NO	25	25
3	NOT AWARE	51	51
	TOTAL	100	100

**Company have a separate policy
for work – life balance**

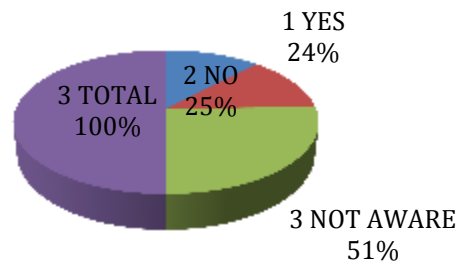


Chart 4: Graphical presentation of separate life policy on work–life in the company

Interpretation: From the above analysis we can see that most of the employees don't know that company have a separate policy on work-life balance and only 24 % people aware of the policy.

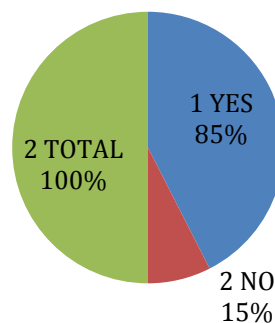
5. Does your organization provide you counseling service for employees?

Table 5: Table showing Counselling services for employee in company

S.NO	ATTRIBUTES	RESPONDENTS	PERCENTAGE
1	YES	85	85
2	NO	15	15
	TOTAL	100	100

Chart 5: Graphical presentation of counselling services by company to employees.

**Counselling services for
employee in company**





Interpretation:

From the above analysis we can see from survey most people said that company is providing counselling services and only 16 people don't know about that services.

FINDINGS

1. From the study I came to know that weekly most of the employees are working more than regular timings.
2. From the questionnaire it shows that employee work life balance in **Ispatial** is good, with the policies and procedures.
3. Employees showed their opinion towards the working environment is very good and the employees aren't feeling stress in office
4. From table 5, I observed that most of the employees are going for entertainment programs
5. Everyone in the company stated that there will be no separate work life balance in any company but have to balance the employees work-life with company policies and procedures.

SUGGESTIONS

1. As the policies for work life balance should be customized to individual needs.
2. Since, most of the employees are not aware of welfare programs I suggested HR manager to make an awareness program and detailed explanation regarding their benefits should be discussed in team meetings.
3. Employee work-life balance will affect the work quality so the organization should give reasonable shift timings according to individual preferences by asking them and this will lead to better production output.
4. For employees' company should provide sanitation hygiene facilities as this will satisfy employees with.
5. Quality of food in the canteen of the company should be at hygiene level and Food coupons should be provided by company based on performance so that it will satisfy the employee.

CONCLUSION

From the study it is clear that employee work life balance in **Ispatial** is good, but there are some problems from employee satisfaction to company. Work-life balance programs play a win-win situation for both employers and employees. When it comes to employee, he will think about work obligations and non-work responsibilities but for employer the major thing comes with the work quality and employee behavior towards work. Now a days most of the companies are modifying their policies and procedures according to employee and working situations. Employer support will create positive employer branding, lesser stress, increased happiness, motivation, Productivity. The Key role of HR is to understand the issues of work-life balance, integrate that to organization's policy and manage the work-life balance of employees by personal analysis regularly.

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A STUDY ON EMPLOYEE RELATIONS IN CAPITAL- IQ, HYDERABAD

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ABSTRACT

Employee relations focuses on preventing and resolving issues affecting people that result from or have an impact on workplace circumstances. The workplace is evolving to incorporate a wider range of nationalities, generations, and worldwide presence. Managers must develop their listening, adaptability, and decision-making abilities in order to increase production and stay competitive. Interpersonal communication and conflict management are the two abilities that should receive the greatest attention, according to a Greg Roper article. Interpersonal communication abilities are often referred to as life coaching abilities in organisations. Employee difficulties can be easily resolved with the aid of conflict management techniques, which also increases workplace happiness. Employees want to know that their suffering is understood, and they need to be listened to and cared about.

The phrase "employer-employee relations" has taken the place of "industrial relations" when referring to this connection. Employee relations is considered as focused on both individual and group connections in the workplace today, with a growing focus on assisting line managers in developing relationships with employees based on trust. High levels of employee involvement, commitment, and engagement in a favourable work environment can enhance corporate results and enhance employee wellbeing.

Here, we look at the current situation of the employment relationship and examine what employee relations means to employers. It quickly examines important employee relations skills, particularly those related to communication and dispute resolution. The brief concludes by examining the ongoing importance of good employee relations for businesses, unions, and HR professionals.

KEY WORDS:

Employer - Employee Relations, Organizational growth, Employee motivation.

INTRODUCTION

Employee Relations involves the body of work concerned with maintaining employer- employee relationships that contribute to satisfactory productivity, motivation, and morale. Essentially, Employee Relations is concerned with preventing and resolving problems involving individuals who arise out of or affect work situations.

Advice is provided to supervisors on how to correct poor performance and employee misconduct. In such instances, progressive discipline and regulatory and other requirements must be considered in effecting disciplinary actions and in resolving employee grievances and appeals. Information is provided to employees to promote a better understanding of management's goals and policies. Information is also provided to employees to assist them in correcting poor performance, on or off duty misconduct, and/or to address personal issues that affect them in the workplace. Employees are advised about applicable regulations, legislation, and bargaining agreements. Employees are also advised about their grievance and appeal rights and discrimination and whistleblower protections.

Employee Relations is a focusing on the importance of understanding and merging corporate, management and employee needs to achieve optimum performance, commitment and effectiveness, addresses research, practice and ideas about relationships between employments.

Coverage

- Communication, participation and involvement
- Developments in collective bargaining
- Equal opportunities
- Health and safety
- HRM
- Industrial relations and employment protection law
- Industrial relations management and reform
- Organizational change and people
- Personnel and recruitment
- Quality of working life

Topicality

Today's turbulent business environment makes increasing demands on managers and workforces, as competitive standards rise and expectations of individuals increase. Managers must respond positively to changes in contemporary workforce attitudes if they are to get the performance levels they need.

Employee relations:

Definition

According to Armstrong (2003), employee relations consist of all those areas of human resource management that deals with employees directly and through collective agreements where trade unions are recognised. The union practices for the welfare and good working condition of the employees. Employee relations are concerned with generally managing the relationship between employer and employees at the workplace that can be formal e.g. contract of employment or procedural agreement. employee relations refers to an organization's efforts to create and maintain a positive relationship with its employees. By maintaining positive, constructive employee relations, organizations hope to keep employees loyal and more engaged in their work.

NEED FOR THE STUDY

A common place that we see the need to apply Relations is in the work place. In the work force, we can see Relations play a key role in leadership success. A person unable to grasp Relations and apply it, will not become or stay a leader. It is critical that anyone seeking to lead or Relations understand "Howletts Hierarchy of Work Motivators."

Salary, benefits, working conditions, supervision, policy, safety, security, affiliation, and relationships are all externally motivated needs. These are the first three levels of "Howletts Hierarchy" When these needs are achieved; the person moves up to level four and then five. However, if levels one through three are not met, the person becomes dissatisfied with their job. When satisfaction is not found, the person becomes less productive and eventually quits or is fired. Achievement, advancement, recognition, growth, responsibility, and job nature are internal motivators. These are the last two levels of "Howletts Hierarchy." They occur when the person motivates themselves (after external motivation needs are met.) An employer or leader that meets the needs on the "Howletts Hierarchy" will see motivated employees and see productivity increase. Understanding the definition of motivation, and then applying it, is one of the most prevalent challenges facing employers and supervisors. Companies often spend thousands of dollars each year hiring outside firms just to give motivation seminars.

OBJECTIVES OF THE STUDY

1. To find out the present relations level of the employees in the organization.
2. To find out the blockages for the Relations (i.e.: disciplined).
3. To study the hygienic and Relational content factors
4. To suggest measures for improvement of the Relations as a discipline Point

SCOPE OF THE STUDY

- The study is confined and relevant only to Capital IQ not applicable to any organization.
- The study covers motivational practices in Capital IQ at various levels of employees.
- The study assists the management in determining the decision regarding the performance of the employee.

RESEARCH METHODOLOGY

The basic principle in the research has been adopted in the overall methodology. The following methodology has been used for meeting the requirements,

- Defining objectives
- Developing the information sources
- Collection of information
- Analysis of information
- Suggestion

APPROACHES TO RESEARCH

1. RESEARCH DESIGNS

There are generally three categories of research based on the type of information required, they are

1. Exploratory research
2. Descriptive research
3. Casual research

The research category used in this project in descriptive research, which is focused on the accurate description of the variable in the problem model. Consumer profile studies, market potential studies, product usage studies, Attitude surveys, sales analysis, media research and prove survey s are the,

Examples of this research. Any source of information can be used in this study although most studies of this nature rely heavily on secondary data sources and survey research.

2. Primary Source: Discussions with plant staff, Interviews, Questionnaire administered.

3. Secondary Source: Journals Magazines and articles from prominent newspapers. Population and Sample: There are 140 Officers & Supervisors and 100 Managerial staff .Thequestionnaire is administered to 50 Officers and Supervisory staff and 50 Managerial staff.

TECHNIQUES OF ANALYSIS

3. SAMPLE DESIGN

- a) Sampling unit: the study is directed towards the executive of managerial level.
- b) Sample size: sample size of 100 is taken in this study

4) DATA ANALYSES

Simple analysis method is followed for analyzing the data pertaining to different dimensions of employees. Simple statistical data like percentage are used in the interpretation of data pertaining to the study. The results are illustrated by means of bar charts.

LIMITATIONS OF THE STUDY

- There are certain limitations of the concept of empowerment.
- It may be cost consuming in selecting personnel, training costs and labor costs may be high, it may result in slower or inconsistent services and poor use of the technique of empowerment.
- At the outset, Managers must also accept the fact that not all employees want to be empowered. Many workers just work better in jobs that are clearly defined and closely supervised.

- Once both employees and managers have received proper training, the next step is to give employee's control of the resources needed to make the improvements in their job and work processes.
- By giving employees information, resources and training and by following with measurements and reinforcement, Human Resources can create an empowered environment.
- But Empowerment should be a continuous process like quality improvement and it is like a race without a finish line. Those companies that take the first step by creating an environment conducive to empowerment will be at the head of the pack.

REVIEW OF LITERATURE

David Farhan (1997, 2000) has, mentioned clearly in his writings that employee relations are the key part of an organization. It includes the objectives like healthy relation between employees and management, employee to employee and superior and employee. He told that no employee should reflect bossism, and treat every one as equal.

D.P Sahoo (2001) introduces all the major issues that are faced by every employee in large industries. He also mentioned the solutions and remedies to such problems. His findings include employee management, employee retention and employee satisfaction.

The research investigations of Mayo (1880–1949), who is regarded as one of the Pioneers of the human relations school of thought, are responsible for the human relations approach.

Employee interactions therefore play a significant role in any firm, according to Mayo. Employee relations are influenced by a number of elements, including organisational structure, charismatic culture, managerial behaviour, labour union clout, and legal and economic laws.

The Hawthorne Experiments, which were carried out at the Western Electric Company's Hawthorne Plant between 1924 and 1932, were the first extensive research of human relations, according to Ton we (2009b). This study was also viewed as the organization's clinical approach to employee behaviour. It makes an effort to concentrate attention on employee behaviour and productivity capacity while taking into account their psychological, physical, economic, and physiological aspects.

According to Crainer (1998, p. 111), the Hawthorne investigations were significant because they demonstrated how crucial Managerial behaviour and attitudes were to

employee engagement and increased performance. They made an effort to satisfy all of the employees by resolving their issues.

According to Crainer (1998, p. 111), the Hawthorne investigations were significant because they demonstrated how crucial Managerial behaviour and attitudes were to employee engagement and increased performance. They made an effort to satisfy all of the employees by resolving their issues.

Taylor (2010) has said unequivocally that every employee should get along with their coworkers and management, since this aids in employee management and company culture adaptation. It mostly concentrates on an organization's employee relations and employee happiness.

Employees go to work to satisfy a Complexity of wants, not just for monetary gain, according to the human relations paradigm advocated by Elton Mayo (1880–1949). Hallowell, a proponent of the human relations school of thinking, claims that neuroscientists' studies have shown that a management strategy that emphasises the human aspect in an organisation results in a high level of connection that boosts productivity in the business. According to a neuroscientist's discovery, good human relationships have a physiological impact on workers. They lower blood levels of the stress hormones cortisol, norepinephrine, and epinephrine, while also raising serotonin and dopamine levels, which reduce anxiety and fear.

Employee relations, according to Elton Mayo (1880), are a crucial idea that must be upheld in all enterprises in a very positive way without being abused. Any employee who is a member of a specific group will bear some of the blame for the company's reputation. It amply demonstrates the cohesion and character of the workforce with senior management.

A study on Standing on the Shoulders of Giants? by E Gallardo and M. Thunnissen (2016) makes this claim. The results of a critical evaluation of empirical talent management research show that the Anglo-Saxon context, particularly the EU, has a significant influence on such research. Additionally, the research's framework and methodology lack rigour. There was a tad of cultural and contextual knowledge. Empirical TM research is mostly based on a TM-specific methodology.

Grant, LM Wallace (2013) stated in his article that employee relations offers insights into the various aspects affecting remote e-workers and generates 10 emergent themes. Access to technology, the capacity for flexible work, and individual competencies were distinguishing characteristics among e-workers.

DATA ANALYSIS AND INTERPRETATION

To analyze the Employee relations in the internal environment of the Capital IQ a questionnaire containing 9 questions prepared. The response to the questions of the employee summarized as:

S.NO	STATEMENT	RESPONSE
1	Is the physical working conditions are taken care by superiors?	65% of the employees agreed
2	Are you accustomed to work under many supervisors for the same nature of work?	50% of the employee disagreed
3	Do you feel to do your duty out of your commitment to job because of the fear of survival?	70% of the employees disagreed
4	Do you feel that working atmosphere is friendly in nature at your work place?	80% of the employees disagreed
5	Do you feel that you are having a good rapport with all your peers and superiors?	50% of the employee agreed
6	Does In your department work is distributed in a fair manner?	60% of the employees disagreed
7	Do you feel that your job is secured?	75% of the employee agreed
8	Do you feel Discipline helps in individual development?	75% of the employee agreed
9	“In the present competitive business scenario there is no external motivation (i.e Discipline point of view) required, one has to be on his own”. Do you agree?	60% of the employees agreed

FINDINGS

- ❖ Main findings indicate that management-employee relationships are less satisfactory in the large firms than in the small firms.
- ❖ Job satisfaction levels are lower in large firms.
- ❖ Less satisfactory management-employee relationships in the large firms may be a major source of the object
- ❖ Many employees feel that work environment is excellent in company.

SUGGESTIONS

The conclusions so far drawn from the study tempts to offer the following suggestions for making the organization ready for empowerment.

1. A general training program covering the importance of and need for employee empowerment in the light of global competition is to be designed in brainstorming session involving internal and external experts.
2. The present study identifies the following areas in which training is to be undertaken.
 - ✦ A training program may be undertaken for Executives in general and to Senior Executives in particular to convince and make them accept the empowerment concept.
 - ✦ Executives working in technical areas to be trained effectively in the areas of their role and interpersonal dependence and relations to make empowerment more fruitful.
 - ✦ A training program may be undertaken about "Shared Leadership" which brings high morale and high productivity and makes the empowerment a success.
3. The subordinate staff who is going to be empowered must be ready to take up this responsibility. A study is to be conducted among the subordinate staff to find out their readiness to discharge the new roles under this empowerment program. This helps in identifying the training areas, to make the subordinate staff completely ready for undertaking empowerment.

CONCLUSIONS

In the above perspective, the present chapter makes an attempt to draw some conclusions. It should be confessed here that the investigator is conscious of the limitations of the study and the conclusion drawn on the basis of the sample from a single unit cannot be generalized about the entire manufacturing sector.

The study examines the readiness for employee empowerment in six aspects, namely effective Communication, Value of people, Clarity, Concept about power, Information and Learning.

A perusal of data pertaining to combination makes us to conclude that the Executives have agreed to the effective down ward communication flow, which is a prerequisite for empowerment.

With regard to value of people, the analysis leads to the conclusion that the Executives give a reasonable value to the Human Resources in the Organization. However, in respect of concept about power, they are some what agreed to share the power.

As far as information sharing with lower rungs is concerned, they are very positive.

One significant conclusion with regards to learning opportunities, which is a basic for empowerment, is that the executives are favorable and feel that sufficient learning opportunities should be there for the rank & file.

As far as clarity is concerned, the executives are somewhat agreed i.e., neutral. The aspect wise percentage analysis leads to the conclusion that the organization is somewhat ready for employee empowerment because the majority of the Executives in almost all aspects are concentrated in somewhat ready group.

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A STUDY ON PERFORMANCE APPRAISAL AT HERITAGE FOODS LTD, HYDERABAD

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ABSTRACT

People have different abilities and aptitudes. There is always some difference between the quality and quantity of the same work on the same job being done by different people. Performance appraisals of Employees are necessary to understand every employee's abilities, competencies, and merit relative worth for the organization. The history of performance appraisal can be dated back to the 20th century and then to the second world war when the merit rating was used for the first time. An employer evaluating their employees is a very old concept. Performance appraisals are an indispensable part of performance measurement. Performance appraisal is necessary to measure the performance of the employees and the organization to check the progress towards the desired goals and aims. The latest mantra being followed by organizations across the world being – "get paid according to what you contribute" – the focus of the organizations is turning to performance management and specifically to individual performance. Performance appraisal helps to rate the performance of the employees and evaluate their contribution towards the organizational goals. If the process of performance appraisals is formal and properly structured, it helps the employees to clearly understand their roles and responsibilities and give direction to the individual's performance. It helps to align the individual performances with the organizational goals and also review their performance. Performance appraisal takes into account the past performance of the employees and focuses on the improvement of the future performance of the employees. An attempt has been made to study the current global trends in performance appraisal.

KEYWORDS: Performance, Appraisal, organizational goals, feedback

1. INTRODUCTION

A major concern of every organization should be to contribute positively towards the achievement of its objective. Organizational effectiveness is often equated with managerial efficiency. A manager can ensure organizational effectiveness only by guaranteeing the full utilization of human resources available through individual employees under his guidance. Hence, it is always required for a manager to monitor and measure the performance of employees.

Moreover, since the organization exists to achieve the goals, the degree of success that individual employees have in reaching this individual goal is important in determining organizational effectiveness. The assessment of how successful employees have been at meeting their individual goal to come a critical part of human resource management. This leads to concept of performance appraisal. A performance appraisal system functions as definition of performance.

Performance appraisal is a method of evaluating the behavior of employees in the work spot, including both qualitative and quantitative aspects of job performance indicate how an individual is fulfilling the job demands and it is always in terms of results. Under performance appraisal not only the performance of an employee but also his potential for development is evaluated.

"Performance Appraisal is a systematic description of an employee's job relevant strengths and weaknesses".

1.1 SCOPE OF THE STUDY

In the present study an attempt has been made to know the actual implementation of performance appraisal techniques in general and some other aspects such as awareness of the workers, effectiveness of the performance appraisal system in particular.

Human resource projections are valid on appraisals. By improving job skills, the employees have lot of scope for development and prepare themselves for higher responsibilities.

A through analysis of the performance appraisal system will help the management to know the short comings, if any. It also help the company in knowing whether the performance appraisal techniques are used to full extent or not, there by the researcher can understand the effective implement of the performance appraisal system.

1.2 OBJECTIVES OF THE STUDY

The objective is to know how effective is the execution of appraisal system in **HERITAGE FOODS INDIA Ltd's.**, Hyderabad.

- To study about the Performance – Evaluation process at Heritage Food LTD, Hyderabad.
- To know how Performance evaluation plays as a motivating factor to increase the overall organizational and employees performances at Heritage Food LTD, Hyderabad.
- To summarize and suggest with suitable suggestions wherever required.

2.RESEARCH METHODOLOGY

The research methodology is a systematic way to solve the problem and it is an important component of the study without which researcher may not be able to obtain the facts and figures from the employees.

2.1 SOURCE OF DATA:

The study is based on primary as well as secondary data collected from different sources:

A). Primary Data:

The primary data is collected with the help of questionnaires, which consists of twenty questions each. The questionnaires are chosen because of its simplicity and liability. Researcher can expect straight answers to the questions. The respondents are informed about the significant of the study and requested to give their fair opinions.

B). Secondary Data:

Secondary data is collected through the documents provided by the personnel department. The documents include personnel manuals, books, reports, journal, etc.

2.2 SAMPLING

A). Sample Unit:

The executives and employed at HERITAGE FOODS INDIA Ltd's., Hyderabad constitute 'universe' of the present study. A part of it is taken as sample unit for the resent study. It includes JGMS, AGMS, manager and other employees of HERITAGE FOODS INDIA LTD, Hyderabad.

B). Sample Size:

The sample size consists of 100 respondents employed in HERITAGE FOODS INDIA Ltd's, Hyderabad. Of these 30 are executives, 20 are senior executives and the remaining 50 are employees.

2.3 PERIOD OF THE STUDY:

Since so many years HERITAGE FOODS INDIA Ltd's.Hyderabad has been following the same procedure of appraisals for their executives and employees and for the study of my project last one-year data has collected on performance appraisals.

3. REVIEW OF LITERATURE

Performance appraisal has been defined by different scholars in various ways. Some of the important definitions are as follows:

Dale S. Beach, "Performance appraisal is a systematic evaluation of the individual with respect to his or her performance on the job and his or her potential for development."

Randall S Schhuler, "performance appraisal is formal structure system of measuring and evaluating an employee's job related behavior and outcomes to discover how and why the employee is presently performing on the job and how the employee can perform more effectively in the future so that the employee, organization and society all benefits."

Dale Yoder, "Performance appraisal includes all formal procedures used to evaluate personalities and contributions and potentials of group members in a working organization. It is a continuous process to secure information necessary for making correct and objective decisions on employees."

H.C. Shiva Prasad (2010) done work to check the performance of Indian software professionals (SPs). Data were collected from 441 software and senior software engineers from eight Indian software firms. The team leaders assessed the performance of software and senior software engineers on 16 items. The exploratory and confirmatory factor analyses of scores on 16 items of the instrument suggest six dimensions of performance. They are work- efficiency, personal resourcefulness, inter- and intra-personal sensitivity, productivity orientation, timeliness, and business intelligence. The dimensions have reliability and high convergent validity. SPs having more years of experience, higher need for achievement, and higher need for social power are high performers. Human resource managers can evaluate the performance of SPs holistically on six dimensions for training, reward administration, job rotation, and promotion decisions.

4. DATA ANALYSIS AND INTERPRETATION

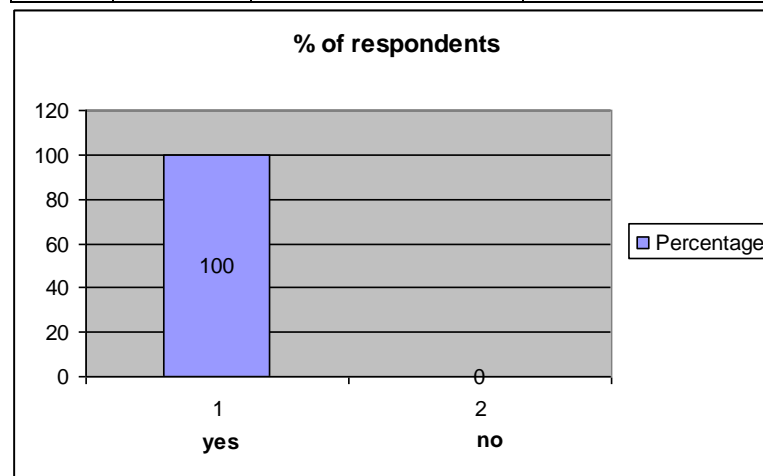
Data analysis has been done by arranging the data in a simple table form and percentages are calculated. The quantitative data has been represented by drawing out the charts where ever necessary.

1. Do you think performance appraisal is needed in a company?

(a) YES

(b) NO

s.no	Options	No. of Responses	Percentage
1	YES	50	100
2	NO	0	0
	TOTAL	50	100

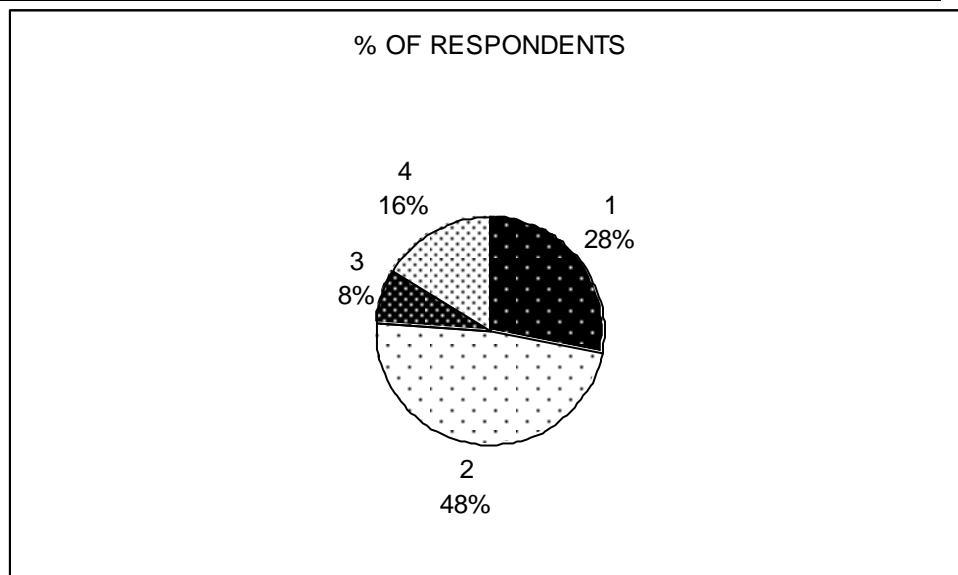


Interpretation:

To above question, almost 100% of the employees thought that the performance appraisal is needed in a company.

2. Performance appraisal rating is used to
- (a) Identify areas of improvement
 - (b) Identifying quality for unit of work
 - (c) Set performance target
 - (d) All the above

s.no	Options	No. of Responses	Percentage
1	Identify areas of improvement	28	28
2	Identify areas of training & development	48	48
3	Set performance target	8	8
4	All the above	16	16
	Total	100	100



Interpretation:

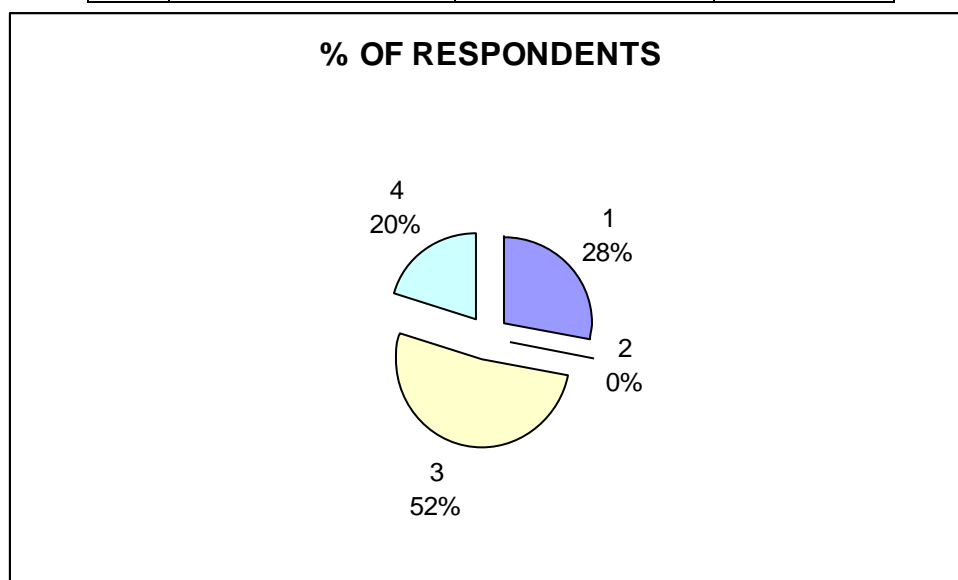
About the useful of Performance appraisal system, 28% have said that appraisal system helped them to identify areas of improvement, to 48% it helped in identifying training & development needs, to 8% it helped in setting performance targets and to 16% it was helpful in all the above areas. By this we can say that P.A is helpful in one way or the other for the employees.

3. In your experience the outstanding Performance of an employee is due to:

- (a) Actual Performance
- (b) Qualification
- (c) Experience
- (d) All the above

s.no	Options	No. of Responses	Percentage
1	Actual Performance	28	28
2	Qualification	0	0
3	Experience	52	52
4	All the above	20	20

	total	100	100
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Interpretation:

Above 28% of the employees responded that the outstanding Performance appraisal is due to Actual Performance, 52% of the employees is due to Experience and 20% of the employees is due to all the above.

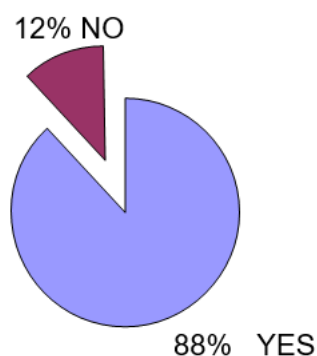
4. Do you think that a good workman gets motivated with frequent Performance Appraisal? Is conducted?

(a) YES

(b) NO

s.no	Options	No. of Responses	Percentage
1	YES	88	88
2	NO	12	12
	TOTAL	100	100

% of respondents



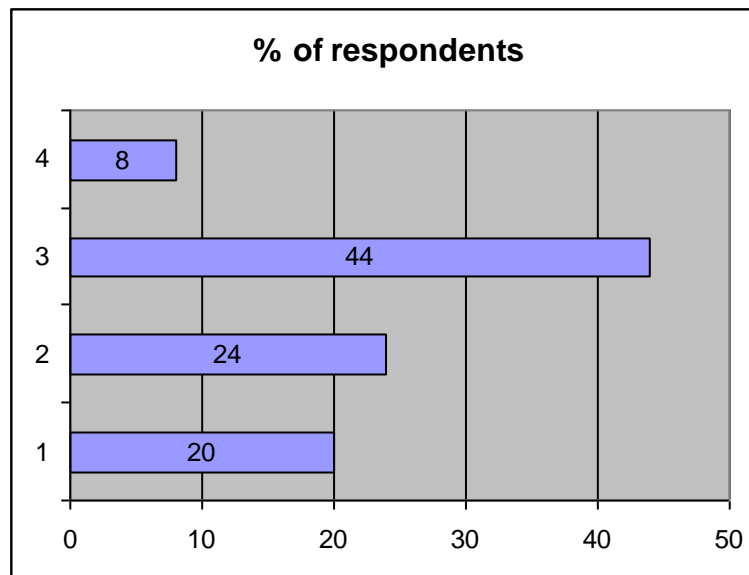
Interpretation:

A majority of 88% of the employees said that a good workman gets motivated with frequent Performance Appraisal and 12% of the employees are not satisfied with above.

5. What are the factors taken into consideration while appraising an individual?

- (a) Interpersonal effectiveness (b) Team building skills
(c) Self motivate skills (d) leadership

s.no	Options	No. of Responses	Percentage
1	Interpersonal effectiveness	20	20
2	Teambuilding skills	24	24
3	Self motivate skills	44	44
4	Leadership	8	8
	Total	100	100



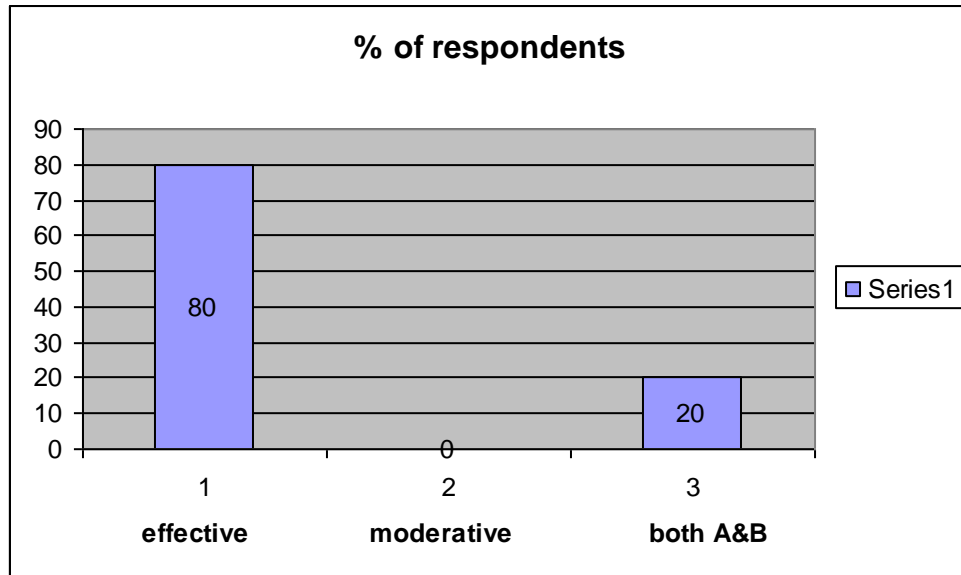
Interpretation:

About 20% of employees considered interpersonal effectiveness while appraising an individual, 24% of employees considered Teambuilding skills, 22% of employees considered self motivate skills and 8% of employees considered Leadership. By this we can say that these are the factors taken into consideration while appraising an individual.

6. In your opinion an employee should be:

- (a) Effective (b) Moderate (c) Both A & B

s.no	Options	No. of Responses	Percentage
1	Effective	80	80
2	Moderate	0	0
3	Both A & B	20	20
	Total	100	100



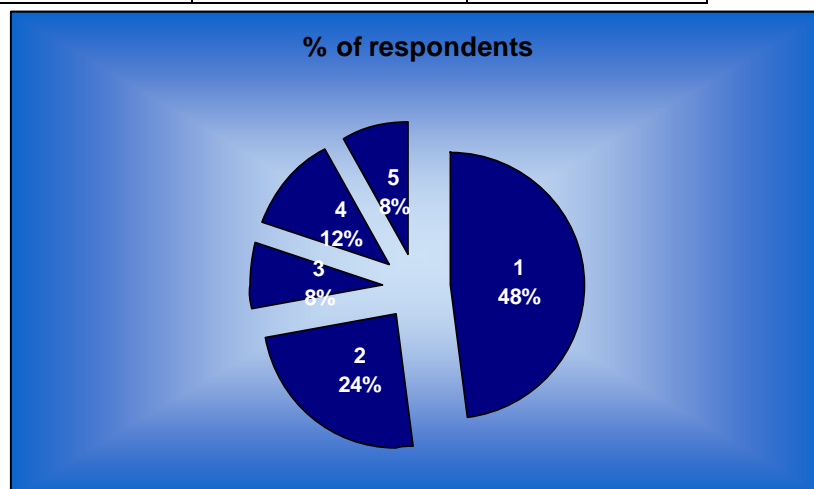
Interpretation:

About 80% of the employees opinion is that the employee should be effective and rest 20% of the employees opinion is that the employee should be effective and moderate.

7. Which method you are using for evaluating Performance?

- (a) 360 degree appraisal (b) MBO (c) Assessment centre
(d) BARS (e) Any other

s.no	Options	No. of Responses	Percentage
1	360 degree appraisal	48	48
2	Mgmt By Objectives	24	24
3	Assessment centre	8	8
4	BARS	12	12
5	Any other	8	8
	Total	100	100



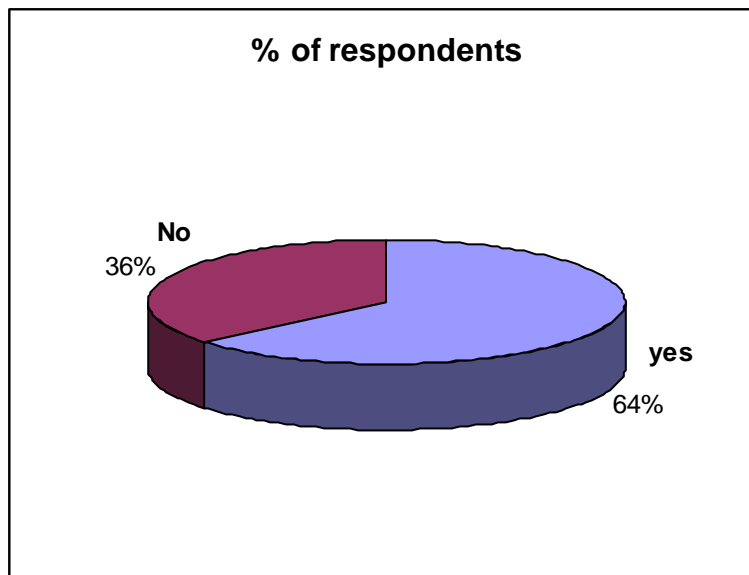
Interpretation:

About 48% of the employees using 360 degree appraisal method for evaluating Performance, 24% of the employees using Mgmt By Objectives 8% of the employees using Assessment centre, 12% of the employees using BARS, 8% of the employees using other method.

8. Is Appraisal process expensive and time consuming?

(a) YES (b) NO

s.no	Options	No. of Responses	Percentage
1	YES	64	64
2	NO	36	36
	Total	100	100



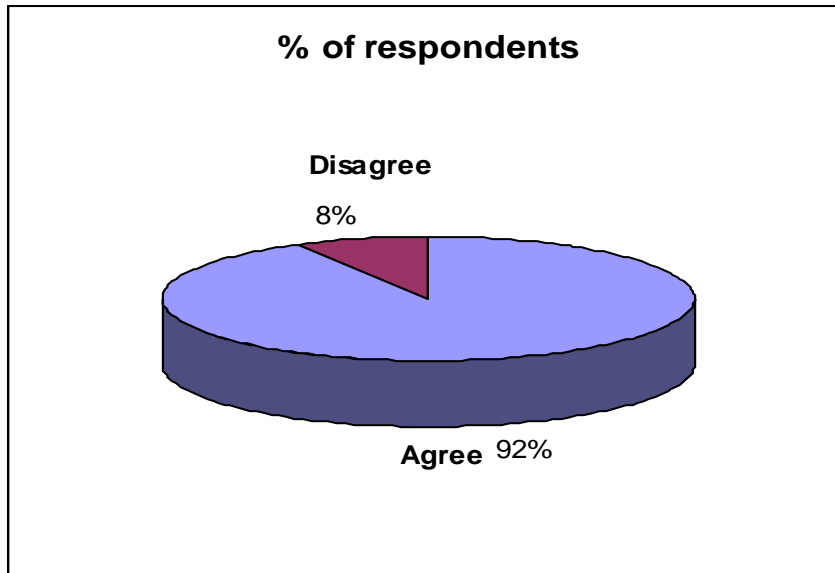
Interpretation:

About 64% of the respondents said that the performance appraisal is expensive and time consuming. And 36% of the respondents said that the Performance appraisal is not expensive and time consuming.

9. Do you agree with the assessment of your reviewing/reporting officers?

(a) Agree (b) Disagree

s.no	Options	No. of Responses	Percentage
1	Agree	92	92
2	Disagree	8	8
	Total	100	100



Interpretation:

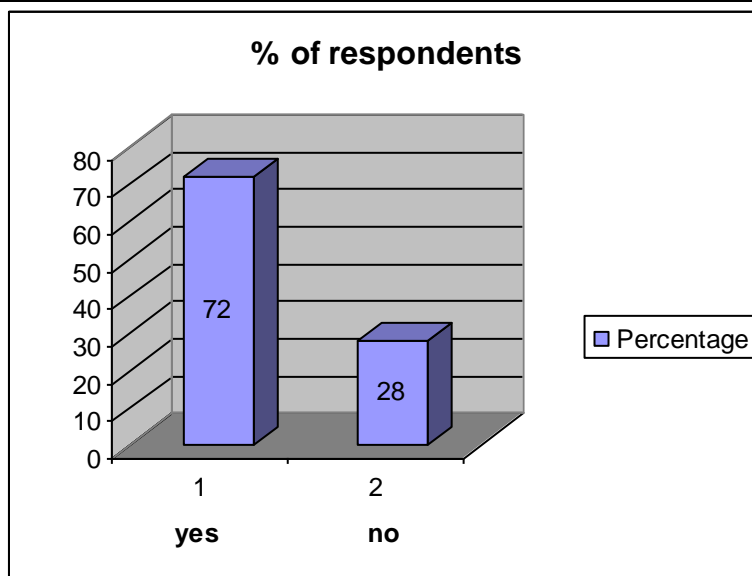
Majority of 92% of the employees responded that reporting officer was good at grading the performance. Nearly 8% were disagreeing his duties as per the guidelines laid down.

10. Do you want any change in frequent between the appraisals?

(a) YES

(b) NO

s.no	Options	No. of Responses	Percentage
1	YES	72	72
2	NO	28	28
	Total	100	100

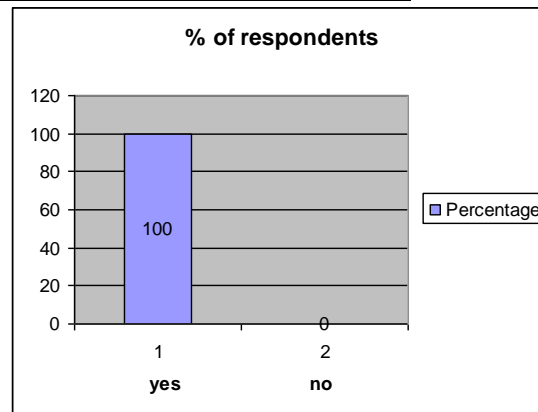


Interpretation:

About 72% of the employees want to change in frequent between the appraisals. And 28% of the employees don't want to change between the appraisals.

11. Have you been able to express all difficulties & problems which you have been facing Regarding your job & achievement of your performance area?
 (a) YES (b) NO

s.no	Options	No. of Responses	Percentage
1	YES	100	100
2	NO	0	0
	Total	100	100

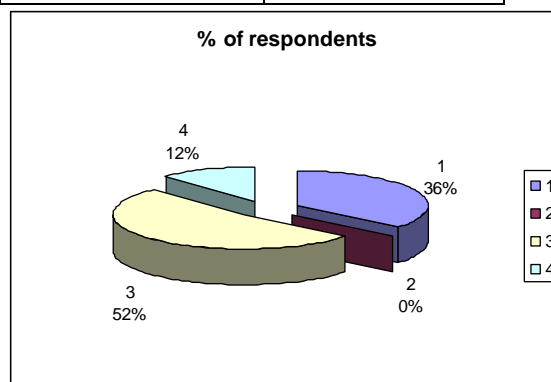


Interpretation:

About 100% of the employees are able to express all difficulties & problems which they have been facing regarding their job.

12. Frequency at which merit rating/Performance appraisal is conducted?
 (a) 1year (b) 2years (c) half yearly (d) Quarterly

s.no	Options	No. of Responses	Percentage
1	1YEAR	36	36
2	2YEARS	0	0
3	HALF YEARLY	52	52
4	QUATERTLY	12	12
	TOTAL	100	100

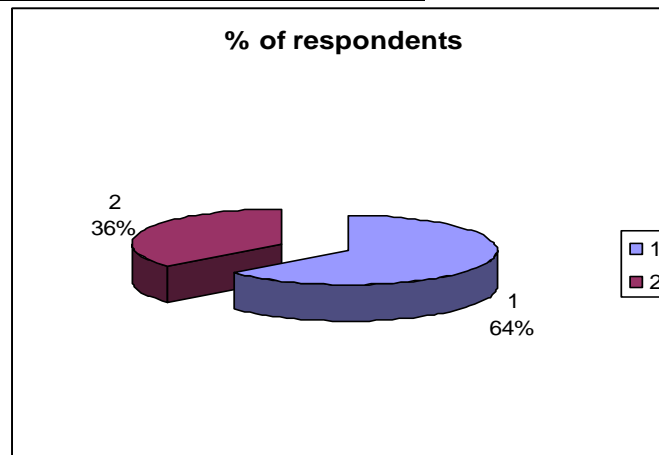


Interpretation:

About 36% of the employees conducted merit rating/performance appraisal at the frequency 1 year, 52% of the employees conducted at half yearly, 12% of the employees conducted at quarterly.

13. Are you satisfied with present Performance appraisal system?
 (a) YES (b) NO

s.no	Options	No. of Responses	Percentage
1	YES	64	64
2	NO	36	36
	TOTAL	100	100

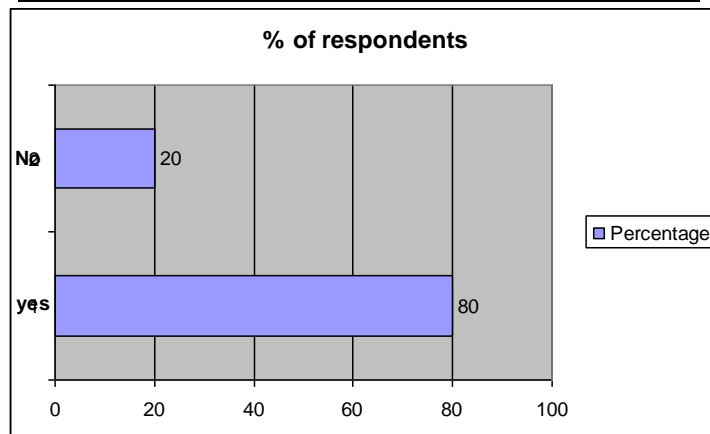


Interpretation:

About 64% of the employees were satisfied with present Performance appraisal system. Rest 36% of the employees was not satisfied with present system.

14. The appraisal is an opportunity for self review & reflection?
 (a) YES (b) NO

s.no	Options	No. of Responses	Percentage
1	YES	80	80
2	NO	20	20
	TOTAL	100	100



Interpretation:

About 80% of the respondents have agreed that its an opportunity to review themselves. About 20% of

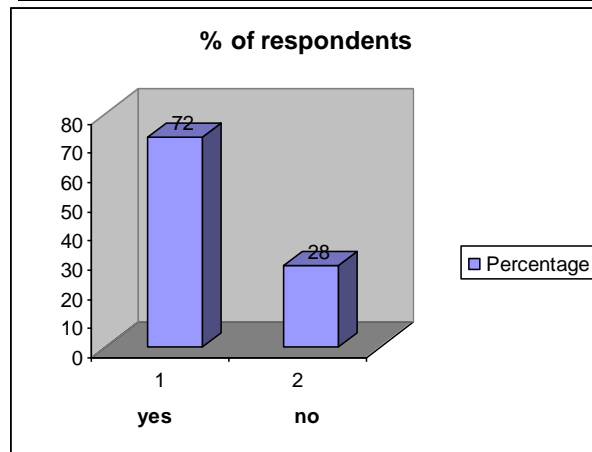
them said that it does not help them in reviewing themselves.

15. Do you think the reward system is fair and adequate?

(a) YES

(b) NO

s.no	Options	No. of Responses	Percentage
1	YES	72	72
2	NO	28	28
	TOTAL	100	100



Interpretation:

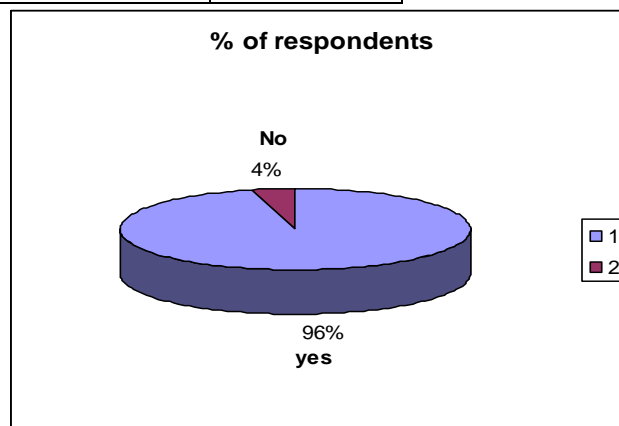
About 72% said that the reward system is fair and adequate and 28% responded that it is not fair.

16. Do you have a good relationship with appraiser after Performance appraisal?

(a) YES

(b) NO

s.no	Options	No. of Responses	Percentage
1	YES	96	96
2	NO	4	4
	TOTAL	100	100



Interpretation:

A Majority 96% of the respondents have the good relationship with appraiser after Performance appraisal. Rest 4% of the respondents is not having a good relationship with appraiser after Performance

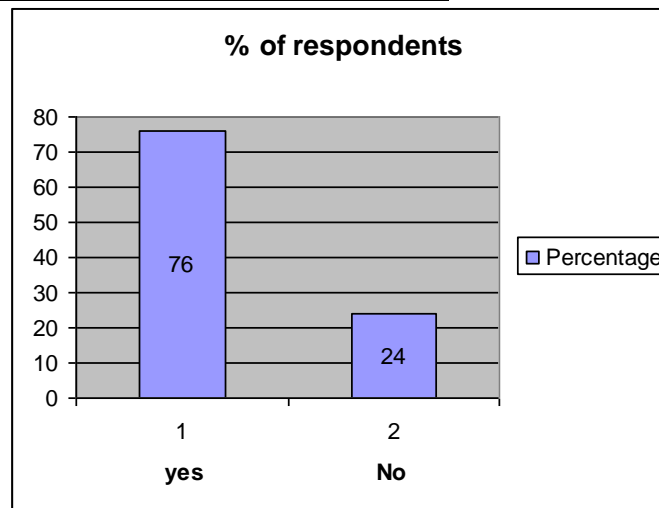
appraisal.

17. Do you feel Performance appraisal promote you?

(a) YES

(b) NO

s.no	Options	No. of Responses	Percentage
1	YES	76	76
2	NO	24	24
	TOTAL	100	100



Interpretation:

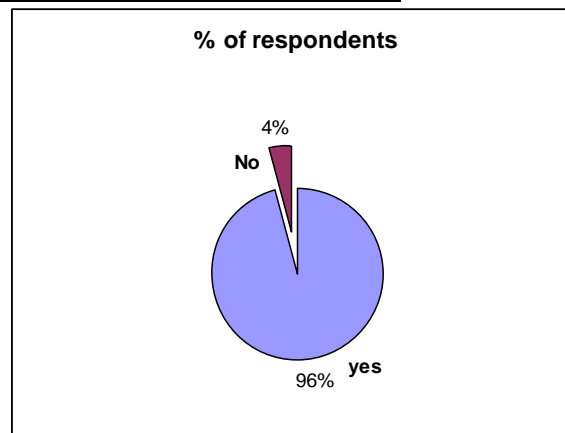
About 76% of the respondents feel that the Performance appraisal can promote the employee. Remaining 24% of the respondents are not agreed with the above sentence.

18. In your opinion PIDS (Process ID service) is necessary?

(a) YES

(b) NO

s.no	Options	No. of Responses	Percentage
1	YES	96	96
2	NO	4	4
	TOTAL	100	100



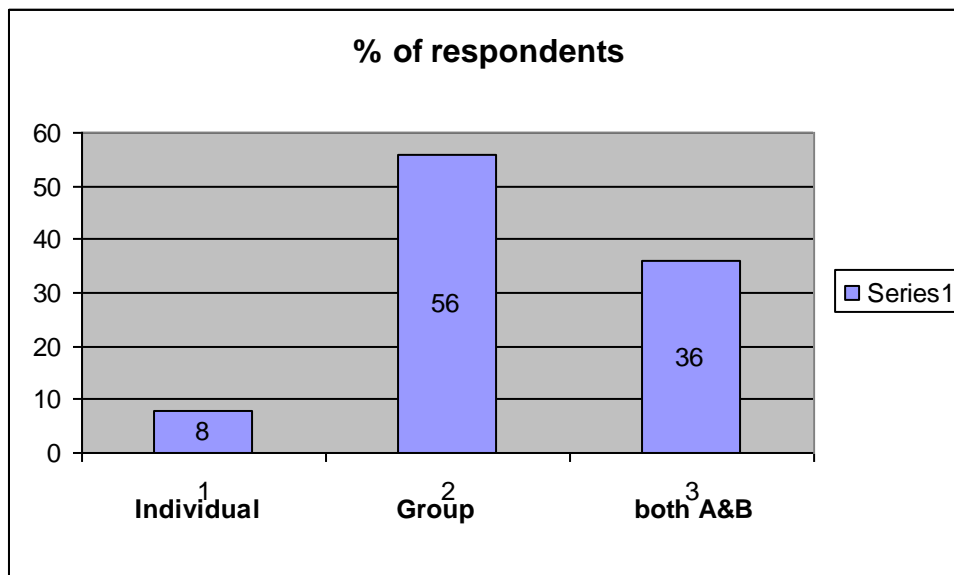
Interpretation:

Majority of 96% of the respondent's opinion is that the PIDS is necessary.
 About 4% of the respondent's opinion is that PIDS is not necessary

19. By which way you are consistent for Performance appraisal in organization?

(a) Individual (b) Group (c) Both A & B

s.no	Options	No. of Responses	Percentage
1	Individual	4	8
2	Group	28	56
3	Both A & B	18	36
	Total	50	100



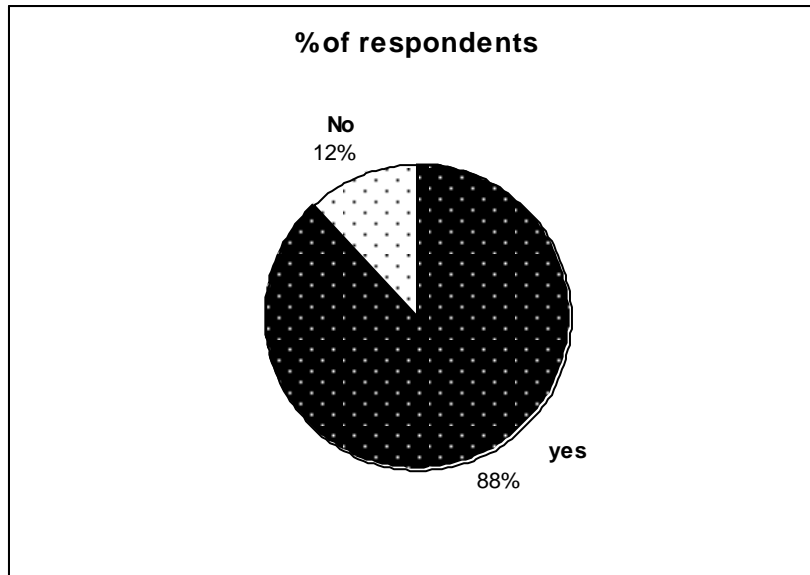
Interpretation:

About 8% of the respondents were consistent as a Individual for Performance appraisal, about 56% of the respondents were consistent as a group for Performing appraisal and 36% of the respondents were consistent as both individual and group for Performance appraisal.

20. Is Balance Score Card helps in improving the Performance?

(a) YES (b) NO

s.no	Options	No. of Responses	Percentage
1	YES	44	88
2	NO	6	12
	Total	50	100



Interpretation:

About 88% of the respondents agrees that the Balance Score Card helps in improving the Performance. About 12% of the respondents disagrees that the BSC helps in improving the Performance.

FINDING

In the light of the above discussion the following findings are made.

- It is revealed that the executive are getting feedback on their performance though which they can review their performance. Sort on the problems and can overcome the difficulties.
- The management has a clear understanding about the problem that the workers are the best with moreover, they are eager to solve the problems of the workers as and when they arise.
- The management was giving requisite training to workers in the areas where they are weak.
- Workers awareness about the fact that the appraisal is one of the factors for promotion was cent percent.
- Performance appraisal system is considered as a means that aim at identifying the areas of improvement, identifying areas of training and development setting performance target for future.
- The management desire having cordial relations with the work to hold mutual discussions.
- The performance appraisal system it exists as it exists now is properly worked out and appropriately evolved. This revealed from the opinion given by the majority of the employees.

SUGGESTIONS

Based on the findings of the study and personal discussions held with various executives and employees at HERITAGE FOODS INDIA Ltd's., Hyderabad possible suggestions and recommendations are given:

- It is recommended that employees should be immediately communicated.
- The result of the appraisal particularly when they are negative.
- It is recommended that the supervisor should try to analyze the strengths and weaknesses of an employee and advise him on correcting the weakness.
- It is commended to counsel the employees appropriately regarding their strength and weaknesses and assist in developing them to realize their full potential in line with the company's goals.

- The top management is very much committed in implementing the performance appraisal system as it is. The performance appraisal system is considered as an essential tool for bridging gap between the top management and the executives it thus helps them to develop cordial relations and mutual understanding.
- It is recommended that the employees should be communicated information about his performance, again his acceptance of it and draw up a plan for future improvement, if necessary.
- It is recommended that the rater must be thoroughly well versed in the philosophy and of the rating system. Factor sales must be thoroughly defined, analyzed and discussed.

To conclude, it is imperative to immunize of the problems or hindrances to strengthen the system.

CONCLUSIONS

1. The rating instruments, which should strive for simplicity not complexity, are derived from job analysis.
2. Training is provided to all employees about the systems and to managers in its use.
3. The appraisal is grounded in accurate job descriptions and the actual ratings are based on observable performance.
4. Evaluations are completed under standardized conditions and are free of adverse impact.
5. Preliminary results are shared with the rate.
6. Some form of upper level review, including an appeal process, exists that prevents a single manager from controlling an employee's career.
7. Performance counseling and corrective guidance services exist.

While many systems may not compare favorably to such standards, recall that the crux of the appraisal problem is not system design. Instead, since evaluation is a matter of human judgment, the conundrum is how the plan and the information it generates is used.

As we peer into the century ahead, personnel appraisal will become either more or less complex. Should the long standing preference for person-centered evaluations persist, then organizational downsizing and workforce changes will likely complicate appraisals. The virtual workplace unbound by time and space is apt to exacerbate this situation.

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**ANALYSIS ON FOREIGN EXCHANGE RISK MANAGEMENT WITH REFERENCE TO
RELIGARE ENTERPRISES LIMITED**

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ABSTRACT

A foreign exchange risk management is a set of procedures that allows a company to achieve its goals in terms of managing currency risk. It is based on the business specifics of the company, including its pricing parameters, the location of its competitors, the weight of FX in the business. A foreign exchange risk management also takes into account the company's sources of information, IT systems, degree of cash flow visibility, and key decision makers (their risk tolerance, their familiarity with different risk management styles. More than four years on from the 2008 financial crisis, the global macroeconomic situation remains extremely uncertain. The US economy is achieving slow growth, but wages and unemployment remain problematic. In Europe, other than in Germany and the Netherlands, the debt crisis appears almost unsolvable. Post-bailout Greece still owes more than 170% of gross domestic product (GDP) despite debt forgiveness; Spain's unemployment rate is over 25%, with its banking system nearly insolvent and so far refusing help. The results from the analysis concluded that the implicit dollar method will significantly preserve the dollar profitability exporters. The employees and managers of exporting firms will be paid implicitly in dollars. The cost to the company will be in dollars. But the pay-out will be in rupees and at the prevailing exchange rates. To overcome these problems exporters should make good governance by making available superior human, social and business infrastructure even if the tax rates are high. Good governance lowers the costs of operations and lowers the aggregate costs of doing business.

Keywords: Risk management, foreign exchange, GDP, Currency, Cash flow.

I. Introduction

International Monetary System

The international monetary system consists of institutions and the financial architecture through which cross-border payments are made. Payments are made on the basis of exchange rate, which expresses the value of one currency in terms of another. Countries have different exchange rate systems and country chooses the foreign currency against which its currency is expressed.

Foreign Exchange Market

The foreign exchange market is the market where the currency of one country is exchanged for that of another country and where the rate of exchange is determined the genesis of foreign exchange market can be traced to the need for foreign currencies arising from:

1. International trade
2. Foreign investment
3. Lending to and borrowing from foreigners

Exchange Rate Determination

Currently, major economic powers in the world (USA, UK, European Union, and Japan) have exchange rates that are fixed by market forces, i.e., the demand and supply of foreign exchange in the foreign exchange market. Theoretically, the value of a country's currency in terms of the currency of another currency (or the exchange rate) is a function of demand and supply. The demand for foreign exchange arises because of imports, FDI outflows and portfolio investments overseas. The supply of foreign exchange arises from exports, FDI inflows and overseas portfolio investment inflows.

The global financial crisis and the on-going health and geo-political issues across the world are causing a lot of tension in the world trade. At this point in time analysing the foreign exchange fluctuations from the perspective of risk and return are of immense importance and are going to lead the world towards a more sustainable and susceptible free trade among different nations.

II. Review of literature:

Prakash Basanna (2019) Foreign exchange risk management (FERM) entails utilizing both external and internal methods like forwards, options, futures, plus swaps which are labeled as currency derivatives. The firms with greater development opportunities and tighter monetary constraints tend to be more willing to utilize currency derivatives. The Forex market offers different derivative instruments to hedge against currency exposures including currency forwards, futures, options, & swaps.

Dr. Rajesh Kumar (2014) with the globalization of Indian economic climate the swap as well as investments have raised along with other nations. All such developments mix to give an increase to cross-currency money flows. The company businesses in India came across currency risk exposure as well as demand for use of modern hedging strategies has arisen for guarding themselves against attendant risks. It's in this particular context that an evaluation of the perceptions as well as issues of the textile exporters within Ludhiana, in relation to derivatives and of the initiatives of theirs in tuning the organizational set up to get as well as follow the requisite abilities in risk management, assumes significance. In this particular research it's discovered the textile exporters within Ludhiana are utilizing hedging resources to conquer the danger of loss as a result of change in international exchange & they're pleased with what they're doing & favour making use of the same to reduce the foreign exchange risk of theirs.

Dr. S. Nagaraju (2018) A Multinational business with high currency danger is apt to experience fiscal difficulties which are likely to experience a disrupting on the working edge of the company. A disrupted economic state is apt to lead to the issue of negative bonuses and also weakens the commitment of different stake holders. Overseas exchange coverage as well as chance is idea that is important in the study of global finance. It's the awareness of the house currency importance of asset, debts, or maybe operating incomes to unexpected modifications in the exchange rates. Exposure is present whether the house currency values on an average in a specific fashion. Additionally, it exists where many currencies are involved. Foreign exchange danger is definitely the variance of the house currency worth of products arising on account of unexpected modifications in the exchange rates. The derivative instruments including forwards, futures & choices are used-to hedge against the international exchange danger of the Multinational corporations. The initial derivatives contract of International Finance is the 'Forward exchange contract'. Forward Foreign exchange is a popular and traditional threat management tool to get protection against adverse exchange fee moves.

Bulawayo (2016) One of the primary key challenges for hospitality and tourism in the Sub Sahara Africa (SSA) region is currency behaviours as well as Exchange rate routine options. If a business engages in global business international currency danger management becomes an important element of doing business and the tourist industry of Zimbabwe wasn't spared on this problem. The goal of the analysis would be to look at the international exchange (forex) Exposure Management Practices by Zimbabwe's tourism as well as hospitality businesses. The study was done by way of a survey on twenty-eight operators in Zimbabwe.

Taufil Mohammad (2017) Exposure to international exchange fee danger is now a progressively vital issue to investors as well as monetary supervisors the same with the globalization of marketplaces, moreover especially in the wake of the happenings which came about in the Asian monetary markets. The effect of international exchange fee exposure on the valuation of the firm continues to be the topic of empirical literature for many years. In the latest times some empirical literature has additionally emerged. This particular analysis evaluation the reports that check out the contact with currency risk of various economies. Both developing as well as developed economies has been governed by this particular study.

A. Marshall (2018) The objective of this particular paper is usually to concurrently survey the foreign exchange danger methods of big UK, Asia and USA Pacific multinational businesses (MNCs). It examined if international exchange risk management methods differ worldwide, which includes initially a big test Asia Pacific MNCs. From 179 (thirty %) functional reactions it's proven that you will find statistically significant local disparities in the value as well as goals of international exchange risk management, the focus on translation and financial exposures, the internal/external methods employed in managing international exchange danger and also the policies in coping with financial exposures.

B. Chandrasekhar Krishnamurti (2013) The reason for this particular analysis is examining the international exchange fee exposure of household companies in the United Arab Emirates (The ramifications and use) of that coverage for the market value of those companies, since the outcome of competition as being a determinant of exchange rate exposure. The justification for this particular research is the fact that the UAE has an open economy with a very high per capita income along with a large yearly industry surplus. Additionally, the World Economic Forum issued the Global Competitiveness report of it's for the entire year 2010 2011 in that the UAE was the one Arab nation which was in the best club of nations which have found an increment in promoting improved and new ways for creating the economies of theirs. Nevertheless, due to the indirect dynamics of international exchange fee exposure for domestic or local companies, the supervisors of these companies are reluctant to participate in hedging

C. ANGELA NANJALA MUMOKI (2009) Considering the banking market will be the backbone of the Kenyan economy, which it's a crucial car which links the Kenyan economic climate to the majority of the planet, that comes with it many consequences especially so the international exchange danger, adoption of proper risk management tactics as well as methods is therefore an important component of an effective banking system in Kenya. A lot of the standard tools used-to hedge currency danger, like futures, swaps as well as choices contracts, are possibly unavailable in emerging markets or even, where available, are traded in ineffective markets and illiquid, making the assortment of things out there very limited.

D. Chris Becker (2006) The Australian economic system has tested resilient to sizable exchange fee fluctuations over the post float time. In part this could be linked to economic institutions as well as non-financial firms learning to adjust to swings in the Australian dollar. This has integrated the increased utilization of fiscal derivative contracts to hedge the foreign exchange exposures of theirs. Aline Mulle (2005) We find proof that is strong in favour of the presence of economies of scale within hedging which European firms do hedging applications in reaction to tax convexity. Our outcomes often help economic distress motives to hedge, though no proof is in favour of company expenses connected motives

III. Need for the study:

- Identifying the factors that cause difficulties in dealing with foreign exchange risk to comment on the fluctuations caused in USD/INR during the study period.
- Analysing the relationships between the extent in the use of the various foreign exchange risk management techniques thus making foreign exchange risk management easier for both institutional and individual investors.
- Gaining knowledge about foreign exchange risk management and its impact factors would enable us in understanding the market better.
- Foreign exchange risk is a major risk to consider for exporters/importers and businesses that trade in international markets.

IV. Scope of the study:

- To study the Foreign exchange risk Management the data is confined to five years (i.e.) 2017-2022.

- Location of the study is confined to Religare Securities Ltd (RSL)-Hyderabad division.
- The analysis tools include, Standard deviation, rate of return, average.
- To sample data Comparison between the high currency rate fluctuation of USD and EURO from 2017-2022.

V. Objectives of the study:

- To discuss the process of foreign exchange rate determination and factors affecting the currency exchange rates.
- To analyse the exchange rates between US dollar and Indian rupee for the period 2017-22.
- To find out reasons for fluctuations in exchange rates of US dollar and Indian rupee for the period 2017-22.

VI. Research methodology:

Data Sources: The requisite data for the study was collected through secondary sources and the sources include,

- Company Website
- Published works of company
- Trading websites.

Duration of the study: The study is conducted for a period 2019-2022

Sample Size: The sample included in the study is USD/INR.

Data Analysis tools: The tools used to analyse the data include,

- Standard deviation.
- Return percentages.
- Graphs

VII. Limitations of the study:

- The major limitation of the research was that the response rate was too small for any significant statistical inference to be derived from the result.
- Due to the financial constraints and the time available for this study, a second mail out was not carried out to lift the response rate.
- For these reasons, an in-depth analysis could not be done as expected. Therefore, the study only focused on the foreign exchange risk management practices in the manufacturing firms.
- The study is confined to analyse the relationship between the firm specific and the risk management practice specific variables.

VIII. Empirical Results:

This section is dedicated to present the results of Data analysis for the study duration,

Date	Price	Open	Return	Average	D	D*D
Jan-17	68.07	68.08	-1.84	0.4	-2.24	5.017
Feb-17	66.94	67.79	-0.56	0.4	-0.96	0.92
Mar-17	65.08	67	0.94	0.4	0.54	0.29
Apr-17	64.53	64.96	0.33	0.4	-0.07	0.004
May-17	64.73	64.42	1.99	0.4	1.59	2.52
Jun-17	64.82	64.69	-0.20	0.4	-0.6	0.36
Jul-17	64.41	64.82	0.60	0.4	0.2	0.04
Aug-17	64.08	64.37	3.78	0.4	3.38	11.4
Sep-17	65.51	64.15	-1.33	0.4	-1.73	2.99
Oct-17	64.99	65.78	-0.15	0.4	-0.55	0.30
Nov-17	64.65	65	1.60	0.4	1.2	1.44
Dec-17	64.06	64.72	-0.38	0.4	-0.78	0.60
						25.935

Table No: 1.1 USD/INR from 1st JANUARY-17to 31st DECEMBER-17

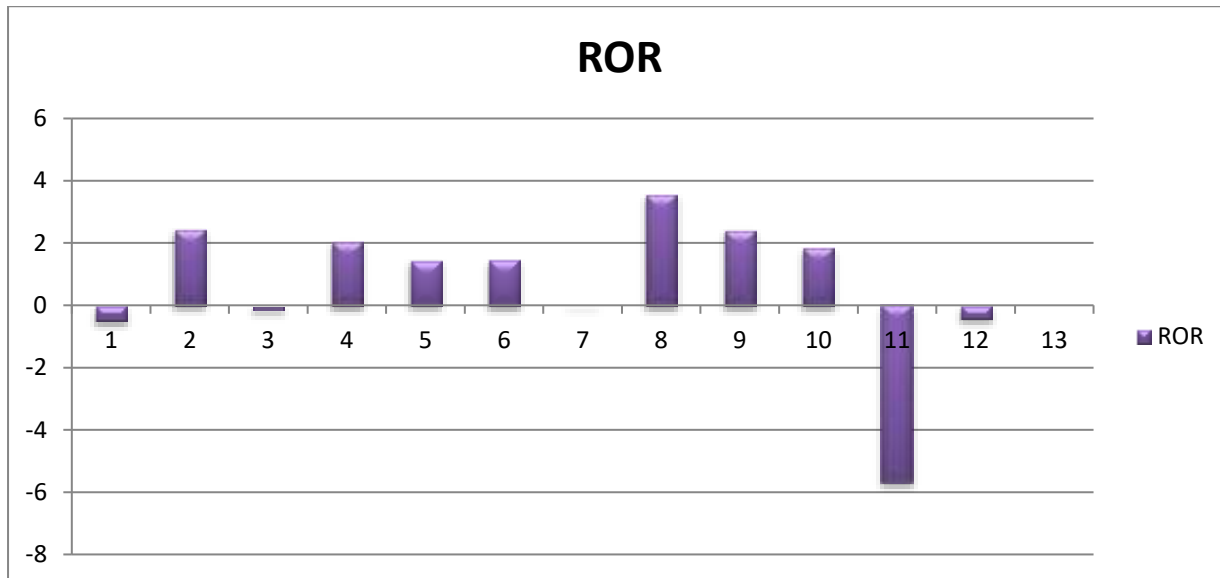
Source: Author's Compilation

$$\text{Rate of Return (ROR)} = \frac{\text{close} - \text{open}}{\text{open}} \times 100; \text{Jan-17 } \frac{62.02 - 63.18}{63.18} \times 100 = -1.84$$

$$\text{AVAREGE} = \frac{\text{total no of items}}{\text{no of items}}; \text{Average} = \frac{4.8}{12} = 0.4$$

$$\sigma = \sqrt{\sum \frac{d^2}{n-1}}$$

$$\text{S. D} = \sqrt{25.935/11} = 1.53$$



Graph No: 1.1.a USD/INR from 1st JANUARY-17to 31st DECEMBER-17

Source: Author's Compilation

The change of USD dollar for a period from 1st January 2017 to 31st December 2017. In the month of August the risk and return peaked up to **112775109.3** and in the month of January the risk and return tailed down to **-53661816.65**. The change of USD dollar for a period from 1st January 2018 to 31st December 2018. In the month of November the risk and return peaked up to **265986394.4** and in the month of March the risk and return tailed down to **-180845240.2**. The change of USD dollar for a period from 1st January 2019 to 31st December 2019. In the month of September the risk and return peaked up to **102085701.3** and in the month of October the risk and return tailed down to **-124015555**. The change of USD dollar for a period from 1st January 2020 to 31st December 2020. In the month of August the risk and return peaked up to **315399448.3** and in the month of December the risk and return tailed down to **-25313726.07**. The change of USD dollar for a period from 1st January 2021 to 31st December 2021.

In the month of September the risk and return peaked up to **328928389** and the month of December the risk and return tailed down to **-23434834.34**. The change of EURO for a period from 1st January 2017 to 31st December 2017. In the month of August the risk and return peaked up to **543530195.2** and in the month of January the risk and return tailed down to **-789870947.5**. The high currency rate fluctuations between USD Dollar and EURO from 2017- 2021. In the year 2015, EURO rates were high compared to USD in other years. The low currency rate fluctuations between USD Dollar and EURO from 2017- 2021. In the year 2015, EURO rates were low compared to USD in other years.

IX. Findings, Suggestions and Conclusion

Findings

1. USD dollar for a period from 1st January 2018 to 31st December 2018. In the month of July the risk and return peaked up to **26767177.53** and in the month of January the risk and return tailed down to **-53661816.65**

2. USD dollar for a period from 1st January 2019 to 31st December 2019. In the month of August the risk and return peaked up to **36987582.24** and in the month of September the risk and return tailed down to **-58610020.43**
3. USD dollar for a period from 1st January 2020 to 31st December 2020. In the month of June the risk and return peaked up to **9408661.964** and in the month of February the risk and return tailed down to **-10106791.36**
4. USD dollar for a period from 1st January 2021 to 31st December 2021. In the month of September the risk and return peaked up to **56775531.03** and in the month of January the risk and return tailed down to **-16530025.73**
5. EURO for a period from 1st January 2018 to 31st December 2018. In the month of August the risk and return peaked up to **543530195.2** and in the month of January the risk and return tailed down to **-789870947.5**
6. EURO for a period from 1st January 2019 to 31st December 2019. In the month of June the risk and return peaked up to **9372833.622** and in the month of December the risk and return tailed down to **-835108141.99**

Suggestions

- Indian companies with sizeable US Dollar denominated exposures are extremely vulnerable to sudden drastic moves in the USD-INR rate.
- They can, to an extent, insulate themselves from such shocks by undertaking hedges in currencies other than Rupee-Dollar.
- For instance, a Dollar payable can be hedged by selling a currency (say Sterling Pound) in order to buy Dollars, instead of selling the Rupee.
- The choice of currency would, of course, depend on the trend and forecast for the currency(s) at that point of time.
- It is easier and safer to generate profits from a Cross-Currency Forward Contract and an Rs 1 Lac profit thereon is equivalent to saving 10 paise depreciation in the Rupee (on USD 1 million).

Conclusion

Despite market expansion the profit generation is still a question mark, so companies have to search for areas of next generation like value added services, software enhancement and development other than just services to survive in the market. In the present day economies are globalized and the stabilities of them are really at stake, the only rescue for the software companies is to improve their responsiveness to the changing scenarios. Indian companies have to develop their services to the bench mark level of global standards so that they can be accepted all over the world. The troubles of many exporters are not a result of the volatility of the rupee but the unfavourably high-cost structure.

Exporters are viable only when foreign exchange earnings get converted into more and more rupees. To improve rupee viability and preserve profits, exporters need to be efficient and productive and bring down aggregate rupee cost. Poor viability will not be resolved by hedging. Considering an inefficient exporter, it requires a breakeven exchange rate of Rs.69 dollar to show profit. In case of forward contract. The forward contract locks in the exporter conversion of dollar revenues to rupee revenues at Rs.71, the market forward price per dollar. The market will surely not buy the exporters dollars at Rs.71 will be wholly ineffective exporters will be in serious trouble despite the perfect hedge. The problem of viability will be solved only when the exporters breakeven moves down to Rs.71 per dollar. By contrast, an inefficient exporter that is viable at Rs.71 per dollar can take advantage of the hedge.

The results from the analysis concluded that the implicit dollar method will significantly preserve the dollar profitability exporters. The employees and managers of exporting firms will be paid implicitly in dollars. The cost to the company will be in dollars. But the pay-out will be in rupees and at the prevailing exchange rates. To overcome these problems exporters should make good governance by

making available superior human, social and business infrastructure even if the tax rates are high. Good governance lowers the costs of operations and lowers the aggregate costs of doing business.

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Crowdfunding: A New Fund Raising Approach to Startup for Business

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Abstract - Getting finance for business startup is most difficult and risk task for business creators. Finance in business is like blood, just as the human body is without blood, so is business without finance. There are many resources / ways to start a business. But in the beginning, it should be clear how much money is needed and when. Financial needs vary depending on the business model and the size and product. So many people are struggling, or fail to generate funds, in due to absence of relationship with industrialists or bank due to lack of sound financial tract record or pledge. This paper is going to study to examine the new trend in financing; that is crowdfunding, types and challenges of crowdfunding, fund raising platforms, funding for new companies and new entities and how it is helpful to capital deficit units.

Index Terms – Startups, Funding Platforms, Pledge, Venture Capital.

INTRODUCTION

Each crowdfunding website is required to attach information to the Entrepreneur and Founder to examine the full details about the product and the venture or goods and services. In general, businesses provide a variety of investments as well as product characteristics, development progress and roadmap for the future. Interested investors and donors look at the details on the website and consult with the manufacturer to provide funding through the website. In 2008 global financial crisis has led to a decline in lending to the banking sector and at the same time confidence in the banking sector. New ideas, startups and other approaches meet the financing needs of existing small and medium enterprises (SMEs), as well as the development of digital technology and financial innovations that have given life to an alternative form of financing.

Internet platforms are very useful for establishing relationships between groups of supporters who are thinking of a new project and are willing to invest funds. Compared to the selection of the most authentic and quality services provided by banks, crowdfunding can be modified to suit individual needs and provide a more flexible approach to the SME sector for fundraising, where it plays a role in establishing better relationships between funding providers and fundraisers. As crowdfunding becomes an open market, a large number of people participate. They volunteer to assist in the funding of product and services. Instead, they expect no reward.

The Crowdfunding Platform is a website that allows managers, founders, implementers of new ideas and other project startups to raise funds through the open market and express details about projects. Supporters can review all the details of the project online and fund a project or topic of their choice. With the current digital technology many employers, donors and sponsors can easily log in to websites.

These websites are very helpful for entrepreneur's project promotion and fundraising. Crowdfunding strengthens the project's financial resource mobilization and finance methods. There have been three recent financial innovations, including corporation benefits and social bonds, as well as crowdfunding. The main purpose of these three financial innovations is to assist in the development of society and the innovations of individuals.

REVIEW OF LITERATURE

Lieser& Groh (2011)“Added that the company section searching business connexons with sales openings and hardware equipment for any of the parts on the web

site is feasible. The innovation climate provides the ability to develop innovative goods, services and structures that better suit societal and environmental requirements in the overall crowdfunding ecosystem. The regulatory system portion contains the factors correlated with sound legal frameworks, land rights security and organizational bureaucracy. The household and the internet contain components which identify the required computing and skills to perform any activity. Finally, the loan segment relates to the terminology and patterns of domestic and non-financial loans and the availability.

Gerber and Hui, (2013) A powerful incentive to contribute to the selection of prizes tends to be for Crowdfunder's. However, though several supporters are driven to join together, the researchers find out that some are driven to donate. Another clear incentive tends to be helping others (i.e. the entrepreneur) for winning crowd founders, both families and friends (f&f), and entrepreneurial backers. Third, as part of and engaging with a group of like-minded persons and with the entrepreneur, several people consulted indicated that there are social advantages. Finally, it was inspired by others to help a cause, namely the need to aid and ensure the progress of a project.

Belleflamme, Lambert and Schwienbacher (2013) The claim argue that crowdfunding must be viewed as a new type of funding based on crowd finance rather than on experienced investors (i.e. others who are professionals at making risky investments), or people with personal ties with the founder (family and friends). They also discuss the attributes of compensation and equity crowdfunding in their theoretical analysis. They sum up three attributes to reward crowdfunding: First, it is always a pre-buying campaign for a product that is already on the market. The provider introduces the characteristics and incentives of the final good that the Crowdfunder will select from. Second, these incentive prices show the ability of customers to pay, encouraging the entrepreneurs to differentiate between two groups: customers who reap higher rewards from consuming the good would be happy to pay more than other users who wait before the commodity is accessible on the market at a cheaper price, to secure additional Community benefits from crowdfunding. This goes

against the economic perception that if you are purchasing anything beforehand, you should be paid with promotions until you realize the cost of the bought product. Thirdly, crowdfunders may recognize and engage in community-based experiences as representatives of their development chain. This involves the procurement of money and active engagement in development.

Mollick (2014) Four principal objectives describe under which entities finance programmes, but further explain why these objectives sometimes intersect, so programmes may enable funders to concurrently accomplish a variety of separate goals. All four priorities are focused on four models: gifts, grants, incentives, and equities. Nevertheless, Mollick (2014) argues that these meanings are inadequate and that their terminology does not take into account two aspects: the founders' purpose and the donors' objective. The paradigm of donation puts funders in the place of philanthropists who do not anticipate a direct return. For example, in arts or humanitarian initiatives, these initiatives prevail. The Fund is given as a lender for the use of financing, as part of the funding model. For the sponsorship of the initiative, the reward-based approach provides the benefits. Different benefits have been described by Mr. Mollick (2014), including the credit in a movie, the artistic contribution in a production product, subsidized contributors, a cheaper price or a related gain. The equity model handles the participant and offers them a stake in the project and financial returns for financing. Wardrop, Zhang, Rau and Gray, (2015) If crowdfunding encourages or contradicts hypotheses of the raising of capital from start-ups is unclear. This uneasiness is stressed in an EY & Cambridge study, where the phenomenon is under-studied and sometimes misunderstood. A literature review about crowdfunding and risk capital investment is discussed in this chapter. Both subjects share some parallels, therefore it makes sense to address risk resources in the evaluation of crowdfunding characteristics.

Previati, Galloppo, & Salustri, (2015) The approach suggested is to assess if our collection was suitable. They also established an index that tests the attractiveness of the crowdfunding ecosystems of the different countries in Europe. A fundamental predictor

of the parameters surrounding this operation can be seen in the cross-funding attractiveness measure. The capacity of countries to attract entrepreneurial activities is based, according to Lieser & Groh (2011), on various factors, but mainly socioeconomic. The Index for Attractiveness consists of five parts which contain information related to the crowdfunding ecosystem: business, creativity, legal background, household and Internet skills and market loans.”

In her dissertation study Vanya Pandakova (2015) states that an "investment project" should be understood as a unique set of interrelated activities aimed at achieving a clearly defined goal related to the construction of new or renovation of existing buildings and facilities through new construction, reconstruction, modernization and major overhaul, of which the main feature is the execution of construction and assembly works, within a defined time period, at a set value and quality requirements, and at predetermined permissible levels of risk.

Another study on motivation of crowdfunders is that of Cholakova and Clarysse (2015). “In addition to evaluating investors' enthusiasm for awards and stock crowd financing projects, the effect of a project on all forms of projects on investors' option of funding for the project would be discussed concurrently. The encouragement of investors is examined by the above results of Gerber and of Hui (2013): receiving (extrinsic) prizes, assisting others, becoming part of a Group, promoting a cause (intrinsic), as well as the need for the entrepreneur to trust. Their survey consists of three separate steps: (1) they have to determine if they want to devote themselves to a presented award campaign and why. (2) respondents are told that an equity CFP project often offers the same project and questioned if they will participate and why. (3) Invitations are granted the chance so far to revisit commitments and determine again how strongly they want to make a commitment in the project (if any) and how much they want to spend as shareholders (if any).

Kelly, (2015) The Agency Hypothesis is commonly used to describe investor-enterprise partnership by scholars researching angels and risk investors but little has been established with respect to the crowdfunding partnership because it is a modern mechanism which

emerged only a few years ago. In the literature on corporate angels and risk capitalists, one factor is agency risk. There is a possibility that investors have considerable difficulties in thoroughly evaluating the entrepreneur's motives and abilities. Secondly, the researchers argued that the idea of business angels and risk capital investors contracts may not give us a full picture and concluded that much more should be clarified by the connexion between investors and entrepreneurs.”

According to Ivan Georgiev (2017), investment projects are a one-time investment of cash in some assets (tangible, intangible and/or financial) to secure income and / or other positive results over a prolonged period. He also states that projects differ in too many ways: scale (large, small); assets (real, financial); areas (markets, production, etc.); objectives (cost minimization, revenue increase, capacity increase); risk (high-risk, low-risk); way of development (with its own forces, by external units) and variance (complementary, mutually exclusive), etc.

Belleflamme et al. (2013) “Call this value to the group which is a crowdfund advantage over conventional support, since this participation will improve the expertise of crowdfunders. They claimed that both reward and equity crowdfunding had group advantages. For equity crowdfunding, the rewards of the community are related to the investing experience and are related to the consumption experience for incentive crowdfunding. Examples of community advantages to investors may be the sense that they belong to a category of citizens that have committed to the very life of a product whilst the advantage to the consumption community may be voting power with respect to product design. If the crowdfunder benefits (consumption or investment benefits) are available, the entrepreneur can concentrate on them and amplify them in order to optimize the crowdfunding potential.”

OBJECTIVES OF STUDY

- To understand the types of crowdfunding.
- To find the various financial sources of startups.
- To know the sources of crowdfunding platforms.
- To analyze the challenges of crowdfunding in startups.

RESEARCH METHODOLOGY

This review explores theoretical and empirical outcomes and we had gone through the academic literature of finance sector and also various sources of secondary data were used for the study.

CROWDFUNDING

Crowdfunding is an alternative way of investing firms in the early stages and in the expansion cycles. It promotes investment through the development of an online forum to finance the project for small donors and individuals through contributing small sums of money and exchanging this concept with others over a set timeline, “which is typically a few weeks. These businesses, especially the social ones, use crowdfunding as a tool, though, not just to finance their services and campaigns but also to attract others who have more interest in the concept itself than potential cash flows or income. It is known that an investor who loves a project is most definitely still involved in the goods and wishes to be his first client. The first step to ensuring potential demand is to create a community that embraces and encourages proposed activities. This is a huge asset in crowdfunding and is exceptional in contrast with other capital outlets.

The following broad categories will group the various business models used by crowdfunding platforms:

- Lending-based crowdfunding (also known as crowd lending, peer-to-peer or marketplace lending): Companies or individuals seek to obtain funds from the public through platforms in the form of a loan agreement.
- Investment-based crowdfunding (Equity crowdfunding): Companies issue equity or debt instruments to crowd- investors through a platform. The current research is dedicated to this model.
- Reward-based crowdfunding: Individuals donate to a project or business with expectations of receiving in return a non-financial reward, such as goods or services, at a later stage in exchange of their contribution.

- Invoice trading crowdfunding: a form of asset-based financing whereby businesses sell unpaid invoices or receivables, individually or in a bundle, to a pool of investors through an online platform.
- Donation-based crowdfunding: Individuals donate amounts to meet the larger funding aim of a specific charitable project while receiving no financial or material return.

VARIOUS SOURCES OF FINANCE FOR STARTUPS

Venture Capital

Raising funds through various companies and individuals to make the necessary investments in businesses run by private individuals or sole proprietors. They fund new businesses in lieu of ownership share. Venture capital firms usually provide funding only to companies with a good track record and good performance. Generally prefer to lend to companies that have high equity investments and are profitable.

Angel Investors

These are individuals or merchants. Funding is usually provided for small survival and development. They like to put their investments in a profitable and safe place. So many contingencies can be put in place just like the venture capital model. Angel investors are interested in the economic development of a particular geographical area. They focus on small investments.

Government Grants

State financial corporation and government institutions provide financial assistance in the form of grants/subsidies to the new entrepreneur or startups.

Initial Public Offerings

Companies may offer equity to public via Initial Public Offer (IPO). It is done when the company is profitable, stable management and higher demand of product and service in the market. It is not happen within a short period to issue IPO, it takes several years to place it.

Warrants

These are a different method of tools which help to people to raise long term finance to companies. Generally, they provide financial assistance to new companies or startups to minimize the risk and encourage investment. These are issued as warranties for initial maintenance in the company as part of the Reimbursement Package.

A warrant is a security that gives the owner of a warrant the right to purchase stock in a company that issues it at a predetermined (exercise) price on a future date (before the specified expiration date).

Its value is related to the market price of the stock and the purchase price (warrant price) of the stock. If the market price of the stock is higher than the warrant price, a holder warrant can be used. This includes buying stock with a warranty price. The warrant is to buy stock at a lower price than the current market price and more it can be used as soon as the price comes.

Debt Financing

Borrow money from financial institutions or individual or bank with an agreement and to repay with the fixed rate of interest at a specific period of time. Who lend money to business they receive benefit on their money that is interest. The debt finance may be secure or unsecured that is depend on the mutual understanding between lender and company. A security lender will provide a loan by pledging any property. This is because if the borrower is in a position to repay the loan by the time agreed upon as per the agreement, the money can be recovered due to this collateral. Also, the unsecured creditor will provide the loan without any collateral. Depending on the type of loan repayment it can be long term and short-term debt. Short term debt can be used for to meet the business operations and long-term debts used to purchase fixed assets such as land, machinery and building so on.

Friends and Relatives

The people who are starting business they may get money from private sources like friends and family. It may be a form of debt or some time own capital and also have a low interest rate. However, if you take a loan from relatives or friends, it should be completed with the same procedure as borrowing from a lender

just like the commercial type. This means creating and executing an official debt document with the amount borrowed, interest rate, repayment terms and conditions.

Banks and Other Commercial Institutions

Banks and other commercial lenders are well-known sources of business financing. Most lenders need a solid business plan, positive reports and affiliates. But these are usually hard to come by in a business start-up. However after the business is done and the profit and loss statements, cash flow budgets and net value statements are provided, the company can take additional funds.

Commercial Finance Companies

Businesses rely on commercial finance companies when they are unable to obtain financing from other commercial sources. Usually these companies pay more attention to yours than enough to repay the money given than the positive reports of the business and the profit estimate. It is not possible to get a loan from a finance company without proper assets or guarantees for the business. However, borrowing from finance lenders is usually less expensive than from commercial lenders.

Government Programs

Central, state and local governments are implementing a number of programs to provide financial assistance to new businesses or small businesses. Governments will always help in the form of subsidies to repay the loans normally taken. The lender is guaranteed by obtaining a loan by mortgaging the limited assets in the business.

Bonds

It is a financial instrument to raise fund for business. There are several types of bonds are available in the market. The bonds may be short term or long term. To meet daily business operation use short term bonds and for purchase of fixed assets and modification of business used long term. Bonds have fixed interest rate and repayable on a specific period of time.

CROWDFUNDING PLATFORMS

Kickstarter:

It is first crowdfunding online platform in India. It was setup in April 2009. It mainly funding for creative projects like technology, music, film etc. it provides simple, safe and reliable method for generating funds through online platform. It collects 5% of fee on total amount for providing such services, if funding is not successful no fee will be collected. It was registered under the income tax act as a charitable trust. The people who are contributing fund, they can tax deduction under sec. 80G i.e 50% of the funding amount.

Wishberry

It raises fund for creative and innovative thoughts. It is a reward-based funding platform to generate funds for innovative and creative thoughts. It mainly focuses on nine zones for access to risk less funding in India - technology, games and apps, arts, design, film, music, theatre, publishing. It was founded in 2011 by AnshulikaDubey, Priyanka Agarwal. The people who are contribute money for the project and in return they get rewards from the project holders.

Indiegogo

It was American crowdfunding platform founded in 2008 by DanaeRingelmann, Slava Rubin, and Eric Schell. It allows people for funding on charity, business startup or innovative ideas. After completion of successful funding or raising amount, they charge 5% fee on the total amount.

Fueladream

It is a platform for funding money for individuals, charities, and firms for creative ideas, causes, events and community activities in India. It was setup in April 2016 in India. The people who want to generate money, they can display it as a story or thoughts in their platform. They have managed more than 700 campaign so far.

Ketto

It is an online crowdfunding platform in India. It is first platform to provide donation based and peer to peer crowdfunding. They provide the funding services across the country for medical to disaster relief. It was

founded in 2012 by VarunSheth, Kunal Kapoor and ZaheerAdenwala and located at Mumbai. It raises funds for individual goals, film, sports team, medical bill payments etc.

Milaap

It is a crowdfunding online platform to provide funding services anyone throughout India for sports, education, medical, and disaster relief, medical and other individual causes. It was founded by young and enthusiastic entrepreneurs Milaap in 2010. At the beginning they raised funds for rural project and small entrepreneurs, later days widely developed by Indian to raise funds from family, friends and social networks for charities and other causes.

CHALLENGES OF CROWDFUNDING

People think that making money through crowdfunding is very easy. But it is not easy for investors to set up a good project to show their support.

- Crowdfunding is not new in India. In ancient times donations were collected from the people and inns and halls were built. But implementing it online is a new thing.
- It is a bit difficult to implement due to lack of proper understanding and trust of the people in India. Winning trust among the people is a big challenge as business is done online.
- To promote long-term credibility and transparency in the Indian industry, the crowdfunding platform needs to be approached in advance.
- Crowdfunding should ultimately look towards building offline debt to create collective awareness and promote larger partnerships.

CONCLUSION

Crowdfunding is a new concept to raise the funds needed to start a business. It is moving fast for fundraising. It is gaining legal legitimacy abroad and is moving forward with a unique set of policies. The growth of small and medium scale industries will be accelerated by raising awareness in India on the

concept of crowdfunding. It serves as an incentive to set up new companies and bring new ideas into reality.

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A STUDY ON EMPLOYEE JOB SATISFACTION AT COCA COLA PRIVATE LIMITED, HYDERABAD

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ABSTRACT:

Job satisfaction refers to one's feelings towards one's job. If the employees expectations are fulfilled (or) the employees get higher than what he / she feels satisfied. If the job satisfaction increases organization commitment will increased. This results in the higher productivity. The main objectives of this paper are to assess the job satisfaction: to identify the effectiveness of job satisfaction and to find out the several factors like personal and organizational factors influencing job satisfaction: to identify the effectiveness of job satisfaction and to find out the several factors like personal and organizational factors influencing job satisfaction of employees.

In this study, 125 no's of respondents have been taken as sample. Percentage analysis, weighted average, chi-square have been incorporated for research analysis. The study helped in revealing the level of satisfaction of employees with reference to the various factors provided in the organization. This study clearly shows that employees under organization are more or less satisfied with the job. The organization should consider on the salary, relationship of employees and supervisors, grievance handling and give more opportunity for the new employees.

Key words: job satisfaction, productivity, organizational commitment.

1.1 INTRODUCTION

Job satisfaction or employee satisfaction is a measure of workers' contentedness with their job, whether or not they like the job or individual aspects or facets of jobs, such as nature of work or supervision. Job satisfaction can be measured in cognitive (evaluative), affective (or emotional), and behavioral components. Researchers have also noted that job satisfaction measures vary in the extent to which they measure feelings about the job (affective job satisfaction), or cognitions about the job (cognitive job satisfaction).

The assessment of job satisfaction through employee anonymous surveys became commonplace in the 1930s. Although prior to that time there was the beginning of interest in employee attitudes, there were only a handful of studies published. Latham and Budworth note that Uhrbrock in 1934 was one of the first psychologists to use the newly developed attitude measurement techniques to assess factory worker attitudes. They also note that in 1935 Hoppock conducted a study that focused explicitly on job satisfaction that is affected by both the nature of the job and relationships with coworkers and supervisors.

History

One of the biggest preludes to the study of job satisfaction was the Hawthorne studies. These studies (1924–1933), primarily credited to Elton Mayo of the Harvard Business School, sought to find the effects of various conditions (most notably illumination) on workers' productivity. These studies ultimately showed that novel changes in work conditions temporarily increase productivity (called the Hawthorne Effect). This finding provided strong evidence that people work for purposes other than pay, which paved the way for researchers to investigate other factors in job satisfaction.

Models of job satisfaction

Edwin A. Locke's Range of Affect Theory (1976) is arguably the most famous job satisfaction model. The main premise of this theory is that satisfaction is determined by a discrepancy between what one wants in a job and what one has in a job. Further, the theory states that how much one values a given facet of work (e.g. the degree of autonomy in a position) moderates how satisfied/dissatisfied one becomes when expectations are/aren't met. When a person values a particular facet of a job, his satisfaction is more greatly impacted both positively (when expectations are met) and negatively (when expectations are not met),

compared to one who doesn't value that facet. To illustrate, if Employee A values autonomy in the workplace and Employee B is indifferent about autonomy, then Employee A would be more satisfied in a position that offers a high degree of autonomy and less satisfied in a position with little or no autonomy compared to Employee B. This theory also states that too much of a particular facet will produce stronger feelings of dissatisfaction the more a worker values that facet.

1.2 NEED FOR THE STUDY:

Job satisfaction of the employees is important if the employees are satisfied then only the organization can function smoothly increases its production, faces competition. If employees are satisfied with their job they will carry a positive attitude. Hence the study has been undertaken to assess the employee job satisfaction which is necessary for the organization in order to make sound decisions. It is said that satisfied employee is a productive employee, any kind of grievance relating to organizational or personal to a greater extent influence on the job. so every organization is giving higher priority to keep their employees satisfaction by providing several facilities which improves satisfaction and which reduces dissatisfaction. Job satisfaction is considered as a key issue by the entrepreneur where efforts are taken and programs are initiated.

1.3 SCOPE OF THE STUDY

The job satisfaction refers to a person's feeling of satisfaction on their job. It is different from person to person. The researcher has chosen to measure the level of job satisfaction in COCA COLA. The study considers only the perceptual elements of employees and does not focus on ground realities. The scope of study cover: work conditions, compensation, extra benefits, conveyance treatment of superiors, colleagues, duty timings, grievance redressal mechanism and promotion policy.

1.4 OBJECTIVES OF THE STUDY

Broad objective:-

- i. To study the overall job satisfaction of employees in COCA COLA,
- ii. To measure the level of satisfaction among employees in COCA COLA
- iii. To measure the relationship and human relations & job satisfaction.
- iv. To find out the most distaining factors which influence their performance in the job.

- v. To give amicable and practical suggestions to improve job satisfaction of employees in COCA COLA.

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- vi. To study the growth opportunity programmers & Training programmers in notice confectionery limited.

1.5 RESEARCH METHODOLOGY

The methodology that is adopted for the study is such that it facilitates the data accumulation. The information is gathered through survey method. The survey method has been adopted for collecting the data from employees.

DATA SOURCES:

Data means a collection of facts in real life statistical data is a collection of facts in numerical figures. The data sources are usually identified using the type of data needed. There are two types of data. The data collected for this research has provided the base for its analysis and interpretation. The data collected was used to draft charts, illustrate through graphs and thus provide for its adequate interpretation. In this research, Primary data as well as Secondary data has been used.

1. Primary data:

The primary data was collected from the respondents by administering a structured questionnaire and also through observation, interview and discussion with management.

2. Secondary data:

Company profiles, Previous year report, Literatures , Journals , Internet, Intranet.

RESEARCH DESIGN

Research Design is defined as the specification of methods and procedures for acquiring the information needed. Generally the research design is any of the following three types- DESCRIPTIVE, EXPLORATORY and CASUAL.

• DESCRIPTIVE STUDY:

Descriptive study/research is marked by the prior formulations of specific research questions. The investigator already knows a substantial amount about the research problem before the project is initiated. Hence this is chosen for my research.

• EXPLORATORY STUDY:

The major purpose of exploratory study is the identification of problem, the more precision formulation of problem and the formulation of new alternative courses of action.

1.4 OBJECTIVES OF THE STUDY

Broad objective:-

To study the overall job satisfaction of supervisors in COCA COLA,

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Specific objectives:-

- i. To measure the level of satisfaction among supervisors in COCA COLA
- ii. To measure the relationship and human relations & job satisfaction.
- iii. To find out the most distaining factors which influence their performance in the job.
- iv. To give amicable and practical suggestions to improve job satisfaction of supervisors in COCA COLA.
- v. To study the growth opportunity programmers & Training programmers in notice confectionery limited.

CASUAL STUDY:

The study involves the determination of the causes of what the researchers are predicting. This is mainly a cause and effect study.

The research design selected by the researcher in the present study is “DESCRIPTIVE” in nature.

RESEARCH INSTRUMENT:

HR research has a one main research instruments in collecting primary data. That is questionnaires.

In order to extract first-hand information from the respondents, a pre-tested questionnaire was prepare and the same was administered to the respondents.

LIMITATIONS

It is true to highlight that every research has its own limitations whether it is being conducted in any area of studies including social sciences. It might be because researcher could not possibly bring the whole perspective of a particular area in one fine study. Therefore, it is imperative to emphasize that research itself is a learning process by which researcher tries to prove many conceptual and methodological issues pertaining to his/her research work.

Hence, like other researches the present research endeavour also suffers from some of the limitations, which are enumerated below :

- i. The size of the sample of present investigation is limited in its nature, which puts— a limitation on the generalization of results of the present study.
- ii. The present investigation was confined with only few Psychological variables— namely, School Organizational Climate, Teaching Attitude, Adjustment and Job Satisfaction while other important psychological variables could also have been included, such as job commitment, job involvement, job motivation, interest and others.

REVIEW OF LITERATURE

Job satisfaction describes how content an individual is with his or her job. The happier people are within their job, the more satisfied they are said to be. Job satisfaction is not the same as motivation, although it is clearly linked. Job design aims to enhance job satisfaction and performance, methods include job rotation, job enlargement and job enrichment. Other influences on satisfaction include the management style and culture, employee involvement, empowerment and autonomous work position. Job satisfaction is a very important attribute which is frequently measured by organizations. The most common way of measurement is the use of rating scales where employees report their reactions to their jobs. Questions relate to rate of pay, work responsibilities, variety of tasks, promotional opportunities, the work itself and co-workers.

History

One of the biggest preludes to the study of job satisfaction was the Hawthorne studies. These studies (1924–1933), primarily credited to Elton Mayo of the Harvard Business School, sought to find the effects of various conditions (most notably illumination) on workers' productivity. These studies ultimately showed that novel changes in work conditions temporarily increase productivity (called the Hawthorne Effect). It was later found that this increase resulted, not from the new conditions, but from the knowledge of being observed. This finding provided strong evidence that people work for purposes other than pay, which paved the way for researchers to investigate other factors in job satisfaction.

Scientific management (aka Taylorism) also had a significant impact on the study of job satisfaction. Frederick Winslow Taylor's 1911 book, *Principles of Scientific Management*, argued that there was a single best way to perform any given work task. This book contributed to a change in industrial production philosophies, causing a shift from skilled labor and piecework towards the more modern of assembly lines and hourly wages. The initial use of scientific management by industries greatly increased productivity because workers were forced to work at a faster pace. However, workers became exhausted and dissatisfied, thus leaving researchers with new questions to answer regarding job satisfaction. It should also be noted that the work of W.L. Bryan, Walter Dill Scott, and Hugo Munsterberg set the tone for Taylor's work.

Models of job satisfaction

Affect Theory

Edwin A. Locke's Range of Affect Theory (1976) is arguably the most famous job satisfaction model. The main premise of this theory is that satisfaction is determined by a discrepancy between what one wants in a job and what one has in a job. When a person values a particular facet of a job, his satisfaction is more greatly impacted both positively and negatively, compared to one who doesn't value that facet. To illustrate, if Employee A values autonomy in the workplace and Employee B is indifferent about autonomy, then Employee A would be more satisfied in a position that offers a high degree of autonomy and less satisfied in a position with little or no autonomy compared to Employee B. This theory also states that too much of a particular facet will produce stronger feelings of dissatisfaction the more a worker values that facet.

Dispositional Theory

Another well-known job satisfaction theory is the Dispositional Theory Template: Jackson April 2007. It is a very general theory that suggests that people have innate dispositions that cause them to have tendencies toward a certain level of satisfaction, regardless of one's job. This approach became a notable explanation of job satisfaction in light of evidence that job

satisfaction tends to be stable over time and across careers and jobs. Research also indicates that identical twins have similar levels of job satisfaction.

Two-Factor Theory (Motivator-Hygiene Theory)

Frederick Herzberg's two factor theory (also known as Motivator Hygiene Theory) attempts to explain satisfaction and motivation in the workplace this theory states that satisfaction and dissatisfaction are driven by different factors – motivation and hygiene factors, respectively. An employee's motivation to work is continually related to job satisfaction of a subordinate. Motivation can be seen as an inner force that drives individuals to attain personal and organizational goals (Hokinson, Porter, & Wrench, p. 133). Motivating factors are those aspects of the job that make people want to perform, and provide people with satisfaction, for example achievement in work, recognition, promotion opportunities. Hygiene factors include aspects of the working environment such as pay, company policies, supervisory practices, and other working conditions.

3.1 INDUSTRY PROFILE

As one of the most important industries that satisfy daily human necessities, food and beverage has witnessed a surge in market share minute by minute. For a long time, they have been considered a first-rate field for running a business. Thereby, especially in the beverage industry, more and more stakeholders desire to engage in this fat land of benefit.

This article will give you a brief overview of the beverage industry: information about the general development of this giant industry- beverage segment with collected statistics, features, and the competitive level.

3.2 COMPANY PROFILE

As the largest beverage company with the most extensive distribution system in the world. You may know us simply as Coca-Cola--the world's most valuable brand and a global icon. The Coca-Cola Company is the world's leading manufacturer, marketer, and distributor of nonalcoholic beverage concentrates and syrups. Its world headquarters is based in Atlanta, Georgia. The company and its subsidiaries employ nearly 31,000 people around the world.

The Coca-Cola Company manufactures syrups, concentrates and beverage bases for Coca-Cola, the company's flagship brand, and also produces over 230 other soft-drink brands sold by and its subsidiaries in nearly 200 countries around the world. Some of Coca-Cola's latest domestic marketing strategies include Coke dominating fountain sales. Thousands of consumers visit fast-food restaurants every day and Coke feels that it is very important to have the consumer see and drink their product at such chains as McDonalds, Burger King, and Domino's Pizza. Coca-Cola is also testing a new plastic cup in the famous Coca-Cola.

The Coca-Cola Company was first established in 1886 by Dr John Styth Pemberton. Today, the company is the world's leading manufacturer in the beverage industry, operating globally in more than 200 countries with its head office located in Atlanta, USA.

The Coca-Cola Company brands include:

- Coca-Cola
- Coke Zero
- Dasani water
- Diet Coke
- Glacéau
- Fanta
- Fresca

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- Full Throttle
- Mello Yello
- Minute Maid
- Monster Energy distributed by Coca-Cola, made by Hansen Natural
- Sprite
- Thums Up

Slogans from the 1990's to 2021

- 1990 - You Can't Beat the Real Thing
- 1993 - Always Coca-Cola
- 2000 - Coca-Cola. Enjoy
- 2001 - Life Tastes Good

- 2003 - Coca-Cola ... Real
- 2005 - Make It Real
- 2006 - The Coke Side of Life
- 2009 - Open Happiness
- 2016 - Taste the Feeling

HISTORY OF COCA COLA

A pharmacist named Dr. John Stith Pemberton invented the refreshing taste of Coca-Cola in 1886. Concocted by a mixture of caramel-colored syrup in a three-legged brass kettle while in his backyard. He then decided to try to “market” the drink at Jacobs’ Pharmacy in his hometown of Atlanta, Georgia. For five-cents, customers were able to enjoy a glass from the soda fountain. An average of nine drinks were sold a day. In 1891 Dr. John Stith Pemberton sold Coca-Cola for 2,300 to an entrepreneur named Asa G. Candler. Within the next four years Coca-Cola was distributed throughout the whole nation. 1893 the Cola-cola trademark and script were patented. The “two C’s were though to look well for advertising”. In 1899 large-scale bottling becomes possible when Asa Candler grants Joseph B. Whitehead and Benjamin F. Thomas exclusive rights for one dollar. But in 1919 Coca-Cola was sold for \$25million to a banker in Atlanta name Ernest Woodruff and a group of investors. That same year, Coca-Cola sold its first share of stock for forty dollars a share. Assuming all dividends were reinvested, those original shares would have been worth approximately \$6.7 million at the end of the year.

Ingredients of Coke

- Carbonated Water
- High Fructose Corn Syrup
- Caramel Color
- Phosphoric Acid
- Natural Flavors
- Caffeine

Description:

This company profile offers a comprehensive analysis of the organization, its business segments, and competitors. It analyzes the business and marketing strategies adopted by the company, to gain a competitive edge in the industry. The profile also evaluates the strengths of the company and the opportunities present in the market.

This profile is of immense help to management consultants, analysts, market research Organizations and corporate advisors. The objective and scope of various sections of our company profile has been discussed below.

Business Developments

This section examines the significant developments that have taken place in the company. It is in the form of news analysis where the most critical company news is discussed.

Discussion of Business Strategies

This section talks about the current and future strategies of the company. All business, marketing, financial and organizational strategies are discussed here.

SWOT Our SWOT Analysis is a valuable step in assessing your company's strengths, weaknesses, opportunities, and threats. It offers powerful insight into the critical issues affecting a business.

Financial Performance

It discusses the most recent financials of the company and also compares the historical sales & income figures with the current and projected figures. The objective is to evaluate the financial health of the company. The analyst opinion and stock performance help us in evaluating the performance of the company from an investor's viewpoint.

Competition Synopsis

This section compares the company with its peer group. The comparable analysis and stock movement are aimed at giving an overview of the competitive landscape in the industry and the company's positioning in its peer group.

Analysis Soft Drink

1 Analysis of the U.S. soft drink industry, based on the competitive forces model of Michael Porter.

In the soft drink industry the entry of new competitors depends on the barriers to entry that are present, and also the reaction from existing competitors that the entrant can expect.

I will now analyze the six major sources of barriers to entry the soft drink industry.

Economies of scale deter entry by forcing the entrant to come in at large scale and risk strong reaction from existing firms or come in at a small scale and accept a cost disadvantage. If a company wants to decline its unit costs of their product, they will have to produce more to lower the cost. The more you produce, the lower the costs.

Definition of soft drinks

The Coca-Cola Company North America offices in Sugar Land, Texas, United States According to the 2005 Annual Report, the company sells beverage products in more than 200 countries. The report further states that of the more than 50 billion beverage servings of all types consumed worldwide every day, beverages bearing the trademarks owned by or licensed to Coca-Cola account for approximately 1.5 billion.

Also according to the 2007 Annual Report, Coca-Cola had gallon sales distributed as follows:

- 37% in the United States
- 43% in Mexico, Brazil, Japan and the People's Republic of China
- 20% spread throughout the rest of the world

In 2010 it was announced that Coca-Cola had become the first brand to top £1 billion in annual UK grocery sales.

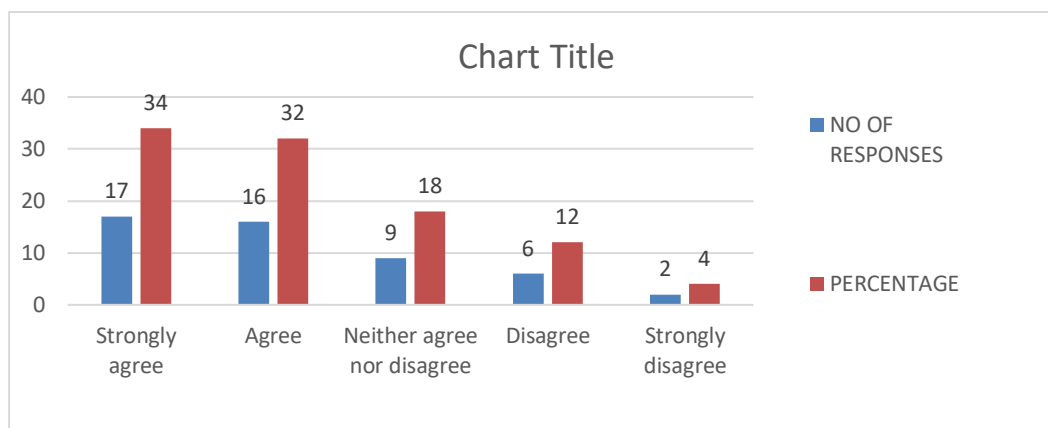
DATA ANALYSIS AND INTERPRETATION

Table No: 4.1

Working hours are convenient for you

PARTICULARS	No of responses	PERCENT
Strongly agree	17	34
Agree	16	32
Neither agree nor disagree	9	18
Disagree	6	12
Strongly disagree	2	4
TOTAL	50	100

CHART 4.1



Interpretation:

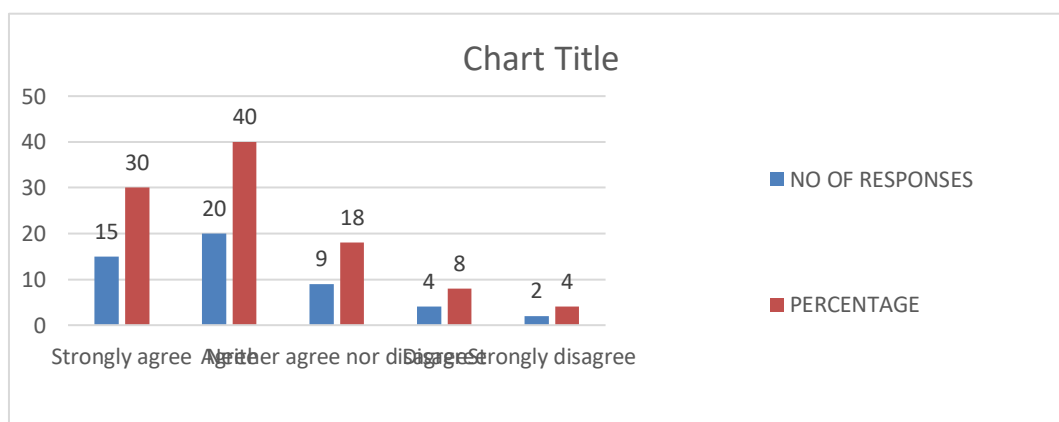
From the above chart and table it is clearly evident that 34% of the Respondents strongly agree that working hours are convenient from them and 32% agree with that and 18% neither agree nor disagree and 12% disagree with the working hours and 4% are strongly against working hours.

Table No: 4.2

Are happy with your work place

PARTICULARS	NO OF RESPONSES	PERCENT
Strongly agree	15	30
Agree	20	40
Neither agree nor disagree	9	18
Disagree	4	8
Strongly disagree	2	4
TOTAL	50	100

CHART4.2



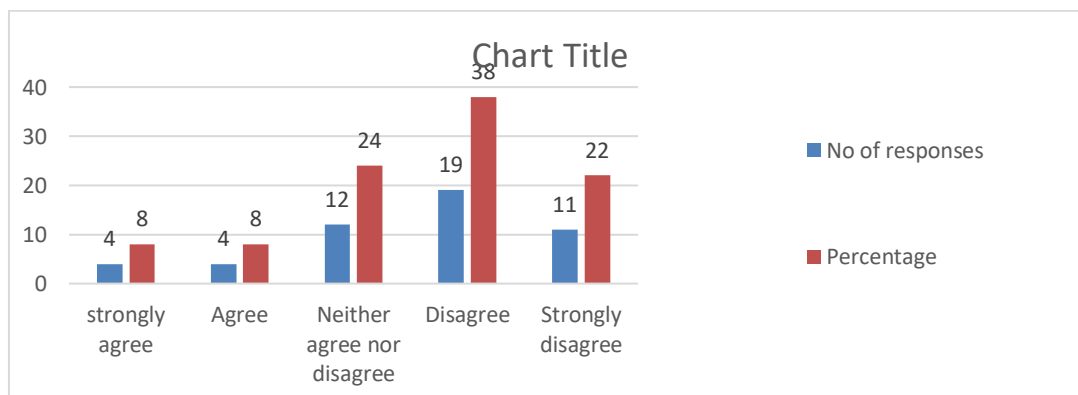
Interpretation:

From the above table it is clear that 30% respondents strongly agree and 40% respondents agree that they are happy with their work place only 8% disagreed and 18% have no idea towards their work place.

Table No:4.3

Do you feel you have too much work to do

PARTICULARS	NO OF RESPONSES	PERCENT
strongly agree	4	8
Agree	4	8
Neither agree nor disagree	12	24
Disagree	19	38
Strongly disagree	11	22
	50	100

CHART-4.3**Interpretation:**

From the above table it is quite clear that the work load is not high, 38% of the respondents disagreed with the question” I feel I have too much work” and another 22% strongly disagreed, 16% admits they have too much work and 24% have no idea towards this question.

FINDINGS

➤ Using the calculated Simple percentage values for the variables, the level of satisfaction of the employees in the organization can be known. They are from 100 - 80% can be regarded as Highly Satisfied, 79 - 60 % can be regarded as Satisfied , 59 - 40 % can be

regarded as Neither satisfied nor dissatisfied, 39 - 20 % can be regarded as Dissatisfied and 19- 0 % can be regarded as Highly Dissatisfied.

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- Employees are highly satisfied with company, work and relationship with colleagues
- Experience and satisfaction with Promotional Opportunities & Possibility of Growth
- Experience and satisfaction with Training & Development

SUGGESTIONS

- There is some dissatisfaction level regarding the Salary among the employees. So, the company may conduct a further survey to find the expectations of employees.
- The study shows that employees are not satisfied with the working environment and infrastructure. So the company may take steps to find out and cater the needs of employees.

CONCLUSION

A survey on satisfaction of employees' has been conducted to know the existing levels of satisfaction so that steps can be taken to maintain and improve the levels and to have a positive attitude among the employees towards their work.

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A STUDY ON CHANGE AND ORGANIZATION DEVELOPMENT AT CIPLA PHARMACEUTICAL COMPANY, HYDERABAD

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Abstract

Organizational development is a main factor to change the organizational growth. It involves several ideas and thoughts from several kinds of peoples. It may used to identify the organizational problems and employee capacities. The development in a organization brings a new ideas to organizational growth and its uses to bring the organization to good position. This article brings a lot of concept and development techniques to explain the organizational development and its improvement. People often do not know what is meant by ‘organizational development’ and yet, if they work in international development, it is very likely that they will have been involved in it. Essentially, it is a planned, organization - wide effort to achieve strategic goals more effectively and efficiently. This report draws on current literature, good practice examples, interviews and case studies on organizational development, to distil useful frameworks and recommendations for future work. It is structured to address the different stages and components of the organizational change process.

INTRODUCTION

Organizational development plan is the process through which an organization develops the internal capacity to be the most effective it can be in its mission work and to sustain itself over the long term. This definition highlights the explicit connection between organizational development work and the achievement of organizational mission. This connection is the rationale for doing OD work. Organization development, according to Richard Beckhard, is defined as:

- ☐ A planned effort...
- ☐ organization-wide...
- ☐ managed from the top...
- ☐ to increase organization effectiveness and health...
- ☐ through planned interventions in the organization's 'processes', using behavioural science knowledge.

According to Warren Bennis, organization development (OD) is a complex strategy intended to change the beliefs, attitudes, values, and structure of organizations so that they can better adapt to new technologies, markets, and challenges.

NEED OF THE STUDY

The fact that OD focuses on the health of both the individual and the entire organization is important for HR managers. One cannot exist without the other. Effective OD works to ensure every

individual's goals and vision are aligned with that of the organization. Organizational development, often abbreviated as OD, improves existing processes and creates new ones. The idea is to understand how to maximize the effectiveness, potential, and capacity of both people and organizations. The science of OD combines industrial/organizational and adult developmental psychology. Organizational development (OD) is an HR function that assesses the need for change, designs an intervention or process, helps management introduce the change, and then evaluates the effectiveness of the change.

SCOPE OF THE STUDY

This project confines to the research in Cipla pharmaceutical company area of Hyderabad consist of 60 Employees

- ☐ Origin and history of organization development.
- ☐ Need for the organization development.
- ☐ Development in organization.
- ☐ Organization development for individual firms.
- ☐ Organization development levels and process.
- ☐ Resistance to change.

OBJECTIVE OF THE STUDY

- ☐ To find of the employees awareness on the organization development that are anticipated in Cipla pharmaceutical company
- ☐ To find out what and how people accept and adopt organization development at work place.
- ☐ To determine the techniques affecting change.
- ☐ To suggest strategies that will increase employees changing behaviour.
- ☐ To study the change management programmed being followed in various economics.

RESEARCH METHODOLOGY

The basic idea sampling is that by selection some of the elements in a population we may draw conclusion about the entire population. For any systematic inquiry application of appropriate methods and scientific bent of mind are Sinequanon. This has an important bearing on the collection of reliable data of the present study is to acquire an intensive option about the organization development in Cipla pharmaceutical company.

Sampling design: Sample population: Sample population for this is all employees working in Cipla pharmaceutical company in Hyderabad.

Sample size: In this project sample size Is which include 60 staff of company.

Sampling technique: in this study non-probability convenient sampling was taken as the sampling technique. as the sample unit of the organization has been taken.

Sampling tools: The study has been carried out by using structured questionnaire is prepared by negotiating with the guide.

Data collection: The data used for analysis and interpretation form annual reports of the company that is secondary forms of data.

LIMITATIONS OF THE STUDY

The study period of 45 days as prescribed by university

The study is limited unto the date and information provided by in Cipla Pharmaceutical company and its annual reports The report will not provide exact change development status and position in Cipla Pharmaceutical company; it may vary from time to time and situation to situation.

REVIEW OF LITERATURE

- ☐ According to Kung Wong Lau(2018)

A collective organizational learning model for organizational development As well, the emergence of innovative business environments and tacit knowledge-based society urges a new form of organizational learning model to cope with employees' learning, knowledge transfer and even knowledge management. The paper aims to discuss these issues.

- ☐ According to David G. Carnevale(2019)

Organizational Development in the Public Sector This book defines organizational development (OD) and discusses the philosophy of OD in terms of its assumptions and values. It addresses the issue of change in organizations and deals with groups and group processes since they are the forerunners of teams in organizations.

- ☐ According to Clare Huffington(2020)

A Manual of Organizational Development

A practical guide to the essentials of organisational change which makes complex concepts accessible to managers, consultants, human resources professionals and others. Includes a directory of further sources of information and assistance.

- ☐ According to Robert T. Golembiewski (2021)

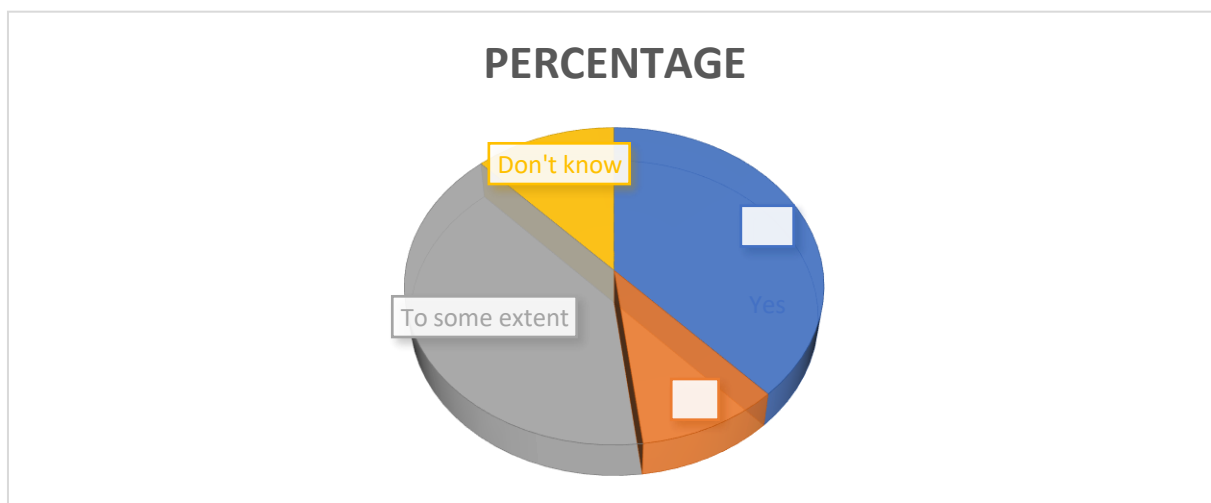
Ironies In Organizational Development Ironies in Organizational Development, Second Edition is an outstanding text for upper-level undergraduate and graduate students taking organizational development courses in the departments of public administration, psychology, management, and sociology, as well as for in-service and professional workshops.

DATA ANALYSIS & INTERPRETATION

1. Do you feel the compelling reasons for adopting the change programme?

- a. Yes
- b. No
- c. To some extent
- d. Don' t Know

Option	NO of employee	Percentage
Yes	9	38%
No	5	10%
To some extent	20	40%
Don' t Know	6	12%



Source :

From question given to the 50 % Employees.

Interpretation:

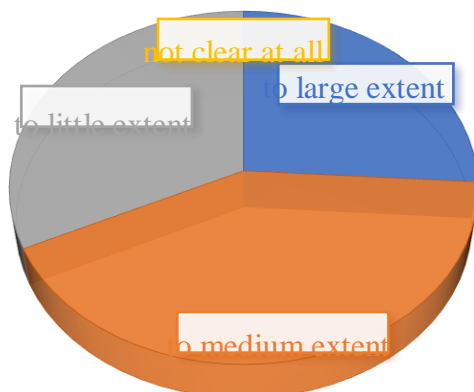
The above chart reveals that 40 % for the employees say that to some extent ,they feel the compelling reasons for adopting the development ,38% of them say yes,12 % don't know ,and10% say no.

2. Are you aware of how when and where the develop will happen ?

- a. to large extent
- b. to medium extent
- c. to little extent
- d. not clear at all

Options	No of Employees	Percentage
to large extent	13	26%
to medium extent	21	42%
to little extent	16	32%
not clear at all	0	0%

PERCENTAGE

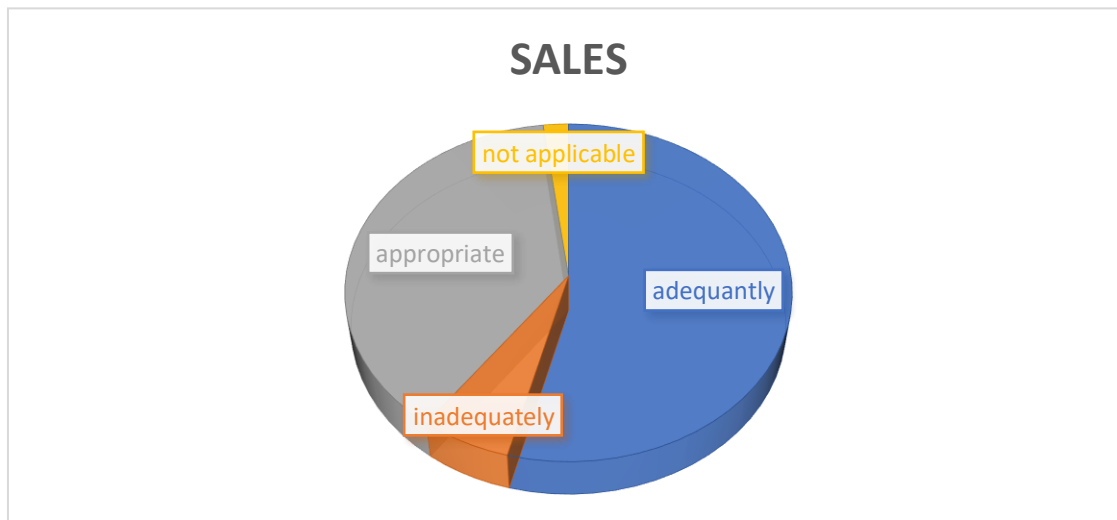


Source : From question given to the 50 % employees.

Interpretation: The above chart reveals that 42% of the employees are aware to medium extent of how ,when where the change will happen ,32% of them to large extent and 26% of them to a little extent.

3. Does the senior executive team support need based changes ?
 - a. adequately
 - b. inadequately
 - c. appropriately
 - d. not applicable

options	No of employees	percentage
adequantely	27	54%
inadequately	19	6%
appropriately	1	38%
not applicable	1	2%



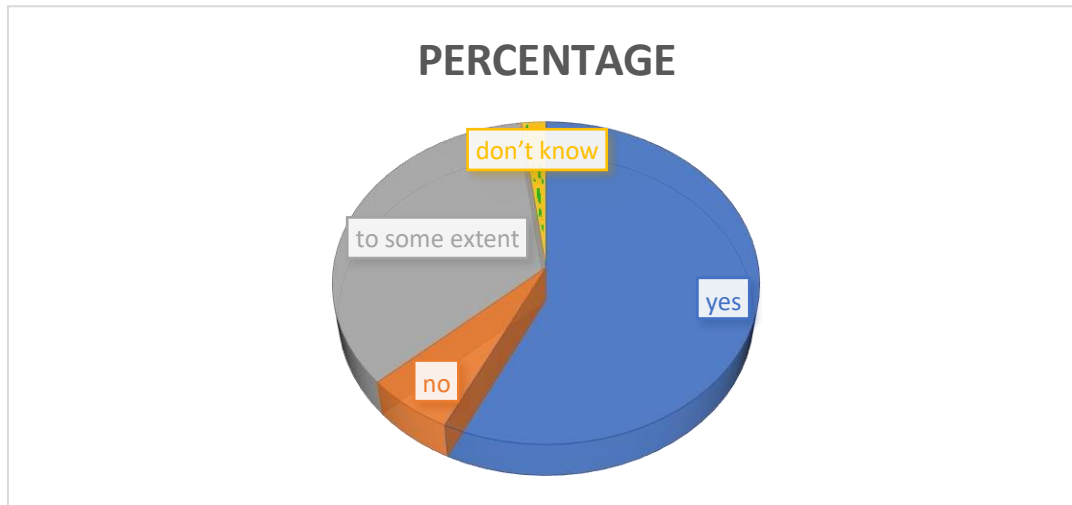
Source : From question given to the 50 % employees.

Interpretation: The above chart reveals that 65% of the employees say that senior executive team support the need based change adequately and 30% of the employees say appropriately and 3% of say that senior executive team support the need based change inadequately and 2%.

4. Has awareness programmes been conducted by your organization while implementing development.

- a. yes
- b.no
- c.to some extent
- d. don't know.

option	No of employees	percentage
Yes	29	56%
No	3	6%
To some extent	17	34%
Don't know	1	2%



Source : From questionnaire given to the 50 % employees.

Interpretation: The above chart reveals that 54% of the employees say that senior executive team support the need based change adequately and 38% of the employees say appropriately and 6% of say that senior executive team support the need based change inadequently and 1%.

FINDING SUGGESTIONS AND CONCLUSION

FINDINGS

- ☐ Above all else, the key lesson learned from the OD process is that OD is an ongoing process which organization must continually address if they are to be healthy and effective. Thus, the Justice Centre is committed to making OD an ongoing part of its future focus.”
- ☐ OD never stops. We’re just beginning. We’re not going to let the OD money run out. We’re going to find ways to pay for it.”
- ☐ We learned that organizational development is everybody’s job. It is a continual process that never ends.”

SUGGESTIONS

After analysis and conclusions, there is some need to provide a few suggestions to the organization I am sincerely providing these suggestions for the welfare of the organization. In order to analyze the job, we have to do some changes.

- ☐ Mainly inspecting work is the main activity that is in the part of incumbent’s supervisory duties. Not only that, there are several activities like training, performance appraisal, coaching etc. also be given to the employees.
- ☐ I observed that eighth grade education is enough for this job.
- ☐ If you take proper precautions for mechanical hazards, the employees can both job effectively and get more output.

CONCLUSIONS

These core components of effective organizations offer a framework for understanding the goals of organizational development work. Specific skills, such as leadership skills, group process skills, communication skills and problem-solving skills, are essential in order for these components to be

developed and maintained.

The process through which each organization approaches OD work must be developed in relation to several factors, including its age and stage of development, the current conditions under which it is operating externally and internally, and the history and identity of the organization. Taken together, these components present a vision for organizational health that can help guide and direct organizational development efforts.

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A STUDY ON RECRUITMENT AND SELECTION AT BIG BAZAAR-HYDERABAD

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ABSTRACT

This study throws light upon various sources of recruitment and selection process in Big Bazaar company. The main purpose of the study is to identify the probable area of improvement for the next generation to make recruitment and selection practices more efficient. The recruitment and selection process is the foremost pillar of success in any organization. Thus, every business must seek to improve the quality of its workforce. To get the best human resource, an efficient and well planned strategy is required at the workplace. Nowadays, technical advances are being made in the field of human resource with time and slowly the traditional sources of human resource are being replaced by new and technically enhanced sources and methods of recruitment and selection processes. Therefore, recruitment process in an organization must be effective to attract the best talent. The primary data for this study has been collected through a structured questionnaire and convenience sampling method was used. In this paper, an attempt has been made to understand the advancing recruitment and selection (staffing) process in the Big Bazaar Company and offer a recommendation for the same.

KEY WORDS : Recruitment, Selection, Human resource, Manpower planning, Big Bazaar.

INTRODUCTION

The conscious and specific direction of effort towards the quality of the workforce in the short and long term. It involves all quality of the workforce in the short and long term. It involves all processes and activities aimed at managing the human resource of an organization i.e. Manpower, planning, recruitment, training and development, career management and human performance. It also involves the productive use of people in achieving the organizations strategic business objectives and the satisfaction of the individual employees needs. In other words it is a formal system for the management of people within the organization. It is mainly divided in to three major areas, staffing, rewarding and designing work.

Human resources planning means deciding the number and type of the human resources required for each job, unit and the total capacity for a particular future date in order to carry out organizational activities. Human resources planning as "a process by which an organization should move from its current man power position to its desired manpower position. Though planning management strives to have the right number and right kind of people at the right place at the right time, doing things, which result in both the organization and the individual receiving maximum long run benefit.

Once the required number and the kind of human resources are determined, the management has to find places where required human resources are/will be available and also work

out strategies for attracting them towards the organization before selecting suitable candidates for jobs. This process is generally known as recruitment. Technically speaking the function recruitment precedes the selection function and it includes only finding, developing the sources of prospective employees and attracting them to apply for jobs in an organization

To define and describe the scope of human resource management requires an understanding of the influences that the changing environment in which human resource management is situated have on human resource management systems and roles. For this reason, a brief survey is given of aspects of the environment that were taken into account when compiling the definition and scope of human resource management.

SCOPE OF THE STUDY

The study covers BIG BAZAAR in Hyderabad consisting of 100 employees.

To analyze the recruitment and selection process in the organization.

To suggest any measures/ recommendations for the improvement of recruitment procedure.

**OBJECTIVES OF THE STUDY**

The purpose of the study is to learn the practical applicability of the theoretical knowledge gained about recruitment and selection process.

- ❖ To gain knowledge about the process of recruitment and selection
- ❖ To know the effectiveness or ineffectiveness of the process of recruitment and selection
- ❖ To prepare the employees to move higher in their jobs.
- ❖ To impart new entrants with basic HRD skills and knowledge.
- ❖ To develop the potentialities of the employees for the next level job.

NEED OF STUDY

The purpose of study is to learn the practical applicability of the theoretical knowledge gained about recruitment and selection process.

- To gain knowledge about, the process of recruitment and selection in BIG BAZAAR.
- To know the effectiveness or ineffectiveness of the process of recruitment and selection in BIG BAZAAR.

RESEARCH METHODOLOGY**DATA COLLECTION METHODS**

The data for the study was collected through primary and secondary METHODS

Primary Data;

Primary methods are those methods that provide first hand information. The methods followed were interview methods and questionnaire method

(a) Interview method:

By this method the employees and managers of the BIG BAZAAR were asked questions regarding the recruitment and selection process, its effectiveness and the relevant or required changes they intended to have in the present recruitment and selection process of the company. The managers of different departments were the majority to be interviewed in the entire sample taken.

Secondary Data:

Secondary methods are those methods that provide already existing information of the past, also called as second hand information. The information was obtained from the different HR journals published by the organization for various purposes like HR 'department personal use, reference by any other department about the performance of various activities that have been started by the HR department, to know about the performance appraisal system or the bonus system etc.

PERIOD OF THE STUDY

Since so many years **BIG BAZAAR** Hyderabad has been following the same procedure of appraisals for their executives and employees and for the study of my project last on-year data has collected on Selection process.

Sampling technique:

Sampling technique is adopted in multi stages.

Stage 1:

Company is selected from particular region only.

Stage 2:

A Sample of 100 is selected through convenient random sampling.

Population Size: 487.

Sample Size: 100

REVIEW OF LITERATURE

According to Korsten (2003) and Jones et al. (2006), Human Resource Management theories emphasize on techniques of recruitment and selection and outline the benefits of interviews, assessment and psychometric examinations as employee selection process. They further stated that recruitment process may be internal or external or may also be conducted online. Typically, this process is based on the levels of recruitment policies, job postings and details, advertising, job application and interviewing process, assessment, decision making, formal selection and training (Korsten 2003).

Rajesh, M., and T. Mahesh Babu.(2018) In article "Human Capital Growth and its Significance on Organisation Performance: Facts from Developmental Economics." Clearly stated that the importance of recruitment and selection and training how to make humancapital for the success of organisation in globalised world (2018): 95-109.

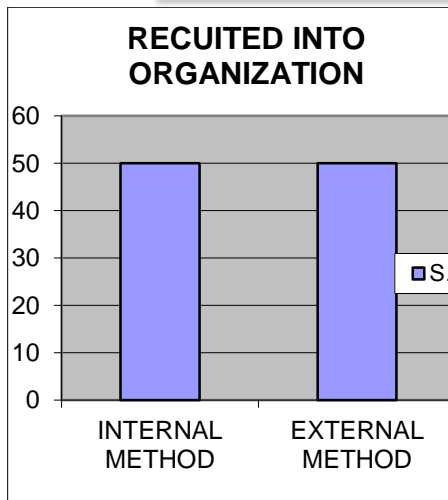
Price (2007), in his work Human Resource Management in a Business Context, formally defines recruitment and selection as the process of retrieving and attracting able applications for the purpose of employment.

Hiltrop (1996) was successful in demonstrating the relationship between the HRM practices, HRM-organizational strategies as well as organizational performance. Hiltrop's (1996) work also showed that selectively hiring has a positive impact on organizational performance, and in turn provides a substantial practical insight for executives and officials involved.

DATA ANALYSIS

1 .By which method did you get recruited in to the organization?

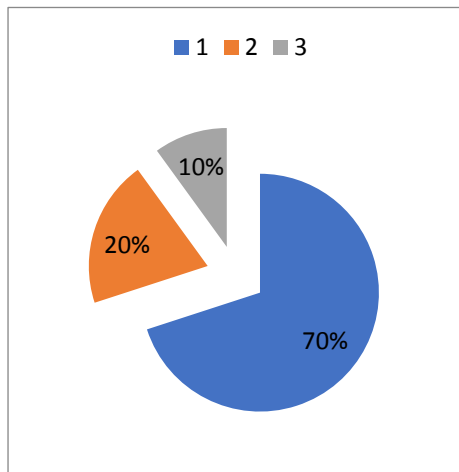
S. No	Response	No of Respondents	Percentage
1.	Internal method	50	50%
2.	External Method	50	50%
		100	100

**Interpretation**

The above table shows that 50% of respondents were recruited by internal method and remaining 50% by external method

2. If by internal method, by which method were you recruited?

S. No	Response	No of Respondents	Percentage
1.	Referred by employees	70	70%
2.	Inter department transfer	20	20%
3.	Promotion	10	10%
		100	100%

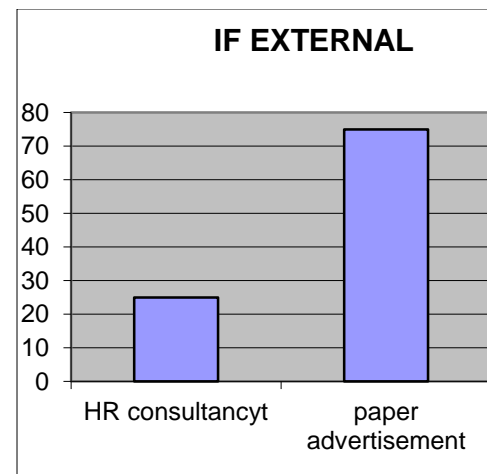
**Interpretation**

The percentage of usage of different internal methods of recruitment like employee referrals, interdivisional and promotion followed by the organization is 70%, 20% and 10% respectively.

3. If by external method, by which method were you recruited?

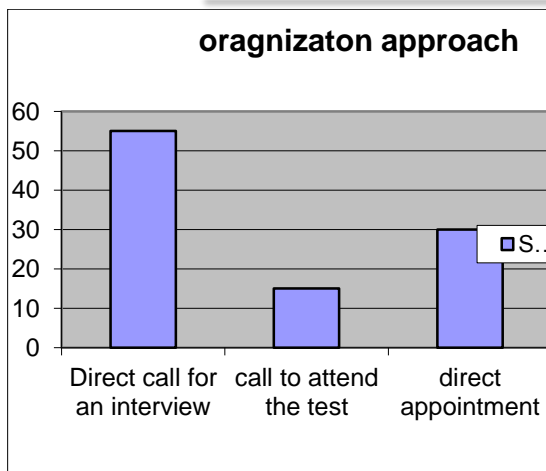
S.No	Response	No of Respondents	Percentage
1.	Direct call for an interview	55	55%
2.	Call to attend the test	15	15%
3.	Direct appointment	30	30%
		100	100%

S. No	Response	No of Respondents	Percentage
1.	HR Consultancy	25	25%
2.	Newspaper	75	75%
		100	100%

**Interpretation**

The information regarding the preference of the external methods of recruitment like HR consultancy; Newspaper advertisements followed by the organization are 25% and 75% respectively.

4. After screening of application how did the organization approach you?-

**INTERPRETATION**

The above table shows that 55% of respondents agreed direct call for an interview and 15% call to attend the test and the remaining 30% by direct appointment.

FINDINGS

- 50% of respondents were recruited by internal method and remaining 50% by external methods.
- The percentage of usage of different internal methods of recruitment like employee referrals, interdivisional and promotion followed by the organization is 70%, 20% and 10% respectively.
- The information regarding the preference of the external methods of recruitment like HR consultancy; Newspaper advertisements followed by the organization are 75% and 25% respectively.
- 55% of respondents agreed direct call for an interview and 15% call to attend the test and the remaining 30% by direct appointment.
- 15% of respondents attended technical test 15% of respondents attended situation test and 70% of respondents appeared for subject test.

SUGGESTIONS

1. While it is a fact that BIG BAZAAR is deploying a good number of recruitment methods.
2. What is important is that the traveling public should further explore and install such recruitment methods, which go to improve public handling methods especially by Marketing Executives.

3. It is suggested a sensitivity training method tailored to enable dealing with commuters should be evolved in consultation with management experts and social psychologists.
4. Employees who are on 'long sick', 'or long absent' should be included in the recruitment need analysis.
5. They should be directed to undergo training at the training college.

CONCLUSION

From the study, the following conclusions are arrived at:

- ❖ Depending on the job vacancy, job specifications and the appropriate source of recruitment is chosen.
- ❖ Mostly, the internal source of recruitment is through employee referrals.
- ❖ It is the responsibility of the recruitment personnel to conduct the needed tests, interviews etc.
- ❖ Most of the interviews that are conducted on the basis of depth interviews.
- ❖ Qualification, experience and personal traits are all important and play a vital role in the selection of a candidate.

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Analysis of Gold Exchange Traded Funds With reference to Net worth Stock Broking LTD

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Abstract

This paper is a study of the performance of Gold ETFs in India. An exchange traded fund (“ETF”) is a form of securities that tracks an index, sector, commodity, or other asset and may be bought and sold on a stock exchange much like a regular stock. An ETF can be set up to track anything from a single commodity's price to a huge and diverse group of securities. ETFs can even be built to follow certain investment strategies. The need and scope of the study is India is the world's largest gold-consuming country. China, on the other side, has the world's fastest-growing economy. The need and scope of the Both India and China are in the process of liberalizing restrictions governing the import and selling of gold in order to facilitate massive gold purchases. In India, online commodity trading is relatively new compared to the stock market. Online commodities trading is dominated by four exchanges: Multi Commodity Exchange of India Limited (“MCX”), National Commodity & Derivatives Exchange Limited (“NCDEX”), National Board of Trade (“NBOT”), and National Multi-Commodity Exchange of India Limited (“NMCE”). As a result, the study scope of the commodities market is relatively broad in the market, which is mostly focused on gold. An analysis is carried out using performance evaluation techniques such as Standard Deviation (“STDV”), Variance, Covariance, Correlation and BETA value. Data for this study have been collected from 2017 to 2021. This research enable market analysts and investors who find the best outlook in the Gold ETF's.

Keywords: Gold Exchange Traded Funds (“ETF's”), Multi Commodity Exchange of India Limited (“MCX”), National Commodity & Derivatives Exchange Limited (“NCDEX”), Covariance, Correlation.

I. Introduction

An exchange traded fund (ETF) is a type of security that tracks an index, sector, commodity, or other asset, but which can be purchased or sold on a stock exchange the same way a regular stock can. An ETF can be structured to track anything from the price of an individual commodity to a large and diverse collection of securities. ETFs can even be structured to track specific investment strategies.

A well-known example is the Standard & Poor's Depository receipt (“SPDR”) S&P 500 ETF, which tracks the S&P 500 Index. ETFs can contain many types of investments, including stocks, commodities, bonds, or a mixture of investment types. An exchange traded fund is a marketable security, meaning it has an associated price that allows it to be easily bought and sold. The main focus of this research is to know the fluctuation in Indian commodity market with reference to gold.

An ETF is called an exchange traded fund because it's traded on an exchange just like stocks are. The price of an ETF's shares will change throughout the trading day as the shares are bought and sold on the market. This is unlike mutual funds, which are not traded on an exchange, and trade only once per day after the markets close. Additionally, ETFs tend to be more cost-effective and more liquid when compared to mutual funds.

An exchange traded fund (ETF) is a type of security that tracks an index, sector, commodity, or other asset, but which can be purchased or sold on a stock exchange the same way a regular stock can. An ETF can be structured to track anything from the price of an individual commodity to a large and diverse collection of securities. ETFs can even be structured to track specific investment strategies.

II. Review of literature:

Samuel AnbuSelvan (2021) this paper is a study of the Performance Evaluation of Gold ETFs in India during the Covid-19 Pandemic Situation. An analysis is carried out using performance evaluation techniques such as the Treynor Performance Index, the Sharpe Performance Index, and the Jensen Performance Index by measuring the alpha, beta, and standard deviations of the selected ETFs traded in National Stock Exchange ("NSE"). Data for this study have been collected for two years from the NSE website from 1st Dec 2018 to 30th Nov 2020. The study shows that the Quantum Gold Fund (ETF) performs reasonably well in accordance with Sharpe's Model, Treynor's Model, and Jensen's Model. According to the Fama model, the Industrial Development Bank of India ("IDBI") Gold Exchange Traded Fund is better off. Industrial Credit and Investment Corporation of India ("ICICI") Prudential Gold Exchange Traded Fund shall perform well by the use of the Sortino Ratio. The Quantum Gold Fund has performed the best of the Gold ETFs chosen for the analysis. This research will enable market analysts and investors who find the best outlook in the Gold ETFs.

DR.P. VIDHYAPRIYA (2014) In India, gold ETFs were launched mainly with objective to increase the liquidity for the better market efficiency. The drawback with gold ETFs is liquidity; some ETFs are illiquid, which impacts their buying and selling flexibility. Hence, investors should consider this as a factor while investing in gold ETFs and should stick to funds that are liquid. Traditionally, Indians love to buy gold and they want to possess it. In fact, they hardly go for ETFs which is just a piece of paper for them. But in India, during the last one year, investment in gold ETFs has risen by Rs. 303 crores. Hence, the study on returns, using sharpe ratio and jenson ratio have been undertaken to identify the growth of gold ETFs in India.

G. Ram Raj (2019) this research article was intended to estimate the volatility and connection between real Gold and Gold Exchange Traded Fund (ETF) in India by using various statistical models. The data for the study period for three years' period 2015-2018 acquired from the National Stock Exchange of India's historical statistics and others. The outcome of this study was found that there are a strong positive short-run relationship and long-run equilibrium relation between gold and Gold ETFs. It is unidirectional, and few bidirectional causes and relationship existed in this study. This Study is fit to be analyzed GARCH model to estimate volatility in the Gold price returns; it shows there persist the volatility effect. This study will be helpful to investors in the selection of better investment options.

Naveen Kumara (2016) Exchange-traded funds (henceforth, ETFs) are passive investment vehicles which have become increasingly popular in a relatively short period of time due the benefits they provide when compared to Mutual Funds and other similar investment avenues. This study has been carried out to analyze the points of distinction between the two very popular forms of ETFs namely Gold ETFs and Equity ETFs. These funds are similar in their functioning however it is necessary to understand the difference in their performance so as to be able to choose the right

market instrument for investing our money. Our research project aims at understanding this difference because performance is one of the major factors affecting the popularity of any investment option.

B. Aarthi (2015) Gold products are considered a highly valuable means of investment in the present scenario of financial markets. There are many alternatives to invest in gold like Gold Exchange Traded Funds (“GETFS”), Gold Fund of Funds (“GFoF’s”), e-gold, stocks of gold mining companies, gold futures, gold bars, gold coins, gold jewellery, etc. Amongst these, the Gold Exchange Traded Funds (“ETF”) and Gold Fund of Funds (“FoFs”) have emerged as the most successful source for investment and ETFs industry has witnessed rapid growth in the last decade. The Gold ETF and Gold FoF provide a convenient way to the investors to intervene in the gold market. This paper attempts to compare the performance of Gold Exchange Traded Funds and Gold Fund of Funds, Return and risk of Gold ETFs has been compared with the return and risk of Gold FoFs. Monthly Net Asset Values (“NAVS”) for the period from March 2011 to March 2014 were used for both the schemes. The study concluded that the Gold ETFs recorded lesser variability as compared to the Gold FoFs and therefore, the performance of Gold ETFs was better than the performance of Gold FoFs.

P. Baba Gnanakumar (2020) Gold ETF, which has been introduced in 2007, in the Indian market as an alternative to investment in physical gold witnessed a heavy outflow of investment during the period 2017-18; whereas, investment in Gold has increased. This research aims to find out the reason for this phenomenon and to create investment analytics between Gold and Gold ETF. We apply K-means of clustering for identifying the bullish/bearish trend in returns and ROC analysis to diagnose the goodness of predictability. The investment analytics is based on short-term gains during the sporadic trends. We found that the decrease in Gold ETF investments is due to less intra-day returns in Gold ETF as compared with Gold. We conclude that the returns from Gold ETF and physical Gold will have an equilibrium effect during the bullish period only. The bearish trend in Gold ETF may be hedged through Gold but not vice-versa. The reason for the negative effect has been portrayed in the Rate of Change (“ROC”) curve. During bearish trend, the mutual fund organizations of Gold ETFs are unable to market the product; where as in case of physical Gold, investors are not having negative perception. However, during bullish trend, the investment in both physical Gold and Gold ETFs are yielding same returns. This research enables the mutual fund managers to decide the investment analytics among Gold ETFs.

Dr. Raghu Anand (2017) Investment decisions are a difficult task for retail investors, considering the diverse instruments available for investing. Under any condition of the economy, Gold has been considered a safe haven for investors. However, having knowledge of only the correlated movement between gold and the markets is insufficient for a private investor. A thorough analysis of the difference in investing in gold and gold ETF’s is critical alongside the knowledge of Gold ETF funds for Indian Retail investors. This research primarily helps in understanding gold as an investment tool, gold ETF’s as a new method of investing in gold. The research has been confined to retail investors in India, and Gold Exchange Traded Funds (ETF’s) as a new investment option in the Indian Securities Market, apart from investment in physical gold and gold jewellery.

III. Need for the study:

- ✓ Create awareness among investors about the different factors that effected in gold prices.
- ✓ To understand the price behaviour of the gold futures and gold bees traded in India bulls.
- ✓ This project give basic knowledge to investors regarding risk and return commodities specially focus on gold.
- ✓ To understand the volatility of gold commodity prices.

IV. Scope of the study

- To study the Gold Exchange Trading Funds the data is confined to five years (i.e.) 2017-2021
- The study conducted at Net worth Stock Broking Ltd located in Hyderabad.
- The Data analysis tools used include, Standard deviation, Variance, Covariance, Correlation and BETA value.
- The sample data comprises of four exchanges trading online in the segment of gold.
- The exchanges considered are Mutual Commodity Exchange (“MCX”), National Commodity & Derivatives Exchange (“NCDEX”), National Board of Trade (“NBOT”) and National Multi-Commodity Exchange of Limited (“NMCE”).

V. Objectives of the study

- ❖ To examine the gold trading value in Mutual Commodity Exchange (“MCX”) gold Futures and Gold BEES
- ❖ To analyse the factors effecting on the Mutual Commodity Exchange (“MCX”) gold Futures and Gold BEES
- ❖ To perform risk -return analysis of Mutual Commodity Exchange (“MCX”) gold Futures and Nippon India ETF Gold BEES.
- ❖ To study trends in metal commodity market with focus on Gold BEES.

VI. Research methodology**RESEARCH DESIGN**

This is a systematic way to solve the research problem and it is important component for the study without which researches may not be able to obtain the format. A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine for collection and analysis of data relevance to the research purpose with economy in procedure.

a. **SOURCES OF DATA:** The study used only secondary data.

- **Secondary Data:**

- The Secondary data are those which have already been collected by some other agency and which have already been processed. The sources of Secondary data are Annual Reports, browsing Internet, through magazines.

- In secondary data collection, different journals, magazines and internet sites are used in collecting the data relating to the commodity market and gold future trading.

VII. Limitations Of the Study

- The analysis was purely based on the secondary data. So, any error in the secondary data might also affect the study undertaken.
- This study has been conducted purely to understand Gold analysis for investors.
- The study is restricted to only gold commodity.
- Detailed study of the topic was not possible due to limited size of the project.
- Suggestions and conclusions are based on the limited data of five Quarters only.

VIII. Empirical Results

A representative analysis carried out is presented in table 1.1 and figure 1.1(a).

Date	Open	High	Low	Close Price	Rate of returns
Jan-21	4,624.95	4,709.00	4,452.00	4,509.35	-2.50
Feb-21	4,488.95	4,582.60	4,272.25	4,324.50	-3.66
Mar-21	4,305.80	4,734.00	4,080.00	4,107.85	-4.60
Apr-21	4,199.95	4,545.00	4,115.10	4,366.85	3.97
May-21	4,380.85	4,499.00	4,317.05	4,460.00	1.81
Jun-21	4,455.00	5,364.05	4,288.95	4,309.75	-3.26
Jul-21	4,359.95	4,497.45	4,252.25	4,451.10	2.09
Aug-21	4,457.30	4,474.00	4,236.50	4,341.15	-2.61
Sep-21	4,369.85	4,421.00	4,200.10	4,216.90	-3.50
Oct-21	4,239.00	4,984.00	4,239.00	4,388.00	3.51
Nov-21	4,392.70	4,889.45	4,351.00	4,415.15	0.51
Dec-21	4,389.00	4,500.00	4,349.95	4,439.00	1.14
				SUM	-7.09
				AVG	-0.59
				Var	10.99
				SD	3.31

Table No: 1.1 From the IDBI Gold ETF for the period of 2021 the average of -0.59, the risk is 3.31.

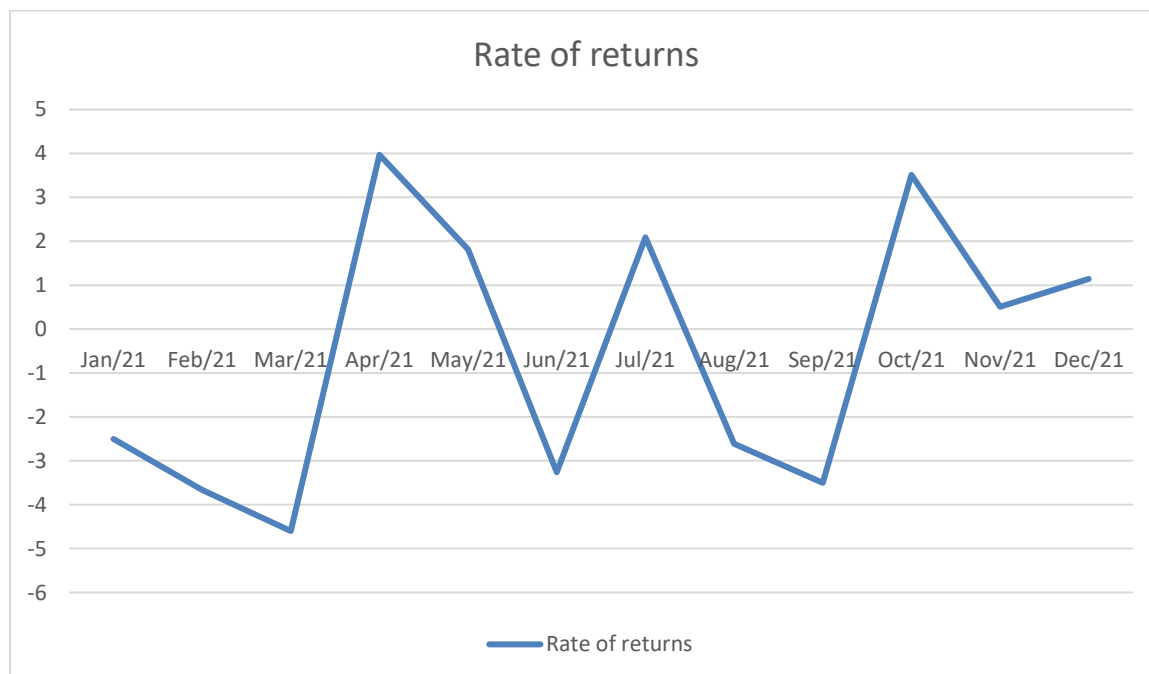


Figure: 1.1(a) From the IDBI Gold ETF for the period of 2021 the average of -0.59, the risk is 3.31.

As from the above it can be seen that the standard deviation (i.e., total risk associated with stock) of IDBI Gold ETF is 3.31, whereas the variance is 10.99. The average stock return is -0.59. The analysis from the year 2017 the average of 0.14, the risk is 1.82. The analysis from the year 2018 the average of 0.42, the risk is 3.14. The analysis from the year 2019 the average of 1.16, the risk is 6.09. The analysis for the year 2020 the average of 1.34, the risk is 6.21. The analysis from the year 2021 the average of -0.45, the risk is 3.68.

IX. Findings, Suggestions and Conclusion

Findings

- Half of the respondents are investing in different schemes of Exchange Traded funds
- The investors prefer investing more in banks and post office, which shows that investors want security, and assured returns.
- Others than Banks and post office the next preference of investors who go for risky preposition in shares and Mutual Funds. That is basically due to misconception that Mutual Fund Companies usually invest in equity market, which shakes trust of people in Mutual Fund.
- Majority of investors invested in open-ended schemes.
- The awareness level about DBFS assets Management Company is moderate but still the awareness should be created because 44% peoples still not invest in DBFS assets Management Company.
- As the investor prefers safe investment and want consistent return, they invest in debt schemes (22.69%).
- The investors prefer DBFS assets Management Company more because of the tax benefit and consistent return.
- Exchange Traded Fund are also preferred because of the cost effectiveness and higher income by investing in equity schemes.
- The banks mostly make the investments through the agent's followed.
- Professional and Business class, which is considered to be the most knowledgeable class of the region prefers Mutual Funds less compare to service class.
- The time frame of the investment by majority of the investors is open-ended schemes in which their money is not locked for 3 to 5 years.

Suggestions

- Gold has been hovering in the range of 51000 - 55000. Though economic recovery is well underway, there is a lack of clear direction for the market. In such a milieu, we advise investors to play it safe. Hence, we recommend investing in Gold ETF's. The scheme is characterized with Good returns exposure, sector-diversification and steady returns.
- Gold has proven to be a good defensive play and has weathered the market volatility well in the past.
- The fund's proven track record along with the strong credentials of its investment team makes it a good bet for long-term equity investors and for relatively risk-averse, investors who seek to invest in a well-blended equity fund with a degree of downside protection. We recommend investing in Gold ETF's.

Conclusion

The Gold ETF's is the part of Mutual funds industry. The ETF markets are experiencing tremendous growth in the recent past. This can be emphasized by the fact that the trading volume of most ETF is increasing. Price of ETF's mostly follows a cyclical pattern, unlike stocks. Therefore, the prices are expected to fall at some point of time, and do not attract investors. There are many types of risks involved in ETF's trading but commodity ETF's are less risky than equity futures but it is highly volatile. Various risk management techniques can be used to minimize the risk, and henceforth from the different price movements. ETF's trading included the intermediary and trading participants likes brokers who make use of the various tools in order to make predictions of the price movement's they also take into consideration the expert analysis. Thus, with the help of the various analysis tools, efficient price predictions can be made, where the investors in commodity futures can benefit from the price movements.

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ANALYSIS OF DIVIDEND POLICIES OF COMPANIES LISTED IN BSE WITH REFERENCE TO INDIA BULLS PVT. LIMITED

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ABSTRACT

Dividend refers to a proportion of company's earnings that is being issue to the class of the shareholder's as decided by the board of directors. For investors, dividends help as Attractive way of investment revenue. Dividend decisions is one of the four key major functions of financial management through which the firm decides on how much to pay and how much to retain in its Net profits. Through dividend decisions companies improve their goodwill thus impacting the share prices. The cyclical relationship among profits, dividends and share value of the companies is instrumental for both companies and investors. A good and balanced dividend policy enables a company to be the face of the company at times. Owing to the importance the present study is intended to analyze the dividend policy of companies listed in BSE's Sensex. Dividend policy is one of the important policies of organization. the present study is related to the analysis of dividend policies for the period of five years in different sectors which are listed in sensex. The present research would be useful for the financial managers of the company in formulating the dividend announcement strategies. Dividend policy is the plan of action of the company used to decide the dividend amount and date of payment.

KEY WORDS: Stock Exchange, Dividend, Ratio analysis.

I. INTRODUCTION

Stock market is a place where the exchange and issuance of shares of public listed companies takes place. Stock market consist of different events which takes place in particular industry or any individual company. The types of events may impact the performance and growth rate of stocks which are listed at the popular stock exchanges.

The company may give announcements related to different events. The announcement of information as bonus issue, stock split, right issues, changes in management, merger or acquisition of the company, earnings and dividend etc., which can produce a immediate effect in stock prices. The present study is on the dividend analysis of companies listed at sensex. Dividend policy is a crucial decision part of the corporate companies, the dividend policy will effect the shareholder's wealth maximization, which refers to increasing the value of the company as calculated by the price of common stock. This can be by giving the fair dividend payment on their investments to the shareholders of the company.

Dividend refers to a proportion of company's earnings that is being issue to the class of the shareholder's as decided by the board of directors. For investors, dividends help as Attractive way of investment revenue. Dividends are usually paid in the form of cash or may also be paid in the form of additional

II. REVIEW OF LITERATURE

A number of literature have been carried out to find the effect of dividend policy on stock prices. Dividend announcement decisions are taken by the board of directors, it has a great importance in the company. Researchers discussed and developed many theories and models regarding to the dividend policies



A literature review is a systematic investigation of a specific topic .some of the following studies related to the present topic.

Fama and Babiak(1968) used lintner's model to examine the dividend policy,and they opined that firms would try to increase the dividends ,when the dividends could continued in the future.

Lee (1996) conducted a study to test the connection between the dividend and earnings.he used bi-variate time-series model over the period covers from the year 1972 to 1992 the results show that earnings of the firm would define by the firm's dividend.

PitabasMohanty(1998) studied more than 200 companies in india to test the behavior if dividend payment over 15 years, he noticed that the companies do not follow the dividend payout ratio regularly instead of that they issue the bonus shares to reward their shareholders. However ,after the issue of bonus shares companies tried to maintain their dividend policies.

Oza(2004) examined 30 non financial companies in india to evaluvate the dividend behavior .The study resulted that current earnings control the decision related to the dividend policy on the basis of past dividend pattern

Pani (2008) used fixed effect model and pooled OLS model to study the dividend policy and stock price behavior over the period covers from 1996 to 2006 by selecting the different sectors in sample of 500 corporate companies listed .He took the six different sectors as a sample i.e., textile ,mining ,electricity ,food and beverages ,non – metallic and service industry. He took the dependent and independent variables. The study presents that net profit, Dividend and retention ratio are important in services ,textiles and mining industries. The companies which are paying dividends are in large and profitable

I ILNEED FOR THE STUDY

- With the advancement of technology , many people are interested in trading in the stock market through online trading facility without a physical existence of a investor .
- The investors will take the decision related to the investment depend upon the company announcement .
- Dividend announcement plays a important role in changes in share price in the stock market.
- It is important to know about the dividend polices of the company ,need of the study will show the clear picture about the analysis of dividend policies which should consider by the investor.

IVSCOPE OF THE STUDY

- The present study is on the analysis of dividend policy of three companies selected from three different sectors listed in Sensex.
- It is limited to the period of five financial years data.
- The scope of this research contain of information taken from the secondary data from various websites.
- Data analysis tools such as Mean, ration ANOVA ,Average, Variance are used to analyze the data.

V.OBJECTIVES OF THE STUDY

The primary objective of the study is to understand the concept of dividend announcement

1. To determine the trends in dividend policy of firms listed at the Sensex.
2. To study and differentiate dividend payment on different categories.
3. To find the relationship between companies in different sectors to measure the dividend per share ratio.
4. To find the relationship between companies in different sectors to measure the dividend payout ratio.

VI. RESEARCH METHODOLOGY

Research methodology is a method to solve the problem for this the data may be collected from the different sources ,the main point has to kept that the sampling fit to the objectives of the study. The data may be collected in two popular ways i.e from the primary data and secondary data.

The present study data is collected from the secondary data like magazines, journals ,websites, money control.

VII. LIMITATIONS OF THE STUDY

The following are the limitations of the study:

1. The present study is done on sample size of 3 sectors listed at BSE can't be made to whole listed companies from BSE
2. The study is collected from the secondary data which will influence the data
3. The study is conducted for the period of 5 years
4. There are many tools to analyze the dividend policy but in this research restricted to limited tool due to the time period

VII I. EMPIRICAL RESULTS

For the purpose of understanding the analysis of dividend policy ,dividend per share and dividend pay- out ratio of three sectors analyzed for the five financial years 2018-2022.

1. DIVIDEND PER SHARE

1.PHARMA SECTOR

PHARMA SECTOR						
Company	2018	2019	2020	2021	2022	AVG
Cipla ltd	2.00	2.00	3.00	3.00	4.00	2.6
Dr.Reddys Laboratories Ltd	20.00	20.00	20.00	20.00	25.00	21
Sun pharma	1.00	3.50	2.00	2.75	4.00	2.65
AVERAGE	7.66	8.5	8.33	8.58	11	8.75

TABLE 1.1: Dividend payout ratio of Pharmaceutical industry

Source: Author's Compilation

In pharmacy sector, Cipla ltd announced the dividend amount is low but there is increasing in dividend per share. In Dr.Reddys Laboratories Ltd dividend per share is constant for 4 years in 2022 it is increased by 5, the sun pharmacy ltd there is poor rate in DPS it is increased in the year 2019 decrease in the year 2020&2021 and increased in the year 2022. in banking sector, HDFC bank dividend per share has good amount it is slightly increased but in the 2022 it is fallen down, in yes bank there is up and down the DPS whereas in SBI bank there is same dips for two years and there is no dividend payment to shareholders. in IT sector TCS company in the year 2021decrease in the DPS and increases by 40/-, Wipro company has poor DPS. Infosys is same as TCS decreased in the 2021& 2022.

2. AVERAGE OF DIVIDEND / SHARE(Rs)

AVERAGE OF DIVIDENDS PER SHARE (RS)					
SECTORS	2018	2019	2020	2021	2022
PHARMA SECTOR	7.66	8.5	8.33	8.58	11
BANKING SECTOR	7.36	8.53	5.23	8.5	2.5
IT SECTOR	24.6	24.9	31.5	17.5	30.5

Table No: 1.2 Dividend payout ratio of Pharma, Banking, IT Sectors

Source: Author's Compilation

Average of dividend per share IT sector has good dips when compared to pharma sector and banking sector. In banking and pharma sector has slightly changes in their DPS crit,it is concluded that is F value is 42.20 and F crit value is 3.88.This is the case $42.20 > 3.88$.Hence we reject the null hypothesis. is concluded that from 2020 to 2022 dividend pay ratio decreased in pharma sector.in banking sector from three companies dividend payout ratio is not good there is a fluctuations in year by year . dividend payout ratio in IT sector companies there is no proper payout ratio. dividend payout ratio is analysed in pharma sector for the five financial years in three different companies .In cipla ltd dividend payout ratio is decreased in the year 2020 and it raised at high ratio .In reddy's laboratories ltd and sun pharma ltd there is no stable in dividend payout ratio there is ups and down in the ratio F crit,it is concluded that is F value is 1.271663 and F crit value is 3.88.This is the case $1.27 < 3.88$.Hence we accept the null hypothesis.



IX FINDINGS, SUGGESTIONS AND CONCLUSION

Findings

The following are the findings of the present study:

To understand the dividend policy, we look over the ratio of dividend per share in companies from different sectors for the financial year (2018-2022)

1. When the average is calculated on company's dividend for each share, it was found that IT sector is having the highest values in each year when compared to other sectors.
2. When the average is calculated on company's dividend payout ratio, it was found that Banking sector is having low value and high values in the IT sector in each year.
3. To achieve the objective of the study, ANOVA ONE WAY test was used
4. In hypothesis test, relation between dividend per share and companies H_0 is rejected and relation between dividend payout ratio and companies H_0 is accepted.

Suggestions

1. To the shareholders must get the maximum amount from the profit, because they are the real owners of the company and the risk bearers.
2. The announcement of dividend payment will effect the stock prices of the company so the management should take the decision fairly.
3. The companies have to pay the dividend every year to their shareholders without any strong reason the firms do not skip the dividend.
4. The company's dividend policy must be designed in a effective way to maximize the shareholders wealth.

Conclusion

The main objective of the present study is to analyse the dividend policy of different sectors listed in the SENSEX. For this motive three sectors were selected, in each sector three companies were analysed for the five financial years i.e, from (2018-2022). To find out the trend analysis of dividend, DPS and DPR were studied. To know the connection between the dividend policy in different sectors ONE –WAY ANOVA test was conducted it gives the interesting results. Analysis of dividend policy is useful for the investors, those want to invest in the company. A dividend policy indicates that how much returns are available to the shareholders.

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COMPARATIVE ANALYSIS OF MUTUAL FUNDS WITH REFERENCE TO PUBLIC AND PRIVATE SECTOR FUNDS

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Abstract

A Mutual Fund is a trust that pools the savings of several investors who share a common financial goal. Each Mutual Fund scheme has a defined investment objective and strategy. As financial markets become more sophisticated and complex, investors need a financial intermediary who provides the required knowledge and professional expertise on successful investing. Through this study one can understand how to invest in Mutual Funds and turn the raw investment into ripened fruits by making wise decisions, and taking the risk factors into account. The mutual funds used for this study are abs frontline equity, axis long term equity, ICICI Pru balanced advantage fund, LIC MF balanced advantage fund, SBI exchange-traded fund Sensex, and UTI nifty ETF. The purpose of the study is to Performa return and risk analysis of private and public sector mutual funds for one year (2021). The statistical tools used are Standard deviation, alpha, beta, R-squared, Sharpe ratio and expense ratio. Mutual Funds are an alternative way of investing in stock and debt instruments. Owing to the advantages of investing in mutual funds like lower transaction costs, diversified portfolio, transparency, liquidity, professional management etc. more investors are in the lineage of investing in mutual funds, however the parameters to be considered for investing in mutual funds include, returns, standard deviation, alpha, beta, R-Squared and expense ratios. At this juncture, the study is a modest attempt to conduct a comparative analysis between public and private mutual fund schemes to suggest better alternatives to investors.

Keywords: Mutual funds, Public and private sector funds, Return and Risk, Mutual Funds Performance.

I. Introduction

A mutual fund is a scheme in which several people invest their money for a common financial cause. The mutual fund industry started in India in a small way with the UTI Act creating what was effectively a small savings division within the RBI. Over a period of 25 years this grew fairly successfully and gave investors a good return, and therefore in 1989, as the next logical step, public sector banks and financial institutions were allowed to float mutual funds and their success emboldened the government to allow the private sector to foray into this area. The advantages of mutual fund are professional management, diversification, economies of scale, simplicity, and liquidity. The disadvantages of mutual fund are high costs, over-diversification, possible tax consequences, and the inability of management to guarantee a superior return. There are some loads which add to the cost of mutual fund. Load is a type of commission depending on the type of funds. Mutual funds are easy to buy and sell. There are many, many types of mutual funds. A code of conduct and registration structure for mutual fund intermediaries, which were subsequently mandated by SEBI. The most important trend in the mutual fund industry is the aggressive expansion of the foreign owned mutual fund companies and the decline of the companies floated by nationalized banks and smaller private sector players.

II. Review of literature

Deb (2008) studied return-based style analysis of equity mutual funds in India and analysed their relative performance with respect to style benchmark. The study was based on 96 schemes belonging two group-ELSS Group (23 Schemes) and Growth Group (73 Schemes). It covered the period from January 2000 to June 2005. The results revealed that Indian equity fund managers were not able to

beat their style benchmark on the average. Though all the funds in the sample were equity schemes, the fixed income assets class was an important component of their style exposure. Most important components of style exposure were the mid-cap stocks.

Mittal and Gupta (2008) in their paper examined the awareness of the investors about mutual funds and various factors affecting the investment decision in the mutual funds. The study revealed that mutual funds had comparative advantage over other options due to high return, high safety, high liquidity and high convenience with moderate volatility. When compared to other investment options, it ranked third most preferred option, Insurance and government bonds having first and second positions. The overwhelming majority (85%) of the respondents were aware of the mutual fund product and risk associated with it and most of them were satisfied with the service provided by mutual fund. In brand acceptance analysis, SBI mutual fund had the highest acceptability.

Chavali and Jain (2009) in their study analysed the performance of 16 equity linked saving schemes by using Sharpe ratio, Standard deviation, Beta, Alpha, R-Squared Cluster analysis and multi-Variate analysis. They also studied the awareness level of investors based on survey of 75 salaried class respondents in Delhi. The results revealed all the equity linked saving schemes had different risk and return parameters. On the basis of comparison of selected funds, the researcher recommended investment in SBI Magnum Tax Gain Scheme. The study further revealed that 85 per cent of the respondents were aware of mutual funds. Surprisingly a large number of investors investing in equity linked saving schemes were not aware about benefits attached with the schemes.

Miglani (2010) in his study examined the growth and development of mutual fund industry in India and evaluated the performance of selected mutual fund schemes. He also tested the market timing abilities of mutual fund managers. The study was based on mutual fund schemes both from public and private sector covering period from 1 April 1999 to March 31, 2004. For evaluating the performance of mutual fund schemes, data was analysed by using Rate of Return, Sharpe measure, Treynor measure, Jensen differential return measure, Sharpe differential return measure and appraisal measure.

To check the market timing, Treynor and Mazuy measure and Henriksson and Merton measure were used. The results revealed that out of the total resources mobilised by all the mutual funds, UTI had the maximum share. The number of schemes increased from 116 to 441 during the period 1992 to 2004. As per risk and return analysis, majority of the fund managers invested in risky assets for getting maximum return. Beta value showed that only tax planning schemes were invested according to their systematic risk. Overall results of all the performance measures showed that most of the schemes were performing very well. Market timing models indicated that fund managers generated superior performance due to their involvement in security selection but they failed in timing the market correctly.

Vyas and Moonat (2012) studied the perception and behaviour of mutual fund investors in Indore, Madhya Pradesh. The study was based on 363 mutual fund investors. The results revealed that most of the respondents invested in equity options with a time span of one to three years. Though 73 per cent of the investors were aware about the risk associated with mutual funds yet only 53 per cent investors analysed the risk. Lump sum investment was the most preferred mode followed by SIP. Gold was the most important option among investors and mutual funds ranked 6th in this regard. Further mutual funds got an average score on all parameters like safety, liquidity, reliability, tax benefits and high returns.

Sowmya. G, (Jan 2014), has studied Performance Evaluation of Mutual Funds in India. The objectives of this are to know the basic concepts and terminologies of the mutual funds in public limited companies and private limited companies. To analyse performance and growth of selected mutual funds schemes with their NAV and their returns. To identify the return variance and to provide suggestions based on the analysis.

III. Need for the study

- The study tries to ascertain the asset allocation, entry load, and exit load, associated with the mutual funds. Ultimately this would help in understanding the benefits of mutual funds to investors.
- Understanding the return and risk associated with mutual fund schemes in public and private sector.
- Analysing the performance of selected schemes using tools of performance which would act as an aid to investors interested in mutual fund schemes.
- As investors in this segment are improving multitudinously in recent times understanding the mutual funds and their functioning with special reference to public and private sector Mutual Funds is the need of the hour

IV. Objectives of the study

- To understand the concept of Mutual Funds with special reference to Public and Private Sector Funds.
- To analyse the performance of private sector and public sector mutual funds based on their returns and risks.
- To make a comparative analysis on public vs private sector mutual fund schemes so as to suggest the best investment alternatives to potential investors.
- To review performance of few funds under both the sectors during the study period.
- To give appropriate suggestions to analysts or investors.

V. Scope of the study

- The Study analyses the performance of private sector funds with that of public sector mutual funds. (Abs frontline equity, axis long term equity, ICICI Pru balanced advantage fund, LIC MF balanced advantage fund, SBI exchange traded fund Sensex and UTI nifty ETF.)
- The study performed at India Infoline Limited (IIFL) located in Hyderabad, Telangana.
- The study used statistical tools like standard deviation, alpha, beta, R- squared, Sharpe ratio and expense ratio.
- The study of return and risk analysis of mutual fund schemes in both public and private sector is confined to one year i.e., 2021

VI. Research Methodology

Research design is some statement or specification of procedures for collecting and analysing the information required for the solution of some specific problem. Here, the exploratory research is used as investigation and is mainly concerned with determining the trends and returns in Mutual Funds and Bank returns.

Data sources

Data available in marketing research are either primary or secondary. Primary Data is not included in this study, only **secondary data** is taken in to account since, it is a comparative analysis. Secondary data is collected from external sources which include information from published material of SEBI and some of the information is collected online. The data sources also include various books, magazines, newspapers, websites etc.

Data analysis tools : Analysis has been done by using the following tools,

- Standard deviation,
- Alpha,
- Beta,
- R- squared,
- Sharpe ratio

- Expense ratio
- Annualized return

VII. Limitations of The Study

- The data that is considered for the Comparative analysis of various Mutual Funds returns of debt and equity funds are only for a short period of one year (2021) and performance during this period may not be the same in the future.
- As the project period is limited, the long-term data of Mutual Funds are not taken into consideration in the analysis section.
- The data taken into account for analysis is very general. Confidential data is ignored as it is highly sensitive. As a result, the information presented in the research report is limited.
- The schemes taken into consideration are limited to three each in public sector and private sector both.

VIII. Empirical Results

NAV Details

Fund Name	Latest NAV	Previous NAV	52-Week High NAV	52-Week Low NAV
Aditya Birla Sun Life Frontline Equity Fund - Direct Plan	339.58	331.96	385.97	309.28
Axis Long Term Equity Fund - Direct Plan	67.83	66.29	87.47	65.41
ICICI Prudential Balanced Advantage Fund - Direct Plan	53.47	52.86	54.74	49.15
LIC MF Balanced Advantage Fund - Direct Plan	9.81	9.70	10.19	9.64
SBI ETF Sensex	574.84	560.62	650.79	519.02
UTI Nifty Exchange Traded Fund	1,714.464	1,670.536	1,938.374	1,553.379

Table No:1.1. Comparison of net asset value of funds

Source: Author's Compilation

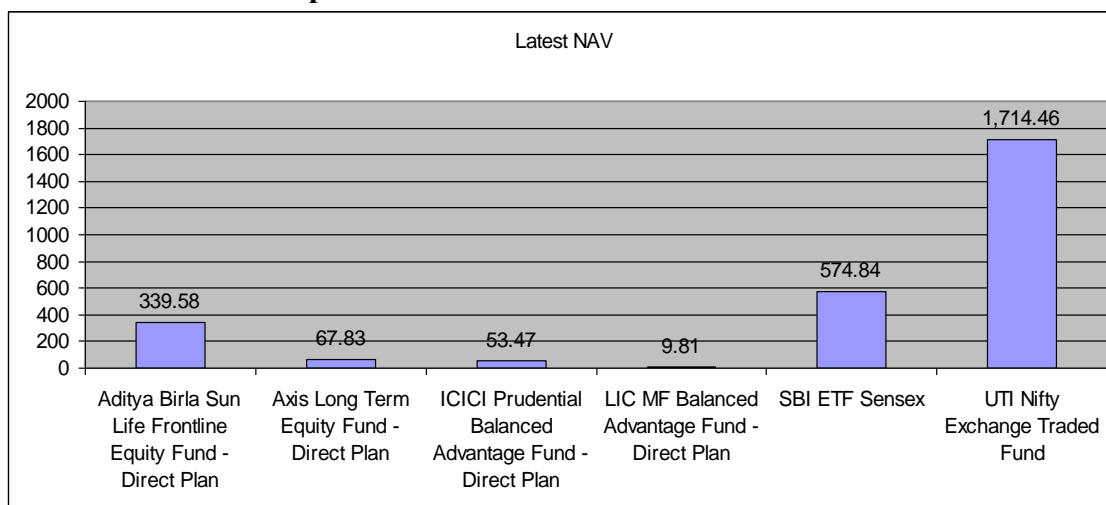


Figure:1.1.a Graphical representation of latest NAV

Source: Author's Compilation

Among the five funds selected, UTI Nifty Fund has the highest NAV of Rs.1714 followed by SBI ETF fund with Rs.574. Aditya Birla Sun Life Frontline Equity fund has a NAV of Rs.339.58 and

Axis Long Term Equity Fund has a NAV of Rs.67.83. LIC MF Balanced Advantage Fund has the least NAV of Rs.9.81.

Comparative Analysis of Expense Ratios

Fund	Expense Ratio
Aditya Birla Sun Life Frontline Equity Fund - Direct Plan	1.06
Axis Long Term Equity Fund - Direct Plan	0.77
ICICI Prudential Balanced Advantage Fund - Direct Plan	1.00
LIC MF Balanced Advantage Fund - Direct Plan	0.40
SBI ETF Sensex	0.07
UTI Nifty Exchange Traded Fund	--

Table no:1.2 Expense ratios of the funds

Source: Author's Compilation

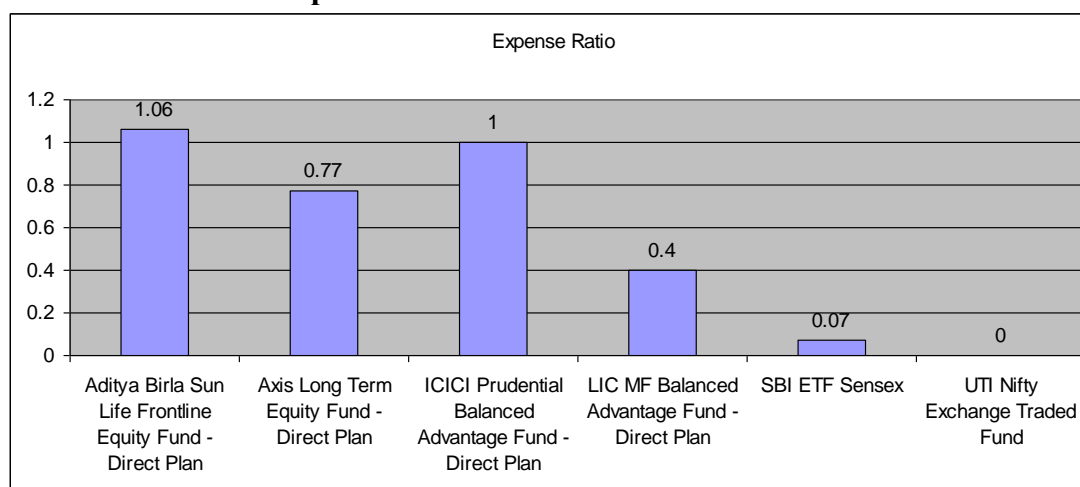


Figure :1.2.a Graphical representation of expense ratios

Source: Author's Compilation

Among the six funds selected, Aditya Birla Sun Life Frontline Equity Fund - Direct Plan has the highest expense ratio of 1.06 % followed by ICICI Prudential fund with 1.00%. Axis Long Term Equity fund has an expense ratio of 0.77% followed by LIC Balanced Advantage Fund with 0.40% and SBI ETF Sensex Fund with 0.07%.

Comparative Analysis of Returns

Fund	1-Month Return	3-Months Return	6 Months Return	1-Year Return
Aditya Birla Sun Life Frontline Equity Fund - Direct Plan	-7.50	-6.60	-10.44	10.20
Axis Long Term Equity Fund - Direct Plan	-11.17	-10.59	-20.56	0.68
ICICI Prudential Balanced Advantage Fund - Direct Plan	-2.02	-0.94	-1.22	9.17
LIC MF Balanced Advantage Fund - Direct Plan	-2.51	-2.31	-1.95	--
SBI ETF Sensex	-6.76	-6.03	-9.19	10.72
UTI Nifty Exchange Traded Fund	-6.85	-5.89	-8.82	10.24

Table no:1.3.Comparative analysis of returns

Source: Author's Compilation

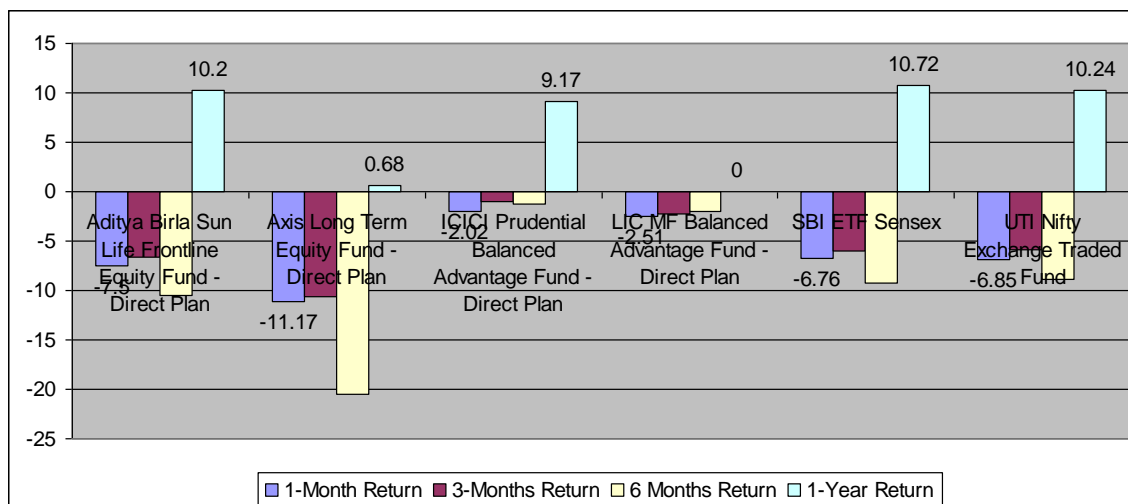


Figure no:1.3.a Returns from the funds in different periods

Source: Author's Compilation

All the five funds have been in losses in the last 9 months due to the sudden crash of stock markets. Over the last one year, SBI ETF Fund has given the maximum return of 10.72% followed by Aditya Birla Sunlife and UTI Nifty ETF with around 10.2% return. ICICI Prudential has given a return of 9% while Axis Long Term Equity fund has given a return of 0.68%.

Comparative Analysis of Risk

Fund	Standard Deviation	Sharpe Ratio	Beta	Alpha	R-Squared
Aditya Birla Sun Life Frontline Equity Fund – Direct Plan	21.52	0.56	1.00	-1.12	0.99
Axis Long Term Equity Fund - Direct Plan	20.53	0.65	0.88	0.52	0.88
ICICI Prudential Balanced Advantage Fund - Direct Plan	13.86	0.66	0.74	1.25	0.92
LIC MF Balanced Advantage Fund - Direct Plan	--	--	--	--	--
SBI ETF Sensex	21.65	0.58	1.01	-0.71	0.99
UTI Nifty Exchange Traded Fund	21.70	0.58	1.01	-0.93	1.00

Table no:1.4 Comparative analysis of risk using various parameters

Source: Author's Compilation

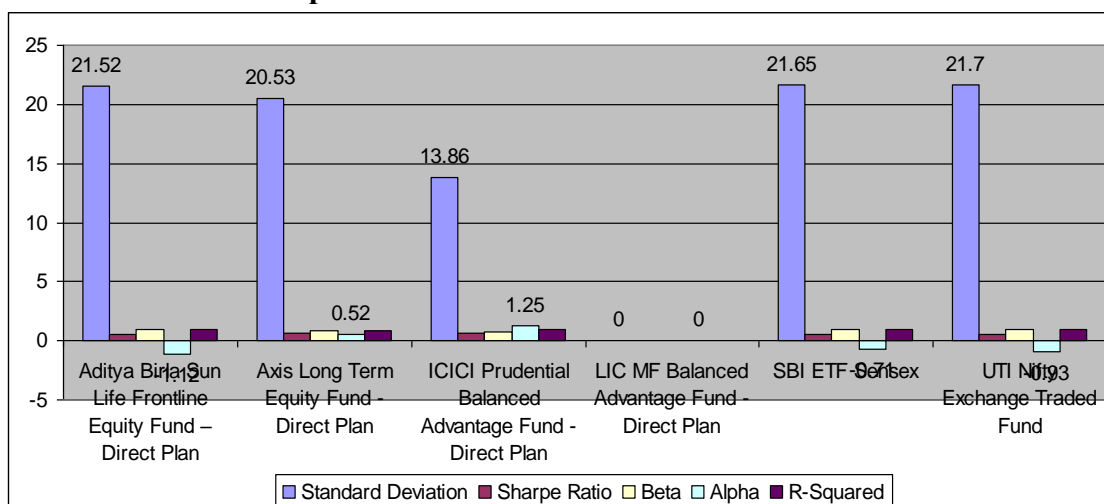


Figure no:1.4.a Parameters of funds

Source: Author's Compilation

All the selected funds have a Standard Deviation of around 20% to 21% except for ICICI Prudential Fund with a standard deviation of 13.86%. Axis and ICICI Prudential funds have the higher Sharpe Ratio of around 0.65 while the remaining funds including Aditya Birla, SBI and UTI have a Sharpe ratio of around 0.58. SBI ETF and UTI Nifty Funds have a beta of 1.01 while Aditya Birla Sun Life Fund has a Beta of exactly 1. ICICI Prudential has a beta of 1.25 each while Axis Long Term Equity Fund has a beta of 0.52 ICICI Prudential has the highest Alpha of 1.25 followed by Axis Long Term Equity Fund with 0.52. Aditya Birla fund has a negative Alpha of -1.12 and SBI ETF Fund has Alpha of -0.71 and UTI Nifty fund has an Alpha of -0.93 UTI Nifty fund has the highest R-Squared of 1.00 followed by Aditya Birla Sun Life and SBI ETF with 0.99. ICICI Prudential has an R-Squared ratios of 0.92 each while Axis Long Term Equity fund stands at the last with R-Squared of 0.88

IX. Findings, Suggestions & Conclusion

Findings

- Over the last one year, SBI ETF Fund has given the maximum return of 10.72% followed by Aditya Birla Sunlife and UTI Nifty ETF with around 10.2% return. ICICI Prudential has given a return of 9% while Axis Long Term Equity fund has given a return of 0.68%.
- A beta of 1.0 shows that the investment price will move in lock-step with the market, while a beta of <1.0 indicates that there will be less price volatility than the market and a beta of >1.0 shows that there will be more price volatility than the market. SBI ETF and UTI Nifty Funds have a beta of 1.01 while Aditya Birla Sun Life Fund has a Beta of exactly 1. ICICI Prudential has a beta of 1.25 each while Axis Long Term Equity Fund has a beta of 0.52
- The funds with lower standard deviation are preferred, in this study All the selected funds have a Standard Deviation of around 20% to 21% except for ICICI Prudential Fund with a standard deviation of 13.86%.
- For financial investors, the more positive an alpha is, the better it is. ICICI Prudential has the highest Alpha of 1.25 followed by Axis Long Term Equity Fund with 0.52. Aditya Birla fund has a negative Alpha of -1.12 and SBI ETF Fund has Alpha of -0.71 and UTI Nifty fund has an Alpha of -0.93
- Sharpe Ratio measures risk-adjusted performance. Axis and ICICI Prudential funds have the higher Sharpe Ratio of around 0.65 while the remaining funds including Aditya Birla, SBI and UTI have a Sharpe ratio of around 0.58.
- Expense Ratios A measure of what it costs an investment company to operate a mutual fund. Among the six funds selected, Aditya Birla Sun Life Frontline Equity Fund - Direct Plan has the highest expense ratio of 1.06 % followed by ICICI Prudential fund with 1.00%. Axis Long Term Equity fund has an expense ratio of 0.77% followed by LIC Balanced Advantage Fund with 0.40% and SBI ETF Sensex Fund with 0.07%.

Suggestions

After the study on mutual funds, there is no much difference in the functioning, risk and returns of Public Sector and Private Sector mutual funds. But there are some suggestions which every potential investor should take of before investing in mutual funds. The recommendations for the potential investors include:

1. Investors should check letter of offer or fund's prospectus to understand all the particulars of the funds in detail.
2. Investors should ensure that the funds track record is the same as that of the current management
3. Investors should avoid Mutual Funds that charge higher exit fees at the back-end door (fees charged by MF from the unit holders at the time to redemption of the units.)
4. Investors should prefer to buy the funds with no hidden costs.
5. Investors should keep a track on the fund's performance at all times.
6. Investors should prefer mutual funds that give better returns with minimum risk.

7. While comparing the funds using various parameters, every parameter should be considered together not in isolation.

Conclusion

Mutual Funds are an easy and simple investment avenue to the small investors. Mutual funds are useful for small investors who do not have huge amounts to invest, lack time, resources and knowledge about the stock markets. Mutual funds give a reasonable rate of return in the long run. A country like India or for that matter any developing country has some basic problems which prevent the information to be available freely and that too in an accessible fashion, so with a situation like that, a professionally managed agency that would monitor the ups and downs of the market and chart out the best investment strategies would be the best thing to opt for. With so many potential investors in India, Mutual Funds can go a long way in getting established, plus with added set of alternatives within the Mutual Fund schemes each has a scheme ready for the specific needs. Whether it is investing in Public Sector or Private Sector Mutual Funds, Investors should study though the details and exercise caution while investing in mutual funds.

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An investigation of the performance and analysis of Indian start-ups

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Introduction:

Startups have gotten much attention recently, not just in India but throughout the globe. Increasingly, they are becoming acknowledged as significant drivers of economic development and employment creation. Startups can significantly influence society and the economy by using innovative and scalable technologies. Over the last two decades, India's startup scene has changed dramatically. A qualitative study has been carried out to comprehend these difficulties better. Semi-structured interviews were conducted with founders, investors, and startup support organizations. A literature search also revealed additional findings. The rest of the document is set up like this: Interviewees indicated the most important possibilities and development drivers for the startup ecosystem in India in the second half. Next, the obstacles faced by startups in India are discussed.

For startups, this section focuses on what resources are available to assist them in overcoming obstacles and taking advantage of possibilities. As the piece points out, further action is required to assist Indian startups. In the early 2000s, a few firms were founded, but the ecosystem was still in its infancy due to the small number of investors and support institutions like incubators and accelerators. "Startup India" was unveiled by Indian Prime Minister Narendra Modi on January 16, 2020. Among the 19 recommendations in the action plan was the development of a corpus fund of INR 10,000 crore, establishing several incubation centers, simplified patent applications, tax breaks for new businesses, and tax exemptions for existing ones.

Strategies:

The Indian government's "Startup India" program encourages and supports startups in India. The government of India hopes that encouraging a startup culture would have the desired effects of spurring economic development and job creation. The government's initiative is designed to help entrepreneurs in Tier 1, 2, and 3 cities and semi-urban and rural locations grow their businesses. The startup effort of the Indian government also intends to: foster entrepreneurship in the nation among women and castes/scheduled tribes. Industrial Policy and Promotion's (DIPP) 19-point action plan is aimed at streamlining and assisting the startup

community, providing financial assistance and incentives, and promoting industry-academic collaborations and incubation opportunities Prime Minister Sri Narendra Modi said the following: "To start India is a ground-breaking initiative aimed at assisting those looking to launch their businesses. That's why the government will back them up to ensure that their ideas may take root and thrive. In the long run, the success of this initiative would help India become a more prosperous and strong country.

The government allows citizens to grow via innovation and design through this single program objective. To achieve the program's objectives, the Government of India has announced this one Action plan. The Startup Ecosystem is covered in detail in this book.

the event Distribution of the package is done in the following areas:

- Simplifying and making eye contact
- Incentives and financial assistance
- Incubation and Partnerships with Industrial Universities

The startup ecosystem in India is currently bursting at the seams with businesses that cater to a wide range of client demands and are doing their best to meet those needs. There has been much assistance from the Indian government as well. The government is serious about supporting the startup movement, as seen by the many creative strategies already in place. Entrepreneurs of the new era may be encouraged to expand and prosper to meet client wants while respecting India's economic and social indices, which is projected to provide the Indian economy with a boost. The government of India's policy framework for startups is examined in this article. Some of the current challenges startups face are shown in the research, and the predicted repercussions are highlighted. A flurry of activity has taken place in the country's startup room this summer because of various issues its members have faced. Appraisals are surging, and investors are filled with optimism. In the wake of a softening of investor and consumer mood, new entrants to the market must consider their value propositions more thoroughly. Startups in the country have had to contend with competition on both a national and international scale. Startups have had to develop new business models and tactics to compete with higher-quality products and customer service. To be successful, you must find a place in your consumers' hearts and wallets.

A qualitative study has been carried out to comprehend these difficulties better. Indian startup professionals, including founders, investors, and representatives of support groups, were interviewed in semi-structured interviews (see appendix for more information on research methodology, including a list of interviewees). In addition, a search of the scientific literature yielded other results. The remainder of the document is arranged in this way. Interviewees indicated the most important possibilities and development drivers for the startup ecosystem in India in the second half. Learn about Indian entrepreneurs' difficulties. For startups, this section focuses on what resources are available to assist them in overcoming obstacles and

taking advantage of possibilities. As the piece points out, further action is required to assist Indian startups.

Due to the inherent risk of startup failure, joining a startup as a team member is not an enticing career choice for many job seekers. Rather, most people choose to work for huge corporations because of the security of larger employment pools. A startup's ability to compete with a huge corporation's brand recognition and financial rewards is also limited. Many people who begin their careers at startups eventually go to more established corporations. Many people have become used to the perks of working for a corporation and are less inclined to make a career transition in the other direction. In addition, many job hopefuls lack the necessary qualifications. Startups are concerned about the knowledge gap between what students learn in college and what they need to gain a job in a field where technology is continuously changing. Because of their lack of familiarity with the sector's demands, young graduates often struggle to get work right out of school. This means that companies have to spend a lot of time and money educating them when hiring new personnel. A third aspect is that many highly skilled professionals have chosen to work overseas. Although numerous startup centers across the globe have attracted foreign talent, Indian entrepreneurs have failed to do the same. As the cost of living in Singapore is greater than in India, expatriates relocate there rather than India because of bureaucracy and visa restrictions.

Definition

If you want to get started, an entity (a Private Limit Society or a True Registered Partnership) must be considered.

At the outset, be in business for at least five years after your company's formation or registration, and Yes, we had a good year for everyone in terms of sales. Be no more than 25 crore rupees. It should not take on a summer shape via a division on the true, complete reconstruction by an already existing company that works on a new business's invention, development, implementation, or marketing. An LLC or individual proprietorship is not considered a startup. A single proprietorship has the legal authority to use the designation 'To start' since it is a limited liability corporation.

In recent years, startups have been the season's flavor for Indian markets. This has resulted in the emergence of several local unicorns across the country. One of the main contributors to this development is the mega-financing invested in most of these unicorns between 2007 and 2017. This is in line with the global trend that dominates the space. Even novice unicorns have had quite a run during this period, where managing the search for investors is generally considered difficult. Investment trends suggest that investors want to get in as early investors, even before the company starts. Overall, India emerges as a thriving, under-penetrated, consumer-driven market with exponential room for growth. Internet penetration and its growing importance will drive most businesses. Because of its consumer demographics, with China out of reach, India offers most of the investment opportunities that the world is considering. This is despite the multitude of operational, regulatory, and tax issues facing the business environment in India.

A Review Of The Literature

In his Article, Christopher A. Pissarides (2021) investigated the impact of starting expenses on job performance. This is a rather academic piece. The study concludes that the inequalities in job market success may be explained by construction variables, which nations should include in their institutional systems.

Startups in India have a variety of financial difficulties, according to Omid Sharifi Bentolhoda Karbalaee Hossain (2019) in their essay. It also focuses on the challenges faced by newcomers at the beginning of their careers. Major technical breakthroughs have pushed investors to increase the bar on the number of effort contractors must perform even sooner in their firms, leading to significant discoveries. Startups serve as a source of technological innovation in all sectors, including the development and market introduction of radical sustainable innovations, while incremental innovation is more the domain of established companies (Fichter and Wei 2018). For example, "green startups" design and deploy products or services that support the aims of a green economy ("reducing greenhouse gas emissions, improving energy efficiency, adopting a circular economy approach, etc."). Moreover, green startups have a great diversity of products and services. The markets and the institutional or regulatory environments that affect green startups determine the challenges and opportunities they face (Bergset and Fichter 2019). In addition, due to the presence of several non-profit or NGO-led initiatives in the environmental sector, it is necessary to make a distinction when defining sustainable entrepreneurship as it takes place in a business context that must be financially self-sufficient in the medium on long term (Shepherd and Patzelt 2018; Thompson et al. 2019).

Goals:

- Discernment of the difficulties experienced by startup firms.
- Startup India is researching growth and prospects.

Starting a Company:

During the last two decades, the startup environment in India has grown tremendously. More and more people are getting involved and providing different sorts of assistance to new businesses. As a result, the ecosystem has developed significantly and is currently in maturation. In some cases, they did successfully, while in other cases, there were departures. Flipkart, an e-commerce startup located in Bangalore, got a significant amount of funding in 2019. Numerous entrepreneurs and other incubators, accelerators, and other support groups flourished in the ensuing years. 7200 to 7700 tech businesses were founded between 2020 and 2022, reflecting a rise of 12 to 1526 percent.

InMobi, a Bangalore-based ad-tech business, was India's first unicorn. There are presently a total of 19 unicorns in existence. Paytm and e-commerce platform Paytm Mall parent company One97 Communications is now India's most valuable startup, valued at \$10 billion. Access to external money has also risen dramatically during the last decade. Foreign investors from the United States, Singapore, China, Japan, and the Middle East contributed significant cash to India's economy. Much money was poured into businesses with nothing but ideas at the beginning of a financing boom, resulting in significant financial losses. After a few funds closed and the market began to clear, investors grew more cautious in their investments. In the last several years, things have begun to get better. The financial world is also influenced by government and CSR activities. A wealth of information was amassed as the first generation of Indian entrepreneurs learned from their failures and attempts. In the end, a few of these entrepreneurs made it big and encouraged others to follow in their footsteps.

In addition, the startup environment has established a feeling of the community over time. The Indian ecosystem has grown to a certain extent and has seen an increase in support across all aspects. The method used to acquire the data is more important. Following is a list of firms cited in the most current January 2017 Nasscom report. A few noteworthy developments in the Indian startup scene are summarised in the following paragraphs. • ONGC announced the introduction of "ONGC Start-up" during the Diamond Jubilee year, an INR 100 crore seed fund for oil and gas industry innovation. Company officials want to launch a website to help people better understand how to plant capital, mentoring, and other assistance forms. ONGC honored Rajendra bhambhu, Deepak Naik, and Prajesj Chopra for inventive solutions to various problems, including a Marlet clutch.

To Determine The Shape Of The Problem:

So suddenly get an inspiration for a new product. A desire of own may have led to the creation of this product. The progress you've achieved so far is commendable. Put yourself in the position of attempting to answer two questions right now: "Does the solution I've come up with work? Effective? Is your problem/solution/hypothesis clear? If so, you have a problem/solution and a hypothesis, and you may begin testing your concept in a press release.

Building Your Card :

A minimal viable product (MVP) is a product that can be tested with the least amount of time and money. This is how you illustrate a point and get insight into consumer behavior while reducing the associated risk. Focus on drawing people into your product once you've built your MVP - that's where the seeds of startup success are sowed.

Shape the Shape of the Product Market:

By the time your MVP has gotten traction, you've had to compensate consumers who purchase more and continue to use your product regularly. How are witness panel by-product markets structured? This one has never been an unreachable entrepreneurial source.

The key to a successful language/market fit test is communicating to your customers what your product accomplishes so that they "get" it. This is where you'll put your email to the test. This one is a certain hit with your intended audience.

Optimization of the Funnel

Your experience or the user's experience varied parts to decrease and remove areas of misunderstanding via funnel optimization. User onboarding processes and other essential activities users learn to utilize your product may fall under this category. Activation, conversion, and retention are all improved due to this practice.

Finding A Channel-Product That Is the Right Shape

To determine the greatest yield and the most efficient methods to reach your target clients, you must investigate channel product fit.

Using a Stepladder:

The phase is time in bowls. In the book game of growth, be on top of your "pings."

Maturity:

The growth rate may slow down in the future. Similar to the corporation, maize becomes more mature. High-tech companies throughout the globe have no intention of slowing down. They've been roasted by the environment and their ancestors' genes.

4. Conclusion

The government of India's flagship project, Startup India, aims to build a strong startup ecosystem in India to foster sustainable development, economic growth, and large ladder-use opportunities for entrepreneurs. We aim to help small businesses develop via innovation and design by launching this program. The Indian government has announced the subsequent steps to meet the initiative's goals: This strategy considers the whole Startup Ecosystem.

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Impact of E – Shopping on Retail Business

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Abstract - Retailers include of a large segment of the population and a larger population is dependent upon these retailers. But the introduction of online shopping with their attractive incentives and wide varieties has slapped on their face the fear of uncertainty and helplessness. This study looks into the various aspects about how retail businesses are being affected and also the various recovery mechanisms they are coming up with to counter those e-stores in their race of survival. This paper also undoes the effect upon the effectiveness of the various concerns due to increasing trend for online shopping.

Index Terms – online shopping, retailers, large segments, attractive incentives, turnover.

INTRODUCTION

Purchasing products or services over the Internet, on-line purchasing has attained tremendous reputation in current particularly due to the fact human beings discover it convenient and easy to store from the comfort of their domestic or office and additionally eased from the trouble of transferring from store to store searching for the best of choice.

Online purchasing is a mode of electronic commerce which lets in customers to directly purchase product and services over the net via a virtual store. Some of the leading online stores presently in India are Amazon, Snapdeal, Flipkart, Myntra and Homeshop18 etc.

Retail is a procedure of selling products and services to customers through various channel of distribution. Retail shops may be small or big but they typically operate in the same line as “purchasing to sale”. Retail mode of business is as old as development and is the most basic form of business. Types of Retail Stores are like

Departmental Stores – it is a retail store which deals wide range of products to the consumers under one roof. In a department store, the consumers can get almost all the products they desire to shop at one place only

Discount Stores – it is also offer a wide range of goods to the consumers at a discounted rate. These shops generally offer a limited collection and the quality in certain cases might be a little poorer as compared to the department shops.

Supermarkets – it is a store which normally offers food items and home need items, properly engaged and arranged in specific departments is called a supermarket. it is an innovative form of the slight grocery stores and supplies to the household needs of the consumer.

Malls - Various retail stores operating at one place system a mall. It would consist of various retail outlets each selling their own produce but at a common platform.

The online has many benefits over retail stores. Firstly, the choice, whereas the bookstore at the junction of the street or the near store hardly offers 4000 references on its stalls or 10 to 20 designs of a particular garment of similar size, Amazon, Flipkart and others have got hundreds of thousands of variety. Internet is full of online retailers offering 10 times or even 1000 times more products than the average retailer can possibly dream of.

For an e-commerce sites, the expenses of storing and referencing a goods represent a small portion of the cost as associated to the cost of storing and referencing a product for "physical" stores. From the customer happiness and convenience of services, internet shopping is creating a major influence upon the retail stores.

Need of the Study

This study is very much important to present eras as this will make awareness about the effect of e-stores upon retail stores. The sudden flow in online shopping and customers have attuned to it to a greater extent which it a real cause of concern for the thousands of retailers who have a small store providing a small different of goods and services which are their source of livelihood. This study wants to undo the real scenario and also look into the risk that looms over the different small-scale retailers. It's time the retailers start thinking deep into this feature and come up with better and innovative plans.

Objectives of study

- To study the result on profitability of retail stores due to the introduction of e-stores
- To examine the effect upon pricing patterns of retail shops in recent times
- To consider the change in business pattern to attain customer satisfaction.

RESEARCH METHODOLOGY

The research methodology includes of the sources of data, methods adopted to gather such data, sampling methods, statistical tools for analysis, data interpretation etc.

Sources of Data:

For the study the primary has been collected through personal interview where interview taken place with the owners of various retail shops. Investigation through schedules at the different units for suitable information.

Sample size:

It consists of all the retailers situated in the Ananthapuramu city from which a 50 retailers are chosen at a random for the purpose of the study.

Sampling Techniques-

For the study convenient sampling technique has been used on the basis of suitability for the convenience of information and which has a significant share in the market so as to give more correct picture of the effect of online shopping.

Data Representation Tools-

The data composed are classified, organized and represented through chart and bar diagram.

Limitations of the study

- The study is limited to Ananthapuramu city only.
- Besides that, the comprehensive study has been lead taking on 50 retail stores based upon convenient sampling.
- Time also a limited factor as the study is lead in a very short period of time.

ANALYSIS & INTERPRETATION

Retail shops are normally operated in the traditional lines of business except a few supermarkets that brought in certain alteration in their business patterns, but the beginning of online shopping in current period has put an upon them because they had been losing on several ground. The study has been made on numerous grounds to understand the aspects of effect upon the business of different retailers that to some scope has led to a change in their strategies.

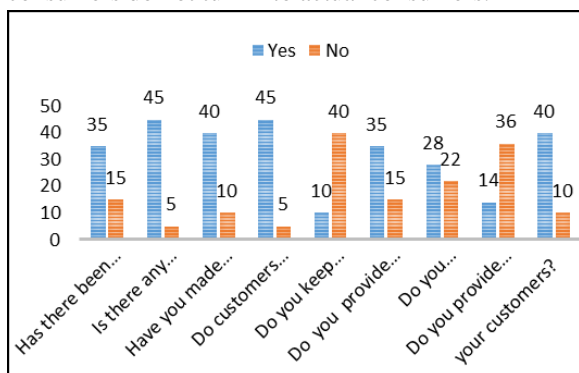
Presentation of data

Table: Table showing the analysis of the various aspects of the impact of online shopping upon retail trade

List of questions:	Yes	No
Has there been any decrease in averageturnover in the past.	35	15
Is there any decrease in profit margin?	45	05
Have you made any increase in discount rates offered to customer in recent times?	40	10
Do customers ask for discount before making purchases?	45	05
Do you keep more variety of stock at your store now-a-days?	10	40
Do you provide after sale services of personalized nature to your customers?	35	15
Do you advertise about your enterprise?	28	22
Do you provide home delivery services to your customers?	14	36
Is there an increase in window shopping in recent times?	40	10

The table things to see that there has been a reduction in turnover in most of the enterprises with a figure as high as 75 to 80%. Most of the retailer stores owners have also agreed to a decrease in their profit edge in recent period as more discounts are been given by

them to the customers in order to ensure a sophisticated amount of sales. Most of the customers are look into that as for discount in currentperiod. Now-a-days the retailers are trying to maintain a good variety of stock and also offers various types of customer focused on services in order to reach and recollect customers. An startling signal is the increase in window shopping which elucidates that potential consumers do not turn into actual consumers.



Interpretation

- The turnover of retailers during the period of time has observed that decline when as compared to years back.
- Online shops were brought in a price war in the market and the lead suffers of this price war are the retailer stores.
- The online stores offered attractive discounts which impact on retails shops. Although the retailers are not able to compete with the online stores.
- E-stores main a wide variety of goods and retailers are fail in that. Because of warehousing and maintaining stock etc.
- Most of the retailers are maintaining to build customer service loyalty. Now they are providing home delivery services in like as to online stores.
- Now a days retailers are more involved in advertisement campaign than ever before to increase sales.

FINDINGS

Revenue and profit margin of the retailers has significantly decreased during the past few years.

- a. Now-a-Days retail shops are more involved in services related to customer satisfaction.
- b. Although the retailers are not able to keep a huge multiple in their product, they are trying to keep the best of them so as to affect more sales.
- c. Customers are looking into make window shopping at a disturbing higher rate to have a physical look at the product and buy that product online at a bargain rate.
- d. Most of the retailers are maintaining to build customer service loyalty. Now they are providing home delivery services in like as to online stores.
- e. Now a days retailers are more involved in advertisement campaign than ever before to increase sales.
- f. Customer are more convenient to purchase goods through online and product range become relatively more important as a deciding factor for shopping online.

SUGGESTIONS

Retailers have to modify their approach towards the market. Today's is a consumer market and as a result the importance is the customer fulfilment. Better quality goods, reasonable price and sociable after-sale services are the basic areas in which the business has to focus to a remarkable extent. Further services should be delivered to the consumers to woe them and build upon a faithfulness which in turn would make sure a constant sales in the years to come.

CONCLUSION

The aspect of retail has altered. The introduction of technology in recent period being the major reason for it. Today, retailing says going into shopping centers, going virtual and going android mobile. But the neighboring stores are always the most important concern for all purpose and seasons. It needs to recuperate not just continue. The retail shops need to just uplift its design of business and face the competitive world with a more optimistic viewpoint. Electronic shops and retail stores both have to continue, none at the cost of the other. It's not just about the maintenance it gives to the thousands of

people but also the accessibility and the determination
of a fixed retail store.

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IMPACT OF SALES PROMOTION ON CONSUMER PURCHASING BEHAVIOUR

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ABSTRACT

Sales promotion is an advertising and marketing method that has been studied for years and has become an important topic in cutting-edge advertising and marketing. The reason for advertising is to get centralized clients and persuade them to buy. Promotion is explained because the coordination of initiatives initiated by all vendors is to persuade statistical channels to install and promote items and services or to sell an idea. Sales promotion is an important detail of the promotional mix. The reason for this consideration is to investigate the impact of revenue advertising on shopping for client behavior. Consumer shopping is considered a fixed variable for behavior. The survey procedure was used and the questionnaire was assigned to the respondents. Sample size was 100 in the study. The sophisticated goal of this study was to find out the effectiveness of sales promotion tools and techniques on customers' buying behavior.

Key words: sales promotion, consumer behaviour, word of mouth, online advertising

INTRODUCTION

Sales promotion is a part of the marketing mix in which various promotional tools are used to improve turnover & make big profits. With the help of sales promotion consumer purchases increased & the efficiency and expectation of intermediaries improved. Marketers these days are constantly focusing on sales promotion, which is one of the key strategies of the marketing mix. Continuous sales promotion has become an important part of the marketing mix. So competition between marketers is also growing rapidly. Technological development & globalization has taken place all over the world. Furthermore, it is one of the most significant technologies in estimating other marketing activities, such as advertising, in view of the size of the large customer base.

In marketing, sales promotion is one of the key techniques & its importance is gradually increasing day by day. Through this communication mix of marketing the process of disseminating information, persuading them and remembering them from time to time in a direct and indirect way about services & goods has taken place.

With the help of sales promotion the customer can be attracted towards the product in a short span of time. This type of promotion includes cash & non-cash incentives to attract customers. These campaign strategies are very effective in markets with high similarity. Brand conversion is also possible in the market.

REVIEW OF LITERATURE

Neha & Manoj, 2013. His research shows that many marketers use different strategies to persuade a customer to buy through a number of promotional tools. It is a key component of the promotional mix that marketers commonly used to create competition, increase turnover and persuade the consumer to buy a product & service from the market. This study focuses on various sales promotion techniques & its impact on decision makers on products and services.

Chandra, Majumdar, & Suman, 2018. in his study defined that the growth of the Indian economy in our country is gradually increasing through the retail business. Modern retailers are directly targeting young people who are more knowledgeable about style, brands and fashion at affordable prices. It plays a key role in the market and increases retailer profits. Retailers use a variety of promotional methods to attract more customers and educate the buyer about the best buy concept. The main purpose of the research is to examine the impact of a promotional tool on consumer purchasing behavior in U.P.'s developed market.

Mehmood, & Ahmad, 2014. His research shows that the impact of the natural environment & sales promotion has greatly influenced customers' purchasing decision. The results show that there is an inconsistent relationship between buying behavior & promotional techniques. However the offer to get one for free is one of the most popular among buyers who show a key

relationship to the buying decision. The most important tool of the promotion mix can be identified by the results of this study, which can have a significant impact on the purchasing behavior of customers.

Mughal et al., 2014. The purpose of this research is to study the impact of the most commonly used methods of promotion mix in the retail sector. These methods include sample, buy one buy free, coupons, price discount etc. Influence the consumer purchase decision. The decision was reversed with two factors: customer loyalty & brand change. In a growing world retail markets have been growing steadily over the past few years. Retailers have used a variety of marketing promotion methods to create a competitive environment in the market, which takes a crucial step and convinces consumers to buy products & services.

OBJECTIVES OF THE STUDY

- To discuss various promotional activities
- To understand the consumer perception towards promotional strategies
- To analyze the consumer behaviour while purchasing goods and services.

RESEARCH METHODOLOGY

This observe turned into accomplished by way of amassing both primary and secondary data. The primary date accumulated as of 100 customers on convenient sampling foundation. We have been organized a structured questionnaire to acquire primary data. We had long gone thru the academic literatures, journals, magazines and additionally diverse sources of secondary facts were used for the observe.

SALES PROMOTION

It is a policy that affects consumers who aim to increase market turnover. This strategy can be useful in the short term, but its effect can be very long lasting. This long-term impact is felt through advertising, personal marketing & public relations, etc. This creates loyal customers for the company. Various sales promotions are used to increase sales. Below are several different sales promotion methods:

- Coupons: This is a kind of certificate / paper that keeps the customer rich at the time of purchase.
- Discounts: This is very similar to coupons, but the redeem period of the two is different as rebates are given after purchase, while coupons are redeemed at the time of purchase.
- Sample: This is an experimental sum of specific items presented to customers through different methods. This is mainly done for launching new products.
- Bonus Packs: This is a kind of promotion mix in which a free tool is very popular for the purchaser. Sometimes an extra amount of product is also given to attract more customers.

CONSUMER BUYING BEHAVIOR

In consumer behavior they make various decisions such as what to buy, when to buy, why to buy, how often to buy, where to buy and so on. All of these decisions have an impact on their future purchases. This nature is evaluated before selecting a promotion mix and evaluating the impact of the product on their purchase decision.

This approach has different levels given below:

- Identification required
- Evaluation of post purchases
- Information search
- Purchase decision
- Evaluation of alternatives
- Sales promotion effect

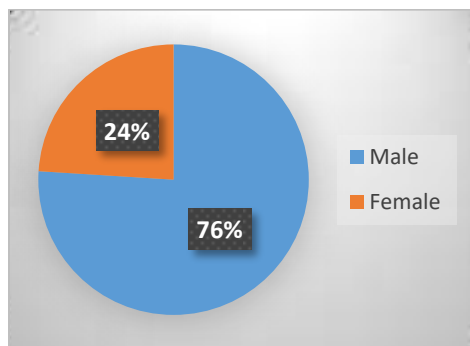
This part of the research has the effect of sales promotion on consumer purchasing decision. This can have a short-term impact on the customer's purchasing decision. Many researchers say it has not had as positive an effect as sales promotion: The use of sales promotion tools increases the cost. It does not reduce revenue as consumers are buying large quantities at low cost.

People are more attracted by low prices compared to their internal features which are mainly preferred by branded companies. In short the theory of price perception mostly affects consumers. It does not support brand equity for long term, which reduces long term sales. Uses of sales promotions especially coupons lose face value along with their face.

ANALYSIS

Gender

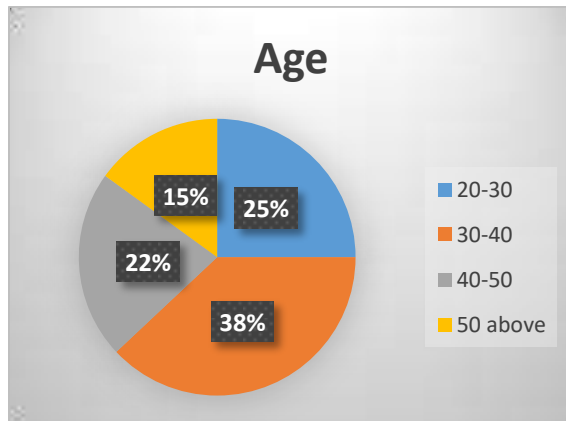
Gender	Respondents
Male	76
Female	24



From the above charts majority of the respondents are male 76% and female 24% participated in the survey.

AGE GROUP.

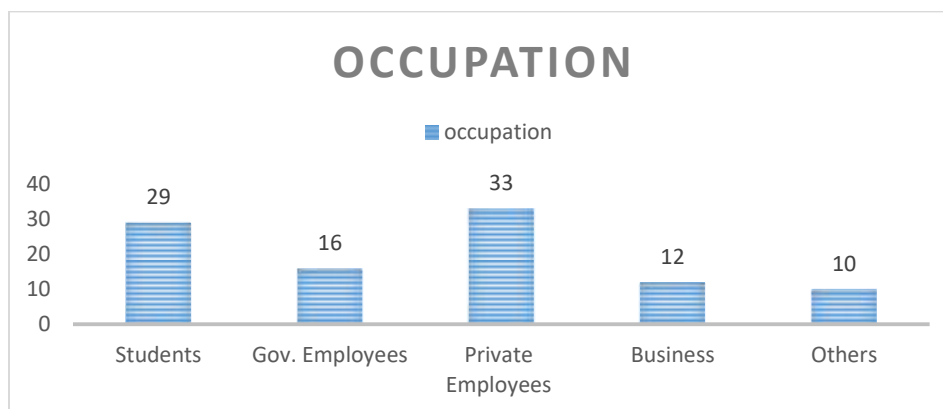
Age group	Respondents
20-30	25
30-40	38
40-50	22
50 above	15



Majority of the respondents belonging to 30-40 (38%) and 20-30 (25%) years ages were participated

OCCUPATION

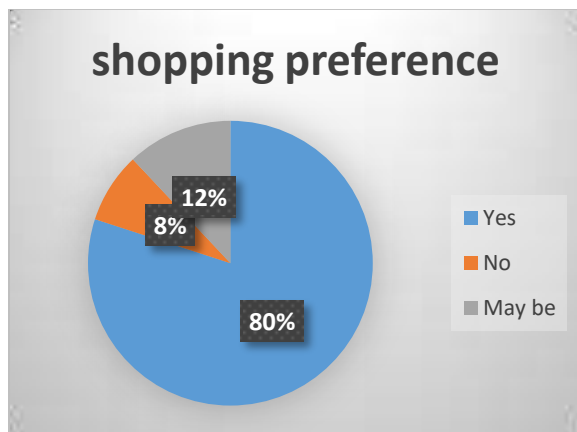
Students	government employees	private employees	business	others
29	16	33	12	10



From the above table showed the respondents occupation. Out of total number 33% are private employees, students 29%, government employees 16% and few from business 12% and others 10%.

Shopping preference

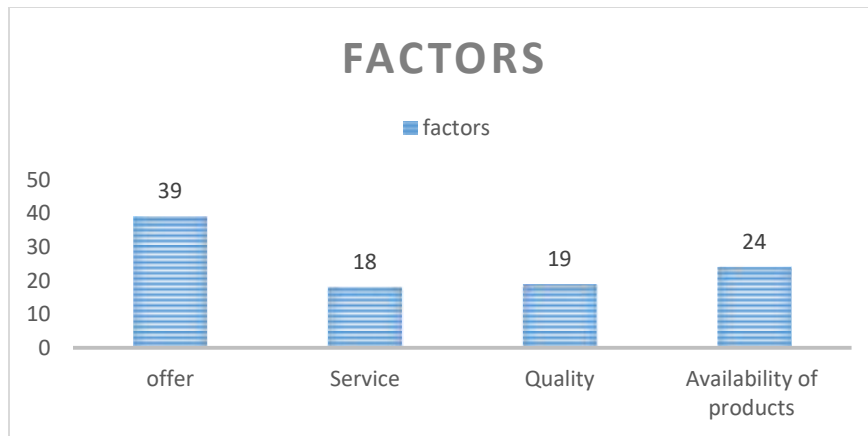
Particulars	Respondents
Yes	80
No	8
May be	12



Out of total respondents 80% are prefer do shopping.

Which factor attracted you when purchasing goods and services?

Factors	Respondents
offer	39
Service	18
Quality	19
Availability of products	24



Most of the customers are attracted availability of products and offers given by the companies.

Ranking promotional activities.

Promotion strategies	Respondents
Price discount	46
Coupon discount	27
Free sample	9
BOGOI	18

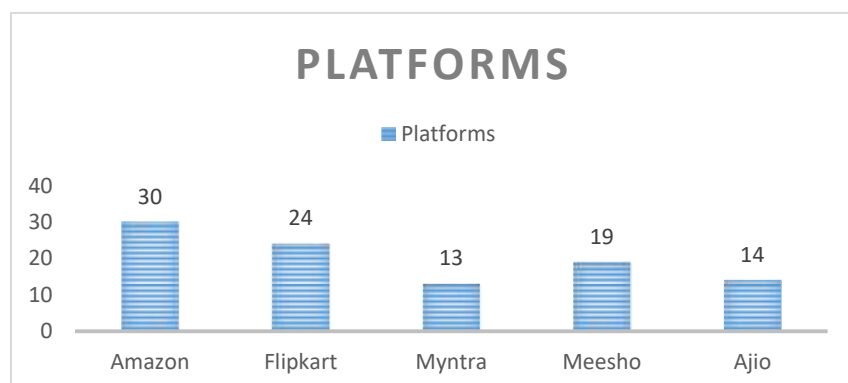


Most of the customers given rank to price discount 46%, coupon discount 27% and BOGOI 18% (buy one get one free). Least preferred is free sample 9% .

Which platform do you prefer for shopping?

Platforms	Respondents
Amazon	30
Flipkart	24
Myntra	13

Meesho	19
Ajio	14



Again it is proved that amazon got first place to prefer shopping. And next place occupied by Flipkart 24% and meesho 19%, Ajio 14% and myntra 13%.

FINDINGS:

- Sales promotional activities have a great impact on consumer purchasing decision.
- Sales promotion is one of the major promotional tools used in marketing products and services.
- The study reveals that sales promotion has an impact on consumers' purchasing decision, but their overall decision depends on what they buy at any given time.
- Customers may be skeptical in some cases, but discounts and price-off deals and the provision of such services will satisfy customers.
- The study shows that sales promotion plays an important role in the marketing program for sellers and retailers and customers are very satisfied with sales promotions such as discounts, coupons, free samples and "buy one free".
- Many customers are attracted to the availability of products and offers offered by companies.
- Most customers rank 46% off price, 27% off coupon and 18% on BOGOI (buy one get one free). Low priority free sample 9%.
- Business and industry individuals have come up with a lot of sales promotion strategies these days for competition and survival.

CONCLUSION

Consumers are the king of the market world. They have the right to choose the product according to their needs. Customers can easily convince the manufacturer on quality, quantity, price, content, feedback etc. This study examines the impact of sales promotion on consumer buying

behavior. In general, the purchase decision mainly affects the evaluation prior to its purchase. But, sales promotion increases short-term sales and does not create loyal customers. Customer creation is all about providing quality services and quality product. Sales promotion is very useful to create awareness among the customers about the goods and to reach the target customers. Sales promotion is a powerful tool to bring new products to market and reach customers.

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INVESTOR BEHAVIOUR TOWARDS VARIOUS INVESTMENT ALTERNATIVES

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Abstract:

Investment is a sources or a fund which generate additional revenue. Every individual is trying to do investment to create income with their savings. There are many types of investment alternatives available in the market like bank deposits, postal deposits, real estate, mutual funds, precious metals (gold or silver) , insurance schemes, equity and debt so on. This paper is going to analyze the investor behaviour towards various investment substitutes. as well as it is going to discuss the factors which makes impact on investors investment options and to analyze investor decision towards different investment substitutes across gender along with an effort to explain the aspects that influence investor choice of unlike investment options. For this study we collected responses of 300 respondents in the region of Anantapur district, Andhra Pradesh. We adopted descriptive research design and the data was collected with a structured questionnaire and the sampling technique was convenience sampling. The data was summarized with the help of various statistical tools like mean, variance, t – test, and ANOVA. The paper is conclude that investors have invested in a variety of investment roads and have done so with the expectation of capital gains and returns, both short-term and long-term.

Key Words: Savings schemes, Stocks, Mutual funds, Deposits, Insurance schemes, Risk factors.

INTRODUCTION

Investing is an art. Investing in a variety of assets depends on the financial status, perception, education and occupation of the individual. When a person has more money than he needs, he earns income by investing the remaining or hidden money in various sectors (bank or postal deposits, gold, real estate, mutual funds, debit and equity et al.). He is called a potential investor.

Now a days Investors have a wide variety of investment avenues to invest in based on their need and requirements. Investment knowledge is very important for investors because it helps them to reduce their investment risk and make profits and make timely investment decisions. Alternative investment avenues are National Savings Certificates, Provident Fund, Mutual Fund Schemes, Insurance Schemes, Chit, Bank Fixed Deposits, Postal Deposits, various metals, Company Fixed Deposits, Company Shares, Bonds / Debentures, Government Securities Schemes and real estate etc.

Some surveys say that many changes have taken place in the changing times and investor preferences towards new saving tools. Various savings and investment schemes were introduced and adopted in the 1990s and 2000s. Over time, investors will abandon the old investment policies and adopt new investment policies. Formerly a National Savings Scheme, Life Insurance and Bank Depositors are now investing in stocks, debentures and Gold.

Making the right investment decision is a complex issue for investors. Many factors influence decisions such as economy, population and their attitude. The main purpose of every investor is to make a profit on the investment. However the potential for return is of greater concern.

Savings vs. Investment

- Savings refers to keep some amount out of our income for future requirement. But investment means which is generate additional income in future.
- Most probably, people do saving to meet unforeseen or sudden expenses in future. On the other hand investment do for increase capital appreciations and generate returns over the period of time.
- Saving do not have risk when compare to investment. But investment has risk, sometimes they may loss desire revenue as well as capital also.
- Savings can easily use at any time when we want and it is highly liquid and convenient. But when come to investment it is not flexible as compare to savings. Because it takes some time to convert from investment into liquid form.

REVIEW OF LITERATURE

Karthikeyan, they conducted research on the understanding of small investors on post office savings schemes and found that older people were more aware of the level of awareness on Kisan vikas patra, national savings schemes and deposit schemes for retired employees than younger ones. The analysis states that living needs and tax benefits are the two main factors affecting investors in semi-urban and urban areas. Approximately 73.3% of investors prefer to invest in small savings schemes in semi-urban and urban areas because the risk is low and profitable.

Kumar, Banu and Nayagam, they conducted a study on investment factors such as post office savings, bank deposits, gold, real estate, equity investments and mutual funds, as well as the ranking of investors' preferences and options in Tiruchirappalli. They noted that investor preferences depend on features such as investment security, liquidity, income stability, capital growth and tax benefits. Therefore, investors need to consider the priority, need and other factors of the investment factors available to them.

Priti Mane. Talked over the schemes that investors are interested in, the plans they choose, the main reasons for such a choice and customer awareness regarding mutual funds. The research deals with investors' investment interests such as bank deposits (fixed deposits, and recurring deposits), mutual funds such as bonds, debt and shares, and a variety of other investment options. They concluded that they had faced many difficulties due to not taking proper advice from the Mutual Funds Authorities on investment factors such as debt and equity associated with the mutual fund.

Shukla – conducted a research on Priority on investment avenues and study on their investment policies that earn their salaries per month. Usually investors invest based on their education skills. They have mainly invested in Lands and Long Term Investments. As well as adherence to criteria such as investment security and low risk

Amudhan and others - Discussed options, performance and investment behavior in relation to purchases of small amounts of securities, deposits, mutual funds, insurance and chit funds. And they found that there is correlation between financial theories and earlier observed substantiation recognized the normal investors. This results that the return received on investment such as interest on deposits, dividend on shares, rent, premium, annuities, and gains on investment.

Mishra – they were conducted an Analysis on investments and investor understanding on mutual funds. Investor feedback was collected using the "t" test. Focusing on Small Investors Savings and Tax Purpose and Large Investors Future Higher Returns. Mutual Funds institutions need to take appropriate steps to grow and survive in India.

Kumar - analysis on before investing, investors are encouraged to think about what factors play a key role in their thinking. They said that in their research, nine factors that influence investor investments are investment security, risk tolerance, return, investment period, periodic return, share fondness, long-term investment, future returns and investment dynamics. They also said that the investor would compare the difference between the time and the return on which their

return was invested. He said these factors can be used to assess the equity investor's future goals and level of satisfaction.

OBJECTIVES OF THE STUDY

- To understand the various methods of investment
- To evaluate investor decision towards different investment avenues across gender
- To know the investor perception towards various factors.
- To provide recommendations to the investors on where to invest.

RESEARCH METHODOLOGY

This research is a descriptive one. The finding and conclusions of the study is based on primary and secondary data during the course of action. The primary data was collected from 300 respondents. Total sample size for primary data was 350. Primary data was collected by the scheduled method and prepared structured questionnaire. Various tools were used for the study in order to collect respondent's opinion. For secondary data collection we had gone through the academic literatures, journals and also various sources of secondary data were used for the study.

Statistical tools:

- Anova: Two-Factor Without Replication
- T-test: Paired Two Sample for Means
- Frequency table and charts/Graphs

Hypotheses

H_0 : There is no relationship between male and female for investment decision

H_1 : There is a relationship between male and female for investment decision

SOURCES OF INVESTMENT:

1. Equity shares:

Share is a part of capital which contribute by the public. They are owners of the company and having voting right. Investing money on shares by purchasing from company through IPO or from secondary markets. It produces good return but highly risk. Investors receive earning on share in the form of dividend and get capital appreciation. The share prices are volatile every day. They are several factors which affect the share price that may be internal or external factors.

2. Equity mutual funds

It is one of the most important popular investment. It is useful to who are looking for long term investment and moderate risk on the investment. It is highly liquidity and produces high return on investment.

3. Debt mutual funds

This type of investment is useful to who are looking for a constant return on investment with low risk. It is less volatile and less risk compare to equity fund. It produces a fixed rate of interest on their investment like bonds, government securities and money market instrument such as T-Bills, commercial papers and other instruments. The tenure of the investment is a day to more than 7 years.

4. National Pension System

It is a long term retirement benefit investment scheme which is governed by the pension fund regulatory and development authority. It is benefit to people who are planning to save money for his after retirement life and tax benefits. Here risk is very low and liquidity also low. The scheme will get maturity at the age of 60 years.

5. Public Provident Fund (PPF)

public provident fund is a retirement saving scheme which is run by the government of India in 1968. Its main purpose is to mobilize small savings in the form of investment from individuals and earn returns on it. The scheme is useful for those who are looking for tax deductions, guaranteed returns and a safer investment option.

6. Bank fixed deposit (FD)

Bank deposits are completely risk free investment to compare other investment option. The interest rates on deposits are depend on the status of individual i.e. citizen, senior citizen and super senior citizen. The return on deposit is moderate. From February 4, 2020, a maximum of Rs. Up to Rs 5 lakh will be insured and earlier it was one lakh both principal and interest.

7. Real Estate

It is one of the best investment to get higher return on their investment. It involves to purchase land or property and give it to let out or lease to collect money in the form of rent. The tenure of investment is long term and risk is moderate. It produces income in 2 ways that is receiving rent and capital appreciation.

8. Gold

Gold has always been considered one of the harmless investments because of its quick recovery in value through economic dips. Banks have been selling gold coins in recent times. Paper Gold is a substitute way to own gold. Investing in gold is a new idea. Investing in Paper Gold is

somewhat costly and can be purchased through Exchange Traded Funds. Gold can also be purchased through Sovereign Gold Bonds.

Profile of respondents

Particulars	Variables	Respondents	Percentage
Gender	Male	190	63.33
	Female	110	36.67
	Total	300	100.00
Age	21-30	100	33.33
	31-40	71	23.67
	41-50	99	33.00
	51-60	17	5.67
	Above 60	13	4.33
	Total	300	100.00
Education	Intermediate	50	16.67
	Under graduate	125	41.67
	Post graduate	71	23.67
	Professionals	54	18.00
	Total	300	100.00
Employment	Government	112	37.33
	Private	128	42.67
	Self employed	50	16.67
	Retired	10	3.33
	Total	300	100.00
Annual income	Up to 2 lakhs	85	28.33
	2 – 4 lakhs	117	39.00
	4 – 6 lakhs	62	20.67
	Above 4 lakhs	36	12.00
	Total	300	100.00
Investment decision	Yes	214	71.33
	No	86	28.67
	Total	300	100.00
Source of investment information	Friends / Relatives	139	46.33
	Experts opinion	66	22.00
	Brokers / Agents	50	16.67
	Media	36	12.00
	Other sources	9	3.00
	Total	300	100.00

From the above table shows demographical profile of respondents. Out of which 63.33% are male and 36.67% are female respondents. 33.33% of the respondents are between 21-30 years ages, 23.67% are 31-40 years age, 33% are 41-50 and 10% are more than 50 years age.

16.67% of the respondents are having intermediate qualification, 41.67% are under graduates, 23.67% are post graduates and 18% are professionals. And further 37.33% respondents are government employees, 42.67% are private employees, 16.67% are self-employed and 3.33% are retired employees. The respondents source for taking decision on investment through friends and relatives which is 46.33% and next highest 22% i.e experts opinion, brokers or agents is 16.67%, media 12% and other source 3%

To evaluate investor decision towards different investment avenues across gender

- Hypotheses**

H_0 : there is no relationship between male and female for investment decision

H_1 :there is a relationship between male and female for investment decision

Anova: Two-Factor Without Replication

<i>SUMMARY</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
bank deposit	2	25	12.5	12.5
Gold	2	67	33.5	24.5
insurance	2	25	12.5	12.5
real state	2	98	49	882
stock market	2	85	42.5	612.5
male	5	190	38	657.5
female	5	110	22	139.5

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Rows	2284	4	571	2.526549	0.195623	6.388233
Columns	640	1	640	2.831858	0.167701	7.708647
Error	904	4	226			
Total	3828	9				

The above analysis shows the decision of the investors towards various investment avenues across gender. Rows refers to the sources of investments and columns refers to the gender. Here

we can noticed that the F value (2.526549) is less than the F critical value (6.388233) and P value is 0.195623 at a significance level of 5% which means the null hypothesis is cannot rejected, it implies H_0 : there is no relationship between male and femalefor investment decision.

T -test:

H_0 : there is no relationship between male and female for investment decision

H_1 :there is a relationship between male and female for investment decision

t-Test: Paired Two Sample for Means

	<i>male</i>	<i>female</i>
Mean	38	22
Variance	657.5	139.5
Observations	5	5
Pearson Correlation	0.569579194	
Hypothesized Mean Difference	2	
Df	4	
t Stat	1.472461067	
P(T<=t) one-tail	0.10744042	
t Critical one-tail	2.131846786	
P(T<=t) two-tail	0.21488084	
t Critical two-tail	2.776445105	

Degree of freedom = $(n - 1)$

$$= (5 - 1)$$

$$= 4$$

Significance level $(\alpha) = 0.05$

t-tabular = 4.6040

t-test =1.47246

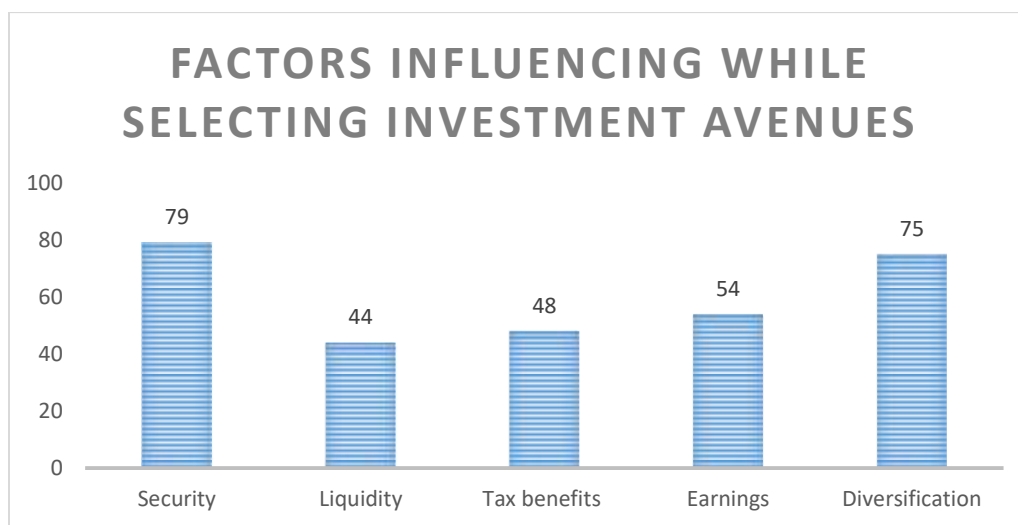
$t_{\text{calculated}} < t_{\text{tabular}}$

Here 't' tabular (4.6040) is more than the 't'calculated (1.47246) which means we accept null hypothesis, and reject alternate hypotheses, H_0 : there is no relationship between male and femalefor investment decision

INVESTOR PERCEPTION TOWARDS VARIOUS FACTORS

1. Factors Influencing While Selecting Investment Avenues

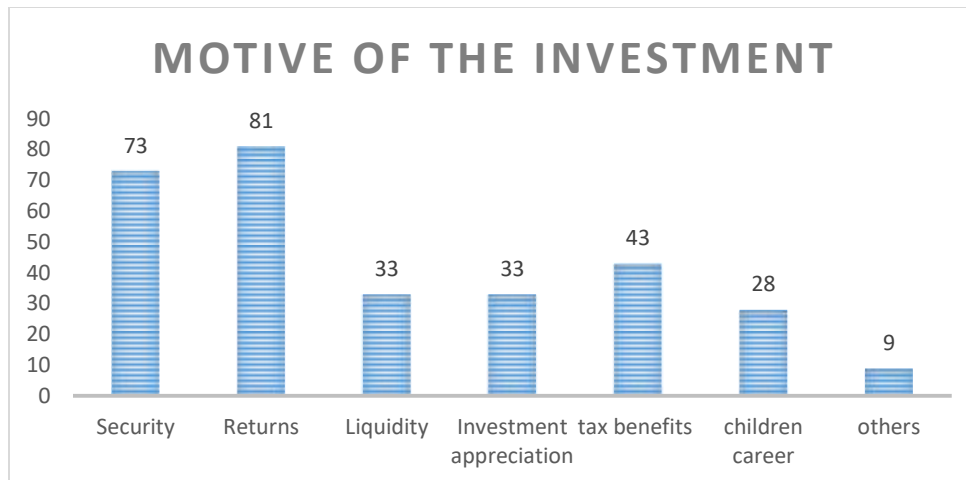
Elements	Security	Liquidity	Tax benefits	Earnings	Diversification
Respondents	79	44	48	54	75



From the above graph disclosed that the two factors are majorly influencing on investment that is investment security (79) and diversification (75). And after next factor is earnings (54). One of the major factor for investment is earning and another factor that influence investment s tax benefits.

2. Motive of the Investment

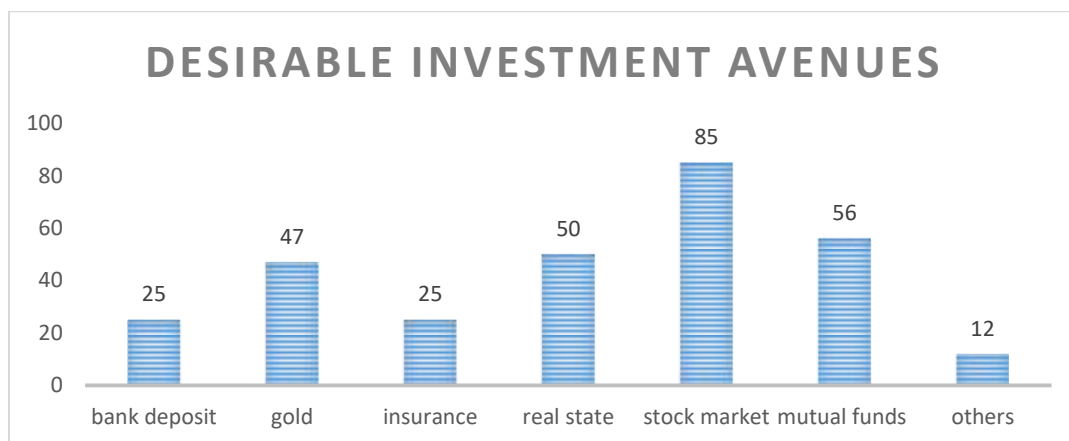
Elements	security	returns	Liquidity	investment appreciation	tax benefits	Children Career	Other
Respondents	73	81	33	33	43	28	9



From the above graphs represent the objectives of investment. Out the total respondents 81 were doing investment for getting return on investment and 73 were security purpose. And next highest reason is getting tax benefits i.e. 43 respondents.

3. BestDesirable Investment avenues

Elements	bank deposit	gold	insurance	real state	stock market	mutual funds	others
Respondents	25	47	25	50	85	56	12



The above graphs disclosed about preferable investment areas of investor. Out of total respondents were preferred stock market (85) because high return and risk also high. And next investment is mutual funds (56) because it produces moderate return with low risk. Later avenue

is real estate and gold. Bank deposits and insurance were done by 25 respondents only because they don't want tolerate risk on investment.

4. Level of Risk Involved in the Investment Schemes

Investments	1	2	3	4	5
bank deposit	--	--	10%	18.33%	71.67%
Gold	1.67%	20%	40%	30%	8.33%
insurance	1.67%	11.67%	55%	28.33%	3.33%
real state	10%	18.33%	38.33%	23.33%	10%
stock market	72.33%	18.33%	9.33%	--	-
mutual funds	5%	38.33%	55%	1.67%	--

(Note: Very High – 1, High – 2, Moderate – 3, Low – 4, Very Low – 5)

RECOMMENDATION TO INVESTORS:

➤ **Making financial roadmap:**

The investor must prepare a financial plan to invest in advance. He will need to find the level of return on investment and the risk tolerance by considering professional or expert guidance. The return on investment may or may not be as expected by the investor. However proper planning should be done without considering the past and present realities otherwise the investors will not get the right return on their investments.

➤ **Find your flexible area:**

With all kinds of investments there must be some risk in something. For example, when investing in stocks, bonds and mutual funds, you have to be determined that some or all of it may not be enough. The higher the risk the higher the return can be obtained. If you are expecting long term returns then investing in shares, bonds and mutual funds is the best term investment. On the other hand, investing only in cash investments may be appropriate for short-term financial goals. The main concern of people who invest in cash equivalents is the risk of inflation, which is the risk of overcoming inflation over time and reducing returns.

➤ **Proper investment mix:**

When investing in stocks, bonds and other stock market items, investors should pay special attention to security and return. The chances of incurring losses are high by investing all the cash in a single category. You can reduce the risk to some extent by investing in a different category. If you have prepared the right portfolio you can reduce the loss on one investment by the gain on another investment. So that it is worth to continue for a long time without losing stability. By investing in Mutual Funds, the investment will have a proper security and return on investment.

➤ **Awareness and guidance from experts:**

We need to have a proper understanding of the investment we are making. Because business is always unexpected. Internal Factor (Managerial Issues, employee Strikes etc.,) and External Factors (Government Policies, Political Issues, Strikes, Foreign Investments, Inflation, and Technology so on) have an impact on our investment and return. Taking expert advice can also help you plan properly and reduce risk and reap the benefits.

SUGGESTIONS:

If countries are to develop economically, investment must grow but if investment is to grow, savings must also grow. Investment decision is based on the investor's preferences. Investment decision is influenced by the investor's gender, income level, employment and savings. Financial institutions change their policies to attract investors. Generally every investor wants to have high returns and low risk on their investment. In the above study, many investors are showing interest in investing in gold, real estate and stocks. Investing in stock to get a return in the long term. However, investing in stocks is risky. Investing with Mutual Funds can be somewhat rewarding. When an investor is investing, there are several factors to consider. By getting the experts' advice you can reduce the risk and get optimum benefit on investment. Without investing in one place, it is possible to reduce risk and earn good returns by building the right portfolio. There is a thought that is "no pain no gain" like that if you bear high risk, you will get high returns.

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A STUDY ON EMPLOYEE JOB SATISFACTION AT HINDUSTAN MACHINE TOOLS, HYDERABAD

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ABSTRACT:

Human Resource is the most important asset of an organization. Planning for the human resource is an important managerial function. Job satisfaction is considered as an important issue where efforts are taken and programs are initiated to fulfil it. The factors which influence the satisfaction of the employee are level of pay, promotions, type of working conditions, work load and stress level, respect from co-workers, good relationship with supervisors, financial rewards. Any kind of dissatisfaction relating to organizational or personal life will influence on the job performance. Therefore, a study on employee job satisfaction helps the organization in knowing employee opinion about the company. The study consists of the following objectives to study the level of employee satisfaction at Hindustan Machine Tools, to examine the factors that are influencing the level of satisfaction of employee of the company, to analyse the overall rate of satisfaction of the employee with respect to the employee productivity. The research method consists of primary and the secondary data. The sample size taken for this study is 100 samples with the ratio of 1: 6. The statistical tools in this study are percentage analysis, percentage and bar charts. There are two variables in this study are dependent and independent variables. The dependent variables are employee's performance and the independent variables is motivation.

KEYWORD:

Employee Satisfaction, Motivation, Working Condition, payroll, location.

INTRODUCTION:

An employee's level of satisfaction is very important factor for a manager or organization to predict an employee's rate of absenteeism, desire to resign or quit the job. Employee satisfaction is also based on his perceptions of the future development. The factors affecting the satisfaction of the employee are good pay, promotions, good working conditions, work load and stress level, respect from co-workers, relationship with supervisors, financial rewards. By safeguarding these factors, the company can ensure the job satisfaction of the employee, thereby improve the productivity and grow into a successful organization. If an employee is not satisfied with the job there are chances for absenteeism, low turnover, lower productivity, committing mistakes, diverting energy for different types of conflicts. Any kind of dissatisfaction relating to organizational or personal life will influence on the job performance. Therefore, a study on employee job satisfaction helps the organization in knowing employee opinion about the company.

REVIEW OF LITERATURE:

- **Vroom (1964)** definition focuses on the part of the employee in the workplace. He defined job satisfaction as tender guidelines on the part of individuals toward work roles which they presently inhabit.
- **ChitraKirshnaswamy (1985)** says job satisfaction is looked with three scopes, the Job, employee holding the job, group

relation influencing the individual in and outside the business. When expectations of both the employer and the employee match then they are found to be satisfied and become productive, and also tend to work longer in the organization.

- **Armstrong (2006)** defined job satisfaction as attitude and feelings employees have towards their work. Positive and good attitudes regarding job show job satisfaction. Negative and bad attitudes about the job indicate job dissatisfaction.
- **Chandrasekar (2011)** says organization has to take responsiveness to make a work environment which enriches the ability of employees to become productive in order to increase profits. He even argued that employee to employee interactions and relations are more important than money but management skills and energy are required to improve the performance of the organization.
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- According to **Edmund. R (2012)** job satisfaction research suffers serious

measurement problems: Noncomparable measures; studies conceptualizing job satisfaction affectively but measuring it cognitively; and ad hoc measures lacking systematic development and validation, especially across populations by nationality, job level, and job type.

- According to **E. Brain Faragher & M. Case (2013)** says that Epidemiologist have long been aware that social and environmental factors can contribute to the incidence of many human diseases. Predictably, as the single activity occupying most people's waking time is work, pressures, strains, and stresses within the workplace have been identified as being a potentially important health factor.
- According to **Abdul Razi (2015)** opine that impact on working environment on job satisfaction. In an environment of tension and division of labour such as Healthcare Services, the performance of employees is one of the most basic challenges. The reason is that performance as a phenomenon is closely related to aspects of effectiveness, knowledge management and quality from one side and to management, financing and development of the organization from the other.
- **Revenio Jalagat jr. (2016)** published that involving on Job performance, job satisfaction and motivation with the help of theoretical models and literatures. Although many studies had already been conducted on job satisfaction and job performance, its relationship is still subject

to much hated debates to specifically determine the extent of its relationship.

- **Judge Timothy. A & Weiss Howard (2017)** opine that job satisfaction and job affect to be research on job attitudes has improved in the sophistication of methods and in the productive use of theory as a basis for fundamental research into questions of work psychology. Early research incorporated a diversity of methods for measuring potential predictors and outcomes of job attitudes.
- **Hong lug, Yang Zhao, Alison white (2019)** job satisfaction, occupational stress, professional commitment, role conflict and role ambiguity were utilized in the subject search in combination with nurses following guidelines for searching the OVID interface.
- **Timothy A. Judge & Shuai Zhang (2020)** Job satisfaction continues to be one of the most studied job attitudes in Industrial and Organizational Psychology (Judge et al., 2017). Academics and practitioners alike have recognized the worth of job satisfaction, given its usefulness in predicting vital organizational effectiveness outcomes (Judge & Kammerer-Mueller, 2012; Society for Human Resource Management, 2015).
- **Farah Azaliney Binti Mohd. Amin (2021)** Job satisfaction reflects a positive feeling towards the task performed. Through this value of job satisfaction, an individual will feel confident and enthusiastic in every job undertaken. job satisfaction is very important in increasing the accountability of special education teachers as well as

motivating themselves to continue to dedicate themselves to religion, race and country.

- **Masood Mosholu, Man -ling Chang & Vanken Pham (2022)**

The importance of employee satisfaction as one of the essential factors helping businesses maintain their competitive advantage and assist companies in overcoming the marketplace's challenges

NEED OF THE STUDY

- Maintaining of employees in organization is leads to improved organization productivity.
- Job satisfaction survey is to be carried out in HMT, so that the rates of an employee satisfaction are taken into account.
- It will be reduced job stress and also decreased employee turnover in the organization.

IMPORTANCE OF THE STUDY:

- Job satisfaction of the employees is important if the employees are satisfied then only the organization can function smoothly increases its production, faces competition. If employees are satisfied with their job, they will carry a positive attitude. Hence the study has been undertaken to assess the employee job satisfaction which is necessary for the organization in order to make sound decisions.
- It is said that satisfied employee is a productive employee, any kind of grievance relating to organizational or personal to a greater extent influence on the job. so, every organization is giving higher priority to keep their employees satisfaction by providing several facilities which improves satisfaction and which reduces dissatisfaction.

- Job satisfaction is considered as a key issue by the entrepreneur where efforts are taken and programs are initiated.

SCOPE OF THE STUDY:

- The job satisfaction refers to a person's feeling of satisfaction on their job. It is different from person to person. The researcher has chosen to measure the level of job satisfaction in HMT.
- The study considers the impact of 10 factors on job satisfaction it concentrates on the effect of factors in general, but no exclusive study is made on them.
- The study considers only the perceptual elements of employees and does not focus on ground realities.
- The scope of study cover: work conditions, compensation, extra benefits, conveyance treatment of superiors, colleagues, duly timings, grievance redressal mechanism and promotion policy.

OBJECTIVES OF THE STUDY:

- To know Perception of employees towards management.
- Research organization will identify the job satisfactory level of the whole employees.
- To analyze the overall rate of satisfaction of the employees with respect to the productivity.
- To examine the factors that are influencing the level of employee satisfaction.

LIMITATIONS:

- The survey is confined to employees of HMT.
- The implication so found are specific to that unit and generalization may not be possible.

- The study was conducted by administering questionnaires and discussion with a limited heterogeneous sample of 100 employees.
- Heavy reliance is placed on the respondent information, which will be verified.

RESEARCH METHODOLOGY

The research is primarily both exploratory as well as descriptive in nature. The sources of information are both primary & secondary.

Research Definition:

The definition of research given by Creswell is "Research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue". It consists of three steps: Pose a question, collect data to answer the question, and present an answer to the question.

Data Sources:

The data collected for the study is mainly through the distribution of questionnaire; to be precise the data collected for study was both primary and secondary sources.

DATA COLLECTION METHOD

Primary data:

The data collected through primary sources mainly relate to the experiences and opinions of respondents regarding various aspects of job satisfaction and source collected from employees helps in structured questioner.

Secondary data:

Secondary data is collected from the previous research paper, articles & published data and also company website.

Research tools

An arranged questionnaire has been set to collect information from the respondents. The questionnaire covers of a change of questions accessible to the respondents for their response.

The several types of questions are used in this survey are: Multiple choice questions

Sample size:

The study refers to the number of items to be selected from the sample. The total number employees working in Hyundai in the region of Hyderabad are 600. The sample size for this study was taken as 100.

Sample size : 100

Ratio : 1:6

Statistical Tools Used:

The data collected was analysed by employing the following statistical techniques:

- ☐ Percentage Analysis
- ☐ Percentage
- ☐ Bar charts

Variables:

Independent variable: Job satisfaction (pay, working hours, schedule, location)

Dependent variable: Employee productivity

Percentage analysis:

Percentage refers to special kind of ration. It is used in making comparison between two or more series of data. It is used to describe relationship. It is used to analyses the data. Bar charts, pie charts were used to explain tabulation clearly.

Formula:

Percentage (%) = $\frac{\text{number of respondents}}{\text{Total number of respondents}} \times 100$

This study is analysed by using the Chi square technique

RESEARCH HYPOTHESES:

Research hypotheses are the specific testable predictions made about the independent and dependent variables in the study. Hypotheses are couched in terms of the particular independent and

dependent variables that are going to be used in the study. The research hypothesis of this study is as follows. H0: There is an impact of job satisfaction on employee productivity.

H1: There is no an impact of job satisfaction on employee productivity.

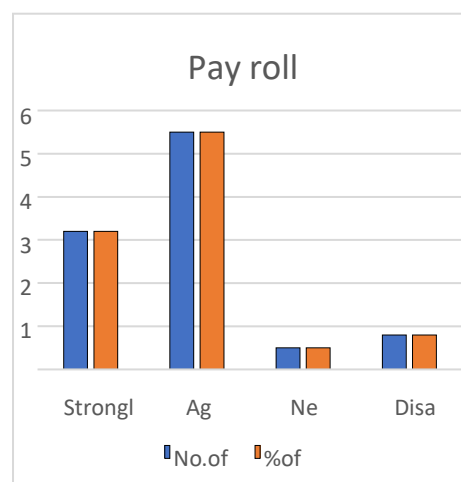
DATA ANALYSIS AND INTERPRETATION

The various data being collected during the survey are presented below:

Table:1

Payroll satisfaction

Particulars	No.of respondents	%of respondents
Strongly agree	32	32
Agree	55	55
Neutral	5	5
Disagree	8	8
Total	100	100



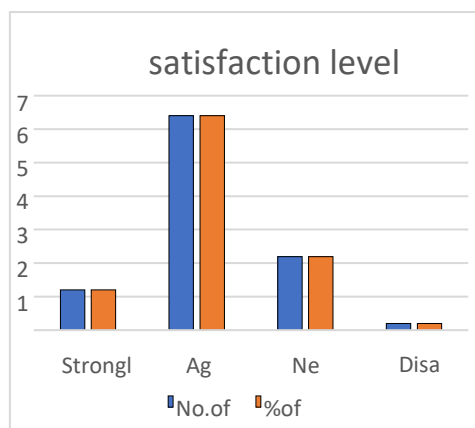
INTERPRETATION:

From the above analysis 55% of employees said that satisfaction of payroll is agreed, 32% of them said that the payroll is satisfaction is strongly agreed and 8% of employees has disagree satisfaction for payroll.

Table:2

Hours worked each week

Particulars	No. of respondents	%of respondents
Strongly agree	12	12
Agree	64	64
Neutral	22	22
Disagree	2	2
Total	100	100

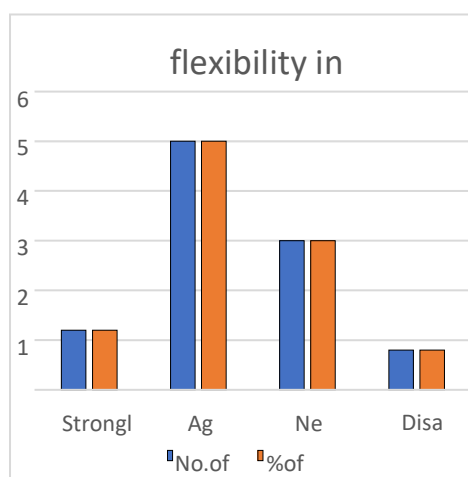
**INTERPRETATION:**

From the above analysis 12% of employees said that hours working each week is strongly agree, 64% said that it is agree, 22% said neutral and 2% said that it is disagreed.

Table:3

Flexibility in scheduling

Particulars	No. of respondents	%of respondents
Strongly agree	12	12
Agree	50	50
Neutral	30	30
Disagree	8	8
Total	100	100

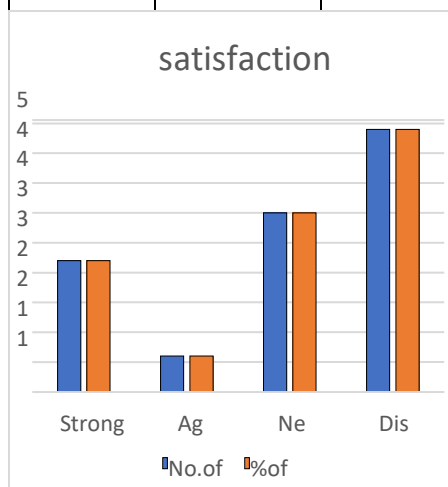
**INTERPRETATION:**

From the above analysis 12% of employees said that flexibility in scheduling at HMT is the strongly agree, 50% said that it is agreed, 30% said that it is neutral and 8% said that it is disagreed.

Table:4

Location of work

Particulars	No. of respondents	%of respondents
Strongly agree	22	22
Agree	44	44
Neutral	6	6
Disagree	30	30
Total	100	100

**INTERPRETATION:**

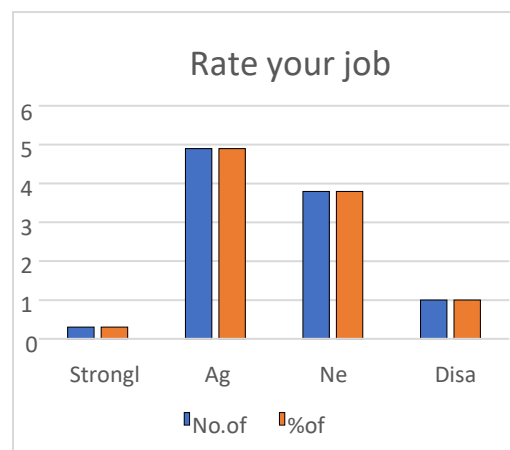
From the above analysis 20% of the employees said that the location of work is the strongly agree, 44% of them said that it is disagree; 30% of them said that it is neutral.

Table:5

.Rate of job satisfaction level

Particulars	No. of respondents	%of respondents
Strongly agree	3	3
Agree	49	49
Neutral	38	38

Disagree	10	10
Total	100	100

**INTERPRETATION:**

When asked to an employee at HMT. From the analysis, the rate of job satisfaction of employees are 49% are agreed 10% of the employees are disagreed job satisfaction level.

Chi square test

Particulars	Observed values	Expected values
Strongly agree	03	25
Agree	49	25
Neutral	38	25
Disagree	10	25

	Job satisfaction	Employee productivity
Job satisfaction	1	7.81
Employee productivity	1.45296E-12	1

Chi-square test value is 1.45296E-12

Table value is 7.81

FINDINGS:

satisfaction of payroll is agreed, 32% of them said that the payroll is satisfaction is strongly agreed and 8% of employees has disagree satisfaction for payroll.

- 12% of employees said that hours working each week is strongly agree, 64% said that it is agree, 22% said neutral and 2% said that it is disagreed.
- 12% of employees said that flexibility in scheduling at HMT is the strongly agree, 50% said that it is agreed, 30% said that it is neural and 8% said that it is disagreed. 4) From the above analysis 20% of the employees said that the location of work is the strongly agree, 44% of them said that it is disagree; 30% of them said that it is neutral.
- The rate of job satisfaction of employees is 49% are agreed 10% of the employees are disagreed job satisfaction level.

CONCLUSION

From the study, I found that **the job satisfaction levels at Hindustan Machine Tools** employees feel the rate of job satisfaction is good. Many respondents satisfied with quality of work with motivation towards their job, job responsibilities, the level of job security, employee payroll, work schedule and also with their additional training and development. In Hindustan Machine Tools few employees are not satisfied with their work location. Finally, I would like to conclude that there is an impact of job satisfaction on employee productivity.

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CUSTOMER SATISFCATION ON BYJUS**LEARNING APP WITH REFERENCE TO HYDRABAD CITY**

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ABSTRACT

The report emphasized the role and the importance of customer satisfaction and loyalty. Customers are the link to a business success. A business organization should focus on a huge number of customers, for this customer satisfaction and loyalty should be incorporated along the long-term goals. This thesis was implemented to an analysing the relationship between customer satisfaction and customer relationship. The objective of this research is to study the concept of customer satisfaction, customer loyalty and its relationship. Moreover, this thesis studies the factors that influence customer satisfaction and loyalty. The thesis project examines customer satisfaction provided by trivet and customer loyalty received by trivet from its customers.

In this thesis, the theoretical background chapter reviews studies on customer satisfaction and customer loyalty and the relationship between these two terms. Various methods that have been widely used to measure customer satisfaction and the outcome results of having loyal customers are presented.

Key words

Customer Satisfaction, Customer Loyalty, Marketing, Relationship, Service Quality, Value.

INTRODUCTION

A lot of research exists on the consumer buying behaviour and consumer satisfaction. Understanding the expectation and perception of consumers is gaining more attraction in the current business world. Also, various researches and studies have been done to understand the learning-

teaching methods. The modern approach of learning-teaching is Constructive which recognizes the learners' understanding and knowledge based on their own experiences. The modern methodologies of educating and learning are exceptionally established in Constructive. The facilitators build the information through the dynamic cooperation of students. They direct their students to discover answers for an issue. Educators utilize present- day conveniences like projectors, various media helps, and online classes for educating.

The way of teaching and learning has been continuously changing in the past few years. The teacher or faculty is not just content providers, they are now mentored and guide. Students need to develop critical thinking, analytical, and problem- solving ability to enhance their knowledge. Learning through videos has been a great way to develop these skills and digital technology is playing a big role in creating and delivering such interactive videos. There has been a shift in demand in the learning experience, parents and students are more comfortable with online learning since it can be accessed from anywhere and anytime. As valuation touches \$8B, BYJU'S become the 3rd largest unicorn in India as of January 2020. BYJU'S is leading the Indian Ed-Tech industry by generating maximum revenue of around \$205M as of March 2019. The company has been growing at a rate of 100% year on year for the last three years. It has 3 million subscribe users in India. BYJU'S is solving the core problem in the Indian education system by providing quality content across the nation through the internet which is accessible to most of the population. This paper aims at determining the satisfaction of subscribers for BYJU'S products. It focuses on a group of primary and higher school going students and analyses their feedback on using BYJU'S products.

STATEMENT OF THE PROBLEM

E-learning being completely new to India and growing popularity of smart phones and internet connectivity has given a platform to digital education. BYJU'S app is subscribed by 3 million people all over the Country. So this study is for analysing the reasons for their satisfaction. Now in the market exists several competitions among different e-learning apps. In this situation it is very important to know whether the subscribers of BYJUS app are happy and satisfied with the app.

NEED FOR THE STUDY

Customer satisfaction is important because it means customers based like what you are doing research that high customer satisfaction leads to greater customer retention, higher, lifetime value a stronger brand reputation but low customer satisfaction scores are important too.

In this project customer satisfaction is analyzed based on primary data and secondary data collected in byjus. To find out how customers are motivated and their performances, and their satisfaction levels and to know the performance and quality of byjus learning app.

OBJECTIVES OF THE STUDY

- To find out the factors motivating customers to prefer BYJU'S learning app
- To identify the satisfaction level of BYJU'S learning app.
- To know about the performance and quality of BYJU'S learning app.

SCOPE OF THE STUDY

The Study attempts to understand the behaviour of BYJU'S app subscribers towards the subscription and services, their satisfaction towards the products, usage pattern and any variation in the actual as compared to their expectations. The study is confined to Hyderabad city.

RESEARCH METHODOLOGY

Research is done for collecting the information that helps to solve certain problems effectively. It is a frame work with a specific logic from the researcher to find out a reasonable solution for a problem. It is a step-by-step activity which needs to be accurate and reasonable solution for a problem. The sample population includes the respondents who are the customers of BYJU'S or aware of the offerings of BYJU'S in India. The sample size of 60 was selected. The samples were chosen by using the purposive sampling technique, which is a non-probability sampling technique, because the exact population size is unknown, and the accessibility to all the customers is difficult. The survey method of data collection was used in this research. The primary data were collected using a structured questionnaire.

DATA COLLECTION

The information relevant for study was drawn from Primary data collection through survey method using Google form. keeping the objective in mind throughout the study. There are two types of data's:

Primary Data

To find out the students' satisfaction towards the BYJU'S learning app, a questionnaire was prepared and data was collected. Also, personal visits were done to certain subscribers who helped to prepare the research report.

Secondary Data

The secondary Data was collected with the help of browsing, magazines, newspaper, articles and papers related to the BYJU'S learning app. Numerous Journal and books related to the study were also browsed to understand the dynamics of the industry.

SAMPLE DESIGN

- School Students were selected for sampling.
- Sample size: 60 respondents who subscribed BYJU'S learning app
- Purposive Sampling is used to draw samples.

DATA PRESENTATION

Data were presented in the form of tables and charts. Percentage analysis was done and results were interpreted using the same.

LIMITATIONS OF THE STUDY

- The research was confined to Hyderabad city . Hence the outcome cannot be generalized.
- Sample size was limited in number. Around, 60 respondents Were chosen because of time and cost constraint
- Some of the response might be biased.

DATA ANALYSIS

Raw primary data has been collected with the help of a questionnaire. The questions were asked to the respondents through structured questioner, the responses are summarised with percentage analysis in the below table. the questions are in the form of statement.

S.no	Statement	Responds
1	Is the app is useful for education	It is clear that 53.3% of respondents agreed the statement ,whereas 45% strongly agreed and rest 1.7% are in neutral. None of them are dissatisfied with the usage of app.
2	Is app make Study easier	It is clear that majority of the respondents (68.3%) agreed the statement, 26.7 % are strongly agreed the statement and rest 5% have are in a neutral state.
3	Visual representative of lectures makes study easy	That about 68.3 % students strongly agreed the statement that visual representation of topics makes studying easy, 28.3 % of them agreed that and rest 3.3% selected the neutral option.
4	Knowledge provided by the app is very effective	It is clear that majority 63.3% of respondents agreed the statement whereas 28.3% of them strongly agreed and 8.3% of them are neutral. None of them are dissatisfied with the knowledge provided by the app.
5	How many hours do you sent on learning in this app?	To table 4.9, 56.7% of respondents agreed that they use app for more than 2 hours a day and 33.3% of them are neutral alike , 5% of the total people disagreed and rest 5% strongly agreed that they use for long time.
6	Orientation exams provided by the app is very effective	Table shows that 75% of total respondents are satisfied with the exams provided by app, 10% strongly agreed to the statement, whereas 13.3 % of them are neutral alike and 1.7% of them are dissatisfied with the statement.

6	Doubts are delivered in a timely manner.	It is clear that 76.7% of respondents agreed the statement that doubts are delivered in a timely manner, 10% of them strongly agreed that ,11.7% are in neutral opinion and rest 1.7% of them disagreed statement.
7	Tutors are knowledgeable about the subject they teach	That 70% of respondents agreed the statement that tutors are knowledgeable about the topic they teach while 25% strongly agreed that statement and rest 5% are in neutral opinion and none of them are dissatisfied with the statement.
8	BYJU'S app is very costly	It is clear that 48.3% agreed the statement that BYJU'S app is little bit costly, while 26.7% of them strongly agreed that ,18. % are in neutral and the rest 6.7% disagreed statement that implies BYJU'S app is affordable for them.
9	Subscription of the app on website accurately represent what they provide	It is clear that 56.7% of respondents agreed the statement that subscription of app on the website accurately represent what they provide, whereas 25% of them strongly agreed that and 18.3% of them are in neutral opinion.
10	Have you subscription other learning apps	It is clear that 50% of respondents disagreed the statement ,13.3% of them strongly disagreed ,13.3% of them are in neutral, 21.7% agreed and rest 5% of them strongly agreed. From this, it is clear that majority of subscribers didn't subscribe other educational learning app.
11	Will you recommend app to others?	It is clear that 53.3% of respondents agreed to recommend BYJU'S app to others ,33.3% of them strongly agreed ,11.7% are in neutral in opinion.
12	Visual learning makes learning interesting.	It is clear that 68.3% of total respondents strongly agreed that visual learning

		makes learning interesting and rest 30% of them also agreed the statement and rest are in neutral opinion
13	Tutors can be connected by students online easily	It is clear that 73.3 % of respondents agreed with the statement that tutors of BYJU'S app can be contacted easily , only 15% of them strongly agreed the statement whereas 10% of them are in neutral opinion.
14	Videos are available in YOUTUBE better than BYJU'S app	It is clear that 46.7% of respondents are in neutral opinion , it implies that no better videos are available in YOUTUBE than BYJU'S app and 25% of them agreed and 3.3% strongly agreed the statement. Around 20% of them disagreed and rest 5% of the respondents strongly disagreed the statement.
15	Brand image of BYJUS'S app is better than other educational leaning apps	It is clear that 51.7% of respondents strongly agreed the statement that brand image of BYJU'S app is better than other online learning apps whereas 31.7 % of the respondents just agreed the statement and 15% of them are in neutral opinion.
16	Learning tougher topic is easier and simple in BYJU'S app	It is clear that 48.3% of respondents strongly agreed the statement that learning tougher topics made easier and interesting in BYJU'S app , 38.3% of them just agreed the statement and Around 13.3% are in neutral alike.
17	Artificial intelligence makes education interesting	Majority (61.7%) of the respondents strongly agreed the statement that artificial intelligence makes learning interesting ,21.7% of them agreed the statement, 13.3% are in neutral opinion and rest 3.3% of them disagreed the statement.
18	Have you satisfied with Byjus services?	Majority of the respondents agreed that they are satisfied with overall performance of the BYJU'S app while only few 10% of them are in a neutral

		opinion. This means that subscribers are satisfied with the usage of BYJU'S app.
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Findings & suggestions

1. It is inferred that majority of the students agreed that BYJU'S app is very useful for education and none of them disagreed that.
2. It is also inferred that majority respondents agreed that BYJU'S app makes studies easier and only a few respondents strongly agreed it.
3. It is inferred that majority of the people strongly agreed that visual representation of topics makes studies easier. None of them has disagreed the statement.
4. It is inferred that 63.3% of respondents agreed that knowledge provided by BYJU'S app is very effective and about 28.3% of them strongly agreed.
5. Majority of the respondents agreed that they use BYJU'S app for more than. 2 hours a day. While 33.3 % of them are in neutral alike.
6. It is inferred that orientation exams provided by the BYJU'S is very effective because most of the people agreed it.
7. It is inferred that doubts of students are clearly delivered in a timely manner.
8. It is also inferred that tutors are knowledgeable about the subject they teach.
9. It is inferred that most of the respondents agreed that BYJU'S app is very costly. It is better to provide some financial assistance to the students.
10. It is inferred that majority of the respondents agreed that subscription of app on BYJU'S website accurately represent what they provide in virtual classroom.
11. It is inferred that majority of the respondents disagreed the subscription of other learning apps. This implies that they are mostly depended upon BYJU'S app.
12. Majority of the respondents are happy to recommend BYJU'S app to others.
13. It is inferred that most of them strongly agreed that visual learning makes learning interesting.
14. Majority of them choose BYJU'S app rather than going to tuitions.
15. It is inferred that respondents agreed that tutors of BYJU'S app can be contacted easily.
16. Majority of the respondents have no exact answer for the statement videos are available better in YouTube than BYJU'S app.

17. It is inferred that Brand image of BYJU'S app is better than any other learning apps.

18. Majority of them agreed that learning tougher topics made their studies simple and easier in BYJU'S app.

CONCLUSION

This research paper helps the researcher to know about the student's satisfaction on BYJU'S LEARNING APP. The BYJU'S app is known for its self-placed learning experience by enabling the students crack down difficult concepts. The app uses a host of modern techniques like web-based learning, visual graphics, video- based instructions, etc. to provide an immersive learning experience. These innovations are highly helpful for the students to understand the basic concepts and enable them to prepare for exams. From the study it is clear that the most of them are satisfied with the knowledge provided by app, visual representation of topics, orientation exams conducted. They are also satisfied with the services provided by tutors. BYJUS APP is very useful for the studies and it makes studies in a interesting way. BYJUS APP is a good substitute for tuitions. From this project it is identified that, most of the students are satisfied with the subscription of BYJUS LEARNING APP and agreed that the app is interactive, comfortable and effective.

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A STUDY ON EMPLOYEE STRESS MANAGEMENT AT NATCO PHARMACUETICALS –HYDERABAD

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ABSTRACT

This paper examines the level of stress management in NATCO employees, Hyderabad District. In addition, this study examines the extent to which personal factors affect stress management. Coping with stress is measured on the basis of the different dimensions of respectful and responsible behavior, leadership and communication of work, leadership of individuals in a team and coping with difficult situations. Stress can be defined as a response to a stimulus that disturbs our emotional balance. It has its existence in every life nowadays. Stress refers to the burden of the conflict between our external environment, which leads to emotional and physical pressure. Stress cannot be avoided, but you can learn to deal with it. The Stress Management Scale was developed by Dr Vandana Kaushik and Dr Namrata Arora Charpe. Sample The NATCO PHARMA employees were selected for their ease of access and affordability using a simple random sample that was analyzed with MS Excel.

KEYWORDS: Stress, stress management, workplace stress, bank employees, stress management level.

INTRODUCTION TO HR

Human resource management is an art of leading people at work so that they do their best for the company. Put simply, Human Resource Management refers to the quantitative aspects of the people who work in an organization.

Human Resource Management is also a management function that deals with the recruitment, motivation and retention of people in an organization. The focus is on people in organizations.

Organizations aren't just bricks, mortar, machines, or supplies. You are human It's the people who run organizations.

HRM involves the application of management functions and principles. The functions and principles are applied to the recruitment, development, retention and remuneration of employees in organizations.

The decision made must influence the effectiveness of the organization. The effectiveness of an organization must lead to an improvement in the services it provides to customers in the form of high-quality products at reasonable costs.

The HRM function is not limited to just starting a business. They also apply to non-commercial organizations such as education, healthcare, leisure, etc.

The scope of HRM is huge indeed. All essential activities in working life from joining a company to leaving - come under the HRM preview. This includes in particular the activities of personnel planning, job analysis and personnel placement, recruiting and selection, orientation and placement, training and further education, performance and job evaluation, remuneration of employees and managers, motivation and communication, social affairs, safety and health, industrial relations and the like

HRM is a broad concept HR management and HR development is a part of HRM.

Before we define "Human Resource Management", it seems good to first define heterogeneous in the sense that they differ in personality, perception, emotions, values, attitudes, motives and ways of thinking.



INTRODUCTION STRESS MANAGEMENT

Stress management refers to a wide range of techniques and psychotherapies aimed at controlling a person's level of stress, especially chronic stress, usually with the aim of improving everyone's functioning. In context, the term "stress" only refers to stress with significant negative consequences, or distress in the terminology advocated by Hans Selye, rather than what he calls eustress, stress whose consequences are helpful or otherwise positive.

Stress creates numerous symptoms that vary depending on the person, situation, and severity. These can include deterioration in physical health and depression. According to the St. Louis Psychologists and Counseling Information and Referral, the process of managing stress is one of the keys to a happy and successful life in modern society. Although life has numerous demands that can prove difficult, coping with stress offers a number of ways to manage anxiety and maintain general well-being.

Distress is the more popular form of stress. The other form, eustress, results from a "positive" view of an event or situation, which is why it is also called "good stress". Eustress helps you face a challenge and can be an antidote to boredom as it requires focused energy. However, that energy can easily turn into distress if something causes you to see the situation as out of control or out of control. Many people find public speaking or airplane flights very stressful because they cause physical reactions such as increased heart rate and loss of appetite while others look forward to the event. It is often a matter of perception: a positive stressor for one can be a negative stressor for the other.

SCOPE OF THE STUDY

This particular study of work stress management is limited within the organization. The study is carried out on the employees of the organization. This is not because resources are not available, but rather the nature of the study itself is limiting. It examines the presence or absence of stress among employees in the organization and identifies the factors that contribute to stress (if any). It also includes the various steps the organization has taken to manage the work stress of the employees, which can be used as a future reference for decision making and policy making regarding the employees. This study shows employee morale.

OBJECTIVES OF THE STUDY

1. To study the nature of stress perceived and experienced by employees.
2. The objective of study is to identify the existence of work stress in the organization and to analyze the stress among workers.
3. To find environmental, organizational and individual factors that causes stress.
4. To study whether employees want the organization to take up measures to reduce stress or they handle by themselves.
5. To study effectiveness of present stress management practices in organization and to put forth suggestion to cope with stress.

RESEARCH METHODOLOGY

Research methodology is a science. It is a method that can be used to solve research problems. It helps in studying how research is scientifically carried out. The scope of the research methodology is broader than the research methods. It explains why we use a particular method and are evaluated either through research or by others. It also explains why a research was done and how the research problems were defined. The research methodology is a way to systematically solve the research problem and the type of data collected, methods of collecting the data analysis.

UNIVERSE OR POPULATION

- The group of people examined is known as the population or universe. Therefore the universe is the totality of all units to be examined in each investigation area.
- Population or universe here includes all employees working in the company. The study on "Stress management adopted by NATCO PHARMA" was carried out on 100 employees of NATCO PHARMA as Universe.

SAMPLE SIZE

The number of sample units selected from the population is known as the sample size.

The sample size of this study is 50 employees. Each respondent is treated as a case of detailed analysis. Various data were collected using questionnaires, interviews and observation. H. Primary and secondary data are taken into account for the analysis.



SAMPLE

A finite subset of a population that is selected from it to study its properties is called a population sample. A sample is a representative part of the population.

SAMPLING

It is a researcher's duty to decide whether to use information from all population units or parts of the population. When the information is gathered from each population unit, it is called a census. While the information is gathered from just a few minutes of the population, this is known as the sampling method. The examined sampling method was chosen for this project.

SAMPLING PERIOD

Sampling period is the time taken to complete the study. Here sampling period is 45 days.

DATA COLLECTION METHOD

Collection of data is the most important step in research of any topic. Data collection includes both primary and secondary data.

PRIMARY DATA

Primary data are those data that are collected for the first time and therefore have an original character.

SECONDARY DATA

Secondary data are data that have been collected and published by another person for their own purpose. Secondary data is usually available in the form of finished products. It is second hand information, secondary data was collected from books, magazines, company websites, other websites, etc.

DATA ANALYSIS

The data collected was tabulated and the percentage of respondents for each factor was calculated using the swing tally marking operation. A percentage analysis was performed to draw meaningful conclusions from the data collected.

TOOLS AND TECHNIQUES OF THE STUDY

Analysis tools: Percentage Analysis

Software tools: MS Excel, Microsoft Word.

Data collection: Questionnaire method, interview method

Presentation tools: Tables, graphs and diagrams.

LIMITATIONS OF THE STUDY

1. The research is carried out in a short period of time.
2. Most of the information is collected via questionnaires; there is a possibility that the respondents received incorrect answers.
3. Since the workers were on shifts, it is difficult to interview everyone.
4. Lack of cooperation from some employees due to their heavy workload.
5. The sample size was small; it is limited because the number of people interviewed is limited to 50 out of the large number of the population.
6. The opinions, behavior and attitudes of the respondents expressed in this study are limited to the duration of the study and can change over time.

DATA ANALYSIS AND INTERPRETATION

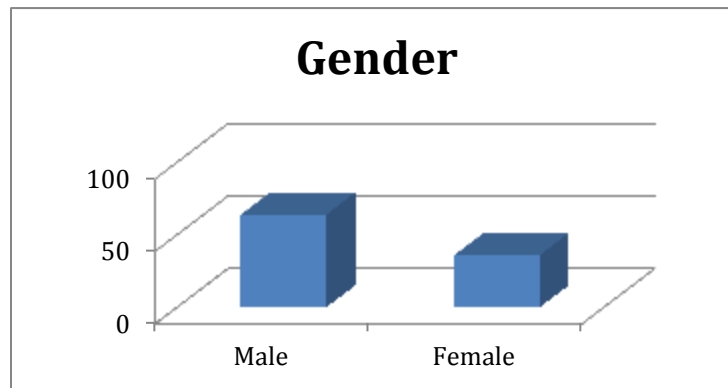
1. GENDER

TABLE NO 4.1

GENDER	NO OF RESPONDENTS	PERCENTAGE
Male	64	64%
Female	36	36%
Total	100	100%



GRAPH – 4.1



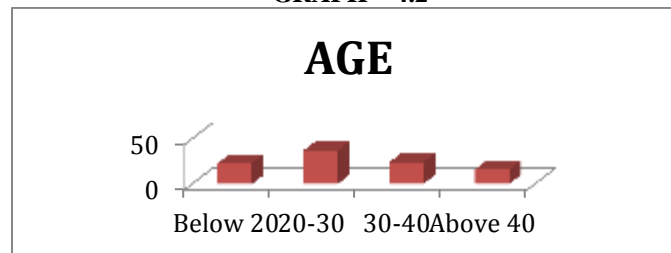
INTERPRETATION: The above table and table chart show the gender of the respondents, 64% of the respondents are male and 36% of the respondents are female. The majority (64%) of the respondents are male.

2. AGE

TABLE – 4.2

AGE	NO OF RESPONDENTS	PERCENTAGE
Below 20	23	23%
20-30	37	37%
30-40	24	24%
Above 40	16	16%
Total	100	100%

GRAPH – 4.2



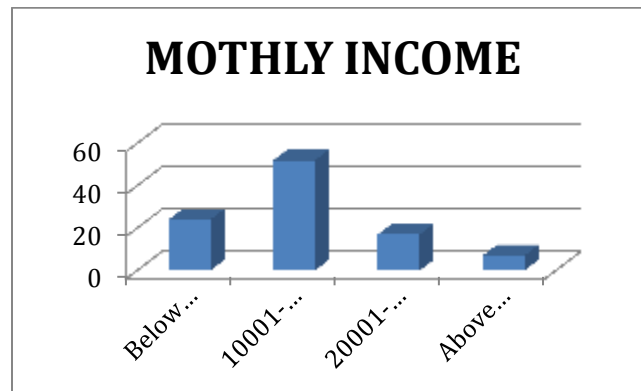
INTERPRETATION

The above table and table chart show the age group of the respondents, it found that 23% of the respondents are in the age group under 20 years old, and 37% of them are in the age group 20-30 and 24% of them are under 20-40 Years old and the remaining 16% of them are under 40 years old. The majority (37%) of the respondents are 20-30 years old.

3. MONTHLY INCOME

TABLE – 4.3

MONTHLY INCOME	NO OF RESPONDENTS	PERCENTAGE
Below 10000	24	24%
10001-20000	52	52%
20001-30000	17	17%
Above 30000	7	7%
Total	100	100%



GRAPH – 4.3

INTERPRETATION

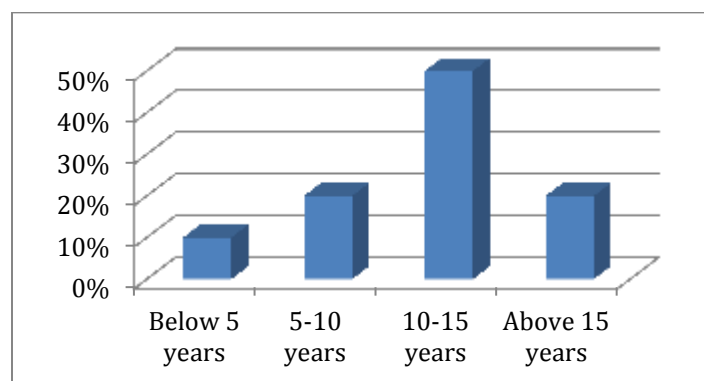
The table above shows that 24% of the respondents belong to the income below 10,000, 52% of the respondents belong to the income 10001-20000.

4. WORK EXPERIENCE IN AN ORGANISATION

Table – 4.4

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
Below 5 years	10	10%
5-10 years	20	20%
10-15 years	50	50%
Above 15 years	20	20%
Total	100	100%

Graph – 4.4



INTERPRETATION

The table and graph above show that 50% of respondents have 10-15 years of experience. 20% experience over 15 years. 20% of the respondents have 5-10 years of experience. Remaining 10% under 5 years.

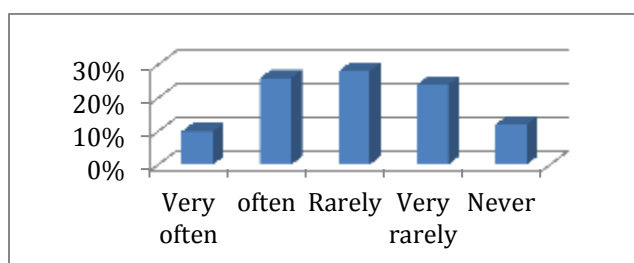
5. How often do you say the word “I am busy or I am having hard time” At the work place.



Table – 4.5

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
Very often	10	10%
Often	26	26%
Rarely	28	28%
Very rarely	24	24%
Never	12	12%
TOTAL	100	100%

Graph - 4.5



INTERPRETATION

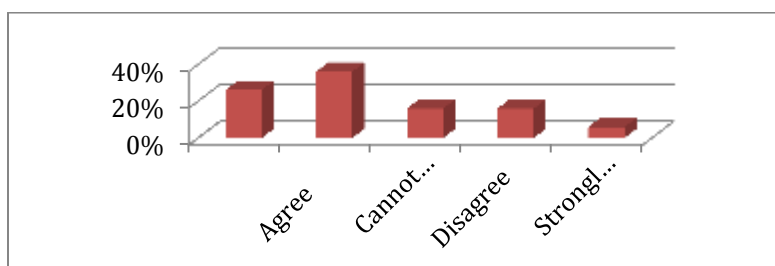
As can be seen from the graph, the majority of respondents (52%) seldom and very rarely state that they are employed at work.

6.Physical environment problems in the work place causes Stress (Temperature, lighting, gases, dust).

Table – 4.6

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
Strongly agree	26	26%
Agree	36	36%
Cannot say	16	16%
Disagree	16	16%
Strongly disagree	6	6%
Total	100	100%

Graph – 4.6



INTERPRETATION

The opinion of the study shows that the majority of respondents (62%) agree that the physical environment (temperature, lighting, gases and dust) causes stress

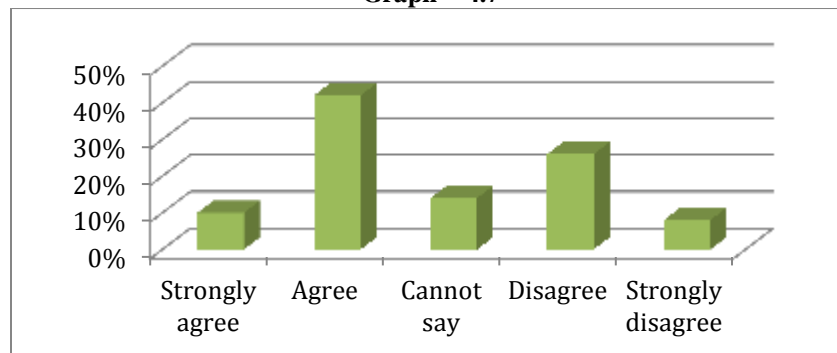
7. You feel pressure of deadlines to complete work.



Table – 4.7

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
Strongly agree	10	10%
Agree	42	42%
Cannot say	14	14%
Disagree	26	26%
Strongly disagree	8	8%
Total	100	100%

Graph - 4.7



INTERPRETATION

The majority of employees (51%) agree with the important question about employees and fully agree with the above statement.

HYPOTHESIS

1. Null hypothesis (H0):

There is no significant relationship between the working conditions and stress management.

2. Alternate hypothesis (H1):

There is significant relationship between the working conditions and stress management.

Chi Square

Chi Square is used as a test of independency. By using chi square, we can find out whether two or more attributes are associated or not. In this parlance chi square test is used to find out whether are or the level of stress plays a significant role in handling stress.

Chi square = $(O-E)^2 / E$

degree of freedom for single data: (n-1)

degree of freedom for double data: (r-1) (c-1)

significance level: 5%

TABLE –WORKING CONDITIONS

WORKING CONDITIONS	NO. OF RESPONDENTS	PERCENTAGE
Pleasant	32	32%
Friendly	25	25%
Neutral	23	23%
Strained	15	15%
Very Poor	5	5%
Total	100	100%



O	E	O-E	(O-E) ²	(O-E) ² E
32	20	12	144	7.2
25	20	5	25	1.25
23	20	3	9	0.45
15	20	-5	25	1.25
5	20	-15	225	11.25
Total	100	0	428	21.4

Level of significance	5%
Calculated Value	21.4
Degree of Freedom	4
Table Value	5.35
TV<CV	

Therefore, Hypothesis is rejected at 5% significant level.

CONCLUSION

Where the calculated value is (21.4) is more than the given table value is (5.35). Where H₁ is accepted and H₀ is rejected. Hence, there is a significant difference between the working conditions affecting the stress management.

FINDINGS

1. 64% of the respondents are male and 36% of the respondents are female.
2. 23% of the respondents are under 20 years old, 37% of them are 20-30 years old, and 24% of them are under 20-40 years old, the remaining 16% are under the age group over 40.
3. 24% of the respondents belong to incomes less than 10,000, 52% of the respondents belong to incomes 10001-20000, 17% of the respondents belong to incomes 20001-30000 and the remaining 7% of the respondents belong to incomes over 30,000.
4. 50% of the respondents have 10-15 years of experience. 20% experience over 15 years. 20% of the respondents have 5-10 years of experience. Remaining 10% under 5 years.
5. 52% seldom and very seldom state that they are employed in the workplace.
6. 62% agree that the physical environment (temperature, lighting, gases and dust) causes stress
7. The majority of employees (51%) fully agree with the above statement.
8. 68% had to struggle with a lack of cooperation in the office, the remaining 32% of the employees never had to struggle with a lack of cooperation in the organization.

SUGGESTIONS

A small percentage of employees experienced high levels of stress. People who, on an organizational level, have many psychological problems in the form of reduced motivation, absenteeism, low productivity goals, etc. to develop coping strategies and to trigger their stress. The stress management course consists of a package program consisting of:

1. Relaxation.
2. Positive attitude towards work / responsibilities.
3. Self-analysis through personality type tests.
4. Development of interpersonal skills.
5. Protection yoga cum meditation.
6. Time management.
7. At the individual level, employees could have a relaxing vacation every two weeks (where time is spent with family).
8. Realize that excessive consumption of tea / coffee is not an answer to stress.



9. Try to get 6-7 hours of uninterrupted sleep every day.
10. An advanced study needs to be done to understand stress and its causes
11. Raise awareness of the after-effects of stress.
12. Give them relaxation techniques such as yoga, counseling, etc. from their own workplace
13. Employees must be granted at least 2 days off per week.
14. Provide public awareness sections to help educate staff about the importance of stress management in their lives.
15. Increase the number of employees so that the workload can be reduced as much as possible and so that the employees can be relieved of tension.

CONCLUSION

The present study was carried out at “NATCO PHARMA at Hyderabad”. The aim was to find out the stress level and personality type of the employees. This was done using a detailed questionnaire. The study found that only a small percentage fall into the low stress category and are highly stressed to some extent in the organization. The process of stress management is cited as one of the keys to a happy and successful life in modern society.

At the end of the study, we can see that signs of stress in employees that affect their behavior can effectively control and reduce it.

This can be done through advice and consideration of the suggestions given here on an individual and organizational level.

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A STUDY ON PRICING STRATEGY ON ULTRATECH CEMENT

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ABSTRACT

Price is important in determining how much a firm earns. The chosen price must be neither high nor too low, and the price must equal the perceived value to target consumers. If consumers think the price is too high, sales opportunities will be lost. Lost sales mean lost revenue. If the price is too low, consumers may view the product as a great value, but the company may not meet its profit goals. Sometimes, as in the case of services, a price that is too low will cause the product to be viewed as less than credible and lose sales for the company. It Managers use various pricing strategies when determining the price of a product, as this section explains. Price skimming and penetration pricing are strategies used in pricing new products; other strategies such as leader pricing and bundling may be used for established products as well. Price skimming has four important advantages. First, a high initial price can be a way to find out what buyers are willing to pay. Second, if consumers find the introductory price too high, it can be lowered. Third, a high introductory price can create an image of quality and prestige. Fourth, when the price is lowered later, consumers may think they are getting a bargain. The disadvantage is that high prices attract competition.

KEYWORDS: Land and Buildings, Plant and Machinery, Cement.

1. INTRODUCTION

Price is the value that is put to a product or service and is the result of a complex set of calculations, research and understanding and risk taking ability. A pricing strategy takes into account segments, ability to pay, market conditions, competitor actions, trade margins and pricing strategies take into account many of your business factors, like revenue goals, marketing objectives, target audience, brand positioning, and product attributes. They're also influenced by external factors like consumer demand, competitor pricing, and overall market and economic trends.

It's not uncommon for entrepreneurs and business owners to skim over pricing. They often look at the cost of their products (COGS), consider their competitor's rates, and tweak their own selling price by a few dollars. While your COGS and competitors are important (as you'll see in the various models below), they shouldn't be at the center of your pricing strategy.

The best pricing strategy maximizes your profit and revenue.

Pricing is one of the major elements of the marketing plan. It enables to differentiate a product or service from another one of similar characteristics. Pricing decisions derive from the underlying objectives and best-suited strategies. The elements of pricing objective include profit maximization, revenue maximization, quality leadership, quantity maximization and survival (Roth, 2007). Pricing objective is focused on three factors, i.e. nature, the desired level of attainment and the associated time horizon. Pricing objectives of service organizations are profit maximization, sales maximization, market share maximization, market share increase, return on investment (ROI), price differentiation, price stability in the market, sales stability in the market, discouragement of new competitors, maintenance of existing customers, long term survival (Avlonitis & Indounas, 2005). The underlying factors that determine a company's price decisions can be categorized as internal factors and external factors. Internal factors include company's marketing objectives, marketing mix strategy, and costs; whereas external factors consist of market environment, demand, competition (Khoso, Ahmed, & Ahmed), 2014 input costs, amongst others. It is targeted at the defined customers and against competitors.



A pricing strategy is a model or method used to establish the best price for a product or service. Pricing strategies help you choose prices that maximize profits and shareholder value while considering consumer and market demand.

If only pricing was as simple as its definition. However, there's a *lot* that goes into the process.

1.1 NEEDS AND IMPORTANTS OF THE STUDY

- Price in combination with promotion becomes a strong tool for influencing buyers to buy products. It interests the buyers and highlights the image of the brand to increase sales. Sometimes organisations focus on other marketing mix elements by keeping the price constant based on recovering costs at certain percentage.
- Pricing also determines standard of living. The lower the prices in the economy, the higher is the purchasing power in the hands of consumers. Price reflects purchasing power of the market.
- Price influences two types of management decisions. First is setting price for a new product and second, adjusting the price of existing products basis the market situation, costs, etc.
- Prices should be set in coordination with distributors. Most organisations strive to give higher profit margins to distributors as the distributors like wholesalers and retailers too aggressively promote the products

1.2 SCOPE OF THE STUDY

- The study is confined to the study of pricing strategies adopted by the company.
- Salary and monetary benefits
- Promotion policy
- Employees participation in management
- The period of study is limited to 45 days only.

1.3 OBJECTIVE OF THE STUDY

- The overall financial, marketing, and strategic objectives of the company
- The objectives of your product or brand
- Consumer price elasticity and price point
- The resources you have available

1.4 LIMITATIONS OF THE STUDY

The following points highlight the nine major limitations of the price strategy. Some of the limitations are:

1. Perfect Market is an Unreal Market
2. Sellers Influence Prices in the Real World
3. Price Adjustment is not Automatic
4. Consumer's Sovereignty is Unreal
5. Competition Leads to Monopoly
6. Wastage of Resources May Occur and Others

2. REVIEW OF LITERATURE

Price goes by various names-freight, fare, license fee, tuition fee, professional charge, rent, interest, etc. But price in an enterprise/business system is seldom so simple. By definition, price is the money that customers must pay for a product or service. In other words, price is an offer to sell for a certain amount of currency.

Here, the word, offer indicates that price is subject to change if there are found insufficient number of customers at the original price of the product. That is why prices are always on trial. If they are found to be wrong, either they must be immediately changed or the product itself must be withdrawn from the market.

Pricing of the product is something different from its price. In simple words, pricing is the art of translating into quantitative terms the value of a product to customers at a point of time. Someone has opined that, "The key to pricing is to build value into the product and price it accordingly."

The salient ingredients of pricing are

1. Pricing covers all marketing aspects like the item-goods or services-mode of payment, methods of distribution, currency used, etc.
2. Pricing may carry with it certain benefits to the customers like guarantee, free delivery, installation, free after-sale servicing and so on.
3. Pricing refers to different prices of a product for different customers and different prices for the same customer at different times.



3. RESEARCH METHODOLOGY

Market methodology should include anything you need to know in order to formulate strategy and make business decisions. Information is available in the form of statistical economic and demographic data from clients, research companies and professional associations members interact with the organization. This is called **secondary research** and will require some interpretation or manipulation for own purposes. Additionally we have carry out our own research through customer feed-back, surveys, questionnaires and focus groups (obtaining indicators to wider views through discussion among a few representative people in a controlled situation). This is called primary research, and is tailored to your precise needs. It requires less manipulation, but all types of research need careful analysis. Be careful when extrapolating or projecting. If the starting point is inaccurate the resulting analysis will not be reliable. The main elements typically need to understand and quantify are:

- Customer profile and market mix
- Product mix
- Demographic issues and new trends
- Future regulatory and legal effects
- Prices and values, and customer perceptions in these areas

3.1 SOURCES OF DATA

To perform the Research study by Researcher, the sources of data obtained are:

Primary research is recommended for local and niche services. Formulate questions that give clear yes or no indicators (i.e., avoid three and five options in multi-choices) always understand how to analyse and measure the data produced. Try to convert data to numerical format and manipulate on a spreadsheet. Use focus groups for more detailed work. To be wary of using market research organizations as this can become extremely expensive. If we do the most important thing to do is get the brief right.

Primary data

The primary data is collected with the help of questionnaires, which consists of twenty questions each. The questionnaires are chosen because of its simplicity and liability.

Secondary Data

This data is obtained directly from the company in the form of brochures, charts, diagrams, document and other forms.

Data Collection Tool

Questionnaire:

This is one of the data collection tools. It is quite popular particularly in case big enquires. It is being adopted by private individuals, research worker, private and public organization and even government. In this method, a questionnaire is issued to the persons concerned with a request to answer the questions and return the questionnaire. A questionnaire consists of number of questions printed or type in a definite order or a form or set of forms

Sample Size:100

4. DATA ANALYSIS

. Pricing strategy of ULTRATECH CEMENT

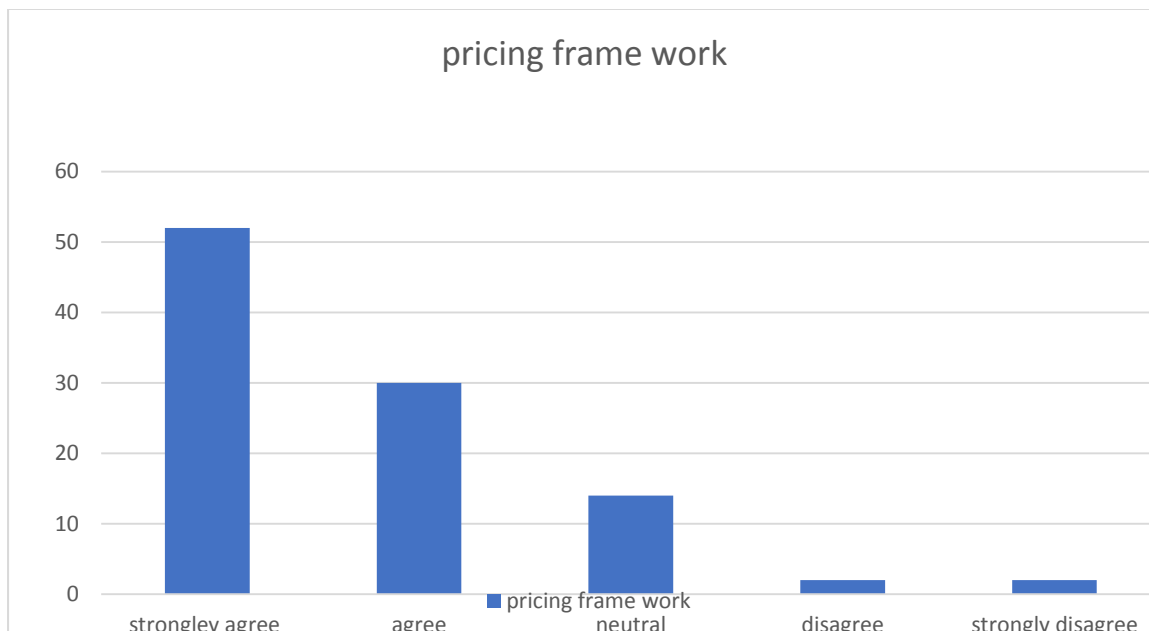
Pricing strategy	
Monopoly	83
Oligopoly	3
Monopolistic	14



INTERPRETATION: From the above table, it is understood that selection of pricing strategy entails that 83% respondents opt for monopoly pricing strategy, only 3% choose oligopoly and 14% go for monopolistic pricing strategy. After observing the organization's internal environment and product line, selection of monopoly market reduces the scope of new entrants as well its sustenance

• **Pricing framework**

	Pricing framework
Strongly Agree	52
Agree	30
Neutral	14
Disagree	2
Strongly Disagree	2



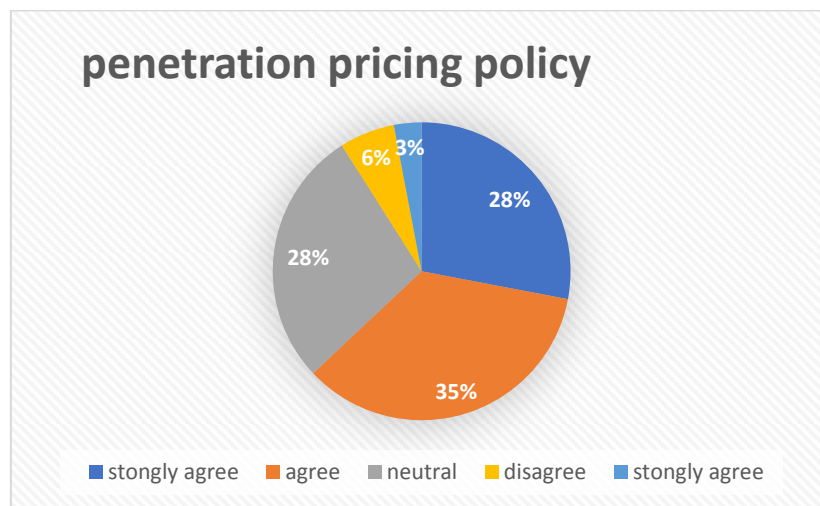
INTERPRETATION

52% respondents are strongly agreed to this concept and 30% respondents also choose this. 14% respondents are neutral, however only 2% respondents are not agreed or disagreed as well as strongly disagreed. So most of the

respondents believe that stable pricing framework is able to bring prospective customers for the good image of the organization.

• **Business penetration pricing policy**

	Penetration pricing policy
Strongly Agree	28
Agree	35
Neutral	28
Disagree	6
Strongly Disagree	3



INTERPRETATION

Adoption of penetration pricing policy expresses that only 35% respondents are agrees to this approach, while 28% have opinions of 'strongly agree'. In this regard, 28% employees are given their responses neutrally, 6% are disagreed to this concept and 3% are strongly disagreed.

4. Skimming pricing policy would be detrimental to the eventual growth and development of the company The policy of pricing to sell consistently at a competitive price

TABLE: Selling pricing policy at competitive price

	Selling Pricing at competitive price
Strongly Agree	27
Agree	36
Neutral	29
Disagree	4
Strongly Disagree	4

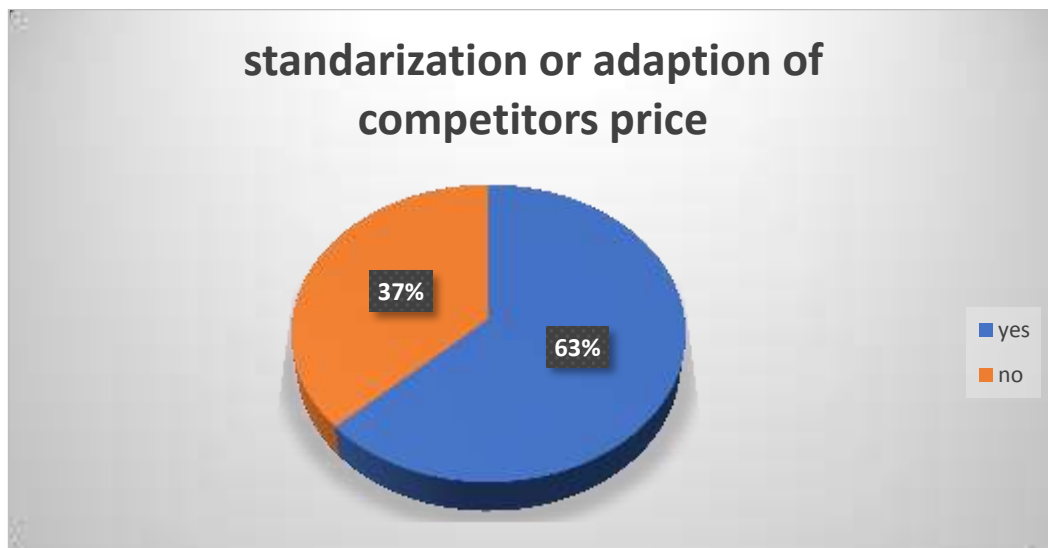


INTERPRETATION

Most of the respondents nodded in agreement which is reflected by 27% respondents who strongly agreed, 36% agreed to this view. On the other hand, 29% people are neutral; Further, only 8% respondents are disagreed with the statement.

5. Standardization or adaption of competitors' price

	Standardization or adaptation of competitors' price
YES	63
NO	37



INTERPRETATION

It is found from the responses of the employees that 63% employees are agreed for the standardization or adaptation of the competitors' price whereas only 37% are not agreed to this approach. So the organization can adopt this pricing strategy to earn their competitiveness.



5. FINDINGS, SUGGESTIONS AND CONCLUSION FINDINGS

1. It is understood that selection of pricing strategy entails that 83% respondents opt for monopoly pricing strategy, only 3% choose oligopoly and 14% go for monopolistic pricing strategy. After observing the organization's internal environment and product line, selection of monopoly market reduces the scope of new entrants as well its sustenance.
2. 52% respondents are strongly agreed to this concept and 30% respondents also choose this. 14% respondents are neutral, however only 2% respondents are not agreed or disagreed as well as strongly disagreed. So most of the respondents believe that stable pricing framework is able to bring prospective customers for the good image of the organization.
3. Adoption of penetration pricing policy expresses that only 35% respondents are agrees to this approach, while 28% have opinions of 'strongly agree'. In this regard, 28% employees are given their responses neutrally, 6% are disagreed to this concept and 3% are strongly disagreed.
4. Most of the respondents nodded in agreement which is reflected by 27% respondents who strongly agreed, 36% agreed to this view. On the other hand, 29% people are neutral; Further, only 8% respondents are disagreed with the statement.
5. It is found from the responses of the employees that 63% employees are agreed for the standardization or adaptation of the competitors' price whereas only 37% are not agreed to this approach. So the organization can adopt this pricing strategy to earn their competitiveness

SUGGESTIONS

- The price offered for ULTRATECH is needed to be monitored due to the challengers arises and several consumers tend to find that has best price for value for them. So it is needed to do benchmarking on challengers' pricing strategy.
- Even though the consumers tend to find the biggest volume possible, it is needed to consider the diminishing marginal utility which will lead to lower consumer satisfaction if the portion given too much.
- For further research, the scope of research may expand bigger into the whole company target market, with more sample size so that it may cover up to one country preferences.
- Further research may come with the additional method or using another analysis technique, using mixed method for deeper problem analysis which will getting fit and lead to very reliable information that can be implemented for company

CONCLUSION

FINALLY, we conclude that of pricing strategies, setting the price for the company's products and services are a vital roles and important parts for our business success, through the understanding the distinct between cost and price which company charge the appropriate and best price which means customer is willing to pay a price to your products then can maximize sales volume and profit margin. Additionally, different pricing strategies can be used at different times to fit with changes in marketing strategies, market conditions, and product life cycles.

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A STUDY ON EQUITY ANALYSIS WITH REFERENCE TO IT INDUSTRY

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ABSTRACT

Each investor craves for fair return on his/her investments, stockholders can obtain maximum return on investments in equity market which involves more risk as compared to other alternatives. Stockholders must be aware of the risk and return elements of those equity securities and the stock market. Equity analysis helps the stockholders to understand about risk and return elements associated with equity market and assists them in taking informed and rational investment choices. Especially IT Industry being the fastest growing industries in our country it is necessary to analyse the risk and return associated with the Industry stocks as the volume of stocks trading has accentuated at a steadfast speed in recent times. In this background, a research has been organized to analyse the risk and return of selected equity stocks in the IT sector of Indian stock market. The data is collected for a period of 5 years i.e., from 1st April 2016 to 31st March 2021. The study is based on secondary data (historical data), it compares the performance of each stock taking NIFTY 50 index and NIFTY IT index as benchmark. From the analysis, ORACLE and L&T have given highest return with moderate risk. ORACLE is the best company to invest, as it produced more returns and having moderate risk with less than one beta and high alpha value.

KEYWORDS: Risk, Return, Equity securities, Nifty 50, Nifty IT Index, IT Industry.

I. INTRODUCTION

Equity analysis is an ex-ante evaluation of different investment avenues, the main aim is to evaluate investment worthiness of the equity shares that is to find out the risk and return of investment in such share. In financial terms, return is the amount which an investor actually earned on an investment during a certain period and risk is the chance or likelihood that a firm savings may or may not distribute the real/probable returns. The relationship of risk and return is an underlying concept in financial analysis and also in every aspect of life. If the Individuals or stockholders want to maximize their benefit, they must consider the combined influence of return or benefit as well as risk or cost on investment. A research has been carried out to study, the equity shares of sampled companies of IT Industry in Indian stock market and provide a clear view on how to navigate through the stock market with a view to make moderate profits with moderate risk factor, governing the investments made by the investor. The IT industry in India is the fifth-largest in the world and considered to be a fastest growing sector. Since, the demand for ITs nowadays is directly connected to overall economic growth and personal incomes, industry growth will low if the economy weakens.

II. REVIEW OF LITERATURE

This part of the review provides details on previous investment studies on the risk-reward ratio. Risk and return

Grewal S.S and Navjot Grewal (1984) revealed some basic investment rules and rules for selling stocks. They warned shareholders not to buy unlisted stocks because the exchanges don't allow unlisted stocks to be traded. It is not about buying dormant stocks, that is, stocks that are rarely traded. The main reason stocks are inactive is because there are no buyers for them. Mostly these are joint ventures that are not doing well. For them, it is not buying shares in controlled companies, as those shares tend to be less active than public companies because they have fewer shareholders. They warn against holding stocks in anticipation of a high price for a long period of time, but rather selling them as long as a reasonable reward is achieved.

Jack Clark Francis (1986) revealed the importance of return on investment, examining the possibility of default and bankruptcy risk, arguing that in an uncertain world, shareholders cannot accurately predict what return an investment will produce., suggested that shareholders can formulate a probability distribution of possible returns. He also said that an investor who buys corporate securities must face the possibility of default and bankruptcy of the issuer; Financial analysts can foresee bankruptcies and issue some easily noticeable warnings of a company's bankruptcy that shareholders may be aware of in order to avoid such risk.

However, and William Edward⁴ (1990) examined the important risks of owning common stock and ways to minimize those risks. They commented that the severity of financial risk depends on how heavily a company is dependent on debt. when an investor holds on to the common stock of



companies that have small amounts of debt. They suggested that a relatively easy way to ensure some level of liquidity is to limit investments in stocks that have had reasonable trading volumes in the past. You can reduce it by choosing common stocks of companies that are diversified in different, unrelated industries.

Nabhi Kumar Jain (1992) special sure hints for purchasing stocks for containing and additionally for promoting stocks. He recommended the stockholders to shop for stocks through diversifying in some of boom businesses running in a special however similarly fast-developing region of the economy. He recommended promoting the stocks, the instant corporation has or nearly reached the height of its boom. Also, promote the stocks the instant you recognise you've got made a mistake withinside the preliminary choice of the stocks. The handiest choice to determine while to shop for and promote high-priced stocks is to become aware of the or distinct advantage or demerit of every of the shares withinside the collection and attain at a choice.

III. NEED FOR THE STUDY

- The accentuated growth rate of the IT Industry in recent times has turned the head winds for the many major economies of the world. India being instrumental in supplying the human capital to the IT industry studying IT stocks movements is the need of the hour.
- Further as the growth of IT industry accelerated the need of the firms for more capital also raised thus many firms lined up for additional funds and capital markets being instrumental channels for funds the study is of at most importance keeping the Industry's growth rate in view.
- Investors being key players in the stock market who focuses on improving their return margins with minimal risk, the study is of prime importance as the major objective of the study is to analyse the risk-return relationship of stock pertaining to IT Industry.

IV. SCOPE OF THE STUDY

- The study's includes India's IT industry specific stocks only
- The study focused on only few Indian IT firms.
- The duration of the study includes April 2018-March 2022.
- The project's focus is on learning the fundamentals of technical and fundamental analysis and applying them to make investment decisions in the IT sector.

V. OBJECTIVES OF THE STUDY

1. To gain knowledge of the concept of risk return analysis
2. To identify and examine the risk and return relationship of selected IT companies in Indian stock market.
3. To find out the relationship among Nifty 50 index, Nifty IT Indices only.

4. To provide valid suggestions for the stockholders, in order to take a rational choice while investing in IT stocks.
5. To find and compare the performance of the selected IT companies in share market.

VI. RESEARCH METHODOLOGY

The study is descriptive in nature, mostly focuses on the price movement of selected IT companies in Indian stock market. The assumptions for conducting the equity analysis, is that the stockholders are risk averse and the investment returns follow a normal distribution. The data of daily and monthly share price are collected from the National Stock Exchange. The data is collected for a period of 5 years i.e., from 1st April 2018 to 31st March 2022.

- Sample design

A sample size of 8 IT companies is selected from NIFTY IT index as on 01/04/2022, which comprises 15 tradable, exchange listed companies. The index represents IT related sectors They are

1. WIPRO LTD
2. INFOSYS LTD.
3. TCS LTD.
4. HCL LTD.
5. TECH MAHINDA LTD .
6. L&T LTD .
7. MPHASIS LTD
8. ORACLE COMPANY LTD.

- Data collection

The study is based on secondary data (Historical data) collected from NSE website. Data is collected for a period of 5 years (i.e., from 1st April 2018 to 31st March 2022). In addition to that, the data has also been collected from newspaper, websites, journals, book reports by researchers and scholars.

- Tools for data analysis

the data collected is analysed with the help of Microsoft Excel using various statistical tools. The following techniques are used for analysing the collected data.

- Mean
- Standard deviation
- Variance
- Co-efficient of variance
- Correlation
- Beta

VII. LIMITATIONS OF THE STUDY

- The study focused on the market with the historical information.
- The study is conducted for a limited period of 5 years.
- While applying the tools transaction cost, impact cost etc, is not taken into consideration. Therefore, it will reflect on the return calculated.
- Tools used for the analysis have their own limitations which may have an impact on the study.

VIII. EMPIRICAL RESULTS

S. No	Name of the Company	Return	
		Daily	Monthly
1	WIPRO LTD	2.9%	6.3%
2	INFOSYS LTD.	51.7%	47.3%
3	TCS LTD.	-86.5%	-87.0%
4	HCL LTD.	-1.3%	0.6%
5	TECH MAHINDA LTD.	-33.5%	-40.2%
6	L&T LTD.	84.2%	80.8%
7	MPHASIS LTD.	-20.5%	-26.1%
8	ORACLE COMPANY LTD.	80.3%	82.9%

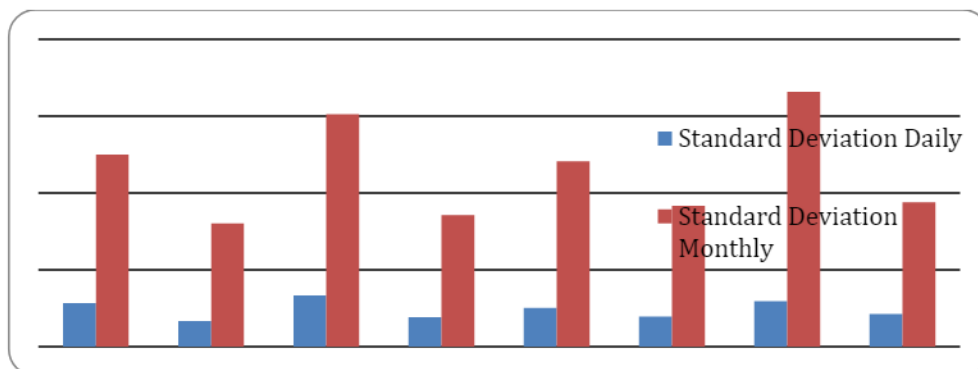
Table No:1.1 Tabular representation of IT Companies returns during 2018-19

Source: Author's Compilation

S. No	Name of the Company	Standard Deviation	
		Daily	Monthly
1	WIPRO LTD	2.827%	12.487%
2	INFOSYS LTD.	1.673%	8.029%
3	TCS LTD.	3.340%	15.115%
4	HCL LTD.	1.926%	8.559%
5	TECH MAHINDA LTD.	2.521%	12.052%
6	L&T LTD.	1.956%	9.171%
7	MPHASIS LTD.	2.965%	16.578%
8	ORACLE COMPANY LTD.	2.117%	9.398%

Table No:1.2 Tabular representation of Standard Deviations of IT Companies returns during 2018-19

Source: Author's Compilation



Graph No:1.a Graphical representation of Standard Deviations of IT Companies returns during 2018-19

Source: Author's Compilation

From the analysis, standard deviation is calculated for the companies based on daily and monthly prices for a period of 5 years, Infosys has lowest standard deviation and Mphasis has the highest daily standard deviation and TCS has the highest

monthly standard deviation. Standard deviation measures the risk of an investment.

S. No	Name of the Company	P-VALUE	
		Nifty IT	Nifty 50
1	WIPRO LTD	0.83	0.82
2	INFOSYS LTD.	0.60	0.78
3	TCS LTD.	0.53	0.35
4	HCL LTD.	0.78	0.37
5	TECH MAHINDA LTD.	0.68	0.39
6	L&T LTD.	0.19	0.81
7	MPHASIS LTD.	0.96	0.64
8	ORACLE COMPANY LTD.	0.37	0.83

Table No:1.3 Tabular representation of t-test results of IT Companies returns during 2018-19

Source: Author's Compilation



From the analysis, the p-value is calculated using t-test, the p-values of the companies return with respect to both nifty IT index return and nifty 50 index return are more than the level of significance (0.05), hence the null hypothesis H_0 is accepted in both cases. Therefore, there is no significant relationship between stock returns and NIFTY-50 returns and no significant relationship between stock returns and NIFTY IT returns.

VIII. FINDINGS, SUGGESTIONS AND CONCLUSION

Findings

1. During the study period, the daily mean return and monthly mean return of all the selected companies in the IT sector is positive except for MPHASIS and L&T. Among all the companies, ORACLE (0.025%, 0.887%) has the highest daily and monthly return.
2. In terms of variance, standard deviation INFOSYS has the lowest risk and MPHASIS and MPHASIS has the highest risk element. As per coefficient of variation TCS and TECHMAHINDRA (daily prices) has the lowest risk per unit of return and TECH MAHINDRA (monthly prices), MPHASIS have the highest risk per unit of return.
3. The correlation coefficient between the daily and monthly return of selected IT companies with the return of NIFTY IT index and NIFTY 50 index is highest for L&T and TCS has the lowest correlation.
4. INFOSYS has the lowest systematic risk (beta) and MPHASIS has highest systematic risk. TCS has the lowest Alpha value and ORACLE has highest Alpha value.

Suggestions

The subsequent recommendations are presented built on the analysis.

1. IT sector achieves the highest continuous output. Investing in the IT sector offers a high return for long-term investments. Hence, it is suggested that long-term investments in this sector would bring the maximum return.
2. It is recommended to shareholders that their investment horizon is not geared towards a long-term investment horizon, but rather depends on their goals and the type of investment opportunity. Instead of making wrong investment decisions, shareholders are encouraged to seek the help of a financial planner.
3. It is recommended that you avoid investing in the final movement and plan the investment at the beginning of the year.
4. The returns of various investments are now based on the market scenario, so it is advisable for shareholders who continue to be aware of new guidelines and to improve condition changes, they need to know not only the investment channels they have invested in, but also the general investment routes so that they can make the diversification necessary to keep your portfolio profitable.

5. Unit holders are advised to invest in suitable speculation avenue which is appropriate for them while making investment.

Conclusion

The goal of maximizing returns can only be pursued at the expense of risk inclusion. When selecting the company to invest in, the investor must consider both the potential return and the associated risk. Empirical evidence shows that there is generally a high correlation between risk and return. In the recent past the market has reached great heights due to business expansion and especially globalization, and the higher proportion of FDI has a direct impact on the demand and supply of a company's shares from peaking. With the market boom, there are many shareholders willing to take more risks. The financial sector is booming and the need for risk and return analysis is growing. Due to the very complicated behaviour of the stock market, it has become mandatory to manage the portfolio in order to reduce risk and maximize returns. Requirements, the portfolio should be developed and reviewed regularly. The analysis of the test of the relationship between risk and return in stocks shows that all the different risk variables considered in the study confirm the effectiveness of the risk and return compensation in stocks. Correlation of stock market performance and average return over the study period. It also discusses the relationship between the systematic risk and return of stocks.

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**INVESTORS AWARENESS TOWARDS ELECTRONIC STOCK TRADING IN INDIA
WITH REFERENCE TO RELIGARE SECURITIES**

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Abstract

Trading is the purchase and sale of products and services, but in this case, it is the purchase and sale of financial services, such as securities, over the Internet. "On-line trading" is a trading method in which investors make orders and confirm trading results through electronic communication channels such the Internet, mobile phones, and Personal Digital Assistants (PDA). The stock market is an important part of the Indian economy because it influences the country's economic growth and financial status. Millions of individuals are linked to the Internet in today's dynamic world. It aims at studying the investor's perception of online trading in share market and helps to find out accessing the present level of service provided by identifying the areas which require attention for improving its services. The technological revolution has had a significant impact on the world as well as the Indian stock market over the last two decades. The National Stock Exchange is ranked ninth in the world as of 2021. A systematic questionnaire was used to collect primary data from 100 respondents. The purpose of this study is to determine investor awareness of electronic stock exchanges and to investigate why customers choose to invest in online trading because it is user-friendly. To conclude that, the respondents are aware of electronic trading.

Keywords: Indian Stock Market, Electronic Stock trading, Investor Awareness.

I. Introduction

Concept of online trading

Because of its simplicity of use and convenience, online commerce has grown in popularity in recent years. Many businesses have gone online to satisfy their consumers' needs, allowing them to trade whenever and however they choose. Trading has existed for as long as we can remember, and when we refer to it, we are referring to financial transactions. Trading is the purchase and sale of products and services, but in this case, it is the purchase and sale of financial services, such as securities, over the Internet. "On-line trading" is a trading method in which investors make orders and confirm trading results through electronic communication channels such the Internet, mobile phones, and Personal Digital Assistants (PDA). The entire process of securities transactions is highly automated, from order placement and routing to order execution and trade confirmation, allowing investors to confirm their trading results in a couple of moments.

History of online trading

E-trading began in 1983, when a doctor in Michigan utilized E-TRADE technology to place the first online trade. What started with a single click more than 16 years ago has now swept the globe. Bill Porter, a physicist and entrepreneur of over a dozen patents to his name, developed the idea while providing online quotations and trading services to Fidelity, Charles Schwab, and Quick and Reilly. This makes Bill ponder why he had to pay a broker hundreds of dollars for stock transactions as an individual investor. He saw the solution in front of him with astonishing foresight: one day, everyone would control computers and invest through them with unprecedented efficiency and control.

Who invented online trading:Geojit Securities was the first to launch an online presence. The National Stock Exchange (NSE) has become the first stock exchange in India to offer an internet-based trading system to its members on February 1, 2000.

Two major stock exchange in India

1. Bombay Stock Exchange:-

On Dalal Street in Mumbai, the Bombay Stock Exchange is located. On December 31, 2012, BSE was the world's ninth largest stock exchange by market capitalisation. The BSE is India's oldest stock exchange. Some stock brokers gathered under a Banyan tree in the beginning of 1855.

2. National Stock Exchange:-

Mumbai is home to the National Stock Exchange. It was launched in 1992 and licensed as a stock exchange in 1993. The primary goal of this exchange was to increase stock market transparency. In June 1994, it began trading in the wholesaler debt market.

II. Review of literature

Sandeep Sharma (2021) The customer satisfaction is only thing that make a business successful. The present study to find out the customer awareness towards online trading. The main objective of the study is to understand the how the online trades take place. The major reason for investing in the share market is convincing and easy to handle.

Jaiswal M., Vashist D. and Kumar A (2009) Traces the growth of online trading from the year 2000 using statistics on volume of online trading from the year 2000 using statistics on volume of online trading, number of e- broking firms, brokerages and demographic patterns. Online trading has dramatically changed the way stock business has been conducted over the years.

Mona Girnara (2020) This research paper contain what is online stock trading, how online stock trading developed, growth of online stock trading, advantages and disadvantages of online stock trading, challenges involve in online stock trading. His objective of study is to analyse growth of online stock trading and problems and challenges involve in online stock trading.

CH. Deepthi (2020) Online trading has emerged as one of the greatest and easiest ways to invest in shares by the investors. This study sheds light on how this online trade markets work and how they are satisfying their investors. It aims at studying the investor's perception of online trading in share market and helps to find out accessing the present level of service provided by identifying the areas which require attention for improving its services.

A. Ganesan (2020) This project brings you insights and tips, direct from Bombay Stock Exchange (BSE) and National Stock Exchange (NSE). This project will allow you to act quickly on the market impact of news and other events. Client will receive the user details and perform bank transactions..

Niranjan Devkota (2021) Majority of respondent agreed that they use both fundamental analysis as well as technical analysis for online trading. Similarly, most of the respondents expressed their opinion that technological factor caused problem on online trading.

Maricar M. Navarro (2020) Online stock trading platforms in the Philippines are widely used across the country which made investing convenient and available for most of all Filipinos. From these various platforms which were readily available and offered by some stock brokerage company in the Philippines, it became the new trend under the new normal, where it facilitated the fast growth of online trading be it in mobile or web-based platform.

Pratima Rawal (2018) This paper studied the perception of people in Faridabad city towards the online trading system of Indian Stock market. But in past time, there was nothing about the electronic trade which resulted the high profile scandals which destroyed the whole society faith. The researcher examined the relationship between the growth and online trading facility of stock market through the correlation technique and significant difference across demographical profile of the respondents .

Jianwei Hou (2015) This newspaper investigates how individuals' demographics might affect the adoption of theirs of internet stock trading. The results suggest that internet stock traders tend to be more apt to be male, have increased degrees of training, and also have higher levels of income compared to non-traders. Era wasn't discovered to correlate with individuals' adoption of internet stock trading. This particular study even discovered that internet stock traders differ from non-traders in conditions of their Internet use actions in addition to the attitudes of theirs to the Internet.

C.Navya (2019) Investors attitude towards online trading .It aims that studying the investor's perception of online trading in share markets and helps to find out the present level of service provided by identifying the area which require attention for improving its services.

III. Need of the study

- ❖ To identify the factors that is influencing the investors to invest in electronic stock exchange in India.
- ❖ To gain knowledge on the present developments of stock market compare to outcry.

IV. Scope of the study

- The project is an attempt to the investors awareness towards electronic stock trading in India and know the stock exchanges in detail.
- It provides thorough knowledge of different aspects of trading in stock exchanges.
- The first dealing with the theory, i.e., concept and history and Who invented online trading and the two major stock exchanges in India .
- The scope of the study analyse us to know the how the online trading activities are carried out in India electronic stock exchanges NSE and BSE
- This study helps the investors to take good decisions when they investing in electronic stock trading .

V. Objectives of the study

- To know how various demographic factors that are influencing the on-line screen based trading system adopted by NSE&BSE.
- To know the awareness level of investors towards electronic stock trading.
- To analyze the changes in trading after the Exchange Shifted from outcry to online trading system.
- To know about the latest developments in the stock exchange Trading system and investors response towards the same.
- To analyze the sectoral preference of Indian investors.

VI. Research methodology

⇒ Data Sources: Primary Data.

The Primary data is the main source from which the data is collected. The data is collected from 100 respondents through a questionnaire. To collect following data I have made use of following source.

- a) Questionnaire survey & interaction with clients in India to know investors awareness towards stock exchanges in India.
- b) Interaction with the business associate of Capital market services India.
- c) The questionnaire was distributed to the Investors, clients by using their contacts from broking agencies

1. **Sampling Technique** : The samples are collected by using Convenient sampling and simple random sampling .

3.Sample size: Totally 100 respondents are collected and the respondents for this study are individuals and investors on stock exchange in India from Hyderabad are taken into consideration.

4.Location: The respondents from Hyderabad city has been collected.

5.Duration: The project 45 days for completion of survey through questionnaire from respondents.

VII .Limitations of the study

1. The study is limited to 100 respondents from Hyderabad city and the respondents may not represent the entire population.
2. Duration is limited to 45 days.
3. The location of the study is confined to Religare Enterprises Ltd. Hyderabad only.
4. Convenient sampling and simple random sampling are used to collect data.
5. Only primary data sources are used to conduct the study.

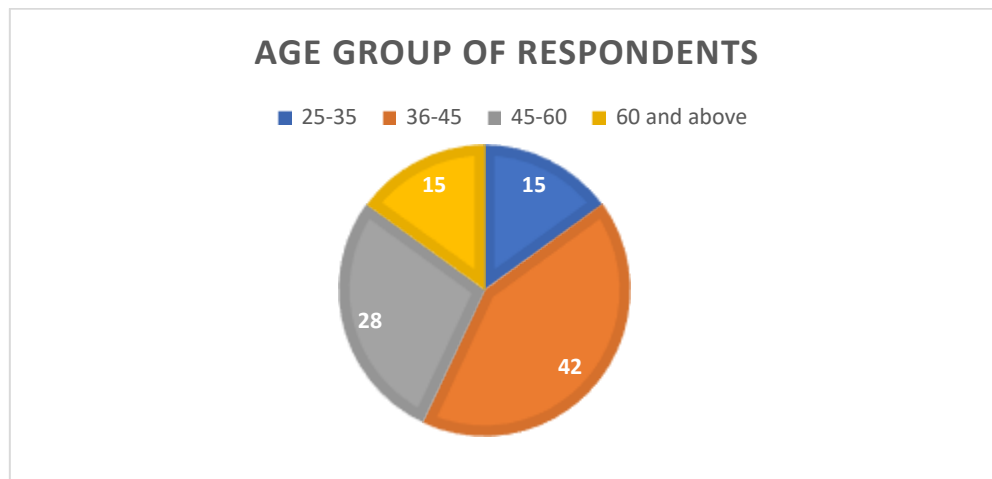
VIII. Empirical Analysis

1. Age group of respondents

25-35	15
36-45	42
45-60	28
60 and above	15
Total	100

Table no :1.1 Age wise segmentation of respondents

Source: Author's complication



Graph no :1.1.a Age wise segmentation of respondents

Source: Author's complication

From the above survey, the respondents are 15 between the age group of 25-35, The respondents are 42 between the age group of 36-45, the respondents are 28 between the age group of 45-60 and the respondents are 15 between the age group of 60 and above. From the above survey, the respondents are 64% of male and the respondents are 36% of female. From the above survey, 18% people are below 1,00,000 annual income, 32% people are between 1,00,000-2,00,000 annual income, 28% people are between 2,00,000-3,00,000 annual income and 22% people are above the 3,00,000 income group people.

From the above survey, the respondents are 35% from the employee occupation, the respondents are 16% from the student, the respondents are 32% from the professional people and the respondents are 17% from the retired people. From the above survey, the respondents are 16% who are investing

monthly in stock market less than 5000, the respondents are 24% who are investing monthly stock market between 5,000 to 10,000, the respondents are 33% who are investing monthly stock market between 10,000 to 20,000 and the respondents are 27% who are investing monthly stock market between 20,000 to 1,00,000. From the above survey, the respondents are 15 between the 10-15%, the respondents are 22 between the 16-18%, From the above survey, the respondents are 35% for investing in the blue chip stock market, The respondents are 37% for investing in the small chip stock market and the respondents are 28% for investing in the mid chip. From the above survey, the people prefer to invest 18% in IT sector, the people prefer to invest 26% in finance sector, the people prefer to invest 30% in banking sector, the people prefer to invest 14% in public sector and people invest to prefer to invest 12% in infrastructure.

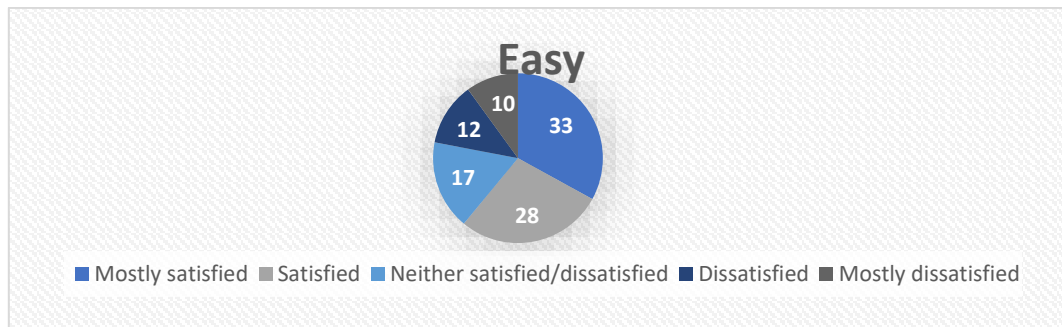
From the above survey, the information collected from friends is 15%, from the brokers is 36%, from the websites is 30% and from the Tv/Radio is 19%. From the above survey, the respondents are 27% mostly satisfied in security, the respondents are 30% satisfied in security, the respondents are 17% neither satisfied/ dissatisfied in security, the respondents are 15% dissatisfied in security, the respondents are 11% mostly dissatisfied in security. From the above survey, the respondents are 23% mostly satisfied in return, the respondents are 35% satisfied in return, the respondents are 21% neither satisfied/ dissatisfied in return, the respondents are 12% dissatisfied in return, the respondents are 9% mostly dissatisfied in return.

2 .How easy do you think investing in stock market

Mostly satisfied	33
Satisfied	28
Neither satisfied/dissatisfied	17
Dissatisfied	12
Mostly dissatisfied	10
Total	100

Table no :1.2 Investor's opinion on stock markets

Source: Author's complication



Graph no :1.2.a Investor's opinion on stock markets

Source: Author's complication

.From the above survey, the respondents are 33% mostly satisfied in easy, the respondents are 28% satisfied in easy, the respondents are 17% neither satisfied/ dissatisfied in easy, the respondents are 12% dissatisfied in easy, the respondents are 10% mostly dissatisfied in easy. From the above survey, the respondents are 29% mostly satisfied in payout, the respondents are 27% satisfied in pay out, the respondents are 19% neither satisfied/ dissatisfied in payout, the respondents are 16% dissatisfied in pay out, the respondents are 9% mostly dissatisfied in payout. From the above survey, the respondents are 27% mostly satisfied in operation access, the respondents are 30% satisfied in operation access, the respondents are 17% neither satisfied/ dissatisfied in operation access, the respondents are 15% dissatisfied in operation access, the respondents are 11% mostly dissatisfied in operation access.

From the above survey, the respondents are 30% mostly satisfied in strategy, the respondents are 28% satisfied in strategy, the respondents are 16% neither satisfied/ dissatisfied in strategy, the

respondents are 12% dissatisfied in strategy, the respondents are 14% mostly dissatisfied in strategy. From the above survey, the respondents are 22% mostly satisfied in availability, the respondents are 29% satisfied in availability, the respondents are 16% neither satisfied/ dissatisfied in availability, the respondents are 21% dissatisfied in availability, the respondents are 12% mostly dissatisfied in availability. From the above survey, the respondents are 26% mostly satisfied in diversification, the respondents are 30% satisfied in diversification, the respondents are 20% neither satisfied/ dissatisfied in diversification, the respondents are 10% dissatisfied in diversification, the respondents are 14% mostly dissatisfied in diversification.

From the above survey, the respondents are 32% mostly satisfied in transparent, the respondents are 27% satisfied in transparent, the respondents are 18% neither satisfied/ dissatisfied in transparent, the respondents are 12% dissatisfied in transparent, the respondents are 11% mostly dissatisfied in transparent. From the above survey, the respondents are 34% mostly satisfied in technology, the respondents are 29% satisfied in technology, the respondents are 18% neither satisfied/ dissatisfied in technology, the respondents are 11% dissatisfied in technology, the respondents are 8% dissatisfied in technology. From the above survey, the respondents are 33% mostly satisfied in regulation, the respondents are 33% satisfied in regulation, the respondents are 14% neither satisfied/ dissatisfied in regulation, the respondents are 11% dissatisfied in regulation and the respondents are 9% mostly dissatisfied in regulation.

IX. Findings, Suggestions and Conclusion

Findings:

- (1) Most of the majority respondents belongs to the age group of 36-45
- (2) In the total of 100 respondents there are majority of male respondents compared to female.
- (3) Majority of the respondents are from between 1,00,000-2,00,000 of annual income
- (4) Highest respondents are employee's in occupation
- (5) Many of the respondents are investing between Rs10,000 to 20,000 monthly in stock market.
- (6) The respondents are expecting between 20-25% returns from stock market.
- (7) It is clear that most of the people of the people are investing in small chip stock market then blue chip and mid chip.
- (8) It is found that out of 100 responses many prefer to invest in banking sector
- (9) In respondents majority of the investors know information about the stocks through brokers.
- (10) From the responses it is clear that many of respondents are satisfied with the returns , operating access, security ,availability from the online trading
- (11) It is clear that respondents in diversification ,transparency and technology are mostly satisfied that investing in online trading .
- (12) It is found that many of the respondents are mostly satisfied with payout.

Suggestions

- 1). Try to explain to investors how fraud will take place so that they will be alert and they can take necessary steps to avoid the frauds.
- 2). If there is increase in the annual income then the investors may show some interest towards investing in stock market
- 3). Genuine investors are not at all interested in the speculative gain as their investment is based on the future profits , therefore the authorities of exchange should be more vigilant in imposing heavy margin to curb the speculative of securities.
- 4). If there is increase in the annual income then the investors may show some interest towards investment .
- 5).If there are more no of people who are educated useful and helpful for them to understand the stock market.

6). Advertisements by the government will be useful to create a awareness to the public

Conclusion

The Stock Exchanges have had a significant impact on India's financial situation as a result of increased globalisation. Information and stock price quotations are practically instantaneous, and investors can act on this information by making a trade from anywhere at any time. This new market will benefit investors, listed corporations, and the company's economies. Trading will become more affordable, faster, and easier to settle with less risk. Raising finance for businesses will be easier, resulting in direct contributions to economic growth. There is no substantial difference in gender preference for share trading company qualities. There is no substantial difference in preference for share trading company qualities between occupations or educational qualifications. Online trading is been preferred by customers rather than Offline trading. Major reason for customers to invest in online trading is its conveyance and user friendly.

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ANALYSIS OF CURRENCY DERIVATIVES LISTED IN NSE

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Abstract

Currency Derivatives are playing an instrumental role in these days as the volume of world trade has increased enormously. The growing demand for the exports and imports, world trade has opened up for a new segment in the stock trading i.e., Currency Derivatives segment. Amid growing popularity of the currency derivatives segment during the time when world is facing intense crisis the study is an effort to analyse and compare the performance of currency derivatives of Indian Rupee(INR) pegged against American Dollar, Europe's Euro. In this study sample is taken from the year 2021 – 2022 and the selection of data was based up on National Stock Exchange ("NSE's"). The study uses three major currencies (USD, Euro, INR) for a duration of 2021-2022. Further, it is observed that the foreign currency derivatives use enhances firm value, however there is no hedging premium associated with foreign currency debt hedging, except when paired with foreign currency derivatives risk is enhanced, according to the project linked to the value effects of foreign currency hedging. The findings of the study for the duration of Jan-21 to May-22 the calculated RSI indicated that both the dollar price and euro price are in down trend. This result was arrived after calculating and comparing the Test Statistics and simulation.

Keywords: Currency Derivatives, Test Statistics, National Stock Exchange, Hedging, Relative strength index (RSI).

I. Introduction

Currency derivatives are considered to be one of the best options to manage any risk against foreign currency exchange rate volatility. Currency derivatives are exchange-based futures and options contracts that allow one to hedge against currency movements. Simply put, one can use a currency future contract to exchange one currency for another at a future date at a price decided on the day of the purchase of the contract. In India, one can use such derivative contracts to hedge against currencies like dollar, euro, U.K. pound and yen. Corporates, especially those with a significant exposure to imports or exports, use these contracts to hedge against their exposure to a certain currency. While all such currency contracts are cash-settled in rupees, the Securities and Exchange Board of India (SEBI), early this year, gave a go-ahead to start cross currency contracts as well on euro-dollar, pound-dollar and dollar-yen.

The two national-level stock exchanges, BSE and the National Stock Exchange (NSE), have currency derivatives segments. The Metropolitan Stock Exchange of India (MSEI) also has such a segment but the volumes are a fraction of that witnessed on the BSE or the NSE. One can trade in currency derivatives through brokers. Incidentally, all the leading stock brokers offer currency trading services too.

II. Review Of Literature

Dr. E.V.P.A.S. Pallavi (2015) the introduction of currency derivatives in India has taken about eight years, and various adjustments to the trading system have been made in that time. The major goal of this research is to examine India's currency derivatives development. The number of contracts exchanged, trading volume, and open interest at the NSE are all examined in order to determine the growth of currency derivatives. Investors and hedgers alike have been enthusiastic about currency derivatives.

Prashant Sharma (2019) The current research examines the effectiveness of the currency derivatives market by evaluating its contribution to the price discovery process using spot and future prices of four currencies traded on the National Stock Exchange (NSE) of India (USD/INR, EURO/INR, GBP/INR, and JPY/INR). According to the findings, spot rates and future rates have a long-run equilibrium connection, with unidirectional causation going from future rates to spot rates for all currencies under study. Because the futures markets play a larger role in price discovery, more investors are drawn to them. As a result, more logical price discovery occurs.

Anwar Hasan Abdullah Othman (2021) in a non-linear framework, this research investigates the influence of hedging on the firm value of Shariah compliant enterprises (SCFs). To investigate the impact of derivatives, use on firm value (Tobin's Q, ROA, and ROE), and this research uses the system-GMM for dynamic panel data. From 2000 to 2017, the sample included 59 non-financial SCFs that were involved in derivatives (18 years).

Abhishek Kumar Sinha (2019) the phenomenal rise of the Indian economy in recent years has fueled the growth of the Indian Forex market. India now has a key role in the global economic landscape and is regarded as one of the world's developing economies. The constant development of the Indian economy, as well as the diversification of India's industrial sectors, have aided the Indian Forex Market's fast expansion. The volume of transactions in the Foreign Exchange Market has increased as a result of India's extensive globalisation and liberalisation. As a result, an active and liquid forex derivative market is required to supply a basket of hedging products for effective foreign currency risk management.

Sung Bae (2017) we find that enterprises with greater export, more foreign currency debt, and larger exchange rate exposures are more likely to employ currency derivatives for hedging, using firm-level data for Korean firms. More currency derivatives usage does not lead to decreased company risk, but such transactions, particularly sell transactions, bring in greater firm values, according to 2SLS regressions. Furthermore, the usage of currency derivatives by enterprises with substantial exposures is linked to reduced company risk as well as lower firm value. These results show that currency futures might help enterprises with minimal and controllable exposures manage risk and safeguard their assets.

Piotr Wybieralski (2021) the purpose of this chapter is to examine the influence of the Covid-19 epidemic and increased market volatility on risk management in Poland's OTC derivatives market. The chapter begins by describing the legal backdrop of derivatives trading with non-financial firms, then analyses the major dangers and explores market players' potential responses. The research does a volatility analysis based on chosen market data in this respect. **Arjun Gope (2014)** financial derivatives are used by a variety of institutions, including businesses, commercial banks, institutional investors, and individuals, to decrease risk, "lay off," or speculate on different hazards. Despite the fact that India's financial derivative market is not very old, the nation has emerged as a big and active derivative market in the global context. In 2012, India's National Stock Exchange (NSE) was rated third in the world, after CME Group and Eurex.

Saurabh Ghosh (2003) in recent years, derivative products such as futures and options on Indian stock exchanges have become essential price discovery, portfolio diversification, and risk hedging strategies. Using the ARCH/GARCH approach, this study investigates the influence of index futures on spot market volatility on the S&P CNX Nifty and the BSE Sensex. According to the empirical investigation, following the introduction of index futures, spot market volatility decreased as the influence of fresh news grew and the effect of uncertainty emanating from old news decreased. Further study demonstrates, however, that market-wide volatility has decreased throughout the time period under review

S. Dinesh (2011) the introduction and proliferation of financial derivatives has been one of the most important developments in the securities markets. In recent years, derivative products such as futures and options on Indian stock exchanges have become essential price discovery, portfolio diversification, and risk hedging strategies. According to the empirical investigation, following the introduction of index futures, spot market volatility decreased as the influence of fresh news grew and the effect of uncertainty emanating from old news decreased.

Dr Nalla Bala Kalyan (2019) the derivatives market has a crucial function to play in the economic growth of a nation. The goal of the research is to look at the impact of financial derivatives on underlying market volatility (futures and options). Financial derivatives are now becoming more popular and widely employed in the financial sector. This has expanded at such a rapid rate over the globe that it is now known as the derivatives revolution. The inception and expansion of the derivatives market is considerably greater in India. Derivative. This essay will look at futures and options using the Indian stock market as a case study. This article tries to advise investors on the best strategies to increase their earnings in derivative markets.

Kishan Egurla (2018) India's derivative market, like its international equivalents, is growing in importance. Derivatives have gained in popularity dramatically since their introduction in the year 2000. The fact that the daily turnover in the derivatives section of the National Stock Exchange is presently in the crores, much larger than the turnover in the cash markets on the same exchange, demonstrates this. The entire turnover in the equities cash market was about Rs 60.5 lakh crore in fiscal 2016-17, while the same for equity derivatives was around Rs 944 lakh billion.

Dr. G. Prabakaran (2017) In India's derivatives industry, futures and options are one of the most significant areas. Financial derivatives have grown to become one of the world's biggest markets in terms of trading volume, number of index and stock options available for trading, and investor engagement in the derivatives market during the last two decades.

James Weston (2001) The usage of foreign currency derivatives (FCDs) in a sample of 720 big nonfinancial enterprises in the United States between 1990 and 1995 is investigated, as well as the possible influence on company value. We establish a positive relationship between firm value and the adoption of FCDs using Tobin's Q as a proxy for firm value. For enterprises with exposure to exchange rates, the hedging premium is statistically and economically substantial, accounting for 4.87 percent of company value on average. We also discover some data that supports the premise that hedging increases business value.

Prakash Basanna (2019) Foreign Exchange Risk Management (FERM) entails the use of both internal and external currency derivatives such as forwards, futures, options, and swaps. Currency derivatives are more often used by companies with more development potential and tighter financial limitations. Currency forwards, options, futures, and swaps are some of the derivative products available in the forex market for hedging currency risks. The purpose of this article is to investigate the effect of different FERM Techniques utilised in the Indian FMCG industry on exchange gains and losses.

Shinhua Liu (2019) Because of the increased information provided by currency derivatives trading, underlying exchange prices should be less predictable than before, and underlying currency markets should be more efficient as a result. For the first time, this theory was tested using a clean sample of three key kinds of currency derivatives introduced in two significant markets from 1982 to 1997. Various statistical studies show that once the derivative contracts were introduced, the underlying exchange rates grew more random, and the currencies involved tended to be priced more efficiently, supporting the premise.

III. Need for the study

The project relating to the value effects of foreign currency hedging indicate that foreign currency derivatives use increases firm value but there is no hedging premium associated with foreign currency debt hedging, except when combined with foreign currency derivatives risk is increased. The study tries to analyze the current trend in currency derivatives market, so it helps for market evaluation. The study helps to identify the concept of hedging in a simplified manner.

IV. Scope of the study

The need of the study is to know the performance of derivative hedging and working and understanding about how to derivative help people to manage the risk and increase the profitability. Most of the investors are not aware about investing in currency derivatives. My project will be helpful for Investors who wants to gain profitability in Foreign currencies.

V. Objectives of the study

- To analyze the various currency derivatives in NSE.
- To evaluate the performance of currency derivatives.
- To analyze the currency derivatives fluctuations using RSI Tools.
- To suggest best currency in Investment Management.

VI. Research Methodology

Research Design: Refers to the framework of market research methods and techniques that are chosen by a researcher. The design that is chosen by the researchers allow them to utilise the methods that are suitable for the study and to set up their studies successfully in the future as well. Since the study is on the currency derivatives segment. The whole research is based secondary sources only

Secondary data sources

For the purpose of data analysis I have taken four pairs traded in NSE. To get more information about this` I collected data from websites, articles and journals related to currency derivative market. For academic point of knowledge I referred NISM currency derivative module work book

Sample size:

- USD/INR
- EUR/INR

Sample duration:

One year data is taken for analysis purpose.

Use of Test Statistics, simulations and software if any

Statistical tools:

Relative Strength Index (RSI) = $100 - \frac{100}{1+RS}$

VII. Empirical Results

For the purpose of data analysis I have taken four pairs traded in NSE. To get more information about this` I collected data from websites, articles and journals related to currency derivative market. For academic point of knowledge I referred NISM currency derivative module work book.

$$\text{Relative Strength Index (RSI)} = 100 - \frac{100}{1+RS}$$

Date	Price	Change	Gain	Loss	Avg Gain	Avg Loss	RS	14-Day RSI
Jan 21, 2021	73.03	-0.05	0.00	0.05	0.06	0.08	0.76	43.22
Jan 22, 2021	72.96	-0.07	0.00	0.07	0.06	0.08	0.71	41.64
Jan 25, 2021	72.94	-0.02	0.00	0.02	0.05	0.08	0.70	41.18

Jan 27, 2021	72.82	-0.12	0.00	0.12	0.05	0.08	0.62	38.42
Jan 28, 2021	73.28	0.46	0.46	0.00	0.08	0.07	1.07	51.75
Jan 29, 2021	73.17	-0.11	0.00	0.11	0.07	0.08	0.96	49.02
Feb 01, 2021	73.32	0.15	0.15	0.00	0.08	0.07	1.11	52.69
Feb 02, 2021	73.21	-0.11	0.00	0.11	0.07	0.07	0.99	49.86
Feb 03, 2021	73.13	-0.08	0.00	0.08	0.07	0.07	0.92	47.84
Feb 04, 2021	73.15	0.02	0.02	0.00	0.06	0.07	0.94	48.40
Feb 05, 2021	73.07	-0.08	0.00	0.08	0.06	0.07	0.86	46.26
Feb 08, 2021	73.1	0.03	0.03	0.00	0.06	0.06	0.89	47.20
Feb 09, 2021	73.04	-0.06	0.00	0.06	0.05	0.06	0.83	45.48
Feb 10, 2021	72.93	-0.11	0.00	0.11	0.05	0.07	0.74	42.42
Feb 11, 2021	72.96	0.03	0.03	0.00	0.05	0.06	0.77	43.54
Feb 12, 2021	72.71	-0.25	0.00	0.25	0.04	0.08	0.59	37.09
Feb 15, 2021	72.72	0.01	0.01	0.00	0.04	0.07	0.60	37.49
Feb 16, 2021	72.79	0.07	0.07	0.00	0.04	0.07	0.68	40.34
Feb 17, 2021	72.8	0.01	0.01	0.00	0.04	0.06	0.69	40.76
Feb 18, 2021	72.63	-0.17	0.00	0.17	0.04	0.07	0.57	36.15
Feb 22, 2021	72.47	-0.16	0.00	0.16	0.04	0.08	0.48	32.43
Feb 23, 2021	72.54	0.07	0.07	0.00	0.04	0.07	0.55	35.55
Feb 24, 2021	72.29	-0.25	0.00	0.25	0.04	0.08	0.43	30.19
Feb 25, 2021	72.72	0.43	0.43	0.00	0.06	0.08	0.83	45.44
Feb 26, 2021	74.19	1.47	1.47	0.00	0.16	0.07	2.31	69.76
Mar 01, 2021	73.76	-0.43	0.00	0.43	0.15	0.10	1.58	61.17
Mar 02, 2021	73.61	-0.15	0.00	0.15	0.14	0.10	1.41	58.47
Mar 03, 2021	73.11	-0.50	0.00	0.50	0.13	0.13	1.02	50.46
Mar 04, 2021	72.99	-0.12	0.00	0.12	0.12	0.13	0.95	48.73
Mar 05, 2021	73.31	0.32	0.32	0.00	0.14	0.12	1.14	53.32
Mar 08, 2021	73.39	0.08	0.08	0.00	0.13	0.11	1.19	54.41
Mar 09, 2021	73.14	-0.25	0.00	0.25	0.12	0.12	1.02	50.42
Mar 10, 2021	73.15	0.01	0.01	0.00	0.11	0.11	1.02	50.58
Mar 12, 2021	72.9	-0.25	0.00	0.25	0.11	0.12	0.87	46.63
Mar 15, 2021	72.62	-0.28	0.00	0.28	0.10	0.13	0.74	42.61
Mar 16, 2021	72.62	0.00	0.00	0.00	0.09	0.12	0.74	42.61
Mar 17, 2021	72.67	0.05	0.05	0.00	0.09	0.11	0.77	43.62
Mar 18, 2021	72.59	-0.08	0.00	0.08	0.08	0.11	0.73	42.34
Mar 19, 2021	72.58	-0.01	0.00	0.01	0.08	0.11	0.73	42.17
Mar 22, 2021	72.41	-0.17	0.00	0.17	0.07	0.11	0.65	39.34
Mar 23, 2021	72.54	0.13	0.13	0.00	0.08	0.10	0.74	42.52
Mar 24, 2021	72.68	0.14	0.14	0.00	0.08	0.09	0.85	45.81
Mar 25, 2021	72.62	-0.06	0.00	0.06	0.07	0.09	0.81	44.63
Mar 26, 2021	72.4	-0.22	0.00	0.22	0.07	0.10	0.68	40.51
Mar 30, 2021	73.87	1.47	1.47	0.00	0.17	0.09	1.80	64.25
Mar 31, 2021	73.42	-0.45	0.00	0.45	0.16	0.12	1.31	56.78
Apr 05, 2021	73.55	0.13	0.13	0.00	0.16	0.11	1.40	58.29
Apr 06, 2021	73.67	0.12	0.12	0.00	0.15	0.10	1.48	59.69

Apr 07, 2021	74.58	0.91	0.91	0.00	0.21	0.10	2.16	68.36
Apr 08, 2021	74.83	0.25	0.25	0.00	0.21	0.09	2.36	70.25
Apr 09, 2021	74.82	-0.01	0.00	0.01	0.19	0.08	2.34	70.07
Apr 12, 2021	75.21	0.39	0.39	0.00	0.21	0.08	2.70	72.99
Apr 15, 2021	75.21	0.00	0.00	0.00	0.19	0.07	2.70	72.99
Apr 16, 2021	74.52	-0.69	0.00	0.69	0.18	0.12	1.55	60.83
Apr 19, 2021	74.96	0.44	0.44	0.00	0.20	0.11	1.84	64.85
Apr 20, 2021	75.12	0.16	0.16	0.00	0.20	0.10	1.96	66.21
Apr 22, 2021	75.07	-0.05	0.00	0.05	0.18	0.10	1.89	65.36
Apr 23, 2021	75.05	-0.02	0.00	0.02	0.17	0.09	1.86	65.00
Apr 26, 2021	74.79	-0.26	0.00	0.26	0.16	0.10	1.52	60.35
Apr 27, 2021	74.64	-0.15	0.00	0.15	0.15	0.11	1.37	57.78
Apr 28, 2021	74.4	-0.24	0.00	0.24	0.14	0.12	1.17	53.84
Apr 29, 2021	74.37	-0.03	0.00	0.03	0.13	0.11	1.14	53.35
Apr 30, 2021	74.39	0.02	0.02	0.00	0.12	0.10	1.16	53.65
May 03, 2021	74.33	-0.06	0.00	0.06	0.11	0.10	1.11	52.55
May 04, 2021	74.26	-0.07	0.00	0.07	0.10	0.10	1.05	51.22
May 05, 2021	74.19	-0.07	0.00	0.07	0.09	0.09	0.99	49.87
May 06, 2021	73.97	-0.22	0.00	0.22	0.09	0.10	0.84	45.78
May 07, 2021	73.66	-0.31	0.00	0.31	0.08	0.12	0.69	40.71
May 10, 2021	73.55	-0.11	0.00	0.11	0.08	0.12	0.64	39.06

Table No: 1.1 Tabular representation of USD/INR for the Duration Jan 2021- May22

Source: Author's Compilation

From the analysis it is observed, In an uptrend, an oversold reading on the RSI is likely much higher than 30%, while in a downtrend, an overbought reading on the RSI is likely much lower than 70%. The estimated RSI indicates that Euro price is in a downtrend based on the above study of Euro price for the period Jan-2021 to Dec-2021. The RSI is currently at zero, indicating that the Dollar will most likely be volatile in the future. In an uptrend, an oversold reading on the RSI is likely much higher than 30%, while in a downtrend, an overbought reading on the RSI is likely much lower than 70%. The estimated RSI indicated that the Euro price was in an uptrend from January to May 2022, based on the above study. The RSI is currently at 70.15, indicating that the Dollar may become more bullish in the future.

VII. Findings, Suggestions and Conclusion

Findings:

- Dollar price for the duration of Jan-2021 to Dec-2021 the calculated RSI indicated that Dollar price in down trend. Recorded RSI is at 70.23 which mean in future Dollar may go volatility.
- Dollar price for the duration of Jan-2022 to May 2022 the calculated RSI indicated that Dollar price in down trend. Recorded RSI is at 70.23 which mean in future Dollar may go volatility.
- Euro price for the duration of Jan-2021 to Dec-2021 the calculated RSI indicated that Euro price in down trend. Recorded RSI is at 0 which means in future Dollar may go mostly volatility.
- Euro price for the duration of Jan-2022 to May-2022 the calculated RSI indicated that Euro price in up trend. Recorded RSI is at 70.15 which means in future Dollar may go bullish.

Suggestions:

- Investor should be maintain strict stop-loss while trading in currency derivatives
- Currency Future need to change some restriction it imposed such as cut off limit of 5 million USD, Ban on NRI's and FII's and Mutual Funds from Participating.
- Now in exchange traded currency future segment only one pair USD-INR is available to trade so there is also one more demand by the exporters and importers to introduce another pair in currency trading. Like POUND-INR, CAD-INR etc.

Conclusion:

By far the most significant event in finance during the past decade has been the extraordinary development and expansion of financial derivatives...These instruments enhances the ability to differentiate risk and allocate it to those investors most able and willing to take it- a process that has undoubtedly improved national productivity growth and standards of livings. The currency future gives the safe and standardized contract to its investors and individuals who are aware about the forex market or predict the movement of exchange rate so they will get the right platform for the trading in currency future. Because of exchange traded future contract and its standardized nature gives counter party risk minimized.

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**ANALYSIS OF WORKING CAPITAL MANAGEMENT PRACTICES OF
KOTAK MAHINDRA BANK LIMITED**

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Abstract

A study on working capital is of major importance, because of its close relationship with current day-today operations of a business. Its effective provision and utilization can do much to ensure the success of a business. While the efficient management may not only lead to loss of projects but also to the ultimate shown fall of what otherwise would be considered as promising concern. A study on working capital is of major importance, because of its close relationship with current day-today operations of a business. Working capital is usually invested in raw material ,work in progress ,finished goods accounts, receivable and saleable securities. Management of working capital usually involves planning and controlling current assets, namely cash and marketable securities, assets receivable and inventories and also administration of current liabilities. Working Capital or current assets management is one of the most important aspect of the over all financial management. It is concerned with the problem that arises in attempting to manage the current assets. The current liabilities and the inter relationships that exists between them. Current assets are the assets, which can be converted into cash with in an Accounting year and includes cash short-term securities, debtors, bill receivable and inventories. Current liabilities are that claim of outside, which are expected to mature for payment with in an Accounting year and includes creditor's bill payable and outstanding expenses. The paper is attempted to analyze the working capital management of the firms considering current assets and current liabilities and managing the funds in such a way that they are enough to cover its current liabilities in a best possible way.

Keywords: Working Capital Management, Current Assets, Current Liabilities, Inventories, Ratio Analysis.

I. Introduction

Cash is the lifeline of a company. If this lifeline deteriorates, the company's ability to fund operations, reinvest and meet capital requirements and payments also deteriorate. Understanding a company's cash flow health is essential for making investment decisions. A good way to judge a company's cash flow prospects is to look at its working capital management (WCM).Working capital of a company reveals more about the financial condition of a business than almost any other calculation. It tells you what would be left if a company raised all of its short term resources, and used them to pay off its short term liabilities. The more working capital, the less financial strain a company experiences. Working capital also gives investors an idea of the company's underlying operational efficiency. Money that is tied up in inventory or money that customers still owe to the company can't be used to pay off any of its obligations. So, if a company is not operating in the most efficient manner (slow collection) it will show up in the working capital. This can be seen by comparing the working capital from one period of time to another; slow collection may signal an underlying problem in the company's operations. Working capital is that it is the difference between an organization's current assets and its current liabilities. Of more importance is its function which is primarily to support the day-to-day financial operations of an organization, including the purchase of stock, the payment of salaries, wages and other business expenses, and the financing of credit sales. It's a measure of both a company's efficiency and its short-term financial health. The better a company manages its working capital, the less the company needs to borrow. Even companies with cash surpluses need to manage working capital to ensure that those surpluses are invested in ways that will generate suitable returns for investors.

Current Assets - Current Liabilities = Working Capital

II. Review of literature:

Seth et al. (2021) argue that human capital, structural capital, and productivity do not affect the efficiency of working capital management and business performance. These findings contribute to effective solutions in working capital management.

Prsa (2020) explains that working capital management has an impact on a company's wealth. Businesses investing more in working capital can expect lower business risk but adverse effects on profitability and vice versa.

Prasad et al. (2019) present the working capital efficiency multiplier (WCEM) as a direct profitability measurement in working capital management. WCEM represents financial performance variables such as return on assets, invested capital, equity return, gross operating income, and net operating income. WCEM reflects the part of WACC that the company invests in working capital management. As mentioned above, the lower WCEM indicates higher efficiency of working capital.

Korent and Orsag (2018) examine the impact of working capital management on profitability in Croatian software companies using descriptive statistics, correlation, and regression analysis. The results suggest that there is a nonlinear concave relationship between net working capital and return on assets. These results indicate that there is an optimal level of net working capital.

Venkatachalam (2017) argues that large working capital can lead to increased costs and reduced profits. Their paper examines the relationship between profitability and various components of current assets based on the Pearson correlation.

Khan (2017) claims that working capital management is a very important part of corporate finance, especially in the manufacturing sector, due to its direct impact on the company's liquidity and profitability.

Shajar and Farooqi (2016) demonstrate that effective working capital management is the most important factor in maintaining a company's survival, liquidity, solvency, and profitability. Optimal working capital management contributes positively to the company's value.

III. Need for the study:

- Working capital management is one of the key areas of financial decision-making.
- Working capital and efficient management of the same will help the business's fixed assets to be utilised efficiently and effectively.
- The financial manager need to understand how to develop effective working capital policies to ensure growth ,profitability , and long-term success for their firms.
- To increase the profitability of a concern , increase in total revenues is must, and to increase revenue , adequate working capital is much needed. TShus adequate working capital contributes in profit making.

IV. Scope of the study:

- The study is confined to five years (i.e) 2017-2021.
- For the study data collection is done at Kotak Mahindra bank Ltd., Hyderabad area.
- Ratio analysis- Current ratio, Quick ratio, turnover ratio are computed on the data.
- The sample data comprises of five years balance sheets of Kotak Mahindra Bank Ltd.

V. Objectives of the Study:

- To study the existing working capital management system of **Kotak Mahindra Group**. (Formerly Kotak Mahindra bank Ltd.).
- To find the liquidity position of the current assets and current liabilities of the company.
- To examine feasibility of present system of managing working capital.
- To understand how the company finances its working capital

VI. Research Methodology

The study of Working Capital management is based on primary as well as secondary data.

Source of the data collected:

- Secondary data sources.

Secondary data:

Secondary data refer to those data that have already been collected by some other person. The secondary data was collected from company's previous annual reports, various books and Internet.

- The required data was sourced from the database and existing documents with Kotak Mahindra Bank Limited including the current process flow of Working Capital Finance.
- Data was also collected from a few websites, company annual reports, Articles, RBI website.

VII. Limitations of the Study:

- The study is mainly on secondary data.
- The lack of sufficient time and resource is another limitation of the study.
- The study is purely based on information given in the annual report.
- Some information is confidential those information may not be made available in the report.

VIII. Empirical Results:

Analysis of working capital performance through ratio analysis

Ratio analysis:

The ratio analysis is one of the most powerful tools of financial analysis. It is the process of establishing and interpreting various ratios (Quantities relationship between figures and groups of figures). It is with the help of ratios that the financial statements can be analysed more clearly and decisions are made from such analyses.

A ratio is a simple arithmetic expression of the relationship of one to another. According to accountants Handbooks by Iken and Bedford a ratio is an expression of the quantities relationship between two numbers.

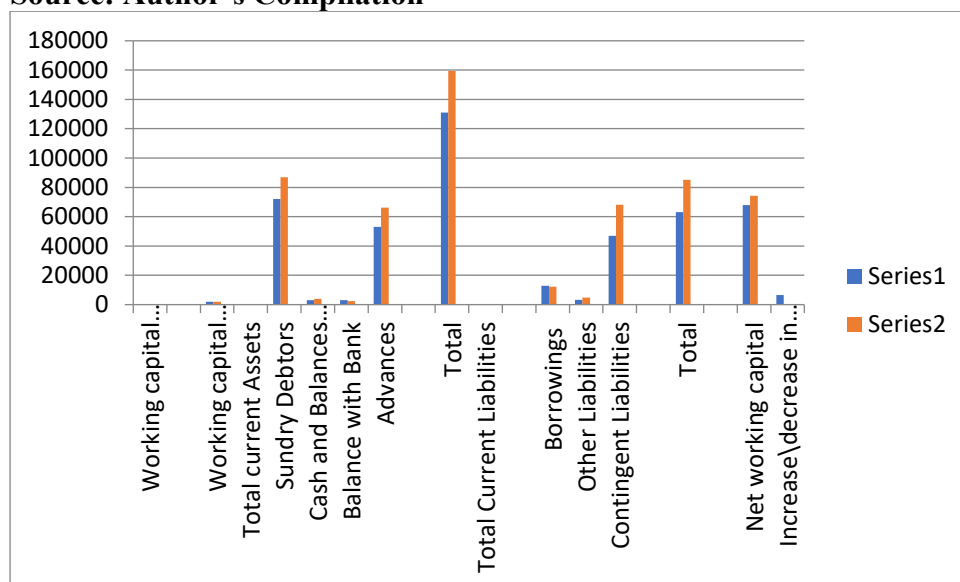
A representative analysis carried out is presented in table 1.1 and figure 1.1(a).

Particulars	2020	2021
Total current Assets		
Sundry Debtors	71967.91	87010.02
Cash and Balances with RBI	2,948.23	3928.3
Balance with Bank	3,031.66	2334.06
Advances	53,027.63	66160.71
Total	130975.43	159433.09
Total Current Liabilities		
Borrowings	12,895.58	12149.71
Other Liabilities	3,333.82	4857.97
Contingent Liabilities	46,903.54	68092.15

Total	63,132.94	85099.83
Net working capital	67842.49	74333.26
Increase\decrease in net working capital	6490.77	

Table No: 1.1 Statement of changes in working capital 2020-21

Source: Author's Compilation



Graph No: 1.1.a Statement of changes in working capital 2020-21

Source: Author's Compilation.

The networking capital of Kotak Mahindra has been increased to 6490.77 Cr the financial position i.e. the performance of Kotak Mahindra has increased and the current assets defects its current liability. In the year of 2019-20 networking capital has been increased to 9562.86 Cr the financial position i.e. the performance of Kotak Mahindra has increased and the current assets defects its current liability. In the year of 2018-19 networking capital has been increased to 2097.48 Cr the financial position i.e. the performance of Kotak Mahindra has increased and the current assets defects its current liability.

The company noted a maximum ratio of 14.12 in the year 2019-20 and the minimum ratio in the year of 2016-17 is 11.73. present year i.e on 2019-20 is 13.50. The ratio is increasing the year 2016-17 is 11.73 in the year, but it is decreased in the year 2018-19. It shows a good sign for the company. The current ratio increased slightly up to 2017-18 is 1.42. But in 2016-17 it declined because of increase in current liabilities, and then it started to decrease further in 2016-17 as 0.33. if the company maintains to increase the ratio it can meet obligations. The current ratio increased slightly up to 2016-17 is 1.33. But in 2016-17 it declined because of increase in current liabilities, and then it started to decrease further in 2020-21 as 1.07. if the company maintains to increase the ratio it can meet obligations.

XI. Findings, Suggestions and Conclusion:

Findings:

- The Kotak Mahindra net working capital is satisfactory between the years 2020-21 since it shows increasing trend.
- The Net working capital is increased by the previous year working capital.
- Fixed assets turnover ratio of Kotak Mahindra increased. The company has to maintain this.

- Total Assets turnover ratio of Kotak Mahindra is not satisfactory because it is always below one, except in the year 2019-20.
- Return on investment is not satisfactory. This indicates that the company's funds are not being utilized in a better way.

Suggestions:

- Improve position funds should be utilized properly.
- Better Awareness to increase the sales is suggested.
- Cost cut down mechanics can be employed.
- Better production technique can be employed.
- The investment on raw material should be made as per the requirement. Unnecessary investment may block up the funds.
- The process that was being used by **Kotak Mahindra Group** with the purchasing department should undergo changes; so that, it seeks enhance the celerity of the delivery of a product without compromising its quality by improving the utilization of materials, labor and equipment.

Conclusion:

Banking has become one of the most important tools for the success of any country. It has become a backbone of any countries growing economy. Banking over the year, in India has seen lots of ups and downs. Today due to liberalization of the economy, more and more sectors are becoming more and more competitive. Banking is no different. Bank like kotak Mahindra and others banks in India are doing terrifies job in banking sector handling better human resources, adopt new technology, and bring new concept and managing standard. Banking sector has seen a lot of transformation in the past post liberalization period, it has became very important for bank to give services best to their capabilities. If the customer are not satisfied with the service provided by the bank, they will transfer their account to some other bank. Result is loss of revenue for the bank and the loss of goodwill. New technology needs to be introduction in the banking sector it is utmost clear that people are not only expecting normal banking services but they want to be as their business partners and help accordingly.

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A STUDY OF HR PLANNING AT KARVY HYDERABAD

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Abstract

The main purposes of this study are to explore the extent to which public Jordanian universities have adopted Human Resource Information System (HR PLANNING) and to examine the current HR PLANNING uses, benefits and barriers in these universities. A structured questionnaire was constructed based on other previous studies; it also pre-tested, modified and translated to capture data from HR PLANNING users in Jordanian universities. The main findings of this study revealed that the quick response and access to information were the main benefits of HR PLANNING implementation. While, the insufficient financial support; difficulty in changing the organization's culture and lack of commitment from top managers were the main HR PLANNING implementation barriers. The present study provides some insights into the performance and applications of HR PLANNING in Jordanian universities that could help Human Resource Management (HRM) practitioners to get a better understanding of the current HR PLANNING uses, benefits and problems, which in turn, will improve the effectiveness of HR PLANNING

INTRODUCTION

Planning is very important to our everyday activities. Different writers what planning is all about and its importance to achieving our objectives have given several definitions. It is amazing that this important part of HR is mostly ignored in HR in most organizations because those at the top do not know the value of HR planning. Organizations that do not plan for the future have less opportunities to survive the competition ahead. This article will discuss the importance of HR planning; the six steps of HR planning that is recasting; inventory, audit, HR Resource Plan; Auctioning of Plan; Monitoring and Control.

Definition of HR Planning

Quoting Mondy et (1996) they define it as a systematic analysis of HR needs in order to ensure that correct number of employees with the necessary skills are available when they are required.

When we prepare our planning programme, Practitioners should bear in mind that their staff members have their objective they need to achieve. This is the reason why employees seek employment. Neglecting these needs would result in poor motivation that may lead to unnecessary poor performance and even Industrial actions.

Importance of Planning

HR Planning involves gathering of information, making objectives, and making decisions to enable the organization achieve its objectives. Surprisingly, this aspect of HR is one of the most neglected in the HR field. When HR Planning is applied properly in the field of HR Management, it would assist to address the following questions:

1. How many staff does the Organization have?

2. What type of employees as far as skills and abilities does the Company have?
3. How should the Organization best utilize the available resources?
4. How can the Company keep its employees?

SCOPE OF THE STUDY

One of the main functions of personnel management in industrial organization is to impart programmers to its employees.

HRM plays a large part in determining the effectiveness and efficiency of the establishment. Increase in productivity is possible only when there is an increase in quantity of output. It applies not only to new employees but also to experienced people. It can help employees and employers to increase their level of performance and to develop skills, knowledge on their present job assignments.

Need for basic purposes of HRM HR planning:

- 1) To increase productivity.
- 2) To improve quality.
- 3) To help a company fulfill its future personnel needs.
- 4) To improve organizational climate.
- 5) To improve health & safety.
- 6) Obsolescence prevention.
- 7) Personal growth.

OBJECTIVES OF THE STUDY

- On an average, every employee at Nutrient undergoes at least 2 training programmers for a financial year and the employer in HR planning requires the executive development programmers at the time of intensive competition.
 - So the study is aimed to know the adequacy of training given to employees and employers.
 - To know whether employees and employers are having enthusiasm in knowing about training and development programmers, training plans, implementation and participation.
 - To suggest appropriate techniques and modification in training to achieve corporate goals.
- Development to employers arises due to providing technical skills and conceptual skills to non-technical managers and managerial skills and conceptual skills to technical managers

RESEARCH METHODOLOGY

Research is scientific and systematic search pertinent information in a specific topic. The meaning of research is “A Careful Investigation (or) Inquiry.

HR planning is the corner stone of sound management, and it makes employees and employers more effective and productive. It is actively and intimately connected with all personnel and managerial activities.

There is a present need for HR planning measures. So that new and changed techniques may be taken advantage and improvements effected in new methods, which are woefully inefficient. Training is practical and of vital necessity because, apart from other advantages mentioned, and increase their “Market Value”, earning power job secure

RESEARCH INSTRUMENT:

In order to collect the data from the people in organization the research instrument used is QUESTIONNAIRE.

A structured questionnaire has been designed, consisting of Closed Ended questions. All the questions are objective. Questionnaire does not contain any column for personal details of the people in Karvy Ltd.,

Questionnaire is designed for employees and employers containing 12 questions respectively. The questions are framed consisting of different factors. Both positive and negative questions are included to reduce the bias.

DATA SOURCES

Data can be broadly classified as;

- 1) Primary data.
- 2) Secondary data.

Primary data

Primary data is obtained through observation, questionnaires, and personal interviews.

Secondary Data

Secondary data is obtained through various, Management books Journals Newspapers and Internet web: www.karvy.com

SAMPLING

Sampling is always necessary to collect data from the whole organization. A small representative sample may serve the purpose. Sample means “A Group Taken From a Large Lot“. This small group should be miniature cross-section and really “Representative” in character. This selection process is called Sampling.

SAMPLE SIZE

Sample is device for learning about masses by observing a few individuals, that selected sample, is “100”.

SAMPLE PLANNING

Sample planning consists four major parts they are

- Sample Unit: Employees of KARVY.
- Sample Size: 100
- Population : 598
- Sample frame: Employees of Karvy, Hyderabad

SAMPLING METHOD

- Sample procedure: simple random sampling Sampling

LIMITATIONS OF THE STUDY

1. Firstly the respondents were not available readily and the data were collected as per the simple random sampling of the respondents.
2. Secondly the sample of only 100 respondents with simple random sample technique applied for selecting the respondents.

Thirdly, time is also one of constraints. Duration of 45 days is not sufficient to cover all the aspects of the study.

REVIEW OF LITERATURE

Dr. Jameender Ritesh (2014) studied the importance and impact of Human Resource Planning. In Effectiveness and Competitiveness of an Organization and felt that HRP is essential in order to Prevent shortage of human resource and skill Satisfy future staffing needs, Avoid industrial unrest Show the flow of information of individuals and increase productivity and concluded that Effective manpower planning must embrace the procurement, employment, development and maintenance of human resource of the organization

Sudhamsetti. Naveen, Dr. D.N. Raju (2014) studied the recruitment and selection process in Cement Industry, Electronics Industry, Sugar Industry. In Krishna DT AP, India and observed that in all the selected industries of the study area recruitment is made by campus placements job.com, data banks etc. The selection is done by evaluating the candidate's skills, knowledge and abilities, which are highly required to the vacancies in selected industries. They also identified that both monetary and non-monetary incentives are given to the employees to motivate them for better.

DATA ANALYSIS AND INTERPRETATION

1) Do you feel that training programmers are necessary for employees?

(a) YES (b) NO

S.NO	OPTION	NO OF RESPO-NDENTS	% OF RESPO-NDENTS
1	YES	100	100
2	NO	0	0
	TOTAL	100	100

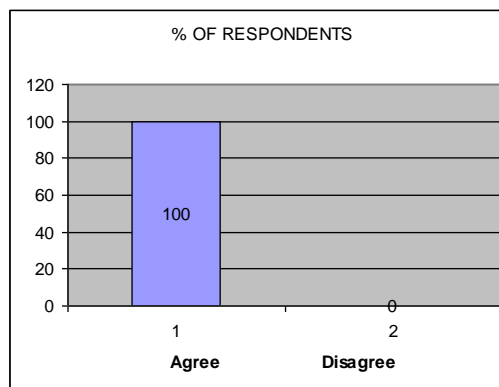
Interpretation:

From the above analysis we can say that 100% employees feel that the training programmers are necessary for employees. The 0% employees feel that training programmers are not necessary for employees.

(2) Training & development programmers affect employees in getting promotion. Do you agree?

(a) Agree (b) Disagree

S.NO	OPTION	NO OF RESPO-NDENTS	% OF RESPO-NDENT S
1	AGREE	100	100
2	DISAG-REE	0	0
	TOTAL	100	100

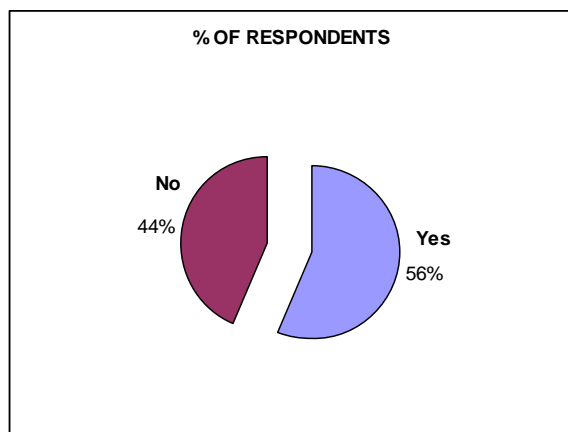


Interpretation:

About 100% of the employees agreed that the training and development programmers affect employees in getting promotion and 0% of the employees disagreed that the training and development programmers affect employees in getting promotion.

(3) Are you satisfied with present HRM Planning following in your organization?

(a) YES (b) NO



S.NO	OPTION	NO OF RESPO-NDENTS	% OF RESPO-NDENT S
1	YES	56	56
2	NO	44	44
	TOTAL	100	100

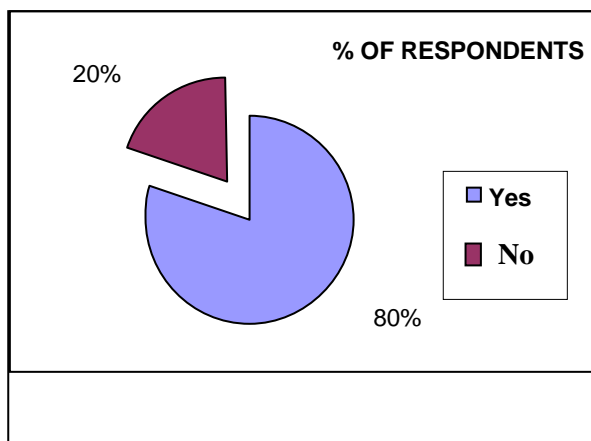
Interpretation:

About 56% of the employees are satisfied with present HRM programmers in organization. 44% of the employees were not satisfied with present programmers in organization.

(4) Are you satisfied with working conditions in your organization?

(a) YES (b) NO

S.NO	OPTION	NO OF RESPO-NDENTS	% OF RESPO-NDENTS
1	YES	80	80
2	NO	20	20
	TOTAL	100	100



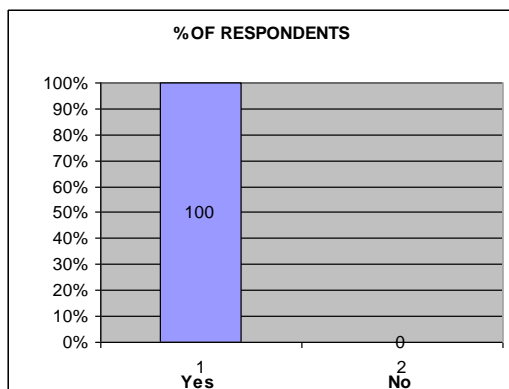
Interpretation:

From the above analysis 80% of the employees are satisfied with working conditions in this organization. Rest 20% of the employees are not satisfied with Working conditions in this organization.

(5) Did Organization give sufficient freedom to express your views and suggestions?

(a) YES

(b) NO



S.NO	OPTION	NO OF RESPO-NDENTS	% OF RESPO-NDENTS
1	YES	100	100
2	NO	0	0
	TOTAL	100	100

Interpretation:

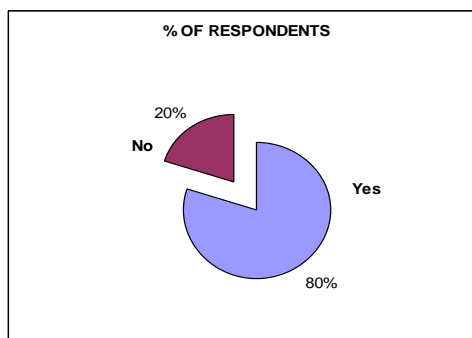
All the employees are satisfactory in the expiration of their views and suggestions.

(6) Does your management give you recognition for good results?

(a) YES

(b) NO

S.NO	OPTION	NO OF RESPO-NDENTS	% OF RESPO-NDENTS
1	YES	80	80
2	NO	20	20
	TOTAL	100	100



Interpretation:

From the above analysis we can say that 80% of the employees respond that their management gives recognition for their good results. And 20% of the employees respond that their management not gives recognition for their good results.

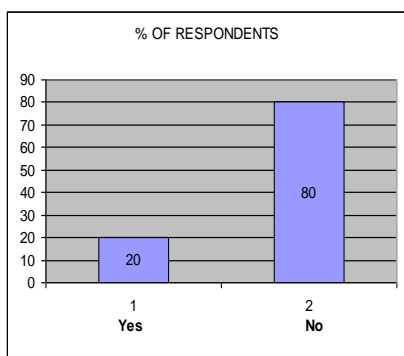
S.NO	OPTION	NO OF RESPO-NDENTS	% OF RESPO-NDENTS
1	YES	80	80
2	NO	20	20
	TOTAL	100	100

(7) Duration of training & Development programmed is sufficient.

(a) YES

(b) NO

S.NO	OPTION	NO OF RESPO-NDENTS	% OF RESPO-NDENT S
1	YES	80	80
2	NO	20	20
	TOTAL	100	100



S. NO	OPTIONS	NO. OF RESPONDENTS	% OF RESPON DENTS
1	SHORT TERM	40	40
2	MEDIUM	60	60
3	LONG TERM	0	0
	TOTAL	100	100

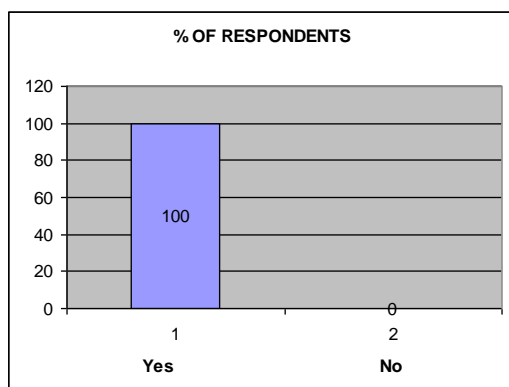
Interpretation:

From the above analysis we can say that 80% of the employees are not sufficient for duration of the programmed. And 20% of the employees are sufficient for duration of the programmed.

A. Do you think that incentives are needed for attending training programmers?

(a) YES

(b) NO



Interpretation:

From the above analysis, we can say that 100% of the employees feel. Those incentives are needed for attending training programmers. 0% of the employees feel. Those incentives are not needed for training programmers.

a) Duration of the Strategy of individual employee programmed is:

(a) Short term (b) Medium (c) Long term

Interpretation:

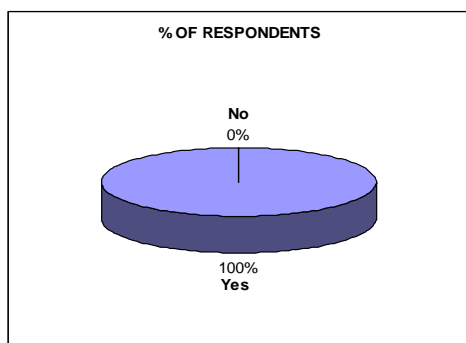
About 40% of the employee's opinion of the duration of Strategy Programmed is short term, 50% of employees opinion is medium and 0% of employees. Opinion is long term.

b) Do you have promotional policies in organization?

(a) YES (b) NO

S. NO	OPTIONS	NO. OF RESPONDENTS	% OF RESPONDENTS
1	TO SMALL EXTENT	20	20
2	TO FULL EXTENT	56	56
3	TO GREAT EXTENT	24	24
	TOTAL	100	100

S.NO	OPTION	NO OF RESPONDENTS	% OF RESPONDENTS
1	YES	100	100
2	NO	0	0
	TOTAL	100	100

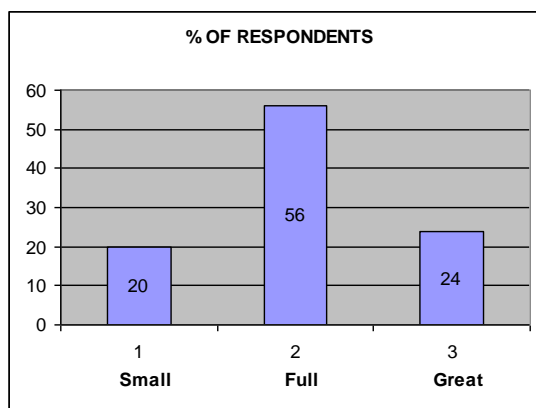


Interpretation:

About 100% of the employees responds that they have a promotion policies in the organization.

a. Will you have an opportunity to apply your newly acquired knowledge & skills?

a) To a Small extent (b) To a Full extent (c) To a Great extent

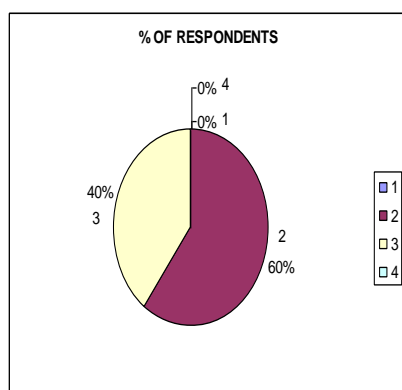


Interpretation:

About 20% of employees has a small extent of opportunity to apply newly acquired knowledge and skills. 56% of the employees has a full extent and 24% of the employees has a great extent of opportunity to apply newly acquired knowledge and skills.

- 10) What is the overall impression of the Organization?
 (a) Excellent (b) Good (c) Satisfactory (d) Poor

S. NO	OPTION	NO.OF RESPONDENTS	% OF RESPONDENTS
1	EXCELLENT	0	0
2	GOOD	60	60
3	SATISFACTORY	40	40
4	POOR	0	0
	TOTAL	100	100



Interpretation:

About 60% of the employees opinion is good on the overall impression of the organization. 30% of the employees were Satisfactory and 0% of the employees were Excellent and Poor on the overall impression of the organization.

FINDING

- The HRM Planning program may be arranged so that each of the employees under goes it at least once in a year.
- The training sessions should be handled by both the internal and external faculty so that it provides more comfort and also the knowledge of the external environment.
- The modern methods of HRM planning should be used so as to have a competitive edge in the market place.
- The organization should also have high emphasis on the accuracy of performance in the program.
- Training should be given to all groups at all levels to improve the efficiency on the whole.
- The HRM planning conducted should be need training programs for improvement of the skills and the knowledge.

SUGGESTIONS

The conclusions so far drawn from the study tempts to offer the following suggestions for making the organization ready for empowerment. The conclusions drawn above convince anybody to identify the following areas to chart out training programs for the executives to make them completely ready for empowerment

1. A general training program covering the importance of and need for employee empowerment in the light of global competition is to be designed in brainstorming session involving internal and external experts.
2. The present study identifies the following areas in which training is to be undertaken.
 - ✦ A training program may be undertaken for Executives in general and to Senior Executives in particular to convince and make them accept the empowerment concept.
 - ✦ Executives working in technical areas to be trained effectively in the areas of their role and interpersonal dependence and relations to make empowerment more fruitful.
 - ✦ A training program may be undertaken about "Shared Leadership" which brings high morale and high productivity and makes the empowerment a success.
 - ✦ The subordinate staff who is going to be empowered must be ready to take up this responsibility. A study is to be conducted among the subordinate staff to find out their readiness to discharge the new roles under this empowerment program. This helps in identifying the training areas, to make the subordinate staff completely ready for undertaking empowerment.

CONCLUSIONS

- The strategy program in **KARVY** is focused on new and old employees.
- Training program is conducted quarterly.
- HR planning principals & program in KARVY is based on the performance and seniority.
- The HRM planning program in KARVY is also the company response to new innovation and upcoming technologies.
- The goal of the program is mainly to improve the job related skills.
- It has been observed during the study that most of the employees expressed the need for each employee to attend the training program least once in a year.
- Most of the trainees supported external faculty rather than internal.
- The job security is not been effected by the program being undergone.

The training program is very much relevant to the present nature of work.

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ANALYSIS OF CUSTOMER PREFERENCE TOWARDS SMALL CARS AT LAKSHMI HYUNDAI WITH REFERENCE TO HYDEREBAD CITY

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Abstract

Products are purchased by customers to meet their requirements. The abundance of goods and services produced by a country is the reason why our economy is strong. All human actions taken during the buying process are referred to as "buyer behaviour" This article presents a viewpoint on the historical development of concepts related to buying, buyer behaviour, decision-making procedures, motivations, and consumer behaviour when making purchases. Because the consumer is king and defines what a business is, a sound marketing strategy must start with an in-depth analysis of consumer behaviour, attitudes, motivations, and needs. Specifically, a marketer needs to know the answers to the following questions Mr.A own the scooter. He is unhappy with the scooter because of its shortcomings or issues. In favour of a different scooter, he decides to replace it. A dependable, problem-free scooter is something he looks forward to. He decides not to buy another scooter from the same brand because he is not satisfied. As a result, the thought of buying a new scooter generates in his mind, and the second he makes the decision that "I must replace the scooter," ideas for purchases begin to flow. The thought passes through his mind as he weighs the benefits. As a result, he starts to think about the type of scooter that will offer the benefits. The benefits stimulate the craving. Any of the numerous scooter brands that offer the desired benefits are available for him to purchase. He gathers Information and keeps an eye out by talking to his friends. He takes a look at the latest scooter advertisements. He chooses the course of action that is 100 percent trustworthy and provides all potential benefits. A retailer could use the services of Mr. A. In order to satisfy his needs, customers buy products. A person's basic needs, like food and shelter, must

be provided for everyone on the planet, but some of these needs are not essential for survival and vary from person to person. If anything, it makes more sense to classify wants and desires as needs rather than necessities. In fact, a large percentage of income in many countries with high standards of living is spent on wants and desires rather than necessities.

Keywords: Consumer Behavior, Customer Preference, Customer Satisfaction, Customer Decision.

I. INTRODUCTION:

The term "consumer behaviour" refers to the internal and external actions that consumers engage in when they search for, buy, and use a good or service. Examining how, what, when, and why? people buy things is part of studying consumer behaviour. There are elements of **personal**, psychological, social, and cultural in it. It also assesses how social groups like family, friends, and reference groups as well as society at large affect the customer. Buyer behaviour consists of two parts: the actual purchasing activity, which is obvious to observers, and the detailed or quick decision-making process, which may involve the interaction of several complex variables that are unclear to observers. What aspects influence a consumer's decision to buy products or services? Consumers purchasing decisions are influenced by a variety of internal and external factors, which complicates the process. Consumers go through a number of stages when making a purchase. We'll talk about them further down.

Purchase Decision

Through the evaluation process described above, customers come to their final purchase decision. For some customers, the process of making the purchase, such as visiting the store to make it, can be just as satisfying as actually making it. The product can be ordered over the phone, online, or in person.

Post Purchase Decision

When making a purchase, have you ever had second thoughts? This is post-purchase behaviour, to put it simply, and studies have shown that many consumers who purchase products exhibit this behaviour. It should go without saying that product manufacturers want their most recent customers to be pleased with their purchases;

consequently, it is equally important for manufacturers to advertise for the benefit of their customers so customers feel secure in the knowledge that they are using a product from a reliable and powerful company. After making a purchase, this affects how customers behave.

What factors influence consumer behaviour while purchasing?

Consumer behaviour is influenced by a wide range of variables, including situational, psychological, environmental, marketing, and individual, families, and cultural factors. In order to decide how to most effectively reach their target audience, businesses make an effort to collect data. These factors have the power to influence someone's decision to buy or not to buy, though some influences may be temporary and others permanent. Let's now examine a few of these components in more detail.



- **Situational factors;** These immediate factors include a store's physical characteristics, such as its location, layout, colours, music, lighting, and even scent. Businesses make every effort to improve these aspects. Additional situational factors include holidays, the passage of time, and customer moods.
- **Demographic factors;** Such as Age, gender, income, occupation, and other personal factors fall under this category. This is also influenced by one's interests

and opinions. To better understand their customers, businesses look more closely at their lifestyles, daily routines, hobbies, etc.

- **Social factors;** This factor also considers your social class, level of education, ethnicity, religion, and sexual orientation, as well as the locals in your area, like your family and friends. People's daily lives and the products they choose to purchase are influenced by the distinctive rituals and customs of various cultures. Similar buying patterns are frequently seen among customers from the same social class. According to the vast majority of market researchers, a person's family is one of the key factors influencing their purchasing choices.
- **Psychological factors;** Consumer behaviour is influenced by a person's capacity of information understanding, sense of needs, and mindset. The way a person reacts to a marketing campaign depends on their mindset and beliefs

II. Review of literature

An article titled "Consumer Behavior Towards Passenger Cars" by A. Srivastava and M. Matta was published in 2021. A study in Delhi NCR examined in-depth consumer behaviour to determine how satisfied customers were with their purchases of passenger cars. The key finding is that the majority of consumers are influenced when making a passenger car purchase by a variety of factors, including culture, family history, age, and lifestyle.

B. Menon (2020). This article on developing parameters and a framework to analyse consumer behaviour patterns for passenger cars found that almost all automakers make similar value propositions. Among all of these, one that may have an impact on a customer's purchasing behaviour is the engine capacity. He discovered that there are other factors that are more crucial than engine capacity. Customer satisfaction, brand community, external influence, customer loyalty, and consumer behaviour patterns are a few examples.

According to Farhan Sadullah (2017), Malaysian automakers must equip their vehicles with safety equipment like airbags and anti-lock brakes, which typically stop a car in the shortest possible distance. Farhan claims that there were 6,200 fewer fatalities in Malaysia six years ago. But the numbers have steadily increased to 6,700. It was determined from the literature review above that there is a connection between

the performance and safety of the cars. The majority of shoppers prioritize safety as their top concern when deciding whether to buy a new or used car. Most automakers are doing their best to develop safety-related innovations and features in the cars in order to satisfy consumers' demand for safety. Because of this, understanding consumer purchasing patterns is crucial for auto manufacturers to reach their target market.

Mahapatra & Kumar (2018) used 32 attributes to analyse customer preferences in an empirical study on customer satisfaction, dissatisfaction, and post-purchase evaluation. They came to the conclusion that the product's performance in terms of pollution, ignition, battery performance, and pickup is significantly influencing the consumers' decision to make a future purchase. Maintenance costs, fuel economy, comfort, brake safety, vibration, pollution/emission, engine sound, ignition, battery performance, horn, wiper performance, pickup, and light are the characteristics he used. However, he did not include occupation or gender as a parameter of satisfaction.

A good reputation can be lost quickly, but it can take five to ten years to build one, according to David Champion (2019), Senior Director of Consumer Reports auto-test operations. Reliability is therefore crucial in determining how well-known automotive companies are.

Drive.com (2016) found that the top ten factors influencing the purchase of a new or used car were reliability (54 percent), price/value for money (36 percent), performance/engine power (29 percent), safety (28 percent), exterior appearance (25 percent), riding and driving comfort (19 percent), inexpensive to service/repair (17 percent), internal space, and fuel economy/environmental concerns (45 percent) (14 percent). Fuel economy, purchase price, maintenance and reliability, safety, performance, and personal or family needs are the primary factors consumers consider these days when choosing a vehicle (Timothy & Patricia Kearney, 2016).

III. Need for the study

- Customers consider various factors for purchasing of small cars in Hyundai.
- The factors they consider are based on certain demographic variables such as income, age, occupation etc.
- It also depends on attributes and Interest of the customer, buying behavior becomes essential to get a competitive edge.
- To Understand customer motives.

IV. Scope of the study

- ❖ The scope is extremely constrained because people's attitude alter over time.
- ❖ The study is only conducted among 100 respondents in the HYDERABAD and RANGAREDDY districts.
- ❖ 45 days are dedicated to conducting the study.
- ❖ The study is only conducted in a specific region. Consequently, it was unable to provide a perfect picture of Hyderabad.

V. Objectives of the study

- The primary goal of the study is to examine customers' reasons for choosing to buy small cars from Hyundai.
- To better understand buyer behaviour theories and concepts, it is important to identify the respondents' ages, educational backgrounds, occupations, and income levels.
- To ascertain the customer's interest in buying small cars from Hyundai or not.
- To ascertain respondents' justifications for buying Hyundai's small cars.
- To understand the weight that each factor has on respondents' decisions to buy small Hyundai cars.

VI. Research methodology

Research design:

It specifies the methodology and technique to be used for achieving the objectives. A research design is a logical and systematic plan prepared for leading a research study. It serves as the manual for gathering, measuring, and analyzing data. The study's primary goal is to assess Hyundai's brand reputation. The study is of a descriptive kind. The best method for descriptive research is surveys. The study therefore employs the survey method. The creation of a research plan for a study assists in giving it direction and in knowing precisely what needs to be done, how, and when, at each stage. A research plan outlines the parameters of research activities and allows the researcher to focus his efforts on the appropriate tasks. With specific research goals in mind, the study can move forward methodically in the direction of his objectives.

Sources of data:

Primary method:

Primary data are those that are gathered newly and for the first time and are therefore unique in nature. The primary data for this study was gathered using an interview schedule method.

Secondary method:

Secondary data are those that have been compiled from primary data. For this study's secondary data, appropriate material from newspapers, magazines, brochures, company reports, standard text books, and the internet has also been used when necessary.

VII. Limitations

- ✧ The project's duration is 45 days.
- ✧ The level of interest of respondents affects how accurate the answers are.
- ✧ Some of the customers were not willing to provide information because they felt it would take up too much of their time.
- ✧ The opinions expressed by the sample may or may not represent the views of the entire population.

VIII. Empirical results

Age group of the respondents:

AGE Between	Number of Respondents
18-28	8
28-38	42
38-48	36
Above 48	14
Total	100

Table 1.1 The above table shows the age group of the respondents surveyed

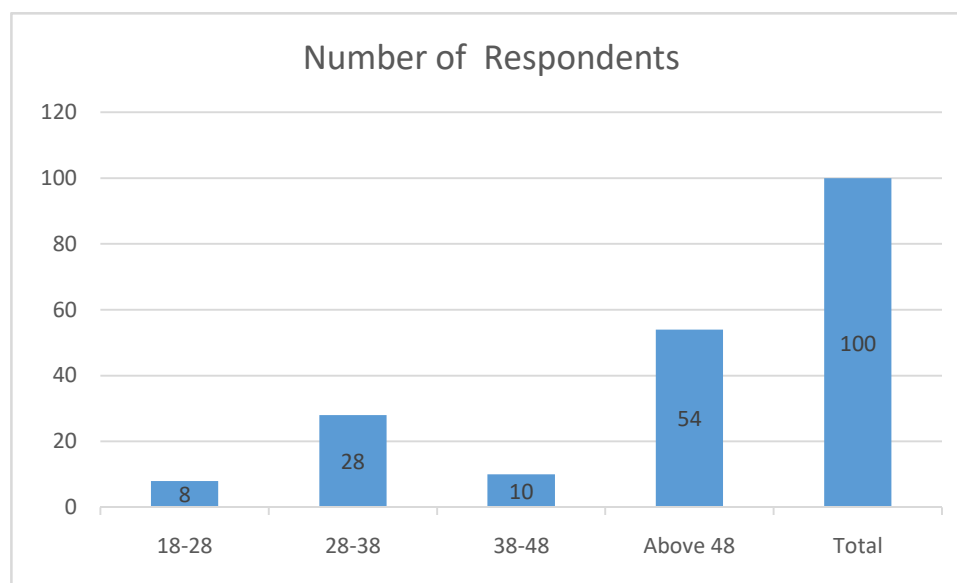
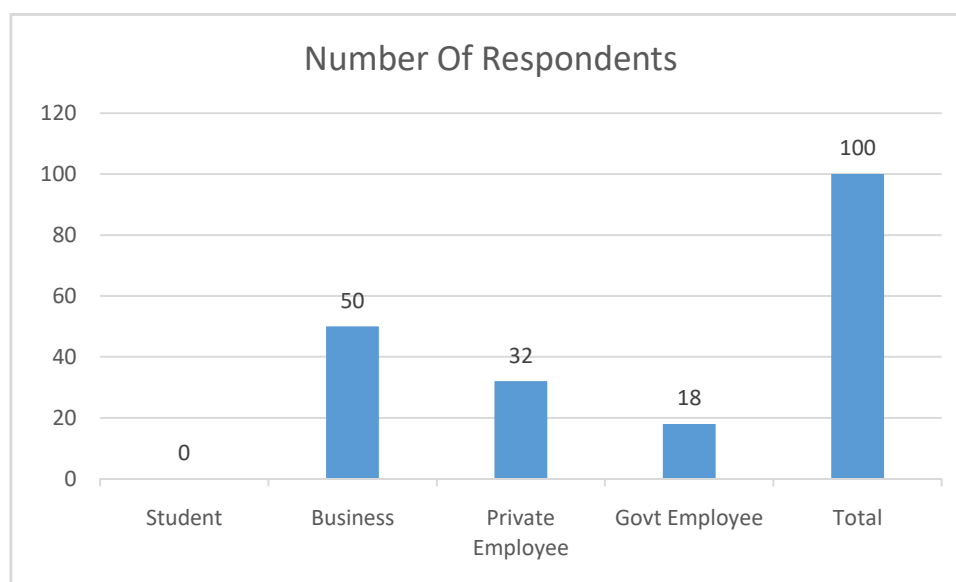


Table 1.1.a The above graph shows the age group of the respondents surveyed

Inference: From the above table, 8% of the respondents belong to the age group of 18-28 years, 28% of the respondents belong to the age group of 28-38 years, 10% of the respondents belong to the age group of 38-48 years, 54% of the respondents belong to the age group of above 48 years.

Occupation of the respondents:

Occupation	Number of Respondents
Student	0
Business	50
Private Employee	32
Govt Employee	18
Total	100

Table 1.2 The above table shows the type of respondents of the respondents surveyed.**Table 1.2.a** The above graph shows the type of respondents of the respondents surveyed.

Inference: From the above table 0% of the respondents are students, 50% of the respondents are businessmen, 32% of the respondents are private employee, 18% of the respondents are Govt employee

Number of Customers preferring to have car

Preferring to have car	Number of respondents
Yes	80
No	20
Total	100

Table 1.3 The above table shows that whether the respondents are Preferring to have Small car or not.

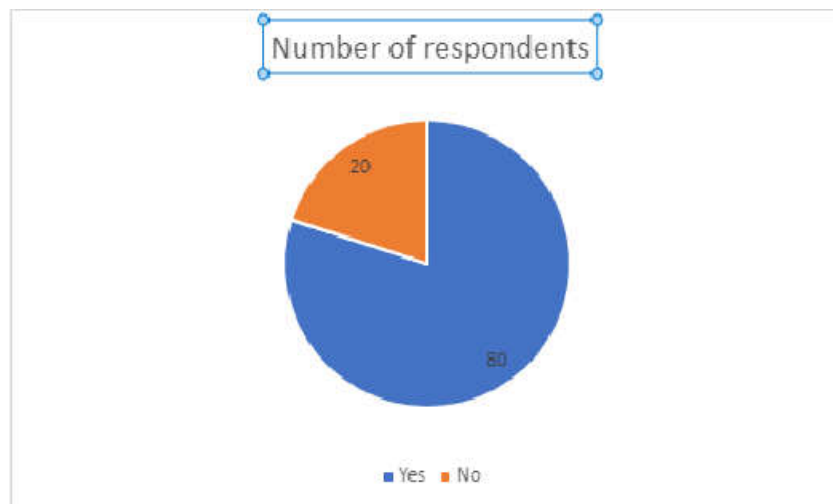
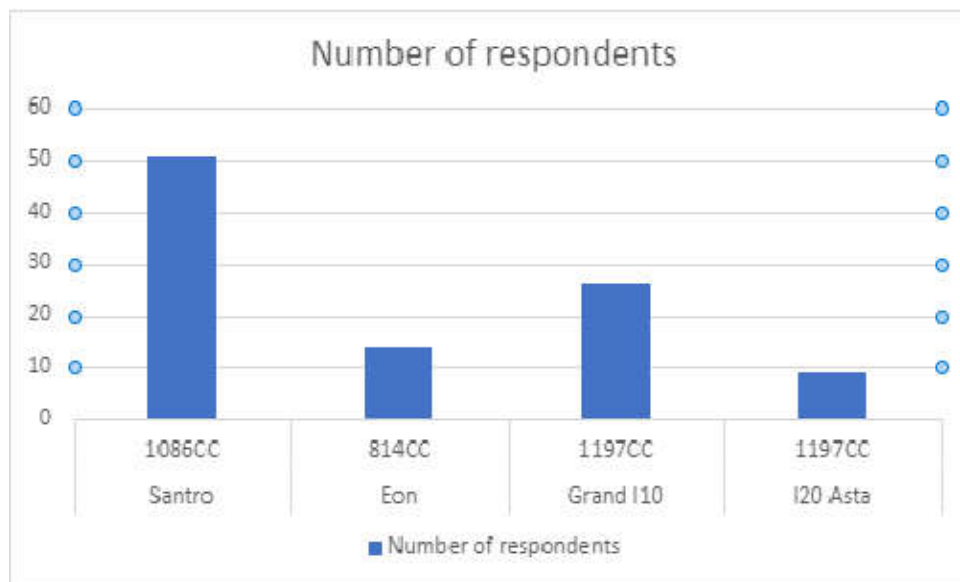


Table 1.3.a The above graph shows that whether the respondents is Preferring a A Small car or not.

Inference: From the above table 80%of respondents are preferring small cars only and rest of the 20% of the respondents are preferring mid range cars.

Type of car that the respondent is Preferring:

Name of the car	Engine capacity	Number of respondents
Santro	1086CC	51
Eon	814CC	14
Grand I10	1197CC	26
I20 Asta	1197CC	09



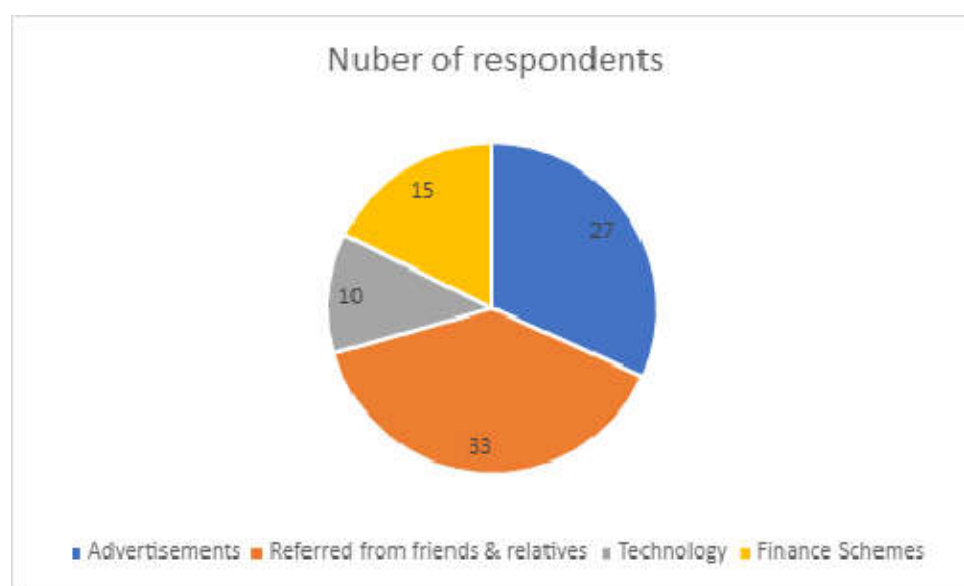
Inference: From the above table 51%of the respondents are Preferring Hyundai Santro (1086CC) cars. 14%of the respondents are Hyundai Eon(814CC) 26%of the respondents are preferring Grand I10 (1197CC) 9% of the respondents preferring I20 Asta (1197CC)

Sources of information

The below table shows, from where did the respondent get the information about the Small cars.

Sources of information	Number of respondents
Offers	15
Advertisements	27
Referred from friends & relatives	33
Technology	10
Finance Schemes	15
Total	100

Inference: From the above table 15% of people known from offers, 27% of people known from advertisements, and 33% of people known from their friends and relatives, 10% people known from technology, 15% of people known from finance schemes.



IX. Finding, Suggestions and Conclusion

Findings

- 50% of the Hyundai customers are business people and 32% of the customers are private employees.
- Most of the respondents belong to the age group of 18-50 years.
- Hyundai 1086CC (SANTRO) is the most preferred model in the Hyundai products.
- Most of the respondents getting information through the Media and friends before purchasing the vehicle.
- Most of the respondents are motivated by their friends and family members.
- Most of the respondents have good satisfaction with the performance of their Hyundai small cars strength.
- 64% of the respondents are satisfied with the mileage of their Cars.
- Most of the respondents felt that the price is reasonable.
- Cent percent of the respondents satisfied with the response of the sales executive at first visit.
- 60% of the Hyundai users have good satisfaction with the performance given by the company.
- Most of the respondents are satisfied with the response of the company to the complaints given by the customers.
- Most of the respondents are satisfied with the fulfillment of promises by the company.

Suggestions

- The Cars recently introduced by Hyundai are mostly concerned about home base. So, they should also consider commercial people while manufacturing.
- Indian market is a price sensitive market's the Cars should be at Minimum price with maximum quality.
- The standard of pricing should be improved.
- Advertisements in Televisions, offers should be increased to attract the People.
- If Hyundai can improve in Performance and brand image it will be the best in all the other competition brands.

Conclusion

The study of 45% of the respondents are Hyundai customers, and hence it is most Preferred Small cars out of various Brands. Hyundai Santro 1086CC is the most preferred model out of all products. 60% of the respondents are considering Hyundai brand before purchasing there for use. Most of the respondents are getting information through friends before purchasing the Hyundai small cars. Most of the respondents are wanting good satisfaction with dealer Service comparing to other brands. Most of the respondents are giving more preference to mileage. 60% of the respondents are affecting by their friends and relatives.

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ANALYSIS OF PORTFOLIO MANAGEMENT AT INDIA INFOLINE PVT. LTD (IIFL)

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ABSTRACT

A Portfolio is a collection of assets. The assets can be physical or financial such as shares, Bonds, obligations, preferred shares, etc. The individual investor or fund manager would not want to put all his money into a company's shares which would pose a great risk. Therefore, it would follow the ancient maxim that all eggs should not be placed in a basket. In this way, it is possible to achieve the objective of maximizing portfolio performance and, at the same time, minimizing portfolio risk through diversification. Portfolio management is the management of various financial assets that make up the portfolio. The study investigates the nature and relationship of project portfolio control techniques and portfolio management performance, and how this relationship is moderated by situational idiosyncratic of internal and external dynamics, industries, governance types, and geographic location. A worldwide questionnaire with 242 responses was used, of which 136 high-performing responses were filtered out for quantitative analysis of best practices. Three portfolio control factors were identified: portfolio selection, portfolio reporting, and decision making style. Two measures for portfolio management performance were identified: achievement of desired portfolio results and achievement of project and program purpose. The results indicate that different portfolio control mechanisms are associated with different performance measures.

KEYWORDS: Portfolio, Capital Markets, Portfolio Management, Reporting.

I. INTRODUCTION

A Portfolio is a collection of assets. The assets can be physical or financial such as shares, Bonds, obligations, preferred shares, etc. The individual investor or fund manager would not want to put all his money into a company's shares which would pose a great risk. Therefore, it would follow the ancient maxim that all eggs should not be placed in a basket. In this way, it is possible to achieve the objective of maximizing portfolio performance and, at the same time, minimizing portfolio risk through diversification. Portfolio management is the management of various financial assets that make up the portfolio.

1. Portfolio management is a decision support system designed to meet the multiple needs of investor.
2. According to the Exchange board of India and securities of portfolio manager it is defined as "portfolio means total holding of securities belonging

to any person".

An investor who considers investing in securities faces the problem of choosing from a large number of securities. Your choice depends on the risk return characteristics of the individual securities. He would try to choose the most desirable value and would like to allocate his funds to his group of values. Once again he faces the problem of deciding what value to keep and how much to invest in each one.

II. REVIEW OF LITERATURE

A review of the literature could be a review written by some to express their point of view on the critical points of current knowledge, including substantive findings, as well as their theoretical and methodological contributions to a selected topic.

S.M. Taariq Zafar, D.S. Chaubey and Shruti Nagar (2013) in their study stated that each investor has different



ideas to invest in actions that can give them the maximum return with a minimum or no risk. Therefore, they want a portfolio that offers maximum between risks, performance and the effect of diversification on portfolio risk with a market and non market risk compound.

Riva Kiran (2012) in the study highlighted the volatility that is influencing the various movement of the portfolio and the stock market. His article revealed that mutual funds and stocks are the most preferred financial path, but he needs some innovation and additional quality dimension in existing services.

Singh (2012) conducted an empirical study of Indian investors and noted that the maximum number of respondents is not very aware of the varied role of mutual funds, bonds and obligation etc. And they are a little confused about the investment in various investment alternatives.

Study found that some demographic factor such as gender, income and level of education have significant impact on the attitude towards various portfolio alternatives. On the contrary, it has not been found that age and occupation influence the attitude of the investor. In his study, he noted that portfolio performance and liquidity appear to be the most profitable benefits of investment in mutual funds, bonds, etc.

Devasena (2006) made an attempt to identify the "risk perception and portfolio management of capital investors". She in her study says that investors do not know the portfolio that would minimize risk and maximize return. And it is also clear that investor have a low level funder standing about the risk and importance of portfolio management since they are not aware the portfolio management of the appropriate steps that must be taken to improve the warning level in the minds of investors.

Rakesh Kumar and Raj s Dhanakar (2010) defined the relationship between risk and return and also examine the possibility of A Diversification on effect on portfolio risk, which is a combination of market and non-market risk. The study was based on the adjusted daily weekly, 36 and monthly adjusted opening and closing prices of BES 100 composite portfolio for the period from June 2005 to may 2010.

III. NEED FOR THE STUDY

- Few banking sector companies have been selected randomly i.e., SBI Bank, Punjab National Bank, Union bank, ICICI Bank, HDFC Bank, etc.,
- This Study Covers the period of 5 years of 2018-22. The main aspect of the is to find and compare the portfolio risk and portfolio return of selected companies.

- Comparing with other selected companies in the industry enables more effective decision making in investments.

IV. SCOPE OF THE STUDY

1. The study is confined to conduct at IIFL holding limited, Gachibowli, Hyderabad with the project title portfolio management with reference banking sector.
2. The study conducted based on data that is available in BSE website.
3. The study is conducted for the 5 year from 2018-2022.
4. The study is conducted completion period of the study is 45 days.

V. OBJECTIVES OF THE STUDY

- To analyze the investment patterns of the selected companies.
- To know the risk and return of the selected banking portfolio.
- To understand the portfolio which offers the maximum return and minimum risk.
- To compare the risk and return involved in each firm so that best portfolio is selected.

VI. RESEARCH METHODOLOGY

Research is a process of careful consideration of study regarding a particular concern or a problem using scientific methods. " it is an art or technique of work undertaken to increase the knowledge in respective field." Research methodology is the set of procedures or techniques used to identify, select, process and analyze information about a topic.

DATA COLLECTION

The goal for all data collection is to capture quality evidence that allows analysis to drive to the formulation of convincing and credible answers to the question that have. Data are the essential input to any decision-making process in business.

Data Sources: Secondary data is used throughout the study and the sources of Secondary data are,

- **Secondary Sources:** The sources of Data collection include,
 - a. Company Releases.
 - b. Websites.

VII. LIMITATIONS OF THE STUDY

- The Study is conducted based on the data that is available in BSE India portal.



- The period of the study is restricted to 45 days.
- The Study has been restricted to the area Kukatpally IIFL Branch only.
- Limited responses are collected since the duration is only for 45 days.

- The tools analysis include only return percentages.

VIII. EMPIRICAL RESULTS

This section is dedicated to present the results of analysis as mentioned below,

Average Return Of Banks:

Average Return=(R)/N

YEAR	OPEN(P0)	CLOSE(P1)	(P1-P0)	(P1-P0)/P0*100
2018	312	228.65	-83.35	-26.71474359
2019	225	249.75	24.75	11
2020	252.75	309.5	56.75	22.45301682
2021	310	295.65	-14.35	-4.629032258
2022	297	333.7	36.7	12.35690236
				14.46614332

TABLE 1.1 : Average return of State bank of India

Source: Author's Compilation

YEAR	OPEN(P0)	CLOSE(P1)	(P1-P0)	(P1-P0)/P0*100
2018	219	120.2	-98.8	-45.11415525
2019	116.25	115.6	-0.65	-0.559139785
2020	116.5	171.5	55	47.21030043
2021	172.5	78.1	-94.4	-54.72463768
2022	78.45	64.35	-14.1	-17.97323136
				-71.16086365

TABLE 1.2 : Average return of Punjab national bank

Source: Author's Compilation

BANKS	RETURN
STATEBANKOFINDIA	2.89
PUNJABNATIONALBANK	-14.23

Table 1.3: Average returns of SBI and PNB

Source: Author's Compilation

Analysis of the standard deviation of State bank is 17.15 and average return is 2.89, standard deviation of Punjab national bank is 36.25 and average return is -14.23, Standard deviation of ICICI Bank is 25.46 and average return is 11.47, standard deviation of HDFC Bank is 30.32 and average return is 10.50, standard deviation of Union Bank is 24.91 and average return is -26.86. Therefore, from the above analysis we found that the ICICI Bank having no risk and high return (11.47) and UNION BANK having high risk and low return (-26.86).

the government of India regarding there capitalization of The average returns of SBI portfolio is 2.89 and this is very low when compared to other Public sector banks.

- The scam in the Punjab National Bank in the year 2018 had showed its impact on the shares of this bank which resulted in the down fall of its shares.
- Union bank merging with the union bank resulted in the down fall of its shares.
- Risk factors is more with the HDFC Shares.
- SBI is highly correlated with the Punjab national Bank.

VIII. FINDINGS, SUGGESTIONS AND CONCLUSION:**Findings**

- Bank This is due to there cent announcement of



- Recent scams in banking sector diverted the investors to investing in insurance schemes, pension funds etc., as they guarantees good returns with less risk.
- Most of the investors feel that investing in capital market and stock market involves the higher So, there for the investors are not showing much interest to invest in them.

Suggestions

- The investors who are willing to earn maximum returns with minimum risk in necessary to have a clear understanding of the Investment objectives, tax status and risk tolerances.
- Even though the amount of returns from SBI is low it the best investment source for the individual to invest as it is the India's largest bank.
- The investor who are seeking for high returns with less risk can invest in the ICICI portfolios.
- From the study it is suggested to invest in the portfolio combinations of ICICI and HDFC bank as they result in the high returns
- At the same time it is suggested to invest in the combinations of the Union bank and HDFC Bank as they result in the high risk.
- The investment should be carefully done based upon the previous performance of the portfolio and present prevailing market conditions.
- Investors who are preferring for less risk and low returns can invest in Union bank.
- It better to invest in few investments or securities that can be watched regularly instead of investing too many securities.
- It is better to estimate the market and industry trends be for investing in securities and selling the securities.
- Instead of totally depending on the portfolio managers or stock brokers it is better to have a min in unpractical knowledge on our investments.

CONCLUSION

This study concentrated on the risk and return relationship of various company portfolios.

From this study we can say that portfolio functioning is depended on the market situations so it is better for the investor to take the guidance and help of the portfolio manager in order to reduce the risk on investment sources. After the overall all study about each and every aspect of this topic it shows that portfolio management is a dynamic and flexible concept which involves regular and systematic analysis. It can be

concluded that the investors should be updated with latest information on the market trends and on the respective company profile in which they are invested.

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A STUDY ON EMPLOYEE MOTIVATION AT

HYUNDAI MOTORS.

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ABSTRACT

Employee motivation is an intricate and sophisticated subject; however, contemporary managers must face and deal with this topic to obtain organizational success. To enhance understanding of employee motivation, managers must recognize the imperativeness of employee motivation, its concepts, and differences in individual needs. Subsequently, managers need to be aware of a variety of employee motivational factors and the changes in priorities of these factors over time. Moreover, managers have to learn previous and current motivational programs, examples, and theories behind them because understanding of these fundamentals can enhance their ability to identify rewards systems that could be matched with employee needs. This understanding of the employee motivation process requires a systematic approach, and managers must realize that employee motivation and its process are there to motivate their employees; therefore, employee input must be valued and included throughout this process. This study helps to know the satisfaction level of employees with the motivational factors used by the company. This project had been undertaken by me to find out the needs and wants of the employees. Under this Study a questionnaire which constituted questions relating to the employees expectation. The gathered data had been critically analyzed relating to employee motivations.

Keywords: employee motivation, motivational programs, motivational factors

INTRODUCTION

However large or small a company or business is, it is employees at all levels that can make or break it. This holds true not only for the people we hire on a regular basis, but also for temporary and contracted workers. It is as important to research and study the needs, drives, and expectations of people we hire or employ, and aim at responding to and satisfying those, as it is with regard to customers. In actual fact, considering the role each "employee" plays in a company's success, analyzing and planning an adequate response to employees' motivations deserves first place in the order of business. Before going any further, let us shift our approach from grouping people under the generic category of "employee" to individual human beings and term them as "hired workers" or "working partners". This is what they are. We must acknowledge them as human beings with individual needs, drives, characteristics, personalities, and acknowledge their contribution to the business success. Motivation has been variously defined by scholars. Usually one or more of these words are included in the definition: desires, wants, aims, goals, drives, movies and incentives. Motivation is derived from the Latin word 'Move on' which means "to move". Human motives are internalized goals within individuals. A motive is an inner state that energies activates, or moves and directs or channels behavior towards goals.

NEED OF THE STUDY

The study is intended to evaluate motivation of employees in the organization. A good motivational program procedure is essential to achieve goal of the organization. If efficient motivational programmes of employees are made not only in this particular organization but also any other organization; the organizations can achieve the efficiency also to develop a good organizational culture. Motivation has variety of effects. These effects may be seen in the context of an individual's physical and mental health, productivity, absenteeism and turnover. Employee delight has to be managed in more than one way. This helps in retaining and nurturing the true believers 4 "who can deliver value to the organization. Proliferating and nurturing the number of "true believers" is the challenge for future and present HR managers This means innovation and creativity.

It also means a change in the gear for HR policies and practices. The faster the organizations nurture their employees, the more successful they will be. The challenge before HR managers today is to delight their employees and nurture their creativity to keep them a bloom

SCOPE OF THE STUDY

- Need to study employee motivation in external and internal process in Hyundai Motors
- The theory and analysis is varies in Hyundai Motors
- How motivation is done to employees in Hyundai Motors
- The collection of data is to study of employee motivation.
- The level of pay and benefits
- .• Quality of the working conditions.
- Employee recognition.
- 5 Job security.
- The perceived fairness of the promotion system within the organization.

OBJECTIVES OF THE STUDY

1. To analyze and examine the effectiveness of Motivation programmers in HYUNDAI MOTORS
2. To assess how often training programmers are conducted and how much are the employees satisfied.
3. To study to what extent the training programmers are applicable to their jobs.
4. To study the employee's opinion on the Motivation in HYUNDAI MOTORS

RESEARCH METHODOLOGY

Primary Source Primary data is collected from direct soureses i.e Discussions with plant staff, Interviews, Questionnaire administered.

Secondary Source Secondary data is collected from indirect soureses Journals Magazines and articles from prominent newspapers. Population and Sample: There are 140 Officers & IInd class employees and 100 Managerial staff .The questionnaire is administered to 100 Officers and IInd class employees staff and 100 Managerial staff (The questionnaire has been administered to Managerial staff at Nalgonda and Miryalaguda Units. The questionnaire has been sent through E mail to all these staff and the replies were also received through e mail)

LIMITATIONS OF THE STUDY

1. This study covers those employees who are working at HYUNDAI MOTORS.
2. The understand and knowledge may vary from person to person. The replied gives by the respondents are taken for granted, though they are not uniform.
- 3.
3. Since names are mentioned in most of questionnaires, most of the employees answered favorable to the company. This might have led to wring finding in the study.
4. The interpretation being based on percentage method is not definite.
5. The report is subjects to changes with fast changing scenario.

REVIEW OF LITERATURE

procedia computer science,

BanuOzkeser (2019)--

Abstract -It's a well-known fact that we are living in a dynamic environment full of unlimited demands. This rapid change makes the competition be stronger and leads the foundations compatible on technological improvement. Therefore, training can be thought as a key player for improving the motivation.

Taylor & Francis online,

Paula M.G. van Veen-DirksORCID Icon &Henk J. ter BogtORCID Icon (2018)

Abstract --This study examines the relations among various types of management control, intrinsic and extrinsic motivation, and performance in the public sector. However, the findings also highlight an essential nuance; in addition to results control, personnel and cultural controls are also important, as they enhance intrinsic motivation and performance.

Sustainability,

Silvia Lorincová ,Peter Štarchoň ,Dagmar Weberová etc..(2019)-

Abstract -Employee performance and their new ideas, as well as their efforts to promote the company in positive ways help build the values of an enterprise, thus The results reported should be accepted and implemented in motivational programs by the employees of human resource departments as a way to keep up with strategic human resource management.

Journal of Business Economics & Management,

Miloš Hitka Affiliation ; Ľudmila Kozubíková Affiliation ; Marek Potkány Affiliation (2018)-

Abstract -The main purpose of this article is to show dependencies between education and gender based on selected motivation factors hence The research results point to the potential of various alternatives for business managers responsible for preparing incentive motivation programmes related to the analysed factors.

Emerald insight,

Abira Reizer, Yael Brender-Ilan, Zachary Sheaffer (2019)

Abstract --Numerous studies have focused on the effect of motivation on performance in the workplace ; this research contributes to self-determination theory by highlighting the role of emotions in understanding how motivation shapes workplace performance.

Springer link,

Joseph Ato Forson, Eric Ofosu-Dwamena, Rosemary Afrakomah Opoku & Samuel Evergreen Adjavon(2021)-

Abstract -Motivation as a meaningful construct is a desire to satisfy a certain want and is a central pillar at the workplace. Thus, motivating employees adequately is a challenge as it has what it takes to define employee satisfaction at the workplace.

Journal of Retailing and Consumer Services,

MuhammadAmina , AmjadShamima, ZulkipliGhazalia etc..(2021)

Abstract --Value Co-Creation (VCC) is an emerging concept that has vast applications in theory and practice, Therefore, the drive of this study is to conceptualize, develop, and validate a scale to measure EMCCV.

Taylor & Francis online,

Ehab Soliman &Hashem Altabtai (2021)-

Abstract -Kuwait is mentioned as one of the multi-national workplaces. This paper aims to identify the motivational factors that affect employees' performance in Kuwait construction industry.This analysis concluded that there is no significant correlation between most of the surveyed categories indicating that there is no consensus between study categories regarding motivational factors ranking.

Business Perspectives and Research,

Najameddin Sadeg Tumi, Ali Nawari Hasan, Jamshed Khalid(2021)

Abstract --Motivation is the process of increasing employee commitment and it is considered one of the key fundamentals, which are essential for organizational success , Thus, the present study aims to investigate possible influencing factors such as compensation, job enrichment and enlargement, training, and their effects on employee motivation in the telecommunication sector in Libya.

DATA ANALYSIS AND INTERPRETATION

S.N O	STATEMENT	RESPONSE
<u>1</u>	Rate your level of satisfaction with the working culture of the organization?	20% of Employees are highly satisfied & 60% of Employees are satisfied
<u>2</u>	Are you satisfied with the support from the HR Department?	24% of Employees are highly satisfied & 60% of Employees are satisfied
<u>3</u>	Which type of incentives motivates you more?	50% of Employees are agree with incentive awards motivate & 46% of Employees are agree with promotion motivates them more.
<u>4</u>	How far you are satisfied with the incentives provided by the Organization?	50% of Employees are satisfied & 10% of Employees are highly satisfied.
<u>5</u>	Which of the following factors which motivates you most?	60% of Employees are agree with salary increase motivates them most & 20% of Employees are agree with promotion motivates them most.
<u>6</u>	Do you think that incentives and other benefits will influence your Performance?	40% Of Employees think & 20% of employees said no option.
<u>7</u>	Does the Top Management involve you in decision making which are connected to your department?	60% of Employees said yes & 30% Of Employees said no.
<u>8</u>	Almost every job can be made more stimulating and challenging?	64% of Employees are strongly agree & 24% of Employees are agree.
<u>9</u>	Many employees want to give their best in everything they do?	60% of Employees are strongly agree & 24% of Employees are agree
<u>10</u>	Management could show more interest in the employees by sponsoring social events after hours?	50% of Employees are strongly agree, 20% of Employees are agree
<u>11</u>	Pride in one's work is actually an important reward?	40% of Employees are strongly agree, 20% of Employees are agree
<u>12</u>	Employees want to be able to think of themselves as "the best" at their own jobs.	40% of Employees are strongly agree, 20% of Employees are agree
<u>13</u>	The quality of the relationships in the informal work group is quite important	30% of Employees are strongly agree, 40% of Employees are agree
<u>14</u>	Individual incentive bonuses would improve the performance of employees	30% of Employees are strongly agree, 20% of Employees are agree

FINDINGS, SUGGESTIONS & CONCLUSION

FINDINGS:

The findings of the study are as follows:- The employees are really motivated by the management. The study reveals that increase in the salary will motivate the employees more. The incentives and other benefits will influence the performance of the employees. Majority of the employees agreed that there is job security to their present job. There is a harmonious relationship that exists in the organization between employees and management. The majority of the respondents are satisfied with their remuneration.

SUGGESTIONS :

- Employee motivation in HYUNDAI MOTORS is good and satisfactory.
- There should be improvement of system approach to every employee in HYUNDAI MOTORS.
- In HYUNDAI MOTORS every employee should be motivated in an effective manner so that every employee will be satisfied.
- All three levels should be taken care of by HR MANAGER.
- Most of the employees agree that the performance appraisal activities are helpful to get motivated, so the company should try to improve the performance appraisal system, so that they can improve their performance.
- Non financial incentive plans should also be implemented; it can improve the productivity level of the employees.
- Organization should give importance to communication between employees and gain coordination through it.
- Skills of the employees should be appreciated.
- Better career development opportunities should be given to the employees for their improvement.
- If the centralized system of management is changed to a decentralized one, then there would be active and committed participation of staff for the success of the organization.

CONCLUSION:

In the above perspective, the present chapter makes an attempt to draw some conclusions. It should be confessed here that the investigator is conscious of the limitations of the study and the conclusion drawn on the basis of the sample from a single unit cannot be generalized about the entire manufacturing sector. With regard to value of people, the analysis leads to the conclusion that the Executives give a reasonable value to the Human Resources in the Organization. However, in respect of concept about power, they are somewhat agreed to share the power. As far as information sharing with lower rungs is concerned, they are very positive. One significant conclusion with regards to learning opportunities, which is a basic for empowerment, is that the executives are favorable and feel that sufficient learning opportunities should be there for the rank & file. As far as clarity is concerned, the executives are somewhat agreed i.e., neutral. The aspect wise percentage analysis leads to the conclusion that the organization is somewhat ready for employee empowerment because the majority of the Executives in almost all aspects are concentrated in somewhat ready group.

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ANALYSIS OF INVESTOR PREFERENCE TO MUTUAL FUNDS WITH REFERENCE TO INDIA INFO LINE LIMITED

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Abstract

New ideas and innovation have always been the hallmark of progress made by mankind. At every stage of development, there have been two core factors that drive man to ideas and innovation. These are increasing return and reducing risks in all factors of life. The securities market is no different. The endeavor has always been to maximize returns and to minimize risk. A lot of innovation goes into developing financial products centered on these two factors. The different securities market product such as Equity, Derivatives, and IPO's and Bonds are compared to know the investors preference towards these products whether it satisfies their objectives of high return and low risk. The project title "Investors Preference related to Securities Market" is the attempt to find out which product in securities market is mostly preferred by the investors and the reason for selecting that product, and what advantages it has over other products. The main objective of this study is to find out how profitable it would be for an investor if he invests in Securities market. The research work is descriptive in nature. The primary data is collected from the investors by using questionnaire, and trading details from the Research Company and secondary data is collected from books such as NCFM module on Equity and Derivatives and other security analysis books and magazines. The major findings of the study were Equity is the most preferred product by the investors followed by Derivatives, Bonds and IPO. Bonds are debt instrument, is highly risky that's the reason investors hesitate to invest in Bonds. Few suggestions are, measures must be taken to increase their awareness towards other products.

Key words: Asset Management, Investment Option, Mutual Fund, Risk and return

I. Introduction

Mutual Fund Industry which is a relatively of a post-economic reforms phenomena in India, has been expanding during this Period in branch and bound Many commercial banks, insurance companies entered into mutual fund industry apart from foreign players. In the early years of evolution of mutual fund industry in the Indian financial market it was a monopoly and continued to be the same till very recent time. Then many players both foreign and Indian entered in the Mutual Fund Industry. This increased the competition between the various firms working in the mutual fund Industry The need for developing various new schemes arises so as to attract investors towards the firm and equally encouraging them to invest. This growth in the Mutual Fund Industry and scope of increasing markets has further increased the competition between the firms in the industry.

The competitions had given raise to demand for specialized products and skills of various individuals who can contribute towards the containment and growth of individual firms in the mutual firm industry. This gave rise to various related organizations and individuals working as specialized teams in the various areas of mutual funds. One such organization is , **India Infoline Ltd** it comes into pictures where the investors apply for the units in a Mutual Fund schemes and verify the validity and eligibility of the investor and allots the units. The mutual fund companies now receive millions of applications if a new scheme is launched.

Mutual funds enable even a small investor to investor to invest, as most of the mutual funds just start from a minimum amount of investment of RS. 5000 hence even a small investor can invest into a mutual fund and reap returns in the same proportions as the other big time investors. This shows that mutual fund industry is one which aims at every section of the society. To deal with this large

population of investors and the competition, the asset management company has been forced to develop and design new schemes and hire the services of professionals.

Mutual fund industry involves various operations from the stage of identification of the target group or defining a market segment, designing a scheme which comes up to the expectations and aspirations of the target group or market segment, reaching the selected market through launching the scheme which is thereby called NFO, till the stage of investing the amount raised in accordance with the norms stipulated with offer document and distributing the returns to the investor by way of dividend, after making adequate provision for taxation and other operating costs. All this process is well organized and performed in a specific order. There are various related organizations which specialize in the activities at various stages of the functioning of the mutual funds.

Review of Literature

S.Rajkumar and Dr. D.Venkatramaraju (2014) In this study analyzed whether investors have chosen their funds based on liquidity rather than having chosen them by the level of safety of mutual funds. The study also highlighted that the socio-economic factors like age, gender, education, income and savings of investors perception towards mutual fund are not encouraging, but the age Of investors and saving habit of respondents is correlated.

Rekha Sharma (2015) Presented a paper on behavior of mutual fund investors towards Investment Avenue. This paper made an attempt to identify the main objective to invest in mutual fund schemes by retail investors and types of mutual fund schemes in which they like to invest. The analysis of the study concluded that investors invest in mutual fund scheme for good return, safety and tax benefits. It also reveals that they select growth schemes and balanced schemes for better benefits.

Ippolito (1992) says that fund/scheme selection by investors is based on past performance of the funds and money flows into winning funds more rapidly than they flow out of losing funds.

De Bondt and Thaler (1985) while investigating the possible psychological basis for investor behavior, argue that mean reversion in stock prices is an evidence of investor over reaction where investors over emphasize recent firm performance in forming future expectations.

Gupta (1994) made a household investor survey with the objective to provide data on the investor preferences on MFs and other financial assets. The short-selling regulation should be operated along with margin trading regulation with substantial initial margin requirement.

Shanmugham (2000) conducted a survey of 201 individual investors to study the Information sourcing by investors, their perceptions of various investment strategy dimensions and the factors motivating share investment decisions, and reports that among the various factors, psychological and sociological factors dominated the economic factors in share investment decisions.

Madhusudhan V Jambodekar (1996) conducted a study to assess the awareness of MFs among investors, to identify the information sources influencing the buying decision and the factors influencing the choice of a particular fund. The study reveals among other things that Income Schemes and Open Ended Schemes are more preferred than Growth Schemes and Close Ended Schemes during the then prevalent market conditions.

Phillip (1995) reported that there is a change in financial decision-making of different mutual fund schemes and investor behavior as a result of participating in investor education programmers sponsored by employees.

Berhein and Garnette (1996) affirmed Philip's findings and further stated that a serious national campaign to promote savings through education and information could have a measurable impact on financial behavior.

II. Need for the study

- This study helps to understand the investors better by knowing their preferred investment option.
- This helps the financial services industry to curate investment options according to the wants of the investors.

- The activities of mutual funds have both short and long term impact on the savings in the capital market and the national economy.

Scope of the study

- To study the Investors preference to mutual funds the data is confined to two years.
- Study conducted at India Infoline Limited-Hyderabad division.
- Data is collected directly from people and organizations via questionnaires or survey.
- The data comprises of two years of calculation of risk growth with reference to IIFL.

Objectives of the study

- To study the technical, procedural, legal dimensions of the NFO.
- To examine briefly the organizational structure, communication network, resource requirements to launch a new fund.
- To study a sample of application drawn from Reliance Mutual Fund.

III. Research methodology

To fulfill the objective of the study both primary and secondary data has been collected. Primary data is the data collected specifically for the study. Data is collected directly from people and organizations via questionnaires or surveys before being analyzed to reach conclusions concerning the issues covered in the questionnaire or survey.

In this study primary data was collected through interaction with staff of , **India Infoline Ltd** and the applications of Reliance equity fund.

Secondary data is the data collected previously by someone else for some other purpose which can be analyzed and interpreted according to requirements. For example, sources of secondary data are government publications, newspapers, worldwide web etc.

In this study the Secondary data is mainly taken from

- * The company's training material.
- * Reconciliation statements.

IV. Limitations Of the Study

- Analysis of the applications is carried out by taking the applications from Reliance equity Fund. The data available is therefore restricted by the design of the application.
- The inspection of applications is done on the basis of a sample of 100 applications. Though the sample is drawn randomly, the possibility of sampling fluctuations affecting the findings cannot be ruled out.
- Numerical data like number of applications received, total subscription amount received, statement of accounts, investor details, etc are not available and therefore a description of these aspects is given.
- NFO process may not be same for all mutual funds that are released. It may differ from one fund to other depending upon the size like the no. of applications received, subscription amount received, etc.

V. Empirical Results

The results of data analysis are presented in this section,

Date	Market Level (NIFTY)	Returns	Axis banking Debt fund-Growth	Returns
22/01/2021	7376.65		1361.26	
21/01/2021	7357.00	-19.65	1360.93	-0.33
20/01/2021	7381.8	24.8	1360.61	-0.32
19/01/2021	7420.35	38.55	1360.51	-0.1

18/01/2021	7561.65	141.3	1360.21	-0.3
15/01/2021	7467.4	-94.25	1359.44	-0.77
14/01/2021	7557.9	90.5	1359.32	-0.12
13/01/2021	7587.2	29.3	1359.09	-0.23
12/01/2021	7527.45	-59.75	1358.79	-0.3
11/01/2021	7611.65	84.2	1358.57	-0.22
08/01/2021	7673.35	61.7	1357.84	-0.73
07/01/2021	7788.05	114.7	1357.5	-0.34
06/01/2021	7828.4	40.35	1357.23	-0.27
05/01/2021	7924.55	96.15	1356.91	-0.32
04/01/2021	7938.45	13.9	1356.59	-0.32
01/01/2021	7897.8	-40.65	1355.73	-0.86
31/12/2020	7938.6	40.8	1355.38	-0.35
30/12/2020	7929.2	-9.4	1354.98	-0.4
29/12/2020	7863.2	-66	1354.62	-0.36
28/12/2020	7888.75	25.55	1354.33	-0.29
23/12/2020	7830.45	-58.3	1352.93	-1.4
22/12/2020	7829.4	-1.05	1352.73	-0.2
21/12/2020	7745.65	-83.75	1352.44	-0.29
18/12/2020	7828.9	83.25	1351.66	-0.78
17/12/2020	7783.05	-45.85	1351.28	-0.38
16/12/2020	7725.25	-57.8	1350.93	-0.35
15/12/2020	7659.15	-66.1	1350.64	-0.29
14/12/2020	7558.2	-100.95	1350.47	-0.17
11/12/2020	7699.6	141.4	1349.96	-0.51
10/12/2020	7643.3	-56.3	1350.08	0.12
09/12/2020	7695.5	52.2	1349.88	-0.2
08/12/2020	7738.5	43	1349.8	-0.08
07/12/2020	7816.55	78.05	1349.73	-0.07
04/12/2020	7817.6	1.05	1349.1	-0.63
03/12/2020	7902.3	84.7	1348.88	-0.22
02/12/2020	7976.7	74.4	1348.49	-0.39
01/12/2020	7958.15	-18.55	1348.17	-0.32
Average		15.74		0.36

Table No: 1.1Calculations of Risk of Axis banking Debt fund-Growth
Source: Author's Compilation

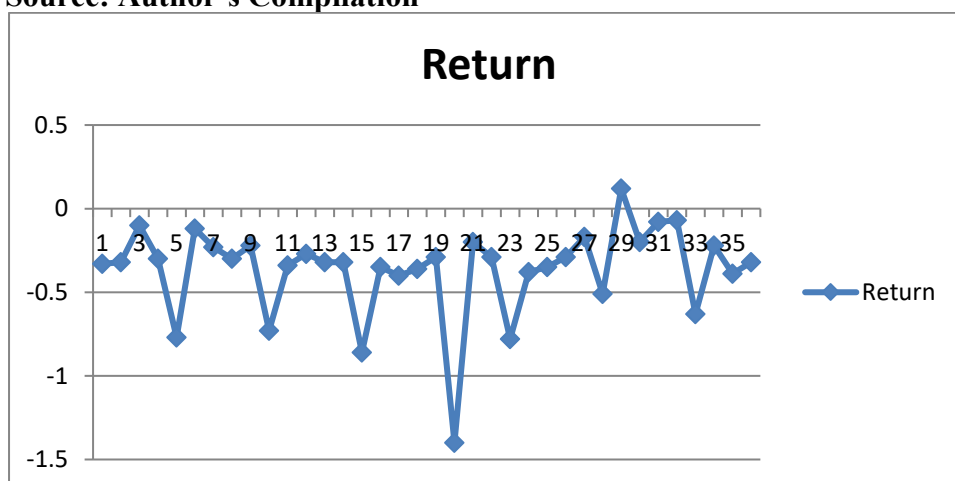


Figure 1.1.a Graphical Presentation of Axis banking Debt fund-Growth
Source: Author's Compilation

Axis banking Debt fund-Growth has been analyzed and it is found that there is a positive growth. However on the basis of the average returns of Axis banking Debt fund-Growth there is a growth

0.36 as against the index average of 14.74 the beta being less than 1 the stock is not highly volatile. IDBI gold fund-growth have been analyzed and it is found that there is a negative growth. However on the basis of the returns of IDBI GOLD FUND-GROWTH there is a negative growth 0.004 as against the index average of negative 0.19 the beta being less than 1 the stock is not highly volatile.

VI. Findings, Suggestions and Conclusion

Findings

- The NFO is found to be a complex activity calling for creating an organization polling the knowledge and expertise of people in different areas.
- The NFO process is simple and well structured as long as it is to investor to investor, but thereafter the process is lengthy time consuming and found to be overlapping at some stages.
- The SEBI regulations governing NFO are comprehensive and protect investor's interest at each level.
- Different funds have been designing different forms of applications for NFO.
- An analysis of sample of applications revealed the following
 - Majority applicants prefer to hold the units individually.
 - Majority of the applicants are in service.
 - NRI s share is about 4% of the total.
 - More than 2/3 rd of the applicants are HUF s.
 - The model age group is 31-60.
 - The most common investment amount is 5000-25000.
 - About half of the applicants prefer Growth option.
 - Almost all applicants make the payments by cheques.
 - There were no NRO, NRE and FCNR accounts.
 - Majority the applicants are male, and.

Suggestions

- Different funds have been using different forms of applications. A standardized form of application maybe designed by the competent authority and should be made mandatory for all funds to use the standard application form.
- The NFO process is very complex and there is a need to simplify the process by eliminating certain unnecessary steps in the process ie instead of carrying out audit for three times and appropriate internal check system maybe devised to keep the errors within the tolerance limits.
- The NRI subscribers to the fund may be encouraged to make the payments from NRO, NRE and FCNR accounts.
- The application from institutional investors and foreign institutional investors are to be encouraged through a package of incentives.
- The participation of senior citizens in the NFO s may be encouraged as they are likely to hold more surpluses compared to others.
- The holding of units in joint names shall be encouraged.

Conclusion

From the study analysis conducted it is clear that in EQUITY FUNDS-Axis banking Debt fund-Growth is performing very well. Investing in the Axis banking Debt fund-GrowthMUTUAL FUND (GROWTH) will leads to profits. By seeing the overall performance Axis banking Debt fund-Growthis performing very well.The prospective investors are needed to be made aware of the investment in mutual funds.The Industry should keep consistency and transparency in its management and investors objectives.There is 100% growth of mutual fund as foreign AMCS are in queue to enter the Indian markets.Mutual funds can also be introduced in rural areas.

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A STUDY ON PRODUCT LIFE CYCLE MANAGEMENT ON KESORAM CEMENT INDUSTRIAL LIMITED

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ABSTRACT

Product life cycle management is the succession of strategies used by management and as a product goes through its product life cycle. The conditions in which a product is sold changes over time and must be managed as it moves through its succession of stages.

It Is claimed that every product has a life period, it is introduced, it grows, maturity, and may decline. A fair comment is that – at least in the short term – not all products or services declined.

Even though its validity is questionable, it can offer a useful ‘model’ for managers to keep at the back of their mind. Indeed, if their products are in the introductory or growth phases, or in that of decline, it perhaps should be at the front of their mind; for the predominant features of these phases may be those revolving around such life and decline. Between these two extremes, it is salutary for them to have that vision of mortality in front of them.

However, the foremost necessary side of product lift-cycles is that, even underneath traditional conditions, to all or any sensible intents and functions they usually don’t exist. In most markets the bulk of the key brands have command their position for a minimum of 20 years.

Thus, the life cycle may be useful as a description, but not as a predictor; and usually should be firmly under the control of the marketer. The important point is that in many markets the product or brand life cycle is significantly longer than the planning cycle of the organizations involved.

KEYWORDS

Raw Materials, Cement, Influencer, Purchase Decision, Individual Home Builders.

I. INTRODUCTION

Product lifecycle management:

Product lifecycle management (PLM) is the process of managing the entire lifecycle of a product from its conception, through design and manufacture, to service and disposal. PLM integrates people, data, processes and business systems and provides a product information backbone for companies and their extended enterprise.

Product lifecycle management (PLM) is more to do with managing descriptions and properties of a product through its development and useful life, mainly from a business/engineering point of view; whereas product lifecycle management (PLM) is to do with the life of a product in the market with respect to business/commercial costs and sales measures.

Product lifecycle management is one of the four cornerstones of a corporation's information technology structure. All companies need to manage communications and information with their customers (CRM-Customer Relationship Management), their suppliers (SCM-Supply Chain Management), their resources within the enterprise (ERP-Enterprise Resource Planning) and their planning (SDLC-Systems Development Life Cycle). In addition, manufacturing engineering companies must also develop, describe, manage and communicate information about their products.

A firm of PLM called people-centric. While traditional PLM tools have been deployed only on release or during the release phase, people-centric targets the quality phase.

II. REVIEW OF LITERATURE

A new product or service to market. There are two parallel paths involved in the new product development (NPD) process: one involves the idea generation, product design and detail engineering; the other involves market new product development (NPD) is the term used to describe the complete process of bringing research and marketing analysis. Companies typically see new product development as the first stage in generating and commercializing new products within the overall strategic process of product life cycle management used to maintain or grow their market share. Documented benefits of product lifecycle management include:

- Improved product quality
- Reduced prototyping prices.
- Ability to quickly establish potential sales opportunities and revenue contributions
- Savings through the re-use of original information
- A framework for product improvement.

- To Reduced wastage
- Savings through the complete integration of engineering workflow.

III. NEED OF THE STUDY

- From the days of industrial revolution when goods & services were produced to the present day, the emphasis has shifted from the producers to the consumer and his needs, and with the consumer becoming more involved.
- In the marketing process there is greater need for information regarding the consumer needs.
- Preferences and making them satisfied of the products & services, has led to a constant but increasing need to conduct marketing research.
- This research is an insight into the mind of the consumer, with the help of which the organizations will become aware of their pitfalls and in turn can also make improvements in the product regarding the level of satisfaction of the consumers towards their offerings in the market place.
- Customers consider various factors for purchasing CEMENT. The factors they consider are based on certain demographic variables. It also depends on attributes and life Performance of the customer buying behavior becomes essential to get a competitive edge.

IV. SCOPE OF THE STUDY

The study is limited to products of Kesoram cement industry only and an attempt has been made to know about the activities that take place at the Fund manager level. Focus has been laid to understand about movement of funds in the organization but to single men's contribution only, i.e., the product life cycle contains the stages which it can be made by the organization only and the study is related to the company of Kesoram cement industry only.

- The scope is limited because attitude of the people changes according to the time.
- The study is restricted to both Hyderabad and Ranga Reddy Dist. and that to among 100 respondents.

V. OBJECTIVES OF THE STUDY

- The study is conducted to evaluate the fixed assets turnover of BIRLA SHAKTI CEMENT.
- The study is conducted to evaluate whether fixed assets are giving adequate returns to the company.
- To understand the Product life cycle in Kesoram cement industry.

- To Know the time period of the product to reach its growth stage, maturity stage, declaim stage.
- What are the marketing conditions of introducing a new product in the external market?
- To appraise the performance of various products.
- To evaluate that if fixed assets are liquidated, what proportion of it will contribute for the payment of owner's fund and long-term obligations.

VI. RESEARCH METHODOLOGY

This is a systematic way to solve the research problem and it is important component for the study without which researches may not be able to obtain the format. A research design is the arrangement of conditions for collection and analysis of data in a manager that aims to combine for collection and analysis of data relevance to the research purpose with economy in procedure.

PRIMARY DATA

Primary Sources include data ascertained from employees and interaction with different people at work place.

SECONDARY DATA

Secondary Sources basically comprise Company's Manuals, Records, Brochure, books, standards and Internet etc.

SOURCES OF DATA:

The data needed for this project is collected from the following sources:

- The data is adopted purely from secondary sources.
- The theoretical contents are gathered purely from eminent text books and references.
- The financial data and information are gathered from annual reports of the company.

VII. LIMITATIONS OF THE STUDY:

Information provided through this project is of restrained in nature i.e. time to time products may be changed depending upon company norms and competitor's strategies and management activity styles may also be changed, molding to the effective strategies and advancements that being aroused in the field based upon the portfolio structure or other constraints like nature or on strategic financial decisions originating there upon.

Research tools:

An arranged questionnaire has been set to collect information from the respondents. The questionnaire covers of a change of questions accessible to the respondents for their response. The several types of questions are used in this survey are: Multiple choice questions.

STATISTICAL TOOLS USED:

The data collected was analyzed by employing the following statistical techniques:

- Percentage Analysis
- Percentage
- Bar charts

VIII. DATA ANALYSIS

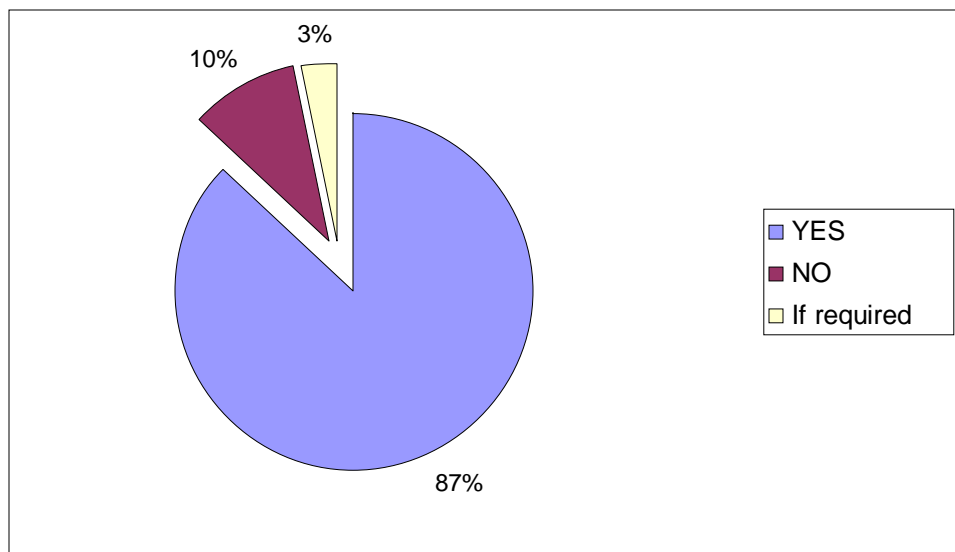
1. Organization will provide the information of the new developing products?

A) Yes

B) No

C) If required

SL. No	Purpose	Number of Respondents	Percentage
1	Personal use	87	87
2	Industrial use	10	10
3	Other use	3	3
Total Number of Respondents		100	100%



Interpretation: From the data collected it is observed that 87% of the Data on new products will be displayed, 10% of the data use for hide and 3 % of the data use for if required.

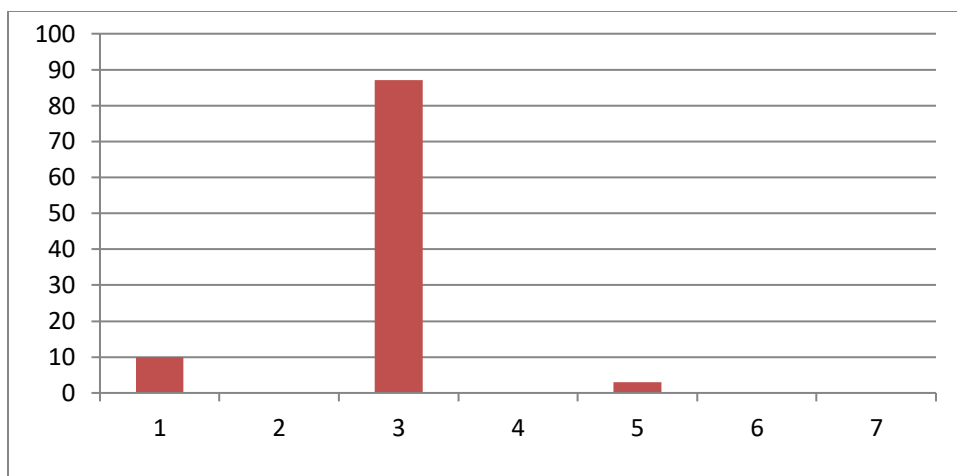
2. How much time it requires to develop a new product process?

A) Weeks

B) Months

C) Years

SL. No	Purpose	Number of Respondents	Percentage
1	Weeks	10	10
2	Months	87	87
3	Years	3	3
Total Number of Respondents		100	100%



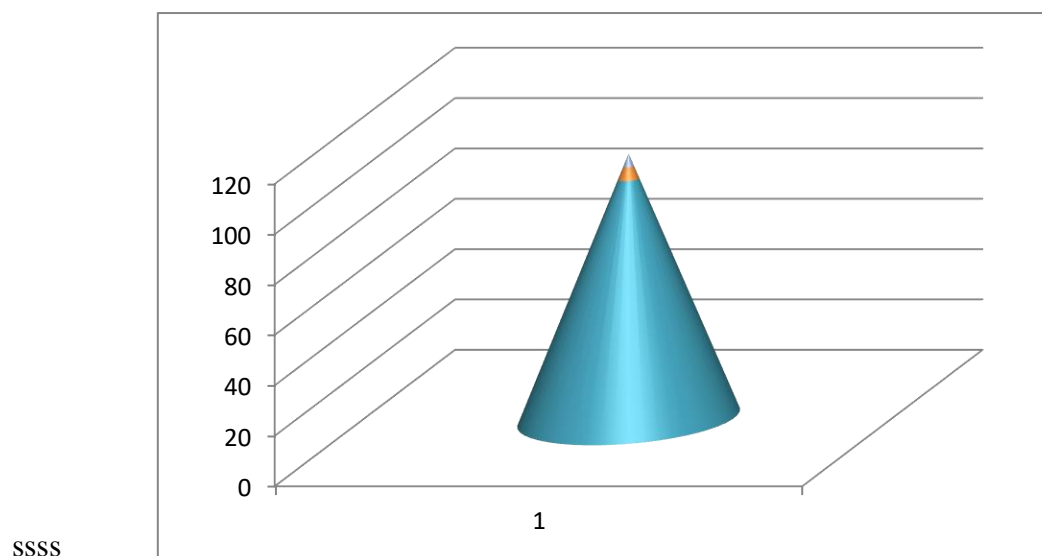
Interpretation: From the data collected it is observed that 87% of the employees says that it will take the months of time, 10% of the of the employees says that it will take the weeks of time, 3% of the of the employees says that it will take the years of time.

3. Role of Research & Development in the new development process?

A) Total work

B) Only developing

SL. No	Purpose	Number of Respondents	Percentage
1	Total work	95	95%
2	Only developing	5	5%
Total Number of Respondents		100	100%

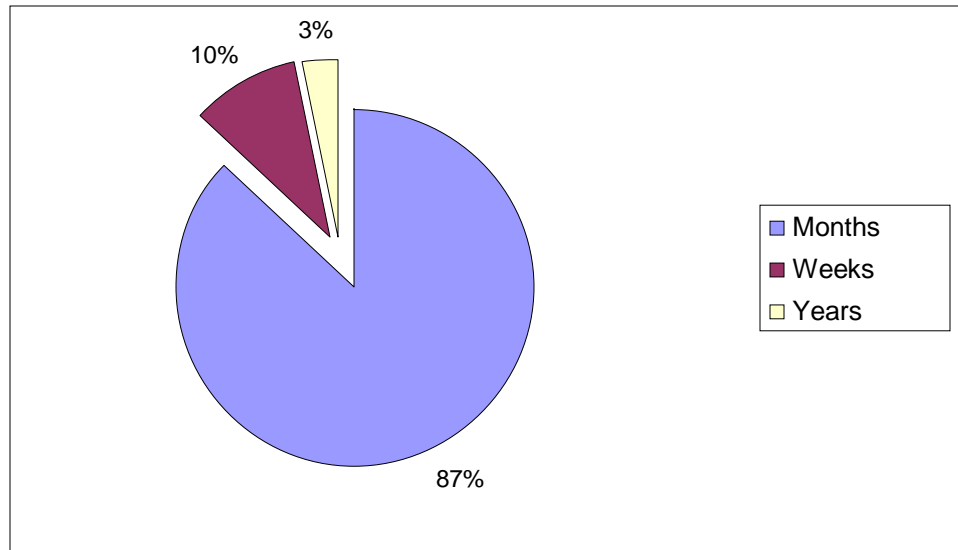


Interpretation: It is observed that 95% of the people feel that the Research & Development is affordable, and 5% of people feel that the Research & Development of service is not affordable.

4. How much time it will take that the product from growth to maturity?

- A) Weeks
- B) Months
- C) Years

SL. No	Purpose	Number of Respondents	Percentage
1	Weeks	10	10
2	Months	87	87
3	years	3	3
Total Number of Respondents		100	100%

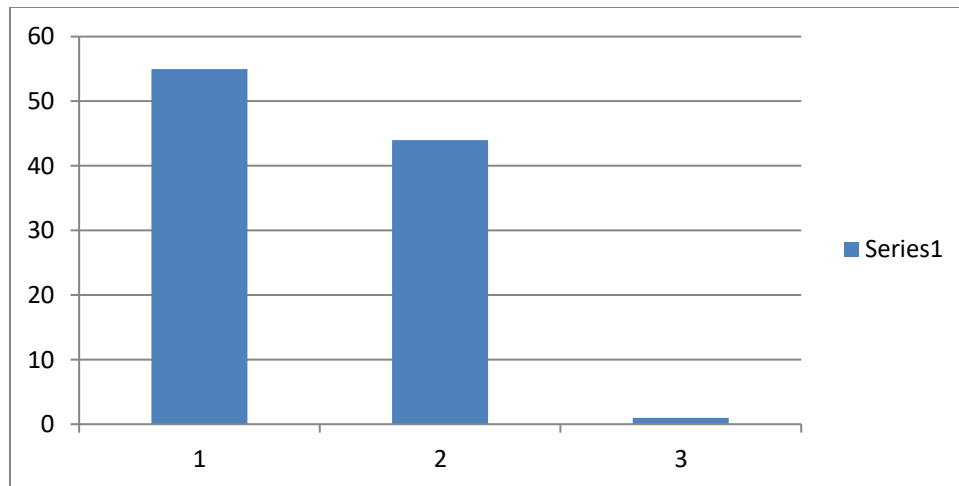


Interpretation: From the data collected it is observed that 87% of the employees says that it will take the months of time, 10% of the of the employees says that it will take the weeks of time, 3% of the of the employees says that it will take the years of time.

5. If the product was in declaim stage what the organization will do?

- A) Modify the project
- B) Develop a new project
- C) Stop the project

SL. No	Purpose	Number of Respondents	Percentage
1	Modify the project	55	55
2	Develop a new project	44	44
3	Stop the project	1	1
Total Number of Respondents		100	100%



Interpretation: From the data collected it is observed that 55% of the employees says that modify, 44% of the of the employees says that it will start new, 1% of the of the employees says that stop the project.

FINDINGS:

- The employees were satisfied with their new product development process.
- They feel good about performance of their organization
- Employees felt that there were opportunities for personal growth.
- The employees feel good about Production in the organization.
- The employees satisfied with team work of an organization.
- The employees feel good about communication process of the organization.
- Research & Development is helpful in improving the talent of an employee.
- The employee satisfied with the organization rate was given by superior.
- The employees felt that there were nil politics.

Over all their contribution towards organizations is highly considerable which generally results and maintain good human relation and monitoring personnel development and also the product development. Finally, we can conclude that employees are satisfied with Kesoram cement Limited.

SUGGESTIONS:

- The organization should more focuses on new product development programmers.
- The organization should focus on more opportunities for personal growth of an employee.
- The management should focus on improving the team work of an employee.
- The management should focus on improving the communication process of the organization.
- The management should more focus on performance appraisal system to develop employee talent.
- The management also should focus on the Demand methods.
- The organization should focus on the total avoidance of the politics.

CONCLUSION:

- By the project entitled product life cycle in Kesoram cement Limited I concluded that the life cycle of the products in the Kesoram cement Limited is limited only and the production in the organization is also very well and the production materials are maintaining in the organization.
- A few products in the Kesoram cement Limited are in the declaim stage but all the remaining products are in maturity state. The company has to improve its quality and other production maintenance such that the company may not attain the declaim state forever.

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Factors Influencing Investors Preference to Mutual Funds with reference to Indiabulls securities Limited

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Abstract

A Mutual Fund is a trust that pools the savings of a number of investors who share a common financial goal. The money thus collected is then invested in capital market instruments such as shares, debentures and other securities. The income earned through these investments and the capital appreciations realized are shared by its unit holders in proportion to the number of units owned by them. Thus a Mutual Fund is the most suitable investment for the common man as it offers an opportunity to invest in a diversified, professionally managed basket of securities at a relatively low cost. Investing in a mutual fund can be a lot easier than buying and selling individual stocks and bonds on your own. Investors can sell their shares when they want. This paper focuses on market share of mutual fund, performance of mutual fund, future potential of mutual fund industry and emerging trends of mutual fund. The two insurance companies LIC and GIC established mutual funds. Securities Exchange Board of India (SEBI) formulated the Mutual Fund (Regulation) 1993, which for the first time established a comprehensive regulatory framework for the mutual fund industry. The maximum number was of the business-class (43%) as most of the respondents were Bank's customers. 19% were students and 11% of service category as the research was also done in college campus. 14% and 13% being Retired and professionals respectively, as it was an open market operation in High Court area. Hence, most of the professionals are Lawyers and Doctors.

Keywords: Mutual Fund, Market Share, Investors, Open Market Operations.

I. Introduction

Mutual Fund is a body corporate registered with the Securities and Exchange Board of India (SEBI) that pools up the money from individual/corporate investors and invests the same on behalf of the investors/unit holders, in equity shares, Government securities, Bonds, Call Money Markets etc, and distributes the profits. In the other words, a Mutual Fund allows investors to indirectly take a position in a basket of assets. Mutual Fund is a mechanism for pooling the resources by issuing units to the investors and investing funds in securities in accordance with objectives as disclosed in offer document. Investments in securities are spread among a wide cross-section of industries and sectors thus the risk is reduced. Diversification reduces the risk because all stocks may not move in the same direction in the same proportion at same time. Investors of mutual funds are known as unit holders. The investors in proportion to their investments share the profits of losses. The mutual funds normally come out with a number of schemes with different investment objectives which are launched from time to time. A Mutual Fund is required to be registered with Securities Exchange Board of India (SEBI) which regulates securities markets before it can collect funds from the public.

The Indian Mutual Fund has passed through three phases. The first phase was between 1964 and 1987 and the only player was the Unit Trust of India, which had total assets of Rs. 6700 crores at the end of 1988. The second phase is between 1987 and 1993 in which period 8 funds were established (6 by banks and one each by LIC and GIC). The total assets under management had grown to rs. 61028 crores at the end of 1994 and the number of schemes were 167. The third phase began with the entry of private and foreign sectors in the Mutual fund industry in 1993. Kothari Pioneer Mutual Fund was the first fund to be established the private sector in association with a foreign fund.

II. Review of literature

Y. Maheswari (2020) In India capital market blesses with an assortment of venture options in contrast to the investors, to help them to put resources into various venture apparatuses and to make certain the productive return. Alongside different range financial items, mutual fund ensures the greatest return and least dangers to the financial specialists. Improvement of different mutual fund schemes in the Indian capital market has end up being one of the most reactant venture road in producing noteworthy speculation development. The Asset the executives' organizations are taking overwhelming part in financial related abundance and they advance speculation practice among the investors at present there are 44 Asset Management Companies (AMCs) contain the mutual fund industry. In this unique circumstance, close observing and execution assessment of mutual funds has gotten progressively fundamental. This Mutual fund industry has seen brilliant development in recent years. This investigation is planned for assessing execution of mutual funds and furthermore to reviewing the job of advantage the management companies in reference to public and private sector. The primary goal of this investigation work is to contemplate money related execution of selected mutual fund schemes through the factual parameters, for example, (beta, standard deviation, treynor's measure, Sharpe ratio). The findings of this study will supportive to investors for their investment choices in future.

Deepak Adhana (2020) The present paper is based on the study of comparing and analyzing the equity fund schemes in respect of bare risk and return. Further the paper compares and analyzes the mutual fund schemes in respect of bare risk and return. The research also studies the average risk and average return of selected companies of Mutual Funds as well as of Equity Shares. The paper in the end, studies the relationship between the risk and return of Equity Shares and Mutual Funds.

PrateekKhanna (2020) Mutual fund industry has experienced a drastic growth within the past twenty years. Increase within the number of schemes with increased mobilization of funds in the past few years provide benefits to the importance of Indian mutual funds industry. To satisfy the expectations of many retail investors, the mutual funds are required to function as successful institutional investors. Proper assessment of varied fund performance and their comparison with other funds helps retail investors for creating investment decisions. This paper examines the performance of mutual fund schemes ranked 1 by CRISIL and compares these returns with SBI domestic term deposit rates. While considering the interest of retail investors simple statistical techniques like averages and rate of returns are used. The results obtained from the study clearly depicts that, in most of the cases the mutual fund schemes have failed even to supply the return of SBI domestic term deposits.

GuruprasadMuthusesan (2020) In this study, an attempt is made to understand the Performance and Preference of the Mutual funds products/services in India and analyzed it from the Marketing and Finance perspective. Hence, the research analysis consists of tools and techniques of marketing

research to understand the customer preference and financial analysis to understand the various Mutual Funds Performance. The study from the survey found that the awareness of the Mutual funds has increase over a period of time. This is also confirmed by the progress of the industry overall and emergence of number of schemes. The people who influence the investors in investing in mutual funds are agents, relatives and people.

Muhammad SaliMaheen (2021) the purpose of this paper is to examine the widely believed beating capacity of actively managed funds during the market downturn. This popular hypothesis has been tested with the performance of Indian Equity Mutual Funds during the pandemic period. The conditional alphas are estimated using lagged instrumental variables with the fixed effect/LSDV estimator and the sys-GMM estimator in contrast to the OLS estimation from a sample of 1271 schemes for 5 months from 1st March 2020 to 31st July 2020. The study's findings indicate that the actively managed Indian mutual fund co-moves with the market and does not possess the ability to beat the market. The major implication comes from the application of fixed effect and GMM estimators for the performance evaluation of Indian Mutual Funds' during the crisis period, and it serves the investors in deciding the profitable investment opportunities.

Sachin Kumar Rohatgi (2020) Investment is necessary for saving and mutual fund can be treated as a vehicle of investment which is liked by all the ages of investors who want to take a ride on it. For doing so, they contribute in this vehicle depending on their risk and return appetite. The fund is invested in the vehicle is driven, controlled and managed by a fund manager. This investment fund uses capital market, money market and debt market to park its funds and get a return on the same. This investment opportunity is best suited for the investor's class who wants a more diversified investment portfolio. In the modern times mutual fund is a big industry in which many private players are coming and trying to capture the growth. There are many schemes launched by the private players which are creating super normal growth for its investors. The various options in the mutual funds schemes have increased their acceptance to a large investor base. Therefore, it is imperative to identify and select those schemes of mutual fund which are best in the lot and can offer better returns to the investors. This research paper has put an effort on validating the selection techniques of mutual fund in India on the basis of return and risk frontier. Paper discussed the basis of selection of all mutual fund schemes based upon highest net asset and ranking. The ranking of these mutual fund schemes is validated by calculating the monthly returns of the funds. Researchers considered data from different sources like yahoo finance, value research online, RBI, NSE etc for this study. After this study, researchers will try to help the investors to identify and select the mutual fund schemes carefully in their portfolio as all the mutual fund schemes even if they are on higher ranking may not perform well in the short run. This will help the investors in maximizing their returns.

M. Blair Vorsatz (2020) we present a comprehensive analysis of the performance and flows of U.S. actively-managed equity mutual funds during the COVID-19 crisis of 2020. We find that most active funds underperform passive benchmarks during the crisis, contradicting a popular hypothesis. Funds with high sustainability ratings perform well, as do funds with high star ratings. Fund out flows surpass pre-crisis trends, but not dramatically. Investors favor funds that apply exclusion criteria and funds with high sustainability ratings, especially environmental ones. Our finding that investors remain focused on sustainability during this major crisis suggests they view sustainability as a necessity rather than a luxury good.

SharazSaleem (2021) This paper aimed to provide empirical evidence on the behavior of the investor toward mutual funds by considering its relationship with risk perception (RP), return perception (Return P), investment criteria (IC), mutual fund awareness (MFA), and financial literacy (FL). Data were collected using a questionnaire from 500 mutual fund investors, from

which 460 questionnaires were used for the analysis. In addition, the snowball sampling technique was used to collect data from different cities in Pakistan. The result showed that RP, Return P, and MFA are insignificant and negatively affect the behavior of mutual fund investors. Investment criteria have a negative and significant effect on the behavior of mutual fund investors. Financial literacy has a positive and insignificant effect on the behavior of mutual fund investors. The results provide better information and guidance to investors and policymakers on the factors that affect the behavior of mutual fund investors.

Ahmed K Elnagar (2020) The purpose of this paper is to compare the performance of prominent multi capital and large capital funds. We examine the performance of 10 prominent funds under both the selected categories has been analyzed during the period of study from 2013 to 2018. Their performance has also been compared against the two most diversified benchmark indices of India such as BSE 200 and Nifty 500. We have also attempted to find out whether there is any considerable difference in the performance of the two categories of funds or not. To do so, we employ a One-way Analysis of Variance (ANOVA) for the comparison of mutual funds as an econometric methodology for a period of study from 2013 to 2018 for a sample of 20 Indian mutual funds. From the empirical findings, we find that the mutual fund schemes under both the categories such as Multi Capital Funds and Large Cap Funds have generated good returns over the period and that too with reasonable risk. Therefore, it is very safe to conclude that they are a good investment option for an investor. In terms of the performance of these mutual funds, the average monthly returns generated by the funds in each category are numerically different, but this difference has not been found statistically significant. At the same time, there is no significant difference between these funds and NIFTY 500 as well as these funds and BSE 200 in terms of their returns.

ReshmaRaju (2020) Investment is done with the motive of earning a regular return, risk-free. In our country, a number of investment measures can be seen ranging from insurance policies to shares or debentures. The type of investment chosen depends upon the income level and the risk taking ability of the investor. Mutual Funds are an emerging mode of investment with great potential as it's got diverging investing modes with regular return and minimized risk. But the awareness level it has with respect to the citizens of our country is really low. The vague knowledge on the same has forced many to stay away or even opt out from such mode of investment.

This study has been adopted with the aim to study the awareness level mutual funds have among the investing population in India and to suggest better remedies to familiarize them among the population.

III. Need for the study

- The project's idea is to project Mutual Fund as a better avenue for investment on a long-term or short-term basis.
- Further Mutual Funds are perceived as productive package for a lay-investor with limited finances, thus this project intends to create awareness to mutual Fund investors.
- Mutual Funds are "Unit Trust" as it is called in some parts of the world has a long and successful history, of late Mutual Funds have become a hot favorite of millions of people all over the world.
- The driving force of Mutual Funds is the 'safety of the principal' guaranteed, plus the added advantage of capital appreciation together with the income earned in the form of interest or dividend.
- Mutual Funds schemes are managed by respective asset managed companies sponsored by financial institutions, banks, private companies or international firms.

IV. Scope of the study

- The study is conducted in India Bulls Finance Company Private limited located in Hyderabad.
- The study covers the randomly selected three companies' growth funds for the period of four years.
- The study here has been limited to analyze open-ended equity schemes of different Asset Management Companies.
- The AMCs SBI, UTI Franklin and ICICI each scheme is analyzed according to its performance against the other, based on factors.

V. Objectives of the study

- To understand the recent trends in Mutual Funds industry.
- To analyze the risk and returns analysis of selected mutual funds
- To help an investor make a right choice of investment, while considering the statistical view of the funds.
- To construct optimal portfolio of selected mutual funds.

VI. Research methodology

My research project has a specified framework for collecting the data in an effective manner. Such framework is called "RESEARCH DESIGN". The problem at hand was to study and measure the awareness level of people regarding mutual funds in the city.

SOURCES OF DATA

Data we collected based on two sources.

- (i) Primary Data: Direct collection of data from the source of information, technology including personal interviewing, survey etc.

VII. Limitations Of the Study

- The study is limited to four years only.
- Information is restricted to India Bulls Finance Private Limited only.
- The study here has been limited to analyze open-ended equity schemes of different Asset Management Companies namely Reliance Capital, Franklin Templeton, HDFC Mutual Fund.

VIII. Empirical Results

In this section the representative Data analysis performed on the collected data and the results of the analysis are presented at length.

a. Which factor influence you most to invest through India Bulls

FACTORS	PERCENTAGE
Bank Services	20%
Safety	42%
Word Of Mouth	14%
Advertisement	6%
Past Experience	18%

Table No: 1.1 Factors influencing to invest through India Bulls

Source:

Author's

Compilation

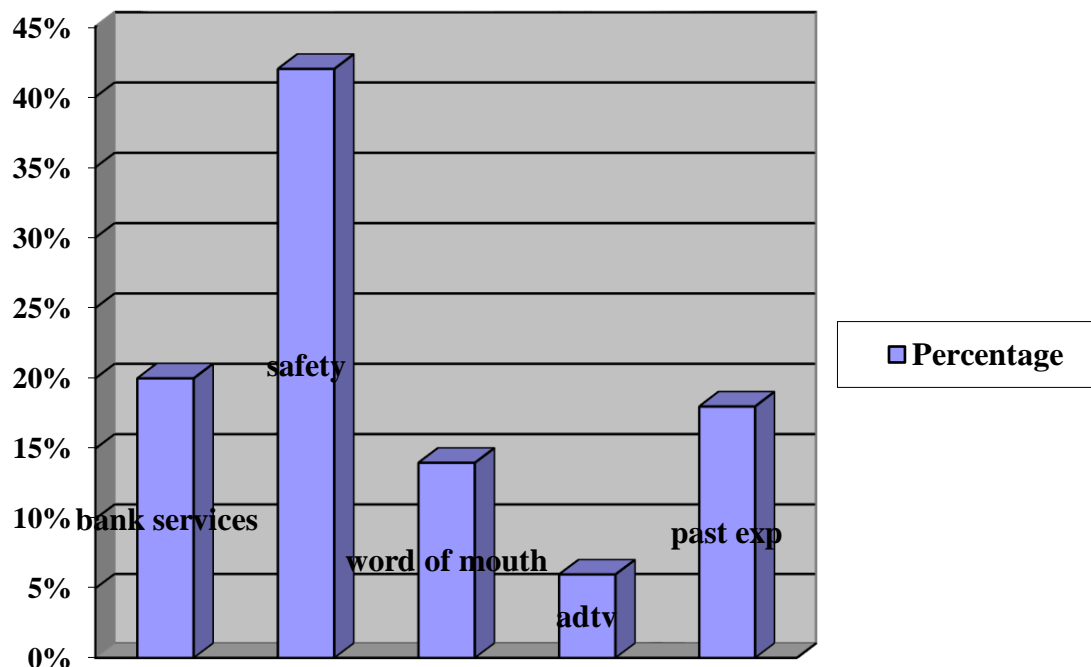


Figure: 1.1.a Factors influence to invest through India Bulls

Source: Author's Compilation

When asked what element influences the most when investing in mutual funds through India Bulls, safety is given a high priority. 42% of investors prefer safety. Bank services account for 20%, previous experience accounts for 18%, word of mouth accounts for 14%, and advertising accounts for 6%. Out of the respondents 80% are extremely satisfied with the services offered by India Bulls 10% are satisfied to lesser extent, 5% are extremely dissatisfied. The maximum number was of the business-class (43%) as most of the respondents were Bank's customers. 19% were students and 11% of service category as the research was also done in college campus. Annual income analysis resulted that 38% of the respondents were of income group between Rs.2-3 Lakhs, 35% of the respondents were of the income group between Rs.1-2 Lakhs, 17% of the respondents were of the income group above Rs.3 Lakhs and 10% of the respondents were of the income group of less than Rs.1Lakh.

Savings analysis of the respondents resulted that around 33%, save Rs.25-30,000 annually. Individuals who save between Rs.50,000-1,00,000 are about 30% and those who save above Rs.1,00,000 are about 25%. The least category being of the respondents, who save below Rs.25,000 annually. Most of the individuals i.e., about 80% are of the opinion that Mutual Fund is a good investment option as it is less risky, and the rest i.e., 20% think that investing in Mutual Funds is as speculative as that of Stock Market.

From the analysis that 39% of the respondents prefer to invest in the various schemes of Mutual Funds, of Franklin Templeton, such as Flexi-Cap, Prima Fund, Prima Plus, etc., as it offers a higher

rate of returns compared to the other companies. The other companies and the various schemes where the investors prefer to invest their funds are:

- State Bank of India (SBI): Magnum Fund, Blue Chip Fund
- HDFC: Tax Savings, Top 200 Fund, Equity Fund
- Birla: Top 100 Fund, Infrastructure Fund
- Reliance: Equity Fund, Growth Fund
- UTI: Leadership Equity Fund, Contra Fund.

Further from the analysis 45% would prefer to invest in,

- Insurance sector, as it is giving triple benefits i.e., insurance coverage, tax benefits and investment option.
- The next preference i.e., 20% is given to real estates because of capital appreciation.
- Fixed deposit is the next preferred avenue (i.e., 12%), as it offers fixed returns and tax rebates (which is introduced in new budget).
- Stock market was given the next preference i.e., 15%, as it is highly speculative though it also offers high returns.
- The least preference is given to mutual funds i.e., 8%.

From the analysis performed it can be concluded that Real Estate and Fixed Deposits were ranked 1st two times, parameters being Good Rate of Return and Capital Appreciation for Real Estate, and Liquidity and Safety of Schemes for Fixed Deposits. Insurance was for ranked 1st on the basis of tax benefit. Mutual Fund is the next preferred scheme on the basis of Rate of Return, Liquidity and Tax Benefit.

IX. Findings, Suggestions and Conclusion

Findings

- When asked that what factor affect most while investing in Mutual Funds through India Bulls than wide preference is given to safety. 42% investors choose safety. 20% bank services, 18% past experience, 14% word of mouth and 6% advertisement.
- Out of the respondents 80% are extremely satisfied with the services offered by India Bulls 10% are satisfied to lesser extent, 5% are extremely dissatisfied.
- From the above, it can be seen that the respondents were of different occupations. The maximum number was of the business-class (43%) as most of the respondents were Bank's customers. 19% were students and 11% of service category as the research was also done in college campus. 14% and 13% being Retired and professionals respectively, as it was an open market operation in High Court area. Hence, most of the professionals are Lawyers and Doctors.
- The above graph reveals that 38% of the respondents were of income group between Rs.2-3 Lakhs, 35% of the respondents were of the income group between Rs.1-2 Lakhs, 17% of the respondents were of the income group above Rs.3 Lakhs and 10% of the respondents were of the income group of less than Rs.1Lakh.
- From the above, it can be seen that most of the respondents i.e. around 33%, save Rs.25-30,000 annually. Individuals who save between Rs.50, 000-1, 00,000 are about 30% and those who save above Rs.1, 00,000 are about 25%. The least category being of the respondents, who save below Rs.25, 000 annually.

Suggestions

- There should be given more time & concentration on the Tier-3 distributors.
- The resolution of the queries should be fast enough to satisfy the distributors

- Time to time presentation/training classes about the products should be there.
- There should be more number of Relationship Managers in different Regions because one RM can handle a maximum of 125 distributors efficiently and also to cover untapped market.
- Regular activities like canopy should be done so as to get more interaction with the distributors.
- Regular session should be organized on the handling of the India Bulls software so as to resolve the account statement problem.

Conclusion

To get an insight knowledge about mutual funds. Understanding the different ratios & portfolios so as to tell the distributors about these terms, by this, managing the relationship with the distributors. To know the mutual funds performance levels in the present market. To analyze the comparative study between other leading mutual funds in the present market. To know the awareness of mutual funds among different groups of investors. To evaluate consumer feedback on mutual funds. Complete insight knowledge about the mutual funds was mentioned in the project. Different ratios with complete graphical representation were explained in the project

To know the performance levels of the project I have done the comparative analysis of the project using the four major leading mutual fund companies using different parameters. To know the consumer awareness I have done the survey using different customers so as to analyze the views about the mutual funds and perception of the customer in the present scenario. To evaluate the ways and means to improve India Bulls.

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**A STUDY ON HRM POLICIES AND EMPLOYEE DEVELOPMENT AT BSNL,
HYDERABAD.**

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ABSTRACT

Employees and employers in all sorts of companies must carry out their job obligations in line with policies and procedures. Human resources policies and procedures are required to promote well-being and advancement, as well as to improve the organization's reputation. When human resources follow the rules and procedures, they will not only be able to carry out their job obligations properly, but they will also promote discipline in the workplace. In terms of many fields such as technical, clerical, management, administration, and so on, policies and procedures must be considered.

Employees are obliged to go through training and development programmes when they are hired by organisations. They are taught human resources policies and practises in these programmes. Human resources can profit to a large extent if they follow the policies and procedures. The meaning and significance of human resources policies and procedures, types of human resources policies, and areas in which human resources policies and procedures are applied are the key topics covered in this research study.

KEYWORDS: HR Policies, Job obligations, Training and development.

1. INTRODUCTION

The process of hiring and developing employees so that they become more valuable to the organization. Human Resource Management include Conducting job analysis, planning needs, recruiting the right people for the job, orienting and training, managing wages and salaries, providing benefits and incentives, evaluating performance, resolving disputes, and communicating with all employees at all levels.

1.1 Human Resource Management Policies:

Definition

According to Armstrong(2006), Human resource management policy refers to “the continuing guidelines on the approach the organization intend to adopt in managing its people” and it reflect the values and philosophies of organization. And HRM policy is notably a reference point when employment practices are being developed and during decision-making regarding the people in the organization. Provide guidance on implementation of procedures and what actions should be taken in line with the policy to effectively carry out day-to-day tasks.

1.2 NEED FOR STUDY

- ❖ to help staff and management teams run the organization.
- ❖ In best use situations – policies play a strategic role in an organization.
- ❖ mission and objectives of the company are documented and communicated to all staff.
- ❖ save the company countless hours of management time.
- ❖

1,3 OBJECTIVES OF THE STUDY

- ❖ To understand the Hrm policy with regard to various organizational aspects in BSNL (NATFM)
- ❖ To know the level of HRM Policies in the organization.

- ❖ To know the effectiveness of the process.
- ❖ To gain Knowledge regarding the HRM policies of the organization.
- ❖ To do a through analysis on the HRM policies followed.

1.4 SCOPE OF THE STUDY

- ❖ As most of the organizations overall performance depends on its employee's performance which depends largely on the HR POLICIES of the organization.
- ❖ In any organization human resource policy is the most important asset.
- ❖ So the project has wide area to help the company to perform well in today's global competition.
- ❖ The core of the project lies in analyzing and assessing the organization and to design an HR POLICY manual.

2.0 RESEARCH METHODOLOGY

Research Methodology is a way to systematically solve the research problems. It explains the various steps that are generally adopted by a researcher in studying the research problem with logic behind them.

2.1 APPROACHES TO RESEARCH

Descriptive approach is one of the most popular approaches these days. In this approach, a problem is described by the researcher by using questionnaire or schedule. This approach enables a researcher to explore new areas of investigation.

A. PRIMARY DATA:

Under this study primary data was collected by using structured questionnaire. The structured questionnaire consists of both open-ended and closed-ended questions. The primary data has been collected through the questionnaire by means of personal interview. The questionnaire consists of number of questions printed in a definite order on a form.

Primary data is personally developed data and it gives latest information and offers much greater accuracy and reliability.

B. SECONDARY DATA:

This will give the theoretical basis required for the report presentation which can be available from various sources such as magazines, office files, inter office manual and web site

2.3 TECHNIQUES OF ANALYSIS

Sampling is that part of statistical practice concerned with the selection of individual observations intended to yield some knowledge about a population of concern, especially for the purposes of statistical inference. Each **observation** measures one or more properties (weight, location, etc.) of an observable entity enumerated to distinguish objects or individuals. Survey weights often need to be applied to the data to adjust for the sample design.

2.4 SAMPLE UNIT

The employees of the TELECOM INDUSTRY are the sample unit in the survey.

2.5 SAMPLE SIZE

The sample size chosen for this study is 60 as instructed by the department since it is a MAJOR RESEARCH PROJECT.

2.6 STATISTICAL METHODS USED

- Percentage analysis
- Charts

2.7 PERIOD OF THE STUDY

The study was held in Bharat Sanchar Nigam Limited (BSNL) for the duration of 45 days at Hyderabad location .

2.8 LIMITATIONS OF THE STUDY

Like any other research, this study also suffers from few limitations, while conducting this survey, are listed as below

- ❖ Less Availability of time limit.
- ❖ Some of the employees were not able to express their ideas freely. Some answers given by the employees might not be correct.
- ❖ The respondents were not available readily and the data were collected as per convenience of the respondents.
- ❖ Information was confidential.

3.0 REVIEW OF LITERATURE

1. Gisela Demo., Iara Nunes., Elaine Rabelo Neiva., & Kesia Rozzette Oliveria. Human Resources Management Policies and Practices Scale (HRMPPS): Exploratory and Confirmatory Factor Analysis, (2012) studied and published the strategic importance of Human Resources Management (HRM) in organisations and the lack of scientific instruments to measure employees' perceptions of HRM policies and practises, this study used exploratory and confirmatory factor analysis with the maximum likelihood method to validate the Human Resources Management Policies
2. Carol Gill & Denny Meyer. 2011. The role and impact of HRM policy studied and published a disconnect between policy and practise, with soft policy employed more frequently than soft practise. It was discovered that there is a detrimental influence on outcomes when there is a gap between policy and practise. Strategic HRM (SHRM) has a favourable impact on the implementation of soft practises by narrowing the gap between policy and practice.
3. Arnel Kalusic, Munir Talovic, & Semso Ormanovic. The Role and Importance of Motivation of HRM studied and published conclusions that can be a recommendation for additional extensive research in this subject, based on the insight into the side and the local literature in the field of motivation, with a special emphasis on material motivation as a full complex system of motivation. Material motivation is the foundation of the organisational motivation system (Vidakovi, 2012). It is critical to have a fair system of material motivation.
4. P.Omed., Shadi Taha & Sewa Omed. Importance of HRM Policies on Employee Job Satisfaction.2020 studied and published employee productivity is heavily influenced by employee performance. Furthermore, high-performing personnel improve the client relationship's quality. Scholars and practitioners have been exploring its antecedents and implications in recent years because to its favourable impact on the organization's internal and external performance. As a result, the purpose of this article is to investigate the impact of HRM policies on employee job satisfaction in Iraq's Kurdistan Region.
5. Jumana Maryam Leghari., Ismail Bashir Leghari., Smaira Aslam & Usama Suleman. Role of HRM Practices in Performance of Organization and Employee Retention. 2014 studied and published the impact of Human Resource Management methods on organisational performance and employee retention is examined in this article. Human Resource Management Practices are critical for keeping employees and improving organisational performance.
6. Derek C. Jones., Panu Kalmi & Antti Kauhanen, Human Resource Management Policies and Productivity: New Evidence from An Econometric Case Study (2006) studied and published We explore

contemporary ways to analysing the influence of HRM on productivity in the first section of the paper. We concentrate on an emerging method, econometric case studies, and summarise the method's key uses. We describe what we consider to be the first replication study of an econometric case study in the second section of the paper. As a result, one of the main goals of this activity is to look at the method's external validity.

7. Arulrajah A. Human Resource Management Practices and Innovation: A Review of Literature. 2014 studied and published that innovative HRM practices (HRM innovation) are critical for fostering organisational creativity. HRM practices are required to play three main functions in this process. In this context, HRM practices should provide the following: first, required inputs for organizational innovations (input role); second, required mechanisms to bring innovations into organisations and third, required mechanisms to retain the organisations' innovation potential.

4.0 DATA ANALYSIS AND INTERPRETATION

To analyse the HRM policy in the internal environment of the BSNL a questionnaire containing 21 questions is prepared. The responses to the questions of the employees are summarized in the below table.

S. No:	Statement:	Response:
1.	How long have you been working in BSNL?	The higher response is for more than 15 years and the next response is 11 to 15 years.
1.	Which is the best describes your position/role?	The higher response is for Employee relations Manager staff and the next response is HR/Manager
2.	Do you agree any special incentives/perks in BSNL?	The higher response is for Strongly Agree and the next response is for Agree.
3.	Do you agree special training programs are conducted to Employees are Benefited?	The higher response is for Strongly Agree and the next response is for Agree.
4.	Are there any systems in BSNL to evaluate the effectiveness of the training programs conducted do you agree?	The higher response is for Strongly Agree and the next response is for Agree.
5.	What is the Scope of employability of BSNL?	The higher response is for Technical Supervision and the next response is for Administration.
6.	What is the Academic background of employers?	The higher response is Degree/P.G (technical) and the next response is Degree.

7.	What are the Selection criteria of employers?	The higher response is Qualification and experience and the next response is Any Other.
8.	What are the Problems faced in recruiting and retaining?	The higher response is High Expectation of Qualified People and the next response is Any Other.
9.	What are the Form of workers participation preferred in the Organization?	The higher response is Sharing information and the next response is Consultation.
10.	Does BSNL places right person in the right job do you agree?	The higher response is Agree and the next response is Strongly Agree.
11.	Is Adequate and relevant information about BSNL and job is provided to the candidate at the time of recruitment do you agree?	The higher response is Agree and the next response is Strongly Agree.
12.	In BSNL the training needs of the employees in BSNL are assessed on the basis of their performance appraisal do you agree?	The higher response is Agree and the next response is Strongly Agree.
13.	What contents of the training programs organized which always relevant to the changing needs of our jobs and our business do you agree?	The higher response is Agree and the next response is Strongly Agree.
14.	Do you agree in BSNL Rewards are strictly linked to employee performance?	The higher response is Agree and the next response is Strongly Agree.
15.	Do you agree Performance appraisal in BSNL aims at improving employee performance and strengthening our job	The higher response is Agree and the next response is Strongly Agree.

	skills?	
16.	What is the number of recreational activities and occasional celebrations are organized in order to let employees show their creativity do you agree?	The higher response is Agree and the next response is Strongly Agree.
17.	Continuous efforts are made in BSNL to create a sense of belonging among employees and feel like a member of the corporate family do you agree?	The higher response is Agree and the next response is Strongly Agree.
18.	Are there any adequate growth opportunities are available in BSNL for those who perform well do you agree?	The higher response is Agree and the next response is Strongly Agree and Disagree.
19.	In BSNL provides programs to assist balancing demands of families with children and/or elderly family members do you agree?	The higher response is Agree and the next response is Disagree.
20.	The objective of the training programmes is complete understanding of different management functions in its totality do you agree?	The higher response is Agree and the next response is Strongly Agree.

5.0 FINDINGS OF THE STUDY

- ❖ The BSNL has a clear, fair and well Appraisal and Reward policy, which makes the employees, were highly satisfied. The BSNL has good Performance Management system, which makes the employees were highly satisfied.
- ❖ The BSNL follows good techniques of Managing people, which makes the employees were highly satisfied in doing their jobs. The BSNL has a transparent, quick widely accepted Promotion and Transfer policy, which makes the employees were highly satisfied.
- ❖ In BSNL, in recent days, more number of motivation classes are not conducting due to funds problem.

- ❖ The BSNL has a good Employee health and Safety system for its employees, which is highly accepted through Job satisfaction. The BSNL has a vibrant Industrial Relation policy, which makes the employees were highly satisfied.
- ❖ BSNL is facing a lot of financial crunch for recruiting the required staff. That's why BSNL is unable to recruit required staff as when required. Moreover BSNL is incurring losses for the last five years. Further BSNL it is providing maximum services in rural area where there is less income but more staff is required since it was scattered more area.

5.1 SUGGESTIONS

From the above study the following suggestions are offered.

- ❖ There should be improved the working pattern in BSNL. Because working process of BSNL is taking more time. Now all directors are posted to look after the duties of various segments.
- ❖ The Organization should focus on mentor system intend to help employees in their career progression.
- ❖ The Organization should conduct Psychometric tests for employees.
- ❖ The Training should be mandatory for all level of employees in all types of jobs i.e technical as well as management.
- ❖ The Departments should develop constructive attitude towards each other to improve HR management.
- ❖ A more transparent and full proof communication system should be developed in the organization.
- ❖ Wages and salary administration process should have a more scientific approach laying stress on equal wages for equal work done.
- ❖ The BSNL is facing lot of financial crises. Due to this, organization is unable to conduct sufficient trainings in the required field. If the financial position increased then the BSNL will take up the trainings for the urgent based training like 3G and 4G.

CONCLUSION

On the basis of study that the level of "HRM POLICY" is considerably high in the BSNL (NATFM), Gachibowli, Hyderabad.

The Hrm Policy of the company provides facilities for all round growth of individuals by training in-house and outside the organization, reorientation, lateral mobility and self-development through self motivation, the Policy implements equitable, scientific and objective system of rewards, incentives and control. the Policy recognizes worth contributions in time and appropriately, so as to maintain a high level of employee motivation and morale, employees agree on the part of their performance that they know what is expected from them. Company inspires the employees to do their best work every day. The employees are not satisfied with the communication and decision- making process as it leaks the information related to organization. the employees do not receive the appropriate recognition and rewards for their contributions and accomplishments. the employees feel that they are not paid fairly for the contributions they make to company's success.

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A STUDY ON PAYROLL MANAGEMENT AT HERITAGE HYDERABAD

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Abstract

The pay structure of a company depends on several factors such as labor market Conditions Company's paying capacity and legal provisions. In India, different acts include different items under wages though all the Acts include basic wage and dearness allowance under the term wages. Under the workmen's Pay Roll act, 1923 wages for leave period holiday pay, overtime pay, bonus, and good conduct bonus form part of wages. Under the payments of wages act, 1936, section 2(vi) any awards of settlement and production bonus, if paid constitute wages. Under the payment of wages act 1948, retrenchment Pay Roll payment in lieu of notices and gratuity payable on discharge constitute wages. The term Allowances includes amounts paid in addition to wages over a period of time including holiday pay, overtime pay, bonus social security benefit etc. the wage structure benefits etc. the wages structure in India may be examined broadly under the following, The basic wage in India corresponds with what has been recommended by the Fair wages committee(1948) and the 15th Indian Labor conference (1957). The various awards by wage tribunals, wage boards, pay commission reports an job evaluation also serve as guiding principles in determining basic wage.

INTRODUCTION

Torrington and Hall (1987) define personnel management as being: "a series of activities which: first enable working people and their employing organisation to agree about the objectives and nature of their working relationship and, secondly, ensures that the agreement is fulfilled" While Miller (1987) suggests that HRM relates to: "those decisions and actions which concern the management of employees at all levels in the business and which are related to the implementation of strategies directed towards creating and sustaining competitive advantage" In a company, payroll is the sum of all financial records of salaries for an employee, wages, bonuses and deductions. In accounting, payroll refers to the amount paid to employees for services they provided during a certain period of time. Payroll plays a major role in a company for several reasons. From an accounting point of view, payroll is crucial because payroll and payroll taxes considerably affect the net income of most companies and they are subject to laws and regulations (e.g. in the U.S. payroll is subject to federal and state regulations). From ethics in business viewpoint payroll is a critical department as employees are responsive to payroll errors and irregularities: good employee morale requires payroll to be paid timely and accurately. The primary mission of the payroll department is to ensure that all employees are paid accurately and timely with the correct withholdings and deductions, and to ensure the withholdings and deductions are remitted in a timely manner. This includes salary payments, tax withholdings, and deductions from a paycheck.



NEED FOR STUDY

- ☐ To help Maintenance and updating of employee information sheet / salary register
- ☐ . Calculation and deduction of statutory deductions like Provide Fund Profession Tax, Income Tax etc
- ☐ To help the staff and management teams runs the organization

OBJECTIVES OF THE STUDY

- ❖ To know the roll of HR in payroll and the payroll software's used in the organization.
- ❖ To find about the software's used in Payroll process and satisfactory level of employees using this software's .
- ❖ To analysis whether these software's are user friendly.
- ❖ To suggest the Latest Software's in achieving organizational objective.

SCOPE OF THE STUDY

One of the main functions of personnel management in industrial organization is to impart programmers to its employees.

HRM plays a large part in determining the effectiveness and efficiency of the establishment. Increase in productivity is possible only when there is an increase in quantity of output. It applies not only to new employees but also to experienced people. It can help employees and employers to increase their level of performance and to develop skills, knowledge on their present job assignment.

Objectives of Employee Payroll(Heritage Foods (India) Limited):

- To Analyze the Pay roll System in Heritage Foods (India) Limited.,
- To ensure effective utilization and maximum development of Employee.
- To ensure reconciliation of individual goals with those of the organization.
- To achieve and maintain high morale among employees..

RESEARCH METHODOLOGY

Research is scientific and systematic search pertinent information in a specific topic. The meaning of research is “A Careful Investigation (or) Inquiry.

EMPLOYEE PAYROLL is the corner stone of sound management, and it makes employees and employers more effective and productive. It is actively and intimately connected with all personnel and managerial activities.

DATA SOURCES:

Data means a collection of facts in real life statistical data is a collection of facts in numerical figures.

The data sources are usually identified using the type of data needed. There are two types of data.

1. Primary data
2. Secondary data

❖ **PRIMARY DATA:**

The first hand information by the investigator by means of observation face to face questioning, telephone interview and mailing questionnaire is called primary data. Primary data consists of original information gathered for a specific purpose.

SOURCES OF PRIMARY DATA:-

For the purpose of present study, the primary data collected from respondents by contacting them personally.

□ **SECONDARY DATA:**

Secondary data consists of information that already exists somewhere, having been collected for another purpose **SOURCES OF SECONDARY DATA:**

For the purpose of present study, the secondary data was collected from published data of the companies. Population is the aggregate of objects animate and inanimate, under study in any statistical investigation. His population for the study here was employees in Met life.

SAMPLING PROCEDURE

With a view to arrive at the sample population for the study, a "Purposive- Cum convenient sampling" was followed. **SAMPLE SIZE**

The sample size includes 100 employees who are working in the Heritage Foods(India)

PERIOD OF THE STUDY

The study was held in Heritage the duration of 45 days.

LIMITATIONS OF THE STUDY

The study is limited to the policies and practices being followed in Heritage Foods (India) Limited get the complete data, in view of its classified nature of the organization.

- ❖ Time factor is the main constraint for the study as it was restricted only to eight-nine weeks.
- ❖ Sampling error is not taken into consideration.
- ❖ The information given by the sample frame is thought accurate by researcher.
- ❖ As the method adopted is Random Sampling, result may not be accurate and believable.
- ❖ As the sample size is 100, whole of the facts could not be collected.
- ❖ The findings of the study are confined only to the question asked in the questionnaire and through personal interviews.

The study has been carried in Heritage Foods (India) Limited only

REVIEW OF LITERATURE

1. Prabhakar S (2013) found employees of Don bosco college of arts and science Sogathur, Dharampuri, Tamilnadu, are very satisfied with intramural facilities but they is a need of further development in the areas of extra mural facilities like transport, leave facility, maternity

benefits, promotion for the staff in college etc. Researchers recommended fixing pay scale for experienced staff in tune with the cost of living and have to think high salaries for those awarded Ph.D.

2. Anand (2010) stated in his research work that employees of IT sector in Chennai district are satisfied with the welfare measures provided by the company. But researcher also suggested some recommendation pertaining to periodic audit of welfare programs by management, personality & stress management etc. Modifications are requiring in the field of safety consciousness, grievance handling & sexual harassment especially for women employees.

3. Balaji (2013) explored the influence of rewards & welfare on job satisfaction & productivity of both public & private sector employees in measure Industrial cities of Tamilnadu. The working environment was fair in terms of office accommodation & furniture, working material, health & safety facilities but on the other side he recommended salary increment, allowances, bonus, fringe benefit & compensation on regular & specific periods to keep their moral high & make them productive.

4. Bhagat (2015) revealed that cleanliness is the big issue in Nashik MIDC. She suggested that cleanliness should be improved, clean & adequate latrines & urinals at the work place improve indirect motivation to employees.

5. Bhati p. (2013) identified in her research work that the different provisions provided to the employees under factories Act 1948 are showing positive relation with the employee's satisfaction. Company should know the requirement of employees in term of different non-financial motivational tools. This study can be useful for identifying the factories which needs to employee satisfaction & company can use those factors retention tool for retaining employees in the organization.

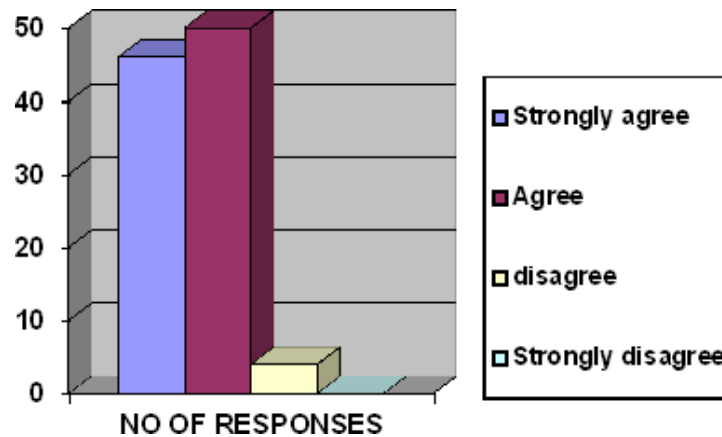
6. Shrinivas K T (2013) conducted research work at BOSCH Ltd. Bangalore division on 100 employees. Researcher concluded that employee Payroll Management are satisfied such as canteen facilities, transport & parking, uniform & safety shoes etc. but employees are dissatisfied with medical & first aid due to improper maintenance of medicine & less no. physicians, rest rooms & recreational facilities are poor due to lack of maintenance.

7. Madhesh (2014) instated that employees having 5-10 years' experience are highly satisfied welfare measures provided by their companies in SIPCOT industrial area in Tamilnadu. He suggested some recommendations regarding welfare inspector, transfer policies & disciplinary rules for betterment of employees.

DATA ANALYSIS AND INTERPRITATION

1. Your organization provides opportunity for growth and security.

OPTIONS	NO OF RESPONSES
Strongly agree	56
Agree	40
Disagree	04
Strongly disagree	0

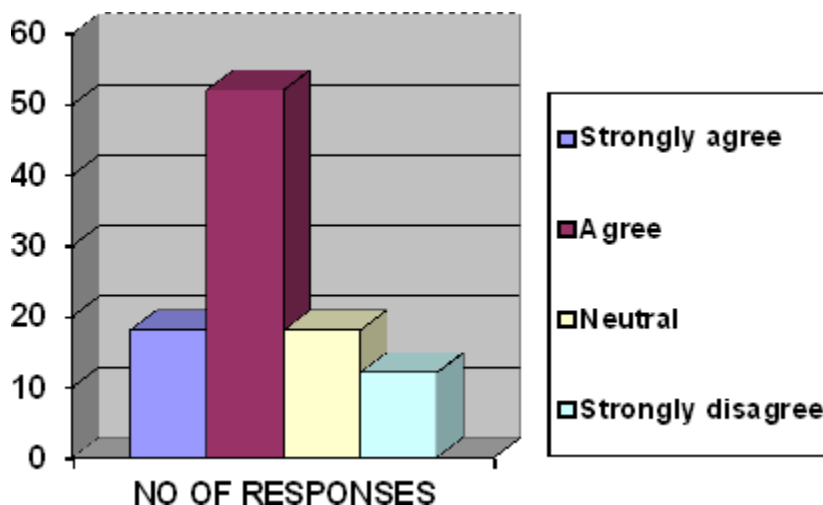


Interpretation:

The survey revealed that most of the employees strongly agree that the **Heritage foods India limited** provides opportunity for growth and security and some are disagree about this.

2. Pay and compensation package is adequate and fair in comparison to performance.

OPTIONS	NO OF RESPONSES
Strongly agree	19
Agree	51
Neutral	17
Strongly disagree	13

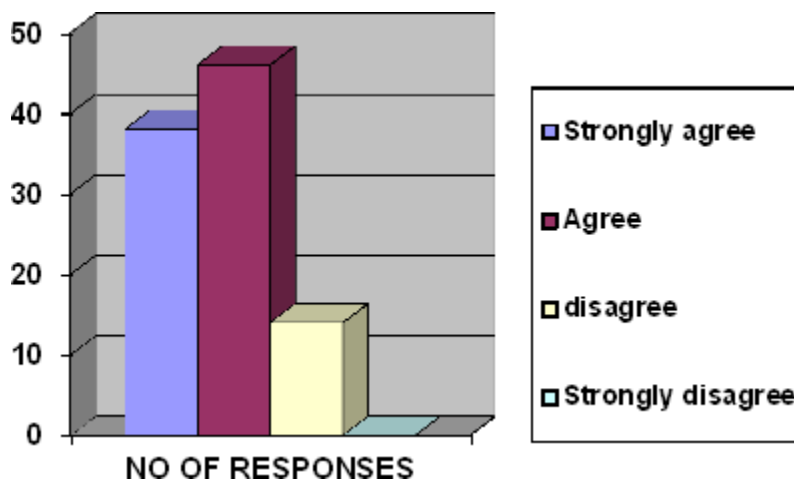


Interpretation:

The survey revealed that most of the employees agree for the reason of their pay and compensation package is adequate and fair in comparison to performance and some are disagree.

3. Medical facilities provided by the organization suites your health needs?

OPTIONS	NO OF RESPONSES
Strongly agree	36
Agree	45
disagree	19
Strongly disagree	0

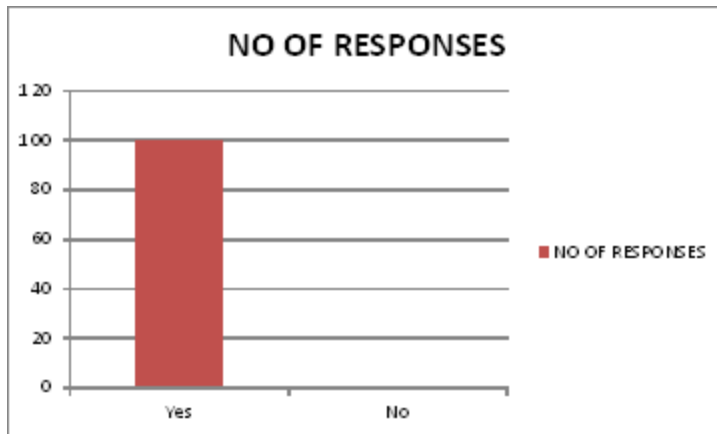


Interpretation:

The survey revealed that most of the employees agree and strongly agree for the reason of the medical facilities provided by the organization which suits their health needs, and few are disagree.

4. Is the original pay rate authorized in writing and subsequent amendments properly approved?

OPTIONS	NO OF RESPONSES
Yes	95
No	5

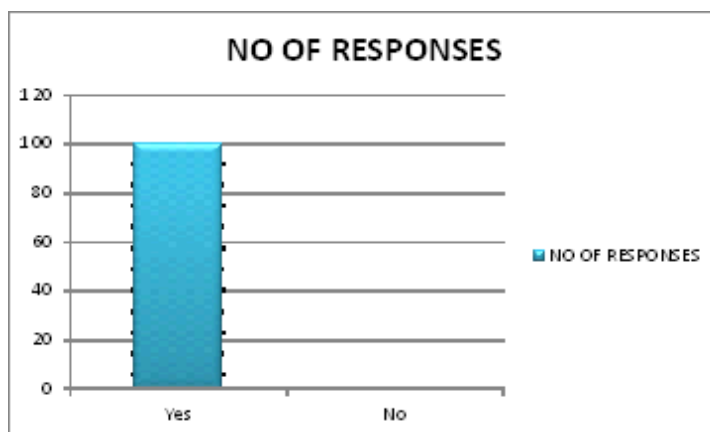


Interpretation:

The survey revealed that most of the employees are saying that the original pay rate authorized in writing and subsequent amendments properly approved by the organization.

5. Is there a periodic check by independent staff, comparing the payroll and personnel records?

OPTIONS	NO OF RESPONSES
Yes	99
No	1

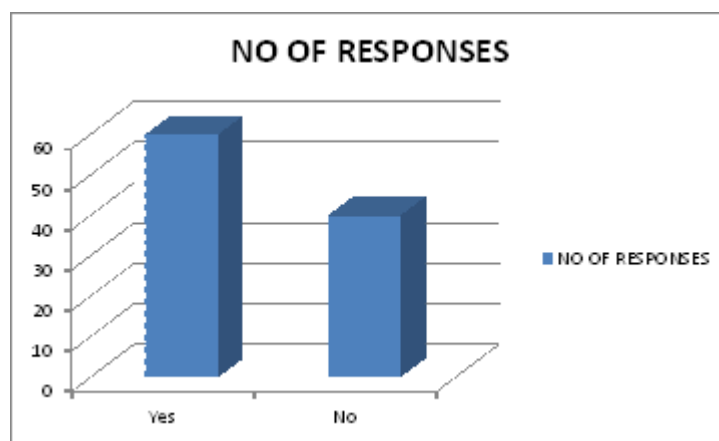


Interpretation:

The survey revealed that most of the employees are saying that there a periodic check by independent staff, comparing the payroll and personnel records properly approved by the organization.

6. Is the calculation of a sample of employee's net pay periodically checked?

OPTIONS	NO OF RESPONSES
Yes	60
No	40



Interpretation:

The survey revealed that most of the employees are saying there is a calculation of a sample of employee's net pay periodically checked, and approved by the organization.

FINDINGS OF THE STUDY SUGGESTIONS

- ☐ Those responsible for approving time worked are independent of those responsible for payroll preparation, determining cheque payments and the preparation and distribution of pay.
- ☐ Those responsible for maintaining personnel records are independent of those responsible for preparing the payroll.
- ☐ Those responsible for payroll preparation are independent of those responsible for the preparation and distribution of pay, particularly where casual labor is employed or where there is no separate and independent personnel department.
- ☐ Those responsible for maintaining personnel records or originating entries on the personnel records are independent of those responsible for preparing pay packets or distributing pay.
- ☐ Those responsible for payroll preparation should be independent of those authorizing cheque payments, authorize bank transfers, etc.
- ☐ for distributing pay should be independent of those determining cheque payments.
- ❖ To improve the comfortness of Employees.
- ❖ Skilled and experienced persons should be provided at service center, so that problems of

the Employees should be resolved completely.

- ❖ It is suggested that some more Benefits should be provided for Employees.
- ❖ To provide better service to Employees at work shop.
- ❖ To make the Organization more spacious inside for development of Employees.
- ❖ To increase the place of R&D at work shop.

CONCLUSION

The global business environment is buzzing with the single most important issue of Building a competitive edge by creating and retaining a large number of Employees than their goods and services every organization is therefore seized of the task of establishing sustaining its worth to the customer, who has been rendered unpredictable by competition”

Therefore every business is making a continuous effort for achieving Employees effort for achieving Employees loyalty In short it is total organizational culture and brand equity, which face challenge. So that there is a perennial struggle amongst organizations to sustain their existence in the market place, and hence in order to sustain the stiff competition the company has to take up market Research frequently to know the changing needs & preference of the Employees.

This helps the company to reframe the policies in providing cutting edge technology to satisfy the Employees & retain him for a life time.

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A STUDY ON CUSTOMER SATISFACTION TOWARDS BIG BAZAAR

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ABSTRACT

Customer satisfaction is the main function of performance and expectation. Customer purchasing behavior and his attitude towards the product can be well know through the interaction with the retailers as he is the only person who receives the impulses of both positive and negative responses. Customer satisfaction is the Customer's perception that a vendor has to meet his expectations, efficiently.

There are many types of retail outlets in Hyderabad but Reliance Fresh outlet providing fresh vegetables, fruits, Reliance value products and FMCG products better than competitors. Quality management of the products at the outlets of Reliance Fresh contributes a lot to their customer satisfaction levels.

Key words: Customer satisfaction, Promotional activities, Discount

I. INTRODUCTION

Marketing is the art of creating, satisfying customers by meeting the needs of customers and by creating value satisfaction for them. As Peter Ducker says “the real meaning of marketing is that the entire business has to be seen from the point given of the customer”. However, customers face a vast array of product and brand choices prices, supplies and to

understand the needs and preferences of the customers it becomes imperative for us to carry out study together information. The purpose of marketing is to provide information at a specific time on customer, trade, competition and the future brands, so as to enable marketers to formulate successful strategies in their quest for customers mind share and market share.

The study helps to find out the attributes and variable that influence the customers behavior towards a given product offering and it shapes the attitudes of the customers kindly towards a specific product, thus by analyzing these we can find out the levels of customer satisfaction, and the results of the marketing study can help the marketers to analyze the weak spots in their marketing strategies and can reformulate their strategies so that they can satisfy their customers and maximize their brand loyalty and profitability.

II. REVIEW OF LITERATURE

According to **Jones and Sasser (1995)**, four basic elements affect customer satisfaction.

They are: The basic elements of the product or service, basic support services, a recovery process for counteracting bad experiences, and extraordinary service. There are many definitions of the key elements of the services, but this one is considered appropriate in the context of care or after sales services. Satisfaction is a function of perceived performance and expectation. If the performance matches the expectations the customer is satisfied. If the performance exceeds the expectation the customer is highly satisfied. If the performance does not match the expectations the customer is dissatisfied. Satisfaction is a person's feelings of pleasure or disappointment resulting from comparing a product's perceived performance (outcome) in relation to his/her expectation. The link between customer satisfaction and customer loyalty is proportional. Suppose customer satisfaction is rated on a scale from 1 – 5. At a very low level of customer satisfaction.

Level-1, customers are likely to throw away.

Level-2 to 4, customers are fairly satisfied but still find it easy to switch when a better offer comes along.

Level-5, the customer is very likely to repurchase an even spread good word of mouth about the company.

The key to generating high customer loyalty is to deliver high customer value. A company's value proposition is much more than it's positioning on a single attribute. Most of the successful companies are raising expectations and delivering performances to match. These companies are aiming for Total Customer Satisfaction. Customer satisfaction is both a goal and a marketing tool. Companies that achieve high customer satisfaction ratings make sure that their target market is known. After sales support management system is a part of Enterprise Resource Planning solution dealing with the support module after the sales of product. It creates an advanced environment to the organization, which are in to technical support after sales.

E.g. Companies offering electronic goods and motor vehicles etc.

III. NEED OF THE STUDY:

- From the days of industrial revolution when goods & services were produced to the present day.
- The importance has shifted from the producers to the consumer and his needs, and with the consumer becoming more involved, in the marketing process.
- This research is an insight into the mind of the consumer, with the help of which the organizations will become aware towards mistakes & can also make improvements in the product.
- The basic need of this project is to know the "Satisfaction" amongst the respondents, with regard to "**BIG BAZAAR**" services and its products.

IV. SCOPE OF THE STUDY:

- The scope of project work is to get the opinions from respondents on the issues mentioned earlier.
- It is limited to the twin cities of Hyderabad.
- The aim of the project is to enlightening the company about different steps to be taken up to increase the shares of **BIG BAZAAR** comparing with competitors.
- Provide better service to the customer.

V. OBJECTIVES OF THE STUDY:

- To know the “Customer Satisfaction” amongst the users of “**BIG BAZAAR**” products.
- To study the ‘Satisfaction’ level of “**BIG BAZAAR**” customers with regard to other products and services offered by **BIG BAZAAR**.
- To ascertain the role of media in promoting and creating awareness towards the diversified portfolio of **BIG BAZAAR** products.
- To find out the quality of service in terms of transmission coverage, clarity in the reception and connectivity of the various services that are being offered by **BIG BAZAAR**.
- To study the satisfaction levels of **BIG BAZAAR**.
- To make suggestions for improvement of their products & their services from the customer’s point of view.

VI. RESEARCH METHODOLOGY:

A structured questionnaire was prepared and presented to the respondents and related questions were asked. Questionnaires mainly contained close-ended questions and a few open ended questions, to identify the reasons for customer’s satisfaction & their dissatisfaction.

The data may be collected in two popular ways.

1. Primary data.
2. Secondary data.

1. PRIMARY DATA:

Primary data is to be collected by the concerned project researcher with relevance to his problem. So the primary data is original in nature and is collected first hand.

Collection of primary data

There are several methods of collecting primary data particularly in surveys and descriptive researches. Important ones are as follows:

1. Observation Method
2. Interview Method
3. Questionnaire
4. Schedules and
5. Other methods which include
 - Warranty needs
 - Distributor audits
 - Pantry audits
 - Consumer panels
 - Using mechanical devices
 - Through projective techniques
 - In depth interviews and

2. SECONDARY DATA:

It is the information previously existing, which has gone through some regular analysis. Under the secondary data, the company's annual reports, brochures, pamphlets, newspapers, journals and internet were taken into consideration.

VII. LIMITATIONS OF THE STUDY:

The following are the limitations of the study:

- 1) The present research is restricted to the twin cities of Hyderabad city only.
- 2) The sample size taken is only 100 customers and as such is very small as compared to the universe, this is due to the constraints of time and effort, and as such may not be enough to generalize to the entire population, however it is presumed that the sample represents the universe.
- 3) Respondents might have responded with the actual feelings of facts while giving responses to the questionnaire.
- 4) Time being a limiting factor was not sufficient to gather opinions from majority of the respondents, who form part of the universal sample.
- 5) Since this study concentrated on customer satisfaction towards BIG BAZAAR no attempt was made to study other activities of the organization. Such as finance, human resource management etc.,

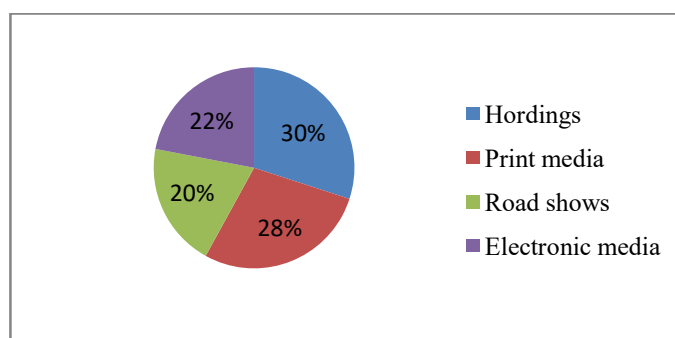
VIII. DATA ANALYSIS:

The total number of respondents of the survey is 100 from Hyderabad city only. The main aim of the survey is to know the satisfaction level of the “**BIG BAZAAR**” Services. The data collected is through primary source, through interviewing the concerned respondents by giving them a structured questionnaire, which includes few open-ended questions.

1) How did you come to know about BIG BAZAAR products?

Sl.No	Number of respondents	Percentage
Electronic media	22	22%
Print media	28	28%
Road shows	20	20%
Hoardings	30	30%
Total	100	100%

Knowing about the product:



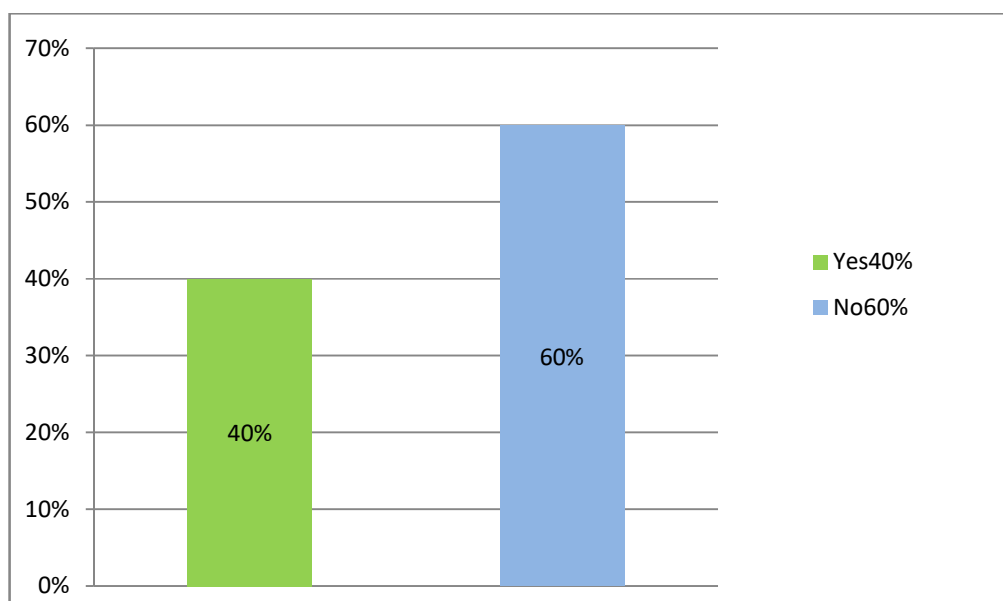
Interpretation:

30% of the respondents came to know about BIG BAZAAR products from hoardings while 28% of the respondents came to know from print media and electronic media was assumed by 22% of the respondents. A small significant 20% of the respondents replied that road shows have helped them in understanding BIG BAZAAR products

2) Did you know the customer awareness program for every month?

	Number Of respondents	Percentage
Yes	40	40%
No	60	60%
Total	100	100%

Including of activation charges:

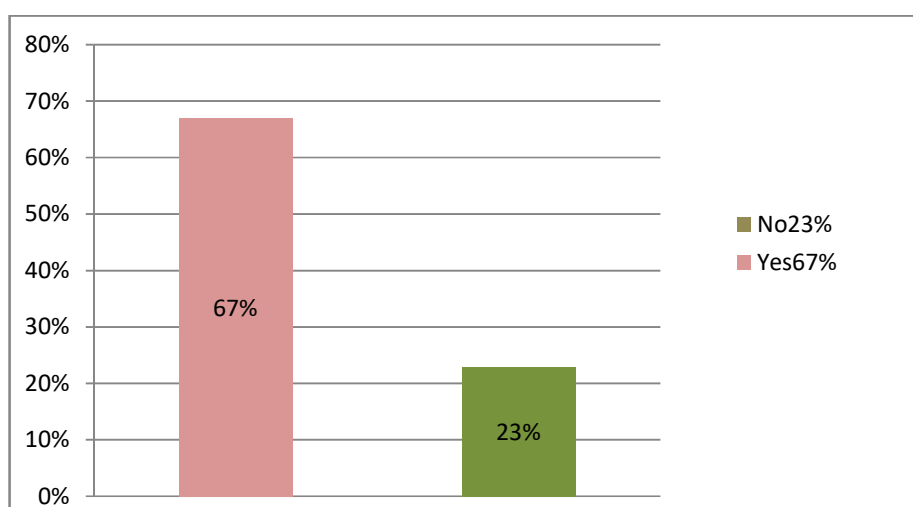


Interpretation:

The above table is indicating that, from the total respondents of the survey 40% respondents are aware of the customer program , and the remaining 60% respondents are completely unaware of this statement, due to lack of communication from the company.

03) Do you want any additional features to be included to you service in future?

	Number of respondents	Percentage
Yes	67	67%
No	23	23%
Total	100	100%

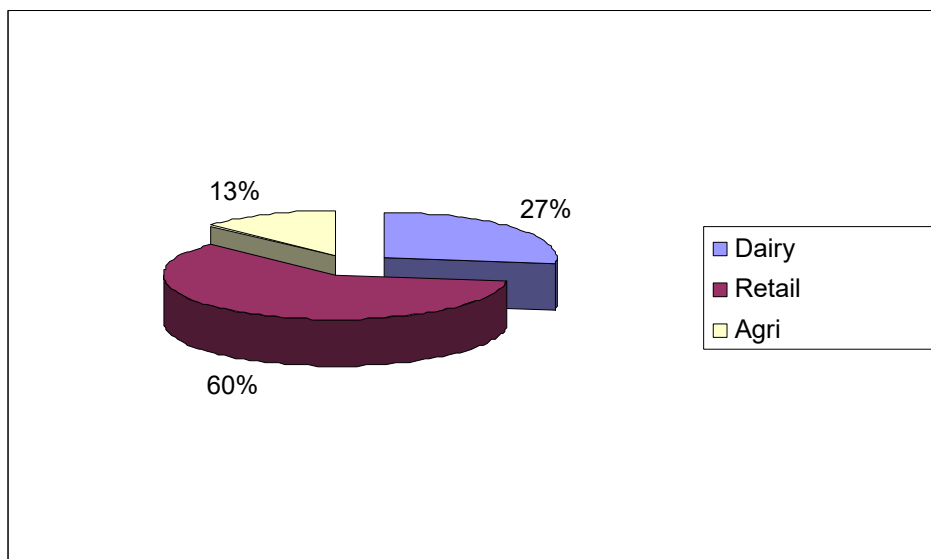
Any additional features:**Interpretation:**

From the above table it is clear that 67% of the total respondents are desirous of having some new features like call waiting, GPRS, MMS etc., to be included in this service in future, and the remaining 23% respondents do not want any changes as far as the additional features are concerned.

4) Which Kind of service are you using? Please mention?

Type of service	No. of respondents	Percentage
Dairy	27	27%
Retail	60	60%
Agri	13	13%
Total	100	100%

Kind of service:



Interpretation

From the above table it can be seen that 60% of them are using retail services, while 27% are using Dairy services, and the remaining 13% are using Agri services.

IX. FINDINGS, SUGGESTIONS & CONCLUSION:

FINDINGS:

The following are the findings of the present study:

- The coverage is limited to only urban areas hence effort should be made to increase the coverage in semi urban and rural areas as it increases the number of subscribers.
- BIG BAZAAR should create awareness amongst its customers regarding various services that are being offered by it by increasing its sales promotion reach.
- Special promotional schemes to be launched especially to target youth segment who take up the new product by having special packages.
- **BIG BAZAAR** try to focus on the after sales customer support as this is perceived to be a weak spot, and should have responsive call centers to address the needs of its customers.

SUGGESTIONS:

- **BIG BAZAAR** should increase the coverage of its all services i.e. dairy and argil and retail also, services by installing more at strategic points.
- The quality of the retail service needs to be improved in terms of clarity and connectivity.
- BIG BAZAAR should vigorously promote its retail services as compared with the competition and should concentrate on individual customers and non-commercial customers.
- BIG BAZAAR should aggressively promote its offerings in various media and should concentrate on hoardings and road shows and electronic media.
- Attractive schemes for owning the retail instruments should be launched to attract more customers.

The respondents are of **BIGBAZAAR**, and they came know about the service from hoardings, print media, primarily and through electronic media and road shows secondarily. The respondents are using BIG BAZAAR since 1 year and below 1 year in most of the cases. The service provided by BIG BAZAAR is used by majority of the respondents and the reason for choosing it is the quality of the service, followed by brand image. Customer satisfaction of the respondents towards BIG BAZAAR is high; In purchasing BIG BAZAAR products family appear to be the prime motivators of the respondents in making their purchase decisions. The respondents are paying their bills at the company show rooms, and these are also on delivery time. The respondents are desirous of having online bill payment service for convenience as it saves their time, money and effort. The instruments being providing with billing service are being well received by the respondents.

1. MARKETING MANAGEMENT

- Philip Kotler

- Philip Kotler & Gray Armstrong

- Stanton

- C.R. Kothari

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Recent Innovations In Indian Banking Sector

Gowripeddi hari kumar¹, N. Ramanjaneyulu²

Abstract

The banking sector plays a significant role in the development of a country's economy. The development of the banking sector depends on the services they provide to customers from different angles. New competitors into the market, new business models, changing customer expectations and the breakdown of traditional services are all pushing traditional banks to launch new technology in their operations. The revolution in the banking sector led to the introduction of Automated Teller Machines (ATM's), Cash Deposit Machines (CDM), Debit cards and Credit cards, Cheque Truncation System (CTS), NEFT (National Electronic Fund Transfers), RTGS (Real Time Gross Settlement), Mobile banking, Internet banking etc. However technological advances around the world have created pressure to use better technology in the banking sector. This paper highlights the diverse innovative products and services offered by Indian banks. The quoted figures are taken from secondary sources. Finally, this paper makes a critical analysis of the acceptance and acceptance of these innovations by banking customers. Primary data were used for this analysis. This paper is detailed in nature and aims to illuminate the knowledge of the readers.

Keywords: Indian Banking, ATM, Plastic Money, Fund Transfers, Mobile Banking, I – Banking.

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1. INTRODUCTION

The banking system in India has reached an outstanding position. The Indian banking sector has undergone many changes over time. In the 1990s, the banking sector in India placed a high priority on technology and innovation. Banks have started using technology to provide faster services. Internet banking and mobile banking have become convenient for customers to do their banking from geographically diverse regions. Now all banks started with the concept of multi-channels like ATMs, plastic money (credit cards, debit cards), mobile banking, internet banking and call centers. Different financial services under one roof that act like a financial supermarket. Intense competition between banks has redefined the concept of the entire banking system. Banks are not only inviting, they are looking for innovative ways to retain customers and enhance the competitive advantage over their competitors.^[1]

2. Banking System in India

The Reserve Bank of India was established in 1935 as the Central Bank for the regulation and direction of banks in India. Reserve Bank of India Divides Commercial Banks into Public Banks, Private Banks and Foreign Banks II Schedule RBI Act 1934. ^[2]

India has so far 12 public sector banks, 22 private sector banks, 56 rural banks, 44 foreign banks, 1485 urban co - operative banks and 96,000 rural co - operative banks. It is planned to increase these from 209110 by August 2020 to 407000 by 2021.

[Source: Indian Banking Industry Report (January, 2021)]

2. Evolution of banking:

Phase - I:

The first phase was from 1786 to 1969. Establishment of banks was slow during this period. The Banking Act was enacted in 1949. This has been very helpful in improving banking performance and management. At this stage people have very little faith in banks and most of them follow post office deposit.^[3]

Phase - II:

The second phase lasted from 1969 to 1991. Many decisions have been made in this area. In 1969, 14 banks were nationalized. The Credit Guarantee Corporation was set up in 1971 to provide loans for people to set up businesses. Despite the nationalization of banks, development in rural areas has not improved much. However, regional rural banks were set up in 1975 on the recommendation of the Narasimhan Committee for rural development and lending. ^[4]

Phase - III:

Phase 3 started after 1991. At this stage a variety of decisions were made to provide quality services to the people. New strategies have been implemented to keep pace with the changing times such as cash payments, online policy, ATM, net banking and mobile banking. Banks are trying to make their financial transactions easier and faster for consumers.^[5]

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3. Review of Literature:

Sanchita Sikka and Upadrasta Venkata Srinath said "Innovations in Banking Products and Services" and emphasized the circumstance that banks crucial to effect technology to provide suitable and cost effective facilities in order to have more customer holding rates. They determined that the forth coming day's growth will be in corporate finance and retail banking with Innovative products backing them.

Madhura Ayachit studies "Information Communication Technology Innovation in Indian Banking Sector: Trends and Challenges" with a goal to study the emergent technology in the Indian banking sector and ICT innovation. They said the technology must adapt to maintain market share and receive customer expectations against increasing competition.

Sandeep Kaur studied "A Study on The New Innovations in Banking Sector" in order to high point the new innovations in the banking sector on national and international level banks. Sandeep Kaur concluded that in order to endure in the new E-Economy banks essential to provide services over internet and with the latest technology.

T. Uma Maheshwari Rao and L. Himawati noted in review the importance of the Internet in providing banking services worldwide and its importance in the Indian perspective. Banks are continuing their operations electronically while changing themselves to effectively counter the current competition. This alteration indicate to regular banking to online banking, allowed customers to conduct online, although saving on various factors. Normal Banking events still overcomes in developing countries like India.

4. Objective of the study:

- To explore the innovations of banking sector in India
- To analyze the challenges to implement the innovations in banking sector.
- To know the customer perception towards implementing the innovative technology in banking.

5. Research Methodology:

This research is descriptive one. Finding and conclusions of the study is based on primary and secondary data during the course of action. The primary data was collected from 90 male and 60 female. Total sample size for primary data was 150. We had gone through the academic literature of Indian banking sector and also various sources of secondary data were used for the study.

6. Banking innovations:

Over the past few years, the banking sector in India has undergone many changes. Many banks have started adopting an innovative approach towards banking with the aim of creating more value to the customers. Information technology has led to new innovations in product design and their distribution in the banking and finance industries. The financial revolution with technological changes completely changed the banking outlook and it was additionally tuned in with the hostility in the banking industry. Challenging the business environment in the banking system creates more innovations in the product, process and market sectors. Today, there is an electronic payment system along with currency notes. The financial sector is moving in the context of having new tools along with liquidity and security. Significant developments in the new era of payment systems in

India:

- The entrance of plastic money is 1980s and early 1990s
- The arrival of ECS (Electronic Clearing Service) is 1990s
- The introduction of online fund transfers is 2000
- The RTGS (Real Time Gross Settlement) was introduced in 2004.
- The NEFT (National Electronic Funds Transfer) was in between 2005-06
- The introduction of CTS (Cheque Truncation System) was in the year of 2008.

Banks around the world are moving strategically on a technologically large scale for development. This allows them to maintain market share against increasing competition and receive customer expectations.

There is need to develop new innovations and new solutions by pleasing the benefit of data, innovative analytics, digital technologies and new distribution platforms. In 2019, the banking industry will be innovative in various fields and will have features and practices that will be the trademark of fintech startups.

Banks and credit unions are rapidly innovating by targeting, expanding, actively advising, restructuring delivery channels, integrating payments and using block chain technology. The following are the most innovative in 2019.

6. Digitalization

Digital services are essential in banking operations as technology advances rapidly and technology becomes an integral part of people's lives. This is because it is imperative to provide their services in favor of the people and to adopt new policies. In India, the early stages of digitization began in the 1980s. Core banking solutions have also been adopted to perform basic functions such as customer service, bookkeeping, etc. to improve information technology and gradually customer experience.

Many changes took place in the 1990s with the entry of the Indian market into the global market through liberalization. Private and international banks have brought new technological changes in the banking sector. Customers can avail banking facilities from anywhere such as Net Banking, IMPS (Instant Payment Service), NEFT (National Electronic Fund Transfer), RTGS (Real Time Gross Settlement), Telebanking.

7. Mobile Banking:

Even though digital services have been in place for less than ten years, all operations are done on your computer desktop. This is only possible if the customer is at home or in an area with a computer or internet connection. However, with the increase in smartphone usage, mobile banking has gained momentum. Low data charges also contribute to their use.

8. Unified Payment Interface (UPI)

UPI is online policy that has been established over the last 4 years and has revolutionized the way cash payments and cash receipts are made online.

Transactions can be completed in a matter of seconds using the interface. With the availability of services like PhonePay, GooglePay, BHIM, WhatsAppPay, etc., you can

easily do things online without any physical cash.^[6]

9.Black chain

Black chain is a powerful technological weapon that is still under development. Security is a major issue for online services. Despite the advancement of technology, online scams continue to occur. Black chain is a good approach to deal with such issues. Technology works on computer science, data structures and cryptography.

10.Artificial Intelligence:

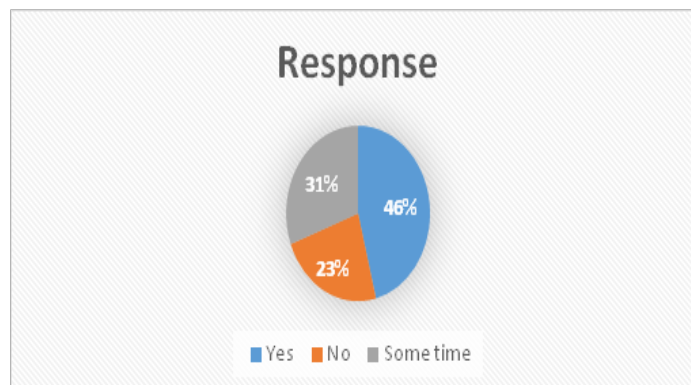
Many private banks and nationalized banks have started to use robots to support the customer services. It is still in starting

12.Analysis

The important results of this analysis are presented over the following charts.

1. Users of Online Banking / Net Banking

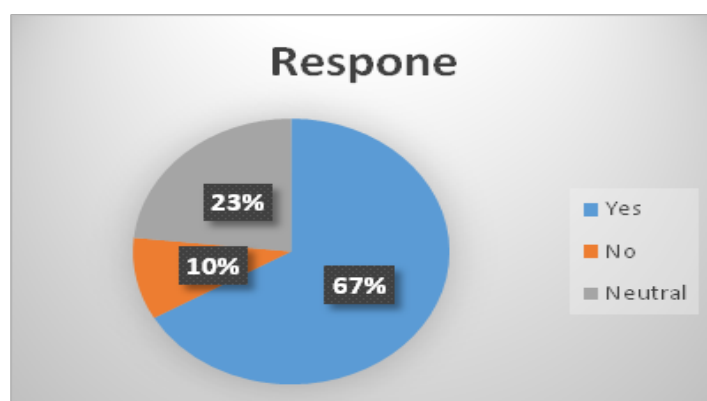
Gender / response	Yes	No	Some time	Total
Male	52	17	21	90
Female	17	18	25	60
Total	69	35	46	150



The above chart said that, 46% out of them were often used online services provided by their banks, and 31% of people use facilities some time and 23% said that they do not use banking online services.

2. Do you believe that technology-based banking service and online banking have increased banking service efficiency?

Gender / response	Yes	No	Neutral	Total
Male	65	10	15	90
Female	35	5	20	60
Total	100	15	35	150



stage. But it is sure to develop and become too accessible to the general public in near future.

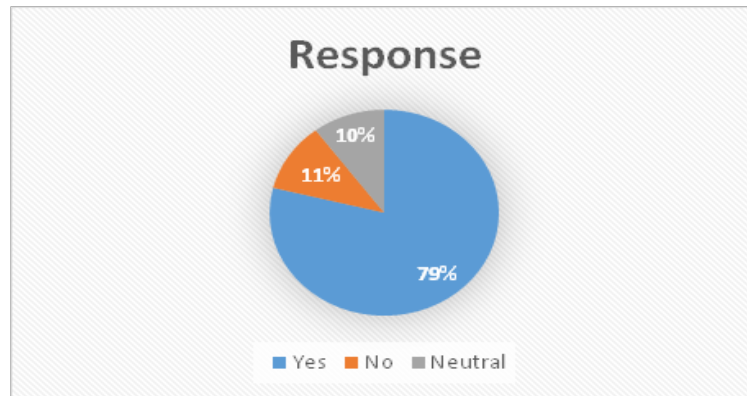
11.Fintech Companies

As banks move towards digitization, fintech has entered the field. Fintech goes a step further and makes them paperless, less existential and cashless. Fintech companies specialize in developing technologies that help companies manage the financial aspects of businesses, such as new software, applications, processes, and business models. Investment in Fintech companies has grown over the past decade, making it a multi-billion dollar industry worldwide.

In the above result said that around 67% believe technology based banking and modern banking services have improved the customer services and banking efficiency. But 23% of them did not respond. Only 10% were said that customer services not improved.

3. Banks can improve the level of customer service and bring their customers closer to the bank by adopting new technology.

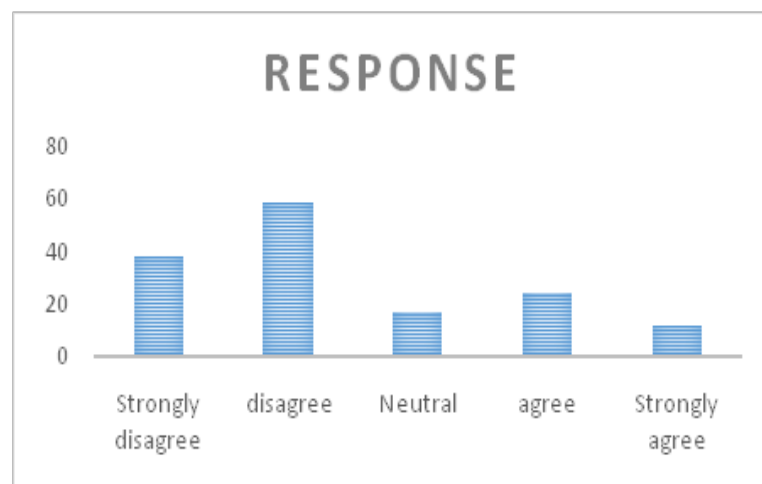
Gender / response	Yes	No	Neutral	Total
Male	69	13	8	90
Female	47	3	10	60
Total	116	16	18	150



Approximately 80% people that, by adopting new technology banks can improve the level of customer service and bring their customers closer to the bank. It clarifies that, the new improvement; 24/7 online banking, efficient banking services, easy fund transfer, net banking, online operations etc. bring customers closer to the banks. Consequently, it satisfies the customers.

4. The costs of banking service are lower than before

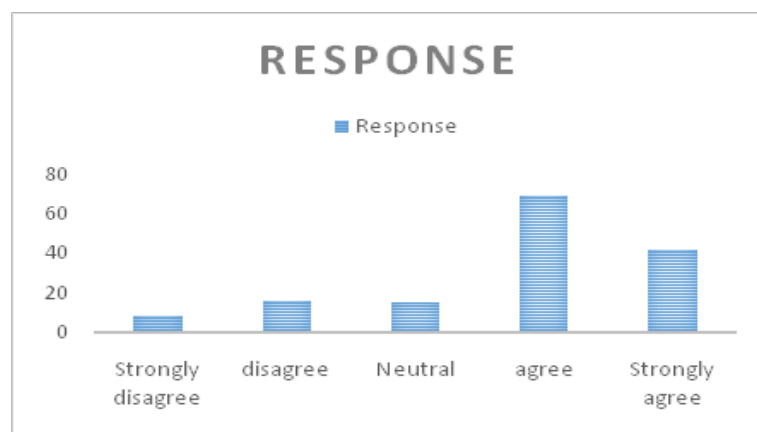
Gender / Response	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
Male	23	32	15	13	7	90
Female	15	27	2	11	5	60
Total	38	59	17	24	12	150



Here suggest that a large number of people do not think that the costs of accessing online or technology-based banking services are higher than ever before. Now a day customers can do their banking almost everywhere. Now they can get cash, send money without going to the bank but they have expenses for every facility. Many believe that costs have risen more than ever before.

5. Internet technology offers better opportunities to establish a unique strategic position compared to other traditional banking services.

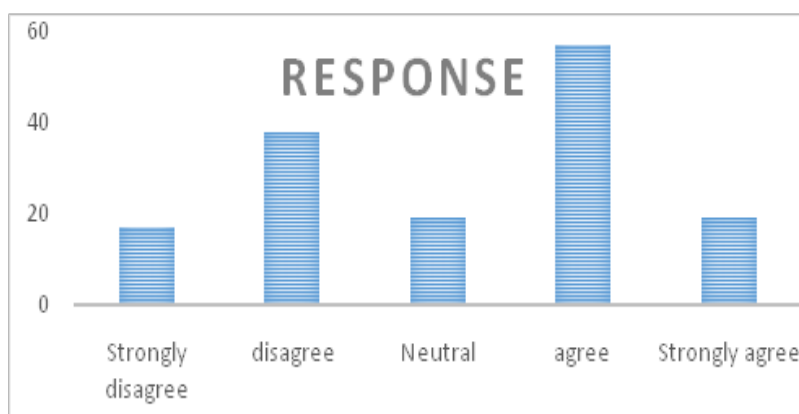
Gender / response	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
Male	3	10	14	34	29	90
Female	5	6	1	35	13	60
Total	8	16	15	69	42	150



It revealed that the majority of customers believe that Internet technology-based banking provides better services.

6. Increase customer service, satisfaction and reduce costs in the banking sector through technological innovation and implementation

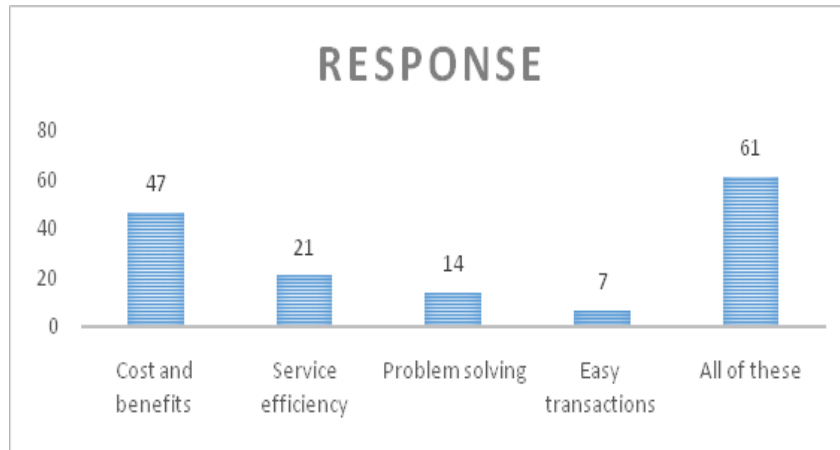
Gender / response	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
Male	10	20	16	34	10	90
Female	7	18	3	23	9	60
Total	17	38	19	57	19	150



The above result revealed that, around 50% respondents said, technology determined banking has increased customer services. Out of that 30% did not agree with the statement and 12% did not comment neither disagree nor agree.

7. Which of the following would be your first priority when you think about banking services?

Gender / response	Cost and benefits	Service efficiency	Problem solving	Easy transactions	All of these	Total
Male	29	14	11	5	31	90
Female	18	7	3	2	30	60
Total	47	21	14	7	61	150



Out of that, 40% of respondents said it wants all the benefits mentioned in the table. However, the main focus should be on reducing costs and providing greater benefits.

13.Challenges in Banking Sector

India's banking sector has made rapid progress in restructuring and is adapting to the new competitive business environment. The major challenges facing banks today are how to manage with competitive services and how to strengthen their balance sheet. These days, banks are burdened with NPAs. Those challenges were as follows:

13.1 Higher operational costs

The foremost worry before the banking industry is higher operational cost for carrying NPA's in their books. This increase has put pressure on the operational capacity of banks and the accumulation of non-performing assets (NPAs) in their credit portfolios.

13.2 Supervisory pressure

Supervisory requirements endure to increase, and banks essential to spend a huge part of their flexible budget on being obedient, and on building systems and procedures to save up with the escalating requirements.

13.3 Technological up gradation

Currently electronic transfers, clearings, and bases reduce translation time. Banks need to grasp the technology and upgrade their services to face the competition.

13.4 T revolution

Indian banks are under severe pressure for performance, otherwise their survival is in jeopardy. As the banking system moves towards virtual banking, the application of IT and e-banking will become a daily routine.

13.5 Intense competition

The Reserve Bank of the India and the Government of India

have set aside the banking industry open for participants from private sector banks and foreign banks. In line with the recommendations of the First Narasimham Committee, the Indian banking sector was introduced to the competition when access was restricted and domestic and foreign banks were allowed to expand their branch networks. A lot of new players like private banks, foreign banks, non-banking finance companies (NBFCs) etc. arrived the market due to these reduced entry barriers. Foreign banks and new private sector banks led the high-tech revolution.

14.Conclusion:

The ongoing technology revolutions around world and the increasing competition among players have led to the transformation of the Indian banking sector. Many public sector banks as well as public sector banks have already adopted technological innovations in their business practice. The Indian banking sector has developed, but customers of banking services have not yet fully followed the new path of banking. Over time, awareness among banking customers improves, leading to a better acceptance of the new type of banking. The future of the Indian banking sector is bright as more and more people are reaping the benefits of innovation in this sector.

Acknowledgemet

Nil

Funding

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ROLE OF FOOD BASED APPS IN INDIA

P. DADAPEER¹, N. RAMANJANEYULU²

Abstract

Getting food through online food apps has gained momentum in recent times. Online tools have shown a new perspective on the food industry. Online allows consumers to choose the food of their choice anytime, anywhere. Facilities like net banking and digital wallet payments, cash on delivery and minimum order value attract the customer well. Distances between City and Village have been reduced due to the widespread use of smart phones. Companies are making their services available online according to the convenience and preference of the customer to keep pace with the changing times. Due to the present Covid-19 pandemic situation, the online food delivery system is gaining momentum. In this research, we will specifically look at the growth and significance of digital apps in food delivery systems operated by food companies in India in specific and some of the approaches they can accept for maintainable business in the coming days and challenges faced by the company.

Keywords: Foods Apps, Food Industry, Online Payments, Smart Phone Revolution, Customer Perception, Food technology.

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1. INTRODUCTION

Online food delivery means ordering food online from a nearby hotel or restaurant. It also allows you to order and pick up items online, as well as pick up food online from the hotel of your choice. The amount for the food can be paid by plastic money (debit card or credit card) or after receiving the order. A portion of the amount paid will be refunded to the online food company.

Due to the time constraints of the current busy schedule, these online food apps allow you to get the food of your choice to the place you want. This means that it is more popular with the customer because of the availability of these services online. Customers can easily access competing service providers at competitive prices and at the same time they can also get input from their peers through social media, which affects their final purchase decision.

2. ORIGIN AND BACKGROUND

The process of ordering food online first began in 1994. The first to order and deliver pizzas online from Pizza Hut. The first online food ordering service, Worldwide Waiter (now Waiter.com), was founded in 1995.

Total population of over 1.2 billion, India today is one of the leading customer marketplaces in the world. Fifty percent of this population is under twenty five years of age, creating India one of the youngest countries in the globe. Furthermore, the large number of middle class Indians is predictable to reach five hundred and fifty million by the year 2025. In

addition, electronic commerce is projected to grow from US \$ 2.9 billion in 2014 to \$ 100 billion by 2021, making it the speed growing e-commerce market in the globe.

In this context it should be noted that the majority of fast food demand shows a growing trend towards those aged between 10 - 40 years. The recent increase in the number of young Indians working productively in sectors such as IT services has increased the spending capacity of individuals. According to figures provided by the World Bank, there has been a fifty percent increase in per capita income since 2006. This growing appetite and the spending potential of young Indians have made the food industry an attractive and lucrative area to start a business. With this significant growth in the online food and restaurant service industry, the gross value of the online food and restaurant industry is projected to reach \$ 2.8 billion by the end of 2019, a significant leap from \$ three hundred millions in 2016. Along with young Indians fueling the growing demand for online food delivery services, the rise of dual-income families in urban India, where both parents work, is dramatically changing the way people live in subtle and important ways. Changes in routines, lifestyle and eating habits have increased the demand for easily accessible and good quality food. It is projected that almost ninety two percent of small families who want or take out fast food do so to save time and energy, rather than making meals at home. Also, the upsurge in the number of working women and the increase in non-renewable income has proven to

be a key demand driver.

3.LITERATURE REVIEW

Cornell Hospitality Reports. Kims and P. Lock has printed an article entitled 'Online, Mobile and Text Food Ordering in the US Restaurant Industry'. It surveyed the top three hundred and six U.S. restaurant chains. Out. It shows that the industry is slowly accepting electronic collation in the form of online, mobile and text orders. Benefits of Electronic Order Improved sales, particularly through automatic upsurge and storage of order information, encourage customers to repeat their previous orders with a single click. Apart from the cost of installation and operation, the main disadvantage of electronic ordering is the ability to expand the rush time volume, which is likely to overwhelm the kitchen.

Cornell University School of Hotel Administration has published a paper entitled 'Consumer Awareness of Electronic Food Ordering'. Researcher Sheryl E. Kims surveyed four hundred seventy online users and originate that almost half of them ordered food online through online food delivery apps or through text messages. The study showed that the main reason for electronic ordering given by those who placed the order (customers) was that they gained convenience and control. The main factor deterring those who do not order through the electronic channel (non-consumers) is the desire for interaction (although technical concern is also a factor).

In the research paper 'Consumer Experiences, Attitudes and Behavioral Intent towards Online Food Delivery (OFD) Services', released by Vincent Chiev Cernoyo, C-Kwang Goh, Sajad Rezoy, researchers studied the constructive relationship between positive motivation and post-utility, Hedonic motivation, price saving trend, time saving trend, online shopping experience, consumer attitude and behavioral intent towards online food delivery (OFD) services. They conclude that consumers are attracted to technology that can provide them with comfort by saving time and effort. Therefore, the website must be user friendly and be able to process the customer request as quickly as possible. In return customers are able to complete the transaction quickly, which is beneficial to both customers and sellers. Some discounts or promotions attract price-sensitive customers because they are more likely to choose the channel as it offers the best value for money.

According to Varsha Chavan et al., the use of a smart device-based interface to view and navigate orders from customers has enabled restaurants to quickly handle orders from customers. Wireless announcement and smartphone technology competences in satisfying and educating business organization and service distribution. Their analysis is that the system is flexible, efficient and easy to use, which is expected to improve the overall restaurant business in the years to come.

Under the title 'Factors Affecting Behavioral Intent to Use Food Delivery Apps' in the Lee E, Lee S, and Xian Yon study, the authors discuss the relationship between decision makers affecting consumer use of food delivery apps. Using an expanded technology acceptance model, they explored consumer experiences in purchasing delivery food through mobile apps. Hypotheses were tested by using the self-management questionnaire online and modeling the structured equation used. In conclusion, it was found that user-generated information, company-generated information, and system quality have a significant impact on perceived use. In addition,

system quality and design quality have strongly influenced perceived usability, which has improved perceived usability, and perceived useful feel and ease of use has influenced attitudes towards the use of mobile apps.

4.OBJECTIVES

1. To study the origin and growth of online food delivery Apps
2. To analyze the approaches of food delivery apps by companies.
3. To identify the challenges of online food delivery Apps.

5.RESEARCH METHODOLOGY

This research has been conducted by secondary data. The data has been gathered via various magazines, journals and online portals so on.

6.GROWTH OF ONLINE FOOD DELIVERY IN INDIA

The huge increase in the number of vehicles and the huge population density leading to high traffic jams, which is more prevalent in metropolitan cities like Delhi, Mumbai, Kolkata and Chennai, has seen a growing trend towards households that prefer to use online food delivery app services rather than cooking at home.

In a recent survey, more than 80% of food orders came out not only from the top 5 metropolitan cities in India, but also exclusively through online food delivery services. The "dining out" culture is now leading to the "eating in" culture. Worldwide food brands are now consolidation their association with food delivery service suppliers such as Zomato and Swiggy. Recently, Cafe Coffee Day launched Chain Virtual Restaurant, the largest indigenous coffee shop in India, offering orders only through Uber. Currently, the Indian online food delivery market is valued at \$ 7 billion. The market is largely occupied by Jomato and Swiggy, who have an 80% share.

7.Swiggy

Swiggy was founded in 2014 in office space by Birla Institute of Technology and Science Pilani alumni Nandan Reddy and Sriharsha Majeti. It started with a neighborhood, six delivery executives and twenty five partner restaurants. It now has partnerships with forty thousands restaurants and thirteen thousands delivery executives in twenty five cities. It currently has a market value of \$ 1.2 billion and approximately \$ 460.5 million in funding.

In 2017, Swiggy was named the 2017 Startup of the Year Awards by the Economic Times Startup of the Year. Co-founders Rahul Jaimini and Nandan Reddy are also listed in the Forbes thirty list. With a backdrop and best industry average delivery time of thirty seven minutes on this list, Swiggy tops the online food delivery market among most competitors.

8.Zomato

Zomato was originally founded as Foodiebay in 2008 and later renamed Zomato in 2010 by Deepinder Goyal and Pankaj Chadha. By 2011 Zomato had expanded to Bangalore, Pune, Chennai, Hyderabad and Ahmedabad and by 2012 it had expanded to the UAE, Sri Lanka, Qatar, the UK, the Philippines and South Africa. It currently operates

in 24 countries.

Zomato came up with an innovative concept called Cloud Kitchen. Over this invention restaurants can increase their business without experiencing any permanent costs. Zomato's market value is now estimated at approximately \$ 2 billion, with Alibaba payment subsidiary Ant Financial holding a nearly ten percent possession stake. Furthermore, Zomato has also picked up twelve startups globally. Despite numerous security breaches and controversies, Zomato continues to be one of the top competitors in the online food delivery market, despite being severely behind in achieving their goal. Zomato also propose made to order consumer service and multiple compensation options. With the availability of all services such as breakfast and dinner.

9.Uber Eats

The company was created in 2009 by Garrett Camp as a carrying network company. It now offers a wide range of services such as ride sharing, taxi cab hailing, bicycle sharing system and food delivery. The company made its first attempt at food delivery in August 2014 in Santa Monica, California. It has gradually begun to expand its network to other cities across the USA and is now present in over two hundred and fifty cities.

The Uber Eats app has been launched separately from their app for Uber Rides. Users can pay for menu, order and food from participating restaurants using their device on iOS or Android platforms or through a web browser. Customers may additionally tip for delivery. The app detects the user's location and displays restaurants separately from those that were closed at the time. Credit / debit card payment will be charged on file with Uber. Meals are delivered by cars, bikes or pedestrian couriers. Upon ordering, the customer will be notified of the total price including delivery fee and meal price. Customers can track the status of delivery after ordering. Uber Eats launched in India in May 2017. In India, the Uber Ride app has been integrated with the Uber Eats app so that the rider can choose to order meals during the ride. Although Uber seems to be a late entrant in the online food delivery app in India, they claim that other online food delivery giants in India, Jomato and Swiggy, have paved the way for them by building a strong market for themselves. Since entering the Indian market, Uber Eats has grown seven times in order volume and they add nearly four thousands and five hundred delivery partners each week. Globally, they have nearly 400,000 active delivery partners. Uber Eats contributes thirteen percent of Uber's gross bookings.

10.Approaches of food delivery apps by companies.

Online ordering:

With the advancement of technology, online ordering has now become the most preferred medium for ordering food. There are a lot of famous food delivery service providers amongst the customers like Foodpanda, Zomato ,Swiggy, etc. You can choose any service depending on your needs and preferences. You may also have your own restaurant online ordering mobile app or website which can be integrated directly into your point of sales.

If you are consuming more than 1 online ordering service, it is imperative to choose the point of sales that automatically collects orders through various online ordering services. This makes it difficult for you to manually count orders at the end

of the day. Applying knowledge can improve your food delivery service and online ordering familiarity for you and your consumer.

Make sure your website is SEO optimized and has a clear CTA. If disordered, deliver on to find out how you can improve your restaurant website to charm more online transactions.

11.Save clear message

Phone ordering is still prevalent, but it can also prove inefficient. Chances are that your staff will accidentally delete the wrong orders, or that a customer will not explain his order properly. Make sure your staff is properly trained to communicate well with customers over the telephone. Train them to make a decent person in perfect order, without any distinction. Make sure customers understand that you offer options in clear order and so place their orders.

Assign status balls with commands and technology we can use technology to our advantage with allotted orders to your restaurant delivery proxies, and then track them after orders have been sent. Through the point of sales is delivery application, you can assign free riders orders. You can track the entire delivery process to assess driver performance and positive routes. It helps you record the time you send and take the time it takes to deliver orders to track and analyze your delivery staff. This module also helps to classify customers according to their order data and maximize home delivery orders based on data.

12.Source of delivery drivers

3rd party restaurant delivery partners such as Zomato, Swiggy, Foodpanda, etc., or subcontracting self-employed distribution drivers to suit your needs, you no longer have to invest in delivery boys and vehicles. Subcontracting distribution drivers is an inventive way to decrease delivery time during unanticipated urgency . It also reduces the cost of such insurance and hourly food supplies.

It averages seventy percent of all restaurant orders that protect children from having children delivering online ordering at home, and almost all restaurants are expected to produce, merging with various online delivery companies.

12.Correct address and customer message

Preparation can take a long time with most restaurant delivery orders are delayed, but can also take a long delivery time. Your delivery can seem daunting reaching the address given by the guys. This is a small hurdle that can be easily managed with proper communication by customers. Confirm the address and call the customer before taking their order for delivery to ask for the appropriate landmarks if the address seems incomplete. Also, use a customer relationship management software to avoid asking for address name, contact details and details every time the user handles the address. Provide your riders with global positioning system to help them identify customer addresses.

13.Pay attention to packing

Packaging or delivering food that the breaks down restaurant delivery sales is a key. Make sure you pack food neatly so that the food is in good condition and not spilled. Ideally, the food should be good to eat as it is served in a

restaurant. You can also use the packaging to create a brand recall for your restaurant. Make sure the restaurant's logo and theme are displayed on the package.

14. Standard delivery procedure

Restaurant Own Sourcing Restaurant delivery partners will not compromise your service capacity to you. Assign kitchen staff and delivery driver's specific delivery responsibilities. Our outsourced delivery drivers must be proficient in their coverage area and make sure your home kitchen staff knows who is responsible for ordering supplies so they keep orders ready. This gives drivers more time to definitely match content and avoid any mistakes.

15. CHALLENGES

The main problem leading to closure of online food delivery startups is that most of them still have not touched a significant portion of the value chain. Referring to a report available by Readymade & Off-Premise, sixty percent of customers' texture that the food they order and eat at a dine-in restaurant tastes the same and forty percent of customers want the same level of freshness.

Additional fundamental cause for the letdown of numerous online food delivery startups is that they are carbon duplicates of each other and lack whole modernization.

These online food delivery service providers are constantly facing the following challenges:

- Lack of appropriate transport control - timely delivery problems and deficit of distribution staff
- The attitude of customers 'on the fence' does not mean loyalty
- Inability to handle large orders (meal - take and take)

16. CONCLUSION:

With the constant flood of professionals in India and the rapid urbanization in India, the food delivery and restaurant sector is now thriving. Currently, many food delivery apps in the Indian market are available for download on smartphones and can order food from their homes. Currently, cash on delivery is the most preferred option of payment, but other digital techniques are also seeing significant growth.

It is safe to say that online food delivery apps are not a passing step and in order to keep up with the growing demand and competition they need to constantly monitor their activities and processes, re-examine and be sensitive to opportunities. There is a huge market for online food delivery startups as consumers are now spending less time preparing food for a variety of reasons such as wage increases, less free time and work stress. Therefore, it is now a waiting game to see how the industry progresses and develops.

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A Study on Inventory Management of Kesoram Cements

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Abstract: *The study examines the concept of the “Inventory management” in relation to the “Kesoram cements”. Inventory is defined as a usable resource, which is physical and tangible such as material, and our stock is our inventory. Though inventory is a usable resource, it is also a idle resource, unless it is managed efficiently and effectively. Inventory management boils down to maintaining an adequate supply to meet the expected demand pattern subject to budgeting consideration. Effectiveness of materials and production functions depend to a large extent upon inventory management. The investment on raw material should be made as per the requirement. Unnecessary investment may block up the funds. Neither too high nor too may inventory turnover ratios reduce profit and liquidity position of industry. S, proper balance should be made to increase profit and to ensure liquidity. The raw material should be acquired from the right source at right quality and a right cost. The process that was being used by KESORAM CEMENTS with purchasing department should undergo changes, so that, it seeks enhance the celerity of delivery of a product without compromising its quality by improving the utilization of material, labor and equipment. To reduce the work, purchasing department may enter the purchasing orders into a data base and did not send to a copy any one. When the merchandise arrived, the receiving clerk would enter the database and determine whether the order agreed with the electronic purchase order.*

Key Words: ABC analysis, Inventory management, Inventory control, Material Management.

I. INTRODUCTION

Raw material form a major input into the organization. They are required to carry out production activities uninterruptedly. The quantity of raw materials required will be determined by the rate of consumption and the time required for replenishing the supplies. The factors like the availability of raw material and Government regulations etc., too affect the stock of raw materials.

Compared to larger organizations with more physical space, in smaller companies, the goods may go directly to the stock area instead of a receiving location, and if the business is a wholesale distributor, the goods may be finished products rather than raw materials or components. The goods are then pulled from the stock areas and moved to production facilities where they are made into finished goods. The finished goods may be returned to stock areas where they are held prior to shipment, or they may be shipped directly to customers. Inventory management uses a variety of data to keep track of the goods as they move through the process, including lot numbers, serial numbers, cost of goods, quantity of goods and the dates when they move through the process. Almost 60% of cash is allocated

for the stock in an undertaking. Materials Management is identified with arranging, securing, putting away and giving the suitable material of right quality, right amount at correct place in opportune time in order to co-ordinate and calendar the creation movement in an integrative route for a mechanical endeavor. Stock Management is basically the procedure by which an association is provided with the products and enterprises that it needs to accomplish its goals of purchasing, stockpiling and development of materials. Stock administration frameworks are key to how organizations track and control inventories. Being able to quantify stock in an opportune and exact way is basic for having continuous business activities since stock is regularly one of the biggest current resources on an organization's accounting report. Stock is a rundown for products and materials, or those merchandise and materials themselves, held accessible in stock by a business. Bookkeeping stock is viewed as an advantage. Stock administration is required at various areas inside an office or inside different areas of a supply system to item the customary and arranged course of generation against the arbitrary unsettling influence of coming up short on materials or merchandise.

II. REVIEW OF LITERATURE

Bern at de William year 2008 This study tells that the main focus of inventory management is on transportation and warehousing. The decision taken by management depend s on the traditional method of inventory control models. The traditional method of inventory management is how much useful in these days the author tell about it. He is also saying that the traditional method is not a cost reducing, it is so much expensive. But the managing the inventory is most important work for any manufacturing unit.

Jon Schreibfeder 1992 He said that it is easy to turn cash into inventory, the challenge is to turn inventory back into cash. In early 1990's many distributor recognize that they needed help controlling and managing their largest asset inventory. In response to this need several companies developed comprehensive inventory management modules and systems. These new package include many new features designed to help distributors effectively managed warehouse stock. But after implementing this many distributors do not feel that they have gained control of their inventory.

study Mr. W.Bagby 2017 Wolf Bagby, Managing inventory In this explains that by managing the inventory it becomes easier for the organization to meet the profit goals, shorter the cash cycle, avoid inventory shortage, avoid excessive carrying costs for unused inventory, and improve profitability by decreasing cash conversion and adopt JIT system. According to this study companies need to get smart about inventory.

D.Hoopman April 7, 2003 (Article from inventory planning and optimization) In this article he said that inventory optimization recognize that different industry have different inventory profiles and requirements. Research has indicated that solutions are priced in a large range from tens of thousands of dollars to millions of dollars. In this niche market sector price is definitely not an indicator of the quality of solution, ROI and usability are paramount.

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Silver, Edward A Dec22, 2002 The existence of budget to be allocated among the stocks of the items and a purchasing production facility having the capability to process at most a certain number of replenishment per year. Because of the constraint the individual replenishment quantities cannot be selected independently.

Delaunay C, Sahin E, 2007. A lots of work has been done but now if we want to go ahead we must have good visibility upon this field of research. That is why we are focused on frame work for an exhaustive review on the problem of supply chain management with inventory inaccuracies. The author said that their aim in this work is also to present the most important criterion that allow a distinction between the different types of managing the inventory

(Das, Bivash , & Onkar , 2012) Incorporation of appropriate inventory management system plays an important role in determining the financial health of a manufacturing company. Since it is difficult to apply proper inventory control model for each item separately because of its huge variety, it is necessary to find out few significant items using ‘Selective Control’ method. ABC and FSN analyses along with XYZ analysis are done. The analysis shows the state of the present inventory management.

(Sharma & Vivek , 2016) Inventory management has to keep accurate records of goods. It is important for keeping cost down. The better inventory management will surely help in solving problems the company would be facing with respect to inventory and will help in reducing huge investment or blocking of money in inventory. There should be tight control over stocks based upon ABC analysis. If we execute and follow the all the techniques of inventory management, we will be able to enhance the profit with minimum cost.

(Smith, 2011) The inventory management practices of six major companies/institutions in various industries were compared with recommendations for improvement by using the ABC analysis inventory management method. The ABC analysis tool was found to be beneficial to most companies. With several companies already utilizing the basic principles behind the method, either manually or with the use of an enterprise resource planning (ERP) system.

III. NEED FOR THE STUDY:

- Every industry on average spends 70% on raw materials (inventory). Therefore there is a need to know the raw material cost and also there is a great importance to understand the inventory management system of this industry.
- The study helps as a log to various departments to take steps to control the inventory process.
- Inventory management is a very simple concept – don’t have too much stock and don’t have too little. Since there can be substantial costs involved in straying above and below the optional range, careful inventory management can make a huge difference in the profitability of a business.
- Although the concept is simple, the process of getting the right balance can be quite a complex and time consuming task without the right technology.
- There are two fundamental questions must be answered, in order to manage the inventory of any physical item – when to order and how much to order.

IV. OBJECTIVES OF THE STUDY:

1. To examine the organization structure of inventory management in the stores of Keasoram Cements.
2. To discuss pattern, levels and trends of inventories in Kesoram Cements.
3. To understand the various inventory control techniques followed by studied by kesoram Cements.
4. To access the performance of inventory management of the Kesoram Cement by selected accounting ratios.
5. To know the inventory control techniques of Kesoram Cements.

V. SCOPE OF THE STUDY

1. The Scope is limited to the operations of “**KESHORAM CEMENT**”.
2. The Information obtained from the Secondary Data of “**KESHORAM CEMENTS**” only.
3. The key Information Performance Indicators from 2016-2020 were only taken.
4. The Profit & Loss, the Balance Sheet was as on last 5 years.
5. Comparison Analysis was done in Comparison of Sister Units.

VI. LIMITATIONS OF THE STUDY:

1. The study is limited only for a period 5 years i.e., from 2016 -20.
2. The limitations of ratio analysis can be applicable of the study.
3. There may be approximation in calculating ratios taking the figure from the annual reports.

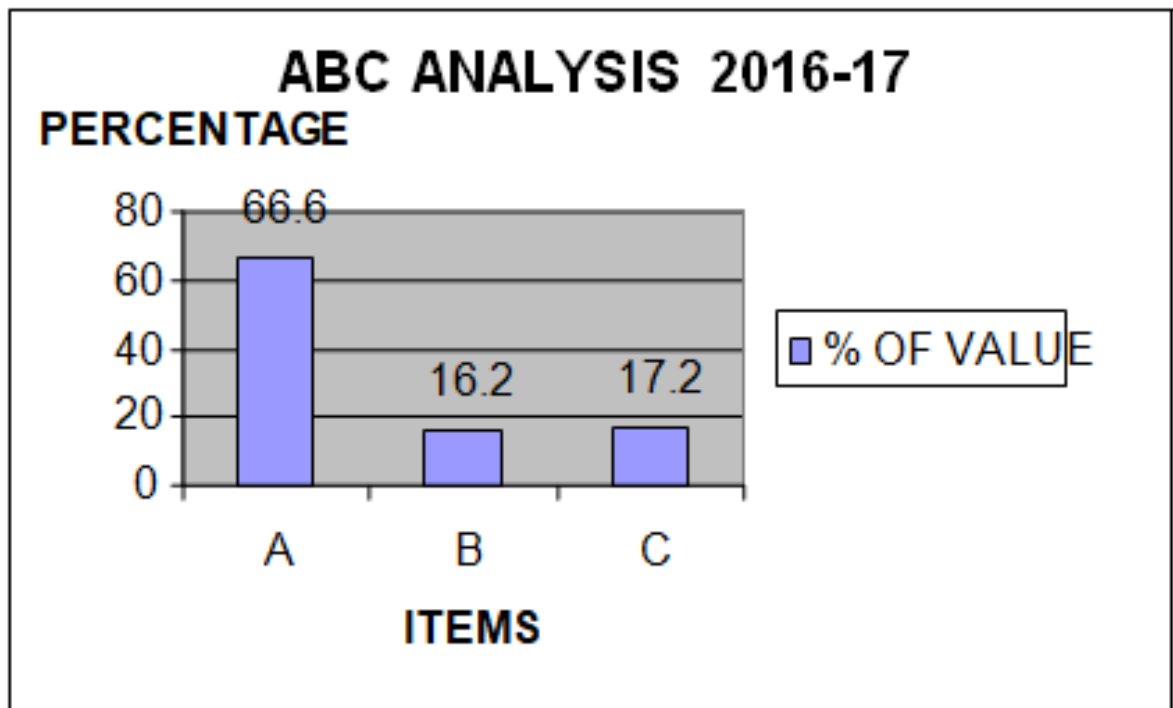
VII. Empirical Results

(A) ABC Classification Of Inventory For 2016-17

CLASS	NO.OF ITEMS	VALUE	% OF VALUE
A	3	69850963	66.6
B	2	17018547	16.2
C	4	1785139	17.2
TOTAL	9	104744649	100

Table No:1.1 ABC Analysis of Kesoram Cements Ltd., 2016-17

Source: Author's Compilation



Graph No:1.a ABC Analysis of Kesoram Cements Ltd., 2016-17
Source: Author's Compilation

From the analysis it is observed that In the indicates in the year 2016-2017, there are 3items in the total value which comes under "A" category, 2 items in the total value which comes under "B" category and 4 items in the total value which comes under "C" category. In the year 2017-2018, there are 2 items in the total value which comes under "A" category, 3 items in the total value which comes under "B" category and 4 items in the total value which comes under "C" category. In the year 2019-2019, there are 3items in the total value which comes under "A" category, 2 items in the total value which comes under "B" category and 5 items in the total value which comes under "C" category.

Further, in the year 2019-2020, there are 3items in the total value which comes under "A" category, 2 items in the total value which comes under "B" category and 3 items in the total value which comes under "C" category, In 2020-2021, there are 2items in the total value which comes under "A" category, 3 items in the total value which comes under "B" category and 5 items in the total value which comes under "C" category. During 2015-20 indigenous items like quick set 520 and quick set 510 are increased annual demand based on the company orders respectively. Further the item wise economic order cost in the year 2016 indigenous items like slag remover and INOPIPE increased based on the company orders respectively. It is observed that In the year indigenous items like 2016 slag remover and 2016 INOPIPE are increased based on the company orders and the EOQ respectively. In the year 2018 silica sand, sieved sand EOQ and company orders are decreased when compared to 2020-21 respectively. The Inventory turnover ratio for the year 2020-21 is 5.00 and there is a gradual decrease to 4.69 and year by year increased. Further, Inventory conversion period for the year 2015-16 is 35 and there is a gradual increase to 2016-17 78, 73 and 58, 47 for the year 2017-18, 2019-20.

VIII. FINDINGS, SUGGESTIONS & CONCLUSION

Findings

- In the above table indicates in the year 2015-2016, there are 3 items in the total value which comes under "A" category, 2 items in the total value which comes under "B" category and 4 items in the total value which comes under "C" category
- In the above table indicates in the year 2016-2017, there are 2 items in the total value which comes under "A" category, 3 items in the total value which comes under "B" category and 4 items in the total value which comes under "C" category.
- In the above table indicates in the year 2017-2018, there are 3 items in the total value which comes under "A" category, 2 items in the total value which comes under "B" category and 5 items in the total value which comes under "C" category.
- In the above table indicates in the year 2018-2019, there are 3 items in the total value which comes under "A" category, 2 items in the total value which comes under "B" category and 3 items in the total value which comes under "C" category.
- In the above table indicates in the year 2019-2020, there are 2 items in the total value which comes under "A" category, 3 items in the total value which comes under "B" category and 5 items in the total value which comes under "C" category.
- In the year of 2015-20 indigenous items like quick set 520 and quick set 510 are increased annual demand based on the company orders respectively.
- In the above table indicates the item wise economic order cost in the year 2015 indigenous items like slag remover and in pipe increased based on the company orders respectively
- The above table indicates the item wise economic order quantity in the year 2017 indigenous items slag remover and 2018 in pipe increased based on the company orders and the EOQ respectively
- In the above year indigenous items like 2015 slag remover and 2018 in pipe are increased based on the company orders and the EOQ respectively.
- In the year 2016 silica sand, sieved sand EOQ and company orders are decreased when compared to 2018-19 respectively
- Inventory turnover ratio for the year 2019-20 is 5.06 and there is a gradual decrease to 4.69 and year by year increased.
- Inventory conversion period for the year 2015-16 is 35 and there is a gradual increase to 2018-12 78, 73 and 58, 47 for the year 2019-20, 2020-21.

Suggestions

- 1) Though the production is higher during the year 2019-20 and the sales were very high that is as per inventory conversion period it took 54 days. This shows that there is demand for cement and the funds unnecessarily tied up. So, proper demand forecasting should be done and according to that it may be manufactured.
- 2) The investment on raw material should be made as per the requirement. Unnecessary investment may block up the funds.
- 3) Neither too high nor too may inventory turnover ratios reduce profit and liquidity position of the industry. So, proper balance should be made to increase profits and to ensure liquidity.
- 4) The raw material should be acquired from the right source at right quality and at right

cost.

- 5) The process that was being used by Kesoram Cement with the purchasing department should undergo changes, so that, it seeks enhance clarity of the delivery of a product without compromising its quality by improving the utilization of material, labor and equipment.
- 6) To reduce the work, the purchasing department may enter the purchasing order in to a data base and did not send a copy to any one. When the merchandise arrived, the receiving clerk would enter the data base and determine whether the order agreed with the electronic purchase order. If it did, payment was authorized to be made at the appropriate time. If it didn't match, the order would be returned until if it is agreed by the Kesoram Cement. If it institutes "invoice less purchasing" where the supplier did not need to send and invoice to be paid. Generally simplifies the process for all concerned. As a result it would be able to reduce the work of its accounts payable department.

Conclusion

Over all the inventory of Kesoram Cement is up to the mark. Investment on raw materials are 2010.10 lakhs which is very high as compared to 2019-20 which is only 65.32lakhs. The inventory turnover ratio shows that the stock has been converted into sales in only 4.69 times. In the year 2017-18 the stock was cleared within 41 days whereas it took 52 days in the year 2019-20 which took more days for clearing stock. Year 2017-18 is not showing sample profits. This is because of cement prices have been continuously under pressure due to persistent mismatch between supply and demand. In this type of process, it requires more number of employees and supplier should also wait for until the accounts are matched. This process takes an input, adds value to it and provides an output to an internal or external customer.

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A PROJECT REPORT ON EMPLOYEE RETENTION PIXENTIA, HYDERABAD

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ABSTRACT

Employee Retention is a challenging concern of the organization. This study stressed on Employee Retention strategies. Employees are the assets of the organization. To retain skilful and committed employees in the organization, management should take care of employee satisfaction. Find out the reasons of employee turnover and overcome this. The purpose of this study is to prove how employee retention is essential in this day and age, and if the organizations are not awake to the situation and immediate actions are not taken to that effect, what repercussions lay ahead and how they would affect the organization and the industry.

Key Words: Employee Retention, Reasons of Employee Turnover, Strategies of Employee Retention.

INTRODUCTION

Employee retention is a process in which the employees are encouraged to remain with the organization for the maximum time or until the completion of the project. Employee retention is beneficial for the organization as well as the employee. Employees today are different. They are not the ones who don't have good opportunities in hand. As soon as they feel dissatisfied with the current employer or the job, they switch over to the next job. It is the responsibility of the employer to retain their best employees. If they don't, they would be left with no good employees. A good employer should know how to attract and retain its employees.

Most employees feel that they are worth more than they are paid. There is a natural disparity between what people think they should be paid and what organizations spend on compensation. When the difference becomes too great and another opportunity occurs, turnover can result. Pay is defined as the wages, salary, or compensation given to an employee in exchange for services the employee performs for the organization. Pay is more than "dollars and cents;" it also acknowledges the worth and value of the human contribution. What people are paid has been shown to have a clear, reliable impact on turnover in numerous studies.

Employees comprise the most vital assets of the company. In a workplace where employees are not able to use their full potential and are not heard and valued, they are likely to leave because of stress and frustration. In a transparent environment, while employees get a sense of achievement and belongingness from a healthy work environment, the company is benefited from a stronger, reliable workforce harbouring bright new ideas for its growth. [Blog Online And Earn Money.](#)

NEED FOR THE STUDY

Successful employee retention is essential to an organization's stability, growth and revenue. Organizations can achieve employee retention by developing strategies. By knowing the level of satisfaction of employee retention in different departments. It is easy to formulate the strategies and myths are being followed in PIXENTIA INDIA SOLUTIONS PVT LTD. To maximize the employee retention in the organization. A comprehensive Employee retention survey is to be carried out in PIXENTIA INDIA SOLUTIONS PVT LTD. so that the rates of employee Retention are taken into account, a management deficit is defined and to suggest for improvement in employee Retention. Employee Retention is the prerequisite for establishing a healthy organizational .

LIMITATIONS OF THE STUDY

- Time is very short for research, so this is very difficult to get knowledge about everything.

- Since the filling of questionnaires and interviews need special attention maybe the employees are less interested in entertainment.
- The information collected through the questionnaire is subject to the willingness of the respondent to respond.

REVIEW OF LITERATURE

1. According to BIDISHA LAHKAR DAS & DR. MUKULESH BARUAH, in their article **“Employee Retention (2013)”** they identified Any organization's lifeblood is its human resources. Even though the majority of businesses today are tech-driven, technology still needs human resources to function. They are an organization's most important and versatile resource. There is intense competition in the market as a result of overall economic development in all sectors.
2. According to SHARON RUVIMBO TERERA & HLANGANIPAI NGIRANDE (2014) in their article **“THE IMPACT OF REWARDS ON JOB SATISFACTION AND EMPLOYEE RETENTION (2014)”** they identified that How rewards affected nurses' job satisfaction and retention of staff members. The goals of this study were to ascertain whether rewards have affection, establish whether there is a link between rewards and job satisfaction, and establish the link between job satisfaction and employee retention.
3. According to OMER CLOUTIER in his article **“THE IMPORTANCE OF DEVELOPING STRATEGIES FOR EMPLOYEE RETENTION (2015)”** he identified that the performance of an organization will ultimately benefit from an employee staying with the company for a longer period of time.
4. According to ANITHA & FARIDA BEGUM in their article **“ROLE OF ORGANISATIONAL CULTURE AND EMPLOYEE COMMITMENT IN EMPLOYEE RETENTION (2016)”** they identified that One of the difficulties Indian firms confront is employee retention. The most valuable assets in a company are its employees. They are the ones who increase an organization's worth in terms of both quality and quantity. Both in India and overseas, there is a high demand for qualified individuals. Employee retention refers to numerous methods and policies that encourage employees to stay with a company for an extended period of time.
5. According to Gilani, Hasan, Cunningham, and Lucy in their article **“ROLE OF ORGANIZATIONAL CULTURE AND EMPLOYEE COMMITMENT IN EMPLOYEE RETENTION (2017)”** they identified that Researchers and professionals are showing a lot of interest in the topic of employer branding and its effects on employee impressions. This study's major goal is to investigate the impact employer branding has on employee retention. Seven key themes were found in the literature on employer branding, which was: brand values, induction and training, internal brand communication, organizational culture, rewards and benefits, brand commitment, and employer brand management.
6. According to Harpreet Kaur Rakhra in their article **“STUDY ON FACTORS INFLUENCING EMPLOYEE RETENTION (2018)”** they identified that The ability of an organization to retain its employees is referred to as employee retention. Great companies respect committed employees and the ability to keep them. Even when an organization invests a significant amount of money in hiring and training new employees, every year many firms experience a significant loss of talent.
7. According to M.S.Kamalaveni, S.Ramesh, T.Vetrivelin their article **“A REVIEW OF LITERATURE ON EMPLOYEE RETENTION (2019)”** they identified that The hardest task for HR professionals in this competitive environment is to engage and retain individuals in the workforce of the twenty-first century. In order to better grasp the notion of retention, variables

influencing retention, and ways to retain the personnel, this secondary research examines several research articles in journals and books and seeks to analyze reviews on employee retention in various sectors, industries, etc.

8. According to Ricardo Biason in his article **“THE EFFECT OF JOB SATISFACTION ON EMPLOYEE RETENTION (2020)”** he identified Job satisfaction and employee retention, as an academic concept, have aroused wide attention from the fields of management, social psychology, and practical operations in recent years. This research paper reviews more than a decade of research on the antecedents and outcomes of job satisfaction and employee retention.

9. According to **Sunanda Nayak, Debasish Jena, Srikanta Patnaik** in their article **“EMPLOYEE RETENTION, AND EMPLOYEE SATISFACTION (2021)”** they identified The present research is inclined to check the link between two important styles of “Contract” in a job relations, psychological contract and knowledge contract, and job outcomes, i.e., employee retention and employee satisfaction.

10. According to Eva Labroa, and James D. Omartian in their article **“MANAGING EMPLOYEE RETENTION CONCERNS (2022)”** identified the Use census microdata from 14,000 manufacturing facilities to find out how companies are responding to local wage pressures and addressing employee retention concerns. As with using localized performance metrics for bonuses, performance goals are less transparent.

DATA ANALYSIS AND INTERPRETATION

A questionnaire with 10 questions is created to analyse employee retention in the PIXENTIA internal environment. The table below provides a summary of the employees' answers to the questions.

S.NO.	STATEMENT	RESPONSE
1	How long have you been working in PIXENTIA?	The higher response is for more than 11 years of experience and the next response is 5 to 11 years.
2	Which is the best describes your position/role?	The higher response is for Employee relations Manager staff and the next response is HR/Manager
3	Do you agree special training programs are conducted to Employees are Benefited?	The higher response is for Strongly Agree and the next response is for Agree.
4	Are there any systems in PIXENTIA to evaluate the effectiveness of the training programs conducted do you agree?	The higher response is for Strongly Agree and the next response is for Agree.
5	What is the Academic background of employers?	The higher response is B.Tech/Degree/P.G (technical) and the next response is Degree/B.Tech.
		The higher response is High Expectation of Qualified

6	What are the Problems faced in recruiting and Retaining?	People and the next response is Any other
7	What are the Selection criteria of employers?	The higher response is Qualification and experience and the next response is Any Other.
8	Do you agree Rewards are strictly linked to employee performance?	The higher response is Agree and the next response is Strongly Agree.
9	Do you agree Performance appraisal in PIXENTIA aims at improving employee performance and strengthening our job skills?	The higher response is Agree and the next response is Strongly Agree.
10	What is the number of recreational activities and occasional celebrations are organized in order to let employees show their creativity do you agree	The higher response is Agree and the next response is Strongly Agree.

FINDINGS

The majority 38 percent of the respondents are between the age group of 26 – 30 years.

- The majority of the respondents (64%) are men.
- The majority 73 percent of the respondents are married.
- The majority 69 percent of the respondents are from the nuclear family.
- The majority 61 percent of the respondents are between the 6001 to 12000 monthly incomes.
- The majority 61 percent of the respondents are the Education up to +2.
- The majority 33 percent of the respondents are aware of the organization nearby home.

SUGGESTIONS

Key worker retention is crucial to an organization's long-term performance. A Retention Strategy has become critical if your business is to remain productive over time, and it may help you recruit the best applicants by becoming an integral element of your hiring strategy. Because of their history of excellent employee retention, some organizations do not need to recruit because they receive so many qualified unsolicited submissions. How do you make your staff "fall in love" with your company? This is a good question.

The following are some of the suggestions for doing so:

- ❖ The corporation should do a better job of motivating its staff. As a result, employee satisfaction improves.
- ❖ The corporation should establish positive relationships with its personnel to help them enhance their output.
- ❖ The company wants to change the work schedule and policies of their organization
- ❖ The company should also develop the infrastructure facility of their organization.
- ❖ The company wants to reduce its employee retention problem and provide promotional offers to their employees.

CONCLUSION

The study makes a modest attempt to identify the factors that influence employee retention and offers a few recommendations. Employee retention is good at **PIXENTIA INDIA SOLUTIONS PVT LTD** in Hyderabad.

So, all that is required of management is to concretize people and place them in an environment where they can identify the problem, appreciate the need to solve it, identify the factors contributing

to the problem, and act in ways that either eliminate or reduce the casual variables' influence on the problems. Though gradual, the concretization process is certain to yield the intended outcomes when carried out properly.

Employees are the company's most valuable asset. Employees who are unable to reach their full potential and are not heard and valued at work are more likely to depart due to stress and frustration. They require a transparent working atmosphere. Employees may best utilize their potential and develop their talents in a transparent environment where they feel a feeling of accomplishment and belonging. They like being a vital part of such a company, and the company benefits from a stronger, more dependable workforce as well as fresh new ideas for expansion.

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A STUDY ON FINANCIAL STATEMENT ANALYSIS WITH REFERENCE TO KESORAM CEMENTS

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ABSTRACT

Well-organized accounting provides a systematic and chronological record of business transactions and other events, but also a complete picture of the effects of business transactions in the form of an annual report. The annual report is a legal and regulatory obligation for companies, and thus a potential subject of economic and financial analysis.

By analyzing the financial statements, we get a picture of the (credit) creditworthiness of the company. The credit worthiness of a company is a quantitative and qualitative expression of the company's business ability and the security of its business. Credit worthiness assessment is often equated with creditworthiness and liquidity assessment, and as such is reduced to a narrower concept of creditworthiness. On the other hand, solvency in a broader sense implies a synthesized assessment of financial stability, liquidity, solvency, capital adequacy and structure, financial situation, profitability, risk of financial results, profitability and organization of the observed company. Financial is viewed as the existence blood of a business endeavor. In the cutting edge arranged economy, back is one of the essential establishments of a wide range of financial aspects exercises. Finance explanations are readied essential for choice - making. They assume a prevailing job in setting the casing work and administrative end and can be drawn from these announcements is of enormous use in basic leadership through investigation and translation of budget reports. As said prior back is said to be life blood of any business. Every business under taking needs fund for its smooth working.

Keywords: Financial Statement Analysis, Profitability analysis,

INTRODUCTION

Financial Statement analysis is the most important part of Financial Analysis. It is based on statements, which are the end product of accounting system. It is based on statement analysis. It is largely a post-mortem of the transactional activities of a business firm, as recorded in the account books so as to judge the operational ability, profitability and financial soundness.

Finance is one of the basic foundations of all kinds of economic activities. It is the master key which provides access to all the sources for being employed in manufacturing and merchandising activities. It has rightly being said that business needs money to make more money. However it is also true that money generate more money, only when it is properly managed. Hence, efficient management of every business enterprise is closely linked with the efficient management of its finance. Financing of a firm mean providing money for investment in the form of fixed assets and also in the form of working capital for day to day operations.

Business finance mainly involves, rising of funds and thus effective utilization keeping in view the overall objective of the firm. This requires great caution and wisdom on part of management. The management makes use of various financial techniques, devices etc for administering the financial affairs of the firm in most efficient way.

It is true that money (Finance) plays a very important role in the sphere of business to grow and bring the company position at the top. If the financial position of the company is good, there is no doubt that company or industry will grow faster in the existing.

REVIEW OF LITERATURE

Bhunja, A., MukhutI, S., (2011) identified that understanding financial statements is a key to fundamental stock analysis and overall investment research. Financial statements provide an account of a company's past performance, a picture of its current financial strength and a glimpse into the future potential of a firm. The goal is to enhance an ability to make a sound judgment about a company's financial strength and future prospects by using financial statements in your personal investment research.

2.Thomson, R., (2008) said that financial analysis is the process of identifying the strengths and weakness of the firm with the help of accounting information provided in the Profit and Loss Account and Balance Sheet.

3. Anthony, R., (2007) identified that Accounting as a means of collecting, summarizing, analysing and reporting in monetary terms, information about the business. This simple definition highlights the importance of accounting and financial information in the business enterprise. There is a reference to the following accounting principles and scope of the field of accounting and finance.

4. Gordon, M., Shilinglaw, G., (2006) the author explains the importance of business and financial reporting. He highlighted that the economy depends on the business organizations for goods and services. The financial activities of business enterprises of production and sale are of utmost importance.

NEED FOR THE STUDY

1. The most common methods used for financial statement analysis are comparative statements, common-size statements, funds flow analysis and ratio analysis.
2. These methods include calculations and comparisons of the results to historical company data, competitors, or industry averages to determine the relative strength and performance of the company being analyzed.
3. Financial statement analysis is to diagnose the information contained in financial statements so as to judge profitability and financial soundness of the firm. Just like a doctor examines his patient by recording his body temperature, blood pressure, etc.
4. Financial statement analysis is used to identify the trends and relationships between financial statement items. Both internal management and external users (such as analysts, creditors, and investors) of the financial statements need to evaluate a company's

SCOPE OF STUDY

1. The scope is limited to the operations of the **KESORAM CEMENTS PVT LTD.**
2. The information is obtained from the primary and secondary data was limited to the **KESORAM CEMENTS PVT LTD.** sheet was on the last **5** years.
3. Analysis of financial statement can be undertaken by different persons and for different purposes, therefore, the scope of the AFS may be varying from one situation to another.
4. The last technique i.e. The ratio analysis is the most common, comprehensive and powerful tool of the AFS. The importance of ratio analysis lies in the fact that it presents facts on a comparative basis. As such, this study focuses only on this (ratio) analysis.

5. profitability, liquidity, and solvency.

OBJECTIVES OF THE STUDY

- To ascertain the liquidity of the company.
- To measure the profitability of the organization.
- To examine the factors effecting financial and operational performance.
- To analyse the present financial positions as well as the future.
- To measure the efficiency of management in administering / monitoring the assets of the company.
- To measures the solvency of the company.
- To measure the financial strength of the company.
- To makes comparative study with other firms.

METHODOLOGY OF STUDY

Research, which is done for his particular project is with the help of data collection.

Data, which is collected, is mainly secondary data, which is collected from the account books of the Liberty Shoes Limited.

Here the research process, which is used, is as follows: -

RESEARCH DESIGN

Research design is a framework or the blue print for conducting the research project. Research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data.

1. SOURCES OF DATA

Primary data companies of information obtain from employees of this organization.

1.1. Secondary data :-

Secondary data companies of annual reports, questioning, ledger and past records.

Company has provided me annual reports from 2017-2021 by the help of which prepared my report.

In this project, I have used secondary data which has been collected from following sources:-

- ❖ Annual Reports
- ❖ Books
- ❖ Internet
- ❖ Other material and report published by company

1.2 Collection of data:

Data, which is collected for the research is secondary data as I had collected it from the account books of the company.

1.3 Analysis of data :

In this stage of research process the data is made in the tabulated whether data is adequate or not.

1.4 Execution of project:

When data is being collected then that the data is used for the execution of the project.

LIMITATIONS OF THE STUDY

1. The analysis and interpretation are based on secondary data contained in the published annual reports of the study period.

2. Due to the limited time available at the disposal of the researcher the study has been confined for a period of 5 YEARS
3. Ratio itself will not completely show the company's good or bad financial position.
4. The study of financial performance can be only a means to know about the financial condition of the company and cannot show a complete picture of the activities of the company.

CONCEPTUAL FRAMEWORK

According to the American Institute of Certified Public Accountants, financial statements reflect “a combination of recorded facts, accounting conventions and personal judgments and conventions applied affect them materially”. It means that data presented in financial statements is affected by recorded facts, accounting concepts & conventions and personal judgments.

- a) Recorded facts: The term-recorded facts refer to the figures, which are shown in the book of accounts. The figures, which are not recorded in the books, are not depicted in financial statements, no matter how important or unimportant those facts are.
- b) Accounting policies, Assumptions, concepts & conventions:

Accounting policies encompasses the principles, bases, conventions, rules and procedures adopted by in preparing and presenting financial statements. Accounting policies of the organization are consistently followed over along period of time and are reported as schedule to financial statements or as notes to financial statements in the annual report.

As per accounting standards Board, India, fundamental accounting assumptions mean “basic accounting assumptions which underline the preparation & presentation of financial statements. Usually, they are not specifically stated because their acceptance and use are assumed. Disclosure is necessary if they are not followed”. Some fundamental accounting assumptions are going concern concept, consistency, accrual etc.

Accounting concepts are basic framework on the basis of which accounting work is carried out. Some accounting concepts are Business entity concept, Money measurement concept, going concern concept, cost concept, matching concept, Dual aspect concept etc.

Accounting conventions are the principles, which enjoy the sanctity of application on account of long usage, are termed as accounting conventions. E.g. consistency, conservatism, materiality, full disclosure.

INDUSTRY PROFILE

Cement industry in India

The Indian cement industry is directly related to the country's infrastructure sector and thus its growth is paramount in determining the development of the country. With a current production capacity of around 366 million tonnes (MT), India is the second largest producer of cement in the world and fueled by growth in the infrastructure sector, the capacity is expected to increase to around 550 MT by FY20.

India has a lot of potential for development in the infrastructure and construction sector and the cement sector is expected to largely benefit from it. Some of the recent major government initiatives such as development of 100 smart cities are expected to provide a major boost to the sector.

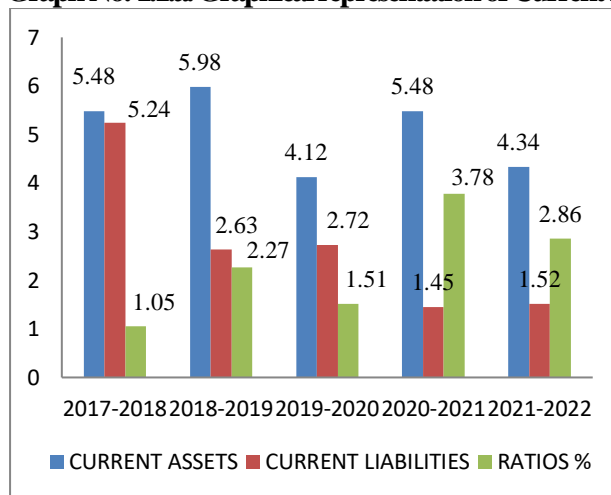
Expecting such developments in the country and aided by suitable government foreign policies, several foreign players such as the likes of Lafarge, Holcim and Vicat have invested in the country in the recent past. Another factor which aids the growth of this sector is the ready availability of the raw materials for making cement, such as limestone and coal.

DATA ANALYSIS & INTERPRETATION CURRENT RATIO

Table No: 1.1 Tabular representation of Current ratio 2017-2022

YEARS	CURRENT ASSETS	CURRENT LIABILITIES	RATIOS%
2017-2018	5.48	5.24	1.05
2018-2019	5.98	2.63	2.27
2019-2020	4.12	2.72	1.51
2020-2021	5.48	1.45	3.78
2021-2022	4.34	1.52	2.86

Graph No: 1.1.a. Graphical representation of Current ratio 2017-2022



INTERPRETATION

The above ratio shows the position of the firm. An ideal current ratio is **2:1**. A firm having a seasonal trading activity may show a lower or higher current ratio at a certain period of the year. So, it does not possible to maintain ideal ratio. The current ratio can also be manipulated very easily.

Similarly, the quick ratio is more conservative than the current ratio, a more well-known liquidity measure, because it excludes inventory from current assets. The ratio is also an indicator of short-term solvency of the company.

In Leverage ratio, a high proprietary ratio will indicate a relatively little danger to the creditors, etc., in the event of forced reorganization or winding up of the company. A ratio below 50% alarming for the creditors since they may have to lose heavily in the event of the company's liquidation on account of heavy losses.

In Activity ratio, a high working capital turnover ratio may be the result of favorable turnover of inventories and receivables. The low working capital turnover ratio indicates the efficient utilization of working capital. Working capital turnover ratio of the company was 2017-18(120.38) in the year 2019(17.4) and it had been increasing till the 2018-19 ,and in next the ratio was slow down to

8.03, and in the year 2018 the ratio again increased to 2019-2020. In the 2017-18 the working capital ratio was very high, compare to rest of the years.

In the year 2017-18 the fixed assets turnover ratio was 5.24, and rest of the following year the ratio was slow down like 4.48. again increased 5.18 (2019-2020). The overall performance of fixed assets turnover ratio of the company is not satisfactory up to the year 2019. The company following straight line method so net fixed assets was decreased.

The capital turnover ratio was very high in the year 2018. Capital turnover of the company was 3.10 in the year 2017 and next following year the ratio had increased to 3.25 and the ratio came to down to 1.48 in the year 2020 and again has increased.

Current assets to fixed assets 2017-2018 increased at the value 8.35 & 7.44 (2018-19) it's identify profitability of company turnover each year stability.

FINDINGS

The current ratio of firm is not maintaining standard i.e. 2:1 in selecting period. So it indicates the idle funds and inefficient utilization of funds and indicates the weak position of the firm.

The company's current ratio maintaining average ratio 1:5.

- The quick ratio of company is also not at all supporting standard norm i.e. 1:1. So it shows inefficient utilization of the company funds.
- In case of proprietor ratio the company could not maintain the optimum level of the ratio. It is fluctuating.
- The company has maintained the efficient reserve and surplus throughout my study analysis.
- The company is maintaining weighted average method while calculating earnings per share.
- The return on investment ratio has continuously decreasing.
- Gross profit of company is fluctuating.
- Net profit of company is continuously decreasing trend in my analyses.

The company is maintaining fixed assets & current assets in proper manner.

SUGGESTIONS

- It is suggested for the company that it should maintain required level of current assets ratio.
- It is suggested that the company should maintain standard norm then only it can enhance the maximum profits.
- It is suggested that the company should maintain optimum level of proprietor ratio.
- Sales are very important to every organization to sustain the growth, so company should try to control the cost of goods sold.
- They have to go in for advertisement and sales promotion policy.
- The company profit has fluctuating so better to take strategic decisions, it must be made for the profit to increase.
- Funds are utilizing in proper manner.
- The company is following straight line method in depreciation so better to adopt diminishing method.
- Earnings per share value is continuously fluctuating trend so the must be maintain increasing trend.

CONCLUSION

This study on the financial performance of "KESORAM LIMITED" proved really useful to the company to assess its financial position. The study has brought the problem in maintaining constant liquidity of the company and the working capital which has to be improved to avoid financial crunch.

In the future, the study was extremely useful in identifying the major areas of concern affecting the financial of the firm.

The study was also extremely useful for the researcher it gave several opportunities to learn the financial process of the company. It was a learning experience for the researcher as the study acted as a bridge to apply theory with practical application.

The study could be used as base for future studies in this area. The financial analysis is the authoritative tool for determining financial strength & weakness of the firm. The financial performance of the “KESORAM LIMITED “is good.

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SCHOOL TEACHERS WORK-LIFE BALANCE INFLUENCING FACTORS

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Abstract

Dynamic people can build dynamic organizations. Effective employees can contribute to the effectiveness of their organization. Competent and motivated people can make things happen and enable an organization to achieve its goals. Hence, organizations should continuously ensure that the dynamism, competency, motivation and effectiveness of the employees remain at high levels. Human resource is even the most critical factor for determining the efficiency and effectiveness of an organization because it is precisely the people who will decide when and how to acquire and utilize various resources, including human resources, in the best interest of the organization. The ultimate success and survival of an organization will invariably be determined by the quality and competence of its human resources. Of all the tasks of management, says Likert "Managing the human component is the central and most important task, because all else depends upon how well it is done". Human resources are the most valuable and unique assets of an organization. In the changing economic environment, Human Resource Management is assuming much greater importance than ever before. It is conceived to be different from the traditional and conventional notion of Personnel Management. Subsequently Human Resource Management (HRM) has become the central concern of any organization either in public, private sector or co-operative sector. It is therefore necessary for all managers to understand and give due importance to the different human resource policies and practices in the organization. Human Resource Management outlines the importance and different functions in an organization. It examines the various HR processes that are concerned with attracting, managing, motivating and developing and retaining employees for the benefit of the organization.

INTRODUCTION

A nation may be endowed with abundant natural and physical resources and the necessary capital and technology but unless there are competent people who can mobilize, organize and harness the resources for production of goods and services, it cannot make rapid strides towards economic and social advancement. The strengths and weakness of an organization are determined by the quality of its human resources, which play a vital role in using other organizational resources and the development process of modern economies. Human resource is the most strategic resource as no other resource can be fully utilized to generate income and wealth of a nation without the active involvement of this resource. In fact, the differences in the levels of economic development of the countries are largely a reflection of the differences in the quality of their human resources and their involvement in national building. Ginzerberg points out that the key elements such as values, attitudes, general orientation and the quality of the people of a country determine its economic development. However, he says that human resources are being wasted through unemployment, disguised unemployment, obsolescence of skills, lack of work opportunities, poor personnel practices and the hurdles of adjusting to change. Human resource accounts for a large part of national output and there exists a wide scope for increasing national wealth through their proper development. Human factor provides value to physical resource and necessary dynamism in the economy.

DEFINITION OF HUMAN RESOURCE MANAGEMENT:

Personal management is the planning, organizing, directing, controlling of the procurement, development, compensation, integration , maintenance and separation of human resources to the end that individual, organization and social objectives are accomplished.

OBJECTIVES OF HUMAN RESOURCE MANAGEMENT:

- To ensure effective utilization of human resources. All other organization resources will be effectively utilized by the Human resources.
- To ensure respect of human beings by providing various services and welfare facility to the personnel.
- To ensure reconciliation of individual groups goals with those of the organization in such as a manner that the personnel feel as sense of commitment.
- To achieve & maintain high moral among employees in the organization by securing better human relations.

WORK-LIFE BALANCE:

There is a complex relationship between work and personal life of individuals. In the present context, the concept of Work-Life Balance (WLB) has gained immense significance. Clark

(2000) defined Work-life balance as satisfaction and smooth functioning at work and home without any role conflict. Work-life balance can be defined as a measure of proper control as to how, when and where people work. Proper work life balance can be achieved when an individual is able to fulfill all his/her needs in respect of family, work and society. Within the social sciences there is much contemporary concern regarding work-life balance (Warren, 2004)'

With increasing demands and pressures of work-life, conflicts between work and personal roles seem to be increasing. Changed demographics of the workforce have been the primary force for the increased focus on family-work issues. Organizations where there is sound work-life balance practices and policies experience better financial outcomes (Fleetwood, 2007). These benefits include: lower rates of absenteeism, increased productivity; improved customer experience; improved recruitment and retention; reduced overheads; more motivated, satisfied and equitable workforce (Employers for Work Life Balance, 2006). Work-life balance is a term that is always used in context of employees in general, but nowadays teachers are found to be overburdened due to their academic work load and career issues (Hakanen et al., 2006). All this adds to the stress among teachers leading to imbalanced work- life equations. Thus, there is a need to study work-life balance issues vis-à-vis teachers.

THE CONCEPT OF WORK-LIFE BALANCE:

The term work life balance (Work Life Balance) was coined in 1986 in response to the growing concerns by individuals and organizations alike that work can impinge upon the quality of family life and vice-versa, thus giving rise to the concepts of “family- work conflict” (FWC) and “work-family conflict” (WFC). The former is also referred to as work interferes with family” (WIF) while the latter is also known as “family interferes with work”(FIW). In other words, from the scarcity or zero-sum perspective, time devoted to work is construed as time taken away from one’s family life.

Work/life programs existed in the 1930s. The policies and procedures established by an organization with the goal to enable employees to efficiently do their jobs and at the same time provide flexibility to handle personal concerns or problems at their family. People entering the workforce today are more likely to turn down to promotions if it is new job means, the employee is having to bring more work to home.

In most developing countries, at least until recently, only men worked outside of the home. The old, established joint Hindu family system facilitated a clear division of responsibilities between the old and the young in terms of decision making, the oldest male member in a patriarchal society is the head of household and would make all the important

decisions; male and female the men would work outside the household, whereas the women are responsible for raising children and taking charge of a myriad household responsibilities, including in some low-income families in certain parts of India, walking many miles each day to fetch water and fire wood.

More recently, the scarcity perspective has given way to the expansion-enhancement approach that views that work can facilitate participation at home and vice-versa. This has given rise to the concepts of “work-family facilitation” (WFF) and “family-work facilitation” (FWF) where experiences acquired at work can facilitate participation at home and vice-versa. These two notions have contributed to the construct of work life balance where a balanced life consists of work and family that are mutually reinforcing-the family experiences of workers can enrich their contribution to work and organizations, and vice-versa.

DEFINITIONS AND IMPLICATIONS:

The word Work-Life Balance is sometimes considered as interwoven with Work-family conflict. However, it can be argued that the latter is more limited in scope than the former because the focus in work-family conflict is more on the relations between work & family. It is also referred to as family friendly work arrangements, (FFWA), and in international literature, as alternative work arrangements (AWA).

Work-Life Balance is the relationship between time and space of work & non-work in societies where income is predominantly generated and distributed through labor markets. Work-Life Balance is being aware of different demands on time and energy saving the ability to make choices in the allocation of time and energy knowing what values to apply.

Much confusion and ambiguity surrounds in understanding and defining the term Work – Life Balance. As a term in its own right Work-Life Balance is rarely defined for reasons that will become clearer as the discussion progresses.

Many authors attempt to define Work-Life Balance policy or Work-Life Balance arrangements. Nevertheless it is possible to discern a number of distinct strands in the literature in relation to definitional and conceptual issues. The first of these themes concerns the contention area of family friendly versus Work-Life family in order to reflect a broader and more inclusive way of conceptualizing the issue and to enable men and those without children, for example to identify with them .

However the perception that Work-Life Balance policies are a family matter and aimed solely at women with children is still held by many employees & employers.

Despite the worldwide quest for Work-Life Balance very few have found an acceptable definition of the concept: here are some proven definitions that will positively impact one's

every day value & balance. Best individual Work-Life Balance will vary overtime, often on a daily basis. The right balance today will probably be different for tomorrow. The right balance when one is single will be different when after marriage and having children; when one is on a start to new career versus when one is nearing to retirement. There is no perfect, one size fits all, as balance is different for each of us because we all have different priorities and different lives.

THE SCOPE OF WORK-LIFE BALANCE:

The issue is complex and difficult to tackle from an organization's perspective because it is different for every individual. The traditional definition of family is a husband who provides financial support, a wife who maintains the household. Cultural differences influence family decisions, and more and more families represent blended racial backgrounds but making work-life integration a way of corporate life is much more difficult. The change in workforce composition has been gradual, but steady. More women are working and, thus, more mothers are in the workforce. In 1996, women comprised 46 percent of the total workforce, compared to 1986 when 44 percent of the work force was women.

Women are less likely to drop-out of the labor force for significant periods of their lives, and more and more women are responsible, alone or with a spouse, for the economic security of their families. The Family and Medical Leave Act, signed by President Clinton in 1993, allowed all US workers to take unpaid leave for up to twelve weeks to care for a seriously ill or new member of the family without putting their jobs at risk. This Act has made the employment picture even more desirable for working mothers, single parents, future parents and two career families. Those demanding balance, however, include not only parents with children, but the rest of the employee population, as well. Older employees need flexibility when dealing with ageing parents.

WORK-LIFE BALANCE-THE CHALLENGES AHEAD:

The complex society of ours makes the individuals with conflicting responsibilities and commitments; hence the work-life balance has become a predominant issue at the workplace. The major factors such as the global competition, the renewed interest in personal lives/family values; and managing the workforce etc. have made it more significant. Studies have revealed that human resource professionals seek innovative ways to attain their organization's competitive advantage in the marketplace and it is found that work-life balance activities offer a win-win solution in this regard.

THE INFLUENCING ELEMENTS IN WORK- LIFE BALANCE:

Many companies have responded to the evolving set of issues and with the influencing

elements related to work life balance by introducing a wide variety of work-life balance practices. These practices help the employees to balance both work and life equally where it supports the employer to increase the retention of the employee. Some of the influencing factors include working hours and flexibility, time bind, Job satisfaction, Job Autonomy and Organizational Commitment.

THE GLOBAL SCENARIO OF WORK LIFE BALANCE:

During the 1960s and 1970s, employers considered work-life mainly an issue for working mothers who struggled with the demands of their jobs and raising children. During the 1980s, recognizing the value and needs of women contributions, pioneering organizations (IBM, Deloitte) began to change their internal workplace policies, procedures and benefits. The changes included maternity leave, employee assistance programs (EAPs), flexi-time, home-based work, and child-care referral. During the 1980s men also began voicing work-life concerns. The term 'work life balance' was first coined in 1986 in reaction to the unhealthy choices that many Americans were making in favor of the work place as they opted to neglect family, friends and leisure activities in the pursuit of corporate goals. Articles of the time suggested a sharp increase in the working hours of the Americans. This had started to affect their families and individual health. Work life balance slowly was gaining grounds in the various organizations. By the end of the decade, work life balance was seen as more than just a women's issue, affecting men, families, organizations and cultures.

In 1990s the recognition of work-life balance as a vital issue for everyone women, men, parents and non-parents, singles and couples. The 1990s saw a rise in the number of working women and dual-income families. A second family configuration, the lone parent household also became prevalent in the 1990s. This growing awareness of the central importance of the issue resulted in major growth in attempted work-life solutions during this decade. Numerous studies showed that the generations from baby boomers to new college graduates were making job choices based on their own work-life issues and employer's cultures.

WORK-LIFE BALANCE -THE TRENDS AND NEW APPROACHES AHEAD:

The challenge of work-life balance in our society is unlikely to disappear. The concept of work life balance is gaining a great deal of attention in both the academic and corporate worlds. The employees are often preoccupied with work when not working, and when in the company of family and loved ones, experience an inability to be meaningfully engaged in no work spheres. Modern work has become more knowledge based, fluid, and intellectual; overworked people think about work all of the time. For many people, work has become cognitively intrusive. To understand work/life balance a cognitive approach was been

introduced that is "Cognitive Intrusion of Work". In simple terms, this means that work/life balance is not just about finding "physical time" to do all that needs to be done. Instead, and more importantly, it is about the "cognitive space" necessary to process, organize, and respond to the thinking demands of life within a complex society.

Total life planning is the latest and innovative approach to work life benefits that helps employees understand the important aspects of their professional life, personal lives and their relativity. Their goal is to encourage employees to look at their lives as a whole and assess relationships, emotional and physical wellbeing, careers, spirituality, and their personal financial situation.

From these programs, employees can assess their available choices to improve balance in their lives and develop an individualized life plan. The most successful programs set a goal oriented environment with a meaningful and transformational component for each individual. The concept of total life has the major benefits such as renewed employee energy, enthusiasm and attachment for work, and enhanced productivity. Total life planning programs may be offered in conjunction with benefits such as health, life, and disability insurance, or on a stand alone basis.

WORK-LIFE BALANCE AMONG SCHOOL TEACHERS:

Ample researches were conducted on teachers Work-life balance as it has been found that teaching is a stressful profession (Rosser, 2004). Another most important reason for studying teachers on the aspect of Work- life balance is that, this is the profession that has overwhelmingly female than in any other profession (Acker 1996). Clark (1989) concluded that it is the teaching profession that has different dimensions such as pattern of work, authority, identification and career etc, and most important thing is that all these dimensions differ with different institutes and subjects that is why this field is most preferred for Work family conflict. Near (1989) studied the feasible ways in which work and life away from work are connected among university faculty members. This study identifies differences on the basis of rank and gender, and also suggests implication of family friendly policies for institutions of higher education. Winslow and Jacobs (2004) find out relationship between faculty workload and their dissatisfaction. The authors find proof that how many professors are discontented because of their workload. In addition, dissatisfaction enhances among those working the longest hours. The data also point out that extended hours on the job really contribute to research efficiency. The extended hours demanded by faculty jobs therefore

pretense a problem for those parents (professors) who want to splurge time with their families and their children

CONCLUSION

To achieve work-life balance, every employee should set the goal and excel both in career and family. Some of the strategies and skills at work such as planning, organizing and setting limits can be used at home and work place for accomplishing a satisfying and fulfilling well balanced life both professionally and personally. Women employees should care the family both physically and financially to satisfy the family needs. Also work for the accomplishment of institutional objectives and individual upliftment to satisfy the career needs. Institutions need to adopt human resources strategies and policies to overcome the issues of the work-life balance of the employees in the current environment. Educational institutions should address the work-life balance related issues among their staff, specifically women and take a holistic approach to design and implement policies to support the teaching staff to manage their work-life balance which would add to the performance of these staff members.

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A STUDY ON TALENT MANAGEMENT ON JOB SATISFACTION AT ASHOK LEYLAND

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ABSTRACT

Talent management is the practice of locating, retaining, and fostering the growth of the most talented employees available today. Talented employees benefit the business in a number of ways, including increased market value, high customer satisfaction, exceptional service, high revenue yield, low cost, and high productivity. Despite the benefits of talent management, the larger challenge is keeping these smart individuals given the harsh business environment that offers new possibilities to employees. The fact that relatively few firms put a major focus on talent management and their leadership structure when it comes to organizational and human resource management must also be emphasized. The corporation invests in new technologies, operating systems, and software planning even though the ultimate success of the business relies on having talented personnel, but they lack talent management abilities. The research's challenge is to evaluate employee happiness and talent management using a case study of a few selected banks in Lagos, despite the fact that modern companies are aware that their success depends on their capacity to inspire talented workers. Talent management and employee job satisfaction.

1.INTRODUCTION

The capacity to find, keep, and foster the most skilled laborers available today is alluded to as the ability of the executives. Gifted specialists give benefits to the organization such as market capitalization, high client satisfaction, fantastic help, high income yield, modest expense, and high efficiency. Bosses with fitting mastery, predominant abilities, extraordinary possibilities, and mental gifts are made accessible to the business by means of the ability of the board. Work fulfillment is a critical part of representative maintenance since gifted representatives either find employment elsewhere or are happy with their positions. Therefore, it is fundamental for a fruitful profession. Worker execution and individual bliss ascend because of occupation fulfillment.

Representative work fulfillment is a consequence of the ability of the executives, which sets laborers in places with vocation ways. Notwithstanding the upsides of the ability of the executives, the greater trouble is keeping up with these splendid individuals given the difficult business environment that presents new choices to laborers. It is likewise critical to feature that, with regards to human asset and hierarchical administration, not very many associations put areas of strength for an on ability the executives and their initiative design. Despite the fact that the last progress of the organization relies upon having gifted representatives, they put resources into new innovations, working frameworks, and programming arranging; however they need the executives' abilities. Notwithstanding the way that contemporary organizations know that their prosperity relies upon their capacity to inspire gifted workers.

Work fulfillment meaning of ability the board

Bosses with proper mastery, predominant abilities, extraordinary possibilities, and mental gifts are made accessible to the business by means of the ability of the executives. Work fulfillment is a critical part of representative maintenance since capable workers either find employment elsewhere or are happy with their positions.

The executives of ability Employees who have been perceived by the firm as having ability are the significant focal point of ability on the board. Be that as it may, the ability of the executives has no settled upon definition (Collings and Mellahi, 2009; Ewerlin and Süß, 2016). Crafted by distinguishing,

picking, creating, assessing, persuading, and holding individuals to guarantee the association's drawn out upper hand is remembered for all meanings of ability the executives.

Work Contentment The feeling of joy that an individual has at work is known as occupation fulfillment, and it is a hot issue in human asset management. It additionally arises as the serious issue of expanding worry for all organizations around the world. 2016 (Tanwar and Prasad). Work fulfillment is viewed as the overall idea that is utilized in numerous areas to measure or characterize how representatives feel about the exhibition, rules, and different parts of their organizations. Moreover significantly affecting the association's efficiency are the association's targets and objectives.

Execution of representatives Job execution is characterized as a worker's capacity to utilize drive and add to ways of behaving that are reliable with the association's objectives (Viswesvaran and Ones, 2000). To survey the level of adequacy and productivity of the specialists' exhibition and assignments, assess and apply the information procured.

1.1 NEED FOR STUDY

The exploration has shown the risky idea of ability the board methods, for example, deficient staff numbers, execution of the executives, and ability systems. These discoveries might be involved by the executives in the auto business to more readily foster skilled representatives and increment work satisfaction. Moreover, since they advantageously affect work fulfillment, the exploration has underscored the significance of the executives methodologies including system, ability assessment process, staffing, ability sending, ability advancement, and ability maintenance in the car business. Clinics should quit overseeing gifted auto staff in the ordinary way to further develop work satisfaction among their wellbeing laborers, particularly ashok leyland representatives. By guaranteeing that car ability the executives' frameworks are incorporated into their essential objectives and dispensing adequate assets to the ability the board framework, the exploration assisted with supporting the arrangement of efficient ability the executives strategies.

1.2 OBJECTIVES OF THE STUDY

- To frame the different ability the board procedures utilized by a couple of Ashok Leyland Hyderabad organizations.
- To survey what ability the executives means for work fulfillment in a specific auto firm, ashok Leyland Hyderabad
- To work out the connection between representative commitment and occupation fulfillment at Ashok Leyland.
- The review's utilization of a cross-sectional study technique restricted its capacity to reach determinations about circumstances and end results over an extensive timeframe.
- Just Ashok Leyland workforce in Hyderabad were the subject of the examination.

1.3 SCOPE OF THE STUDY

The assessment of ability of the executives and worker bliss are the review's principal points. An examination of a specific Ashok Leyland Company in Hyderabad.

2. RESEARCH METHODOLOGY

Cross-sectional review technique was utilized in the review's quantitative exploration plan. Cooper and Schindler argue that the enlightening and prescriptive motivations behind correlational examination, which center around the relationships between factors, are best served by a cross-sectional overview technique.

Test and populace

The four Ashok Leyland plants in Hyderabad were the review's objective populace. The Ashok Leyland were picked utilizing a purposive example procedure since they had a greater number of laborers. Each subject had an equivalent likelihood of being picked when the responders for the firm were picked utilizing a direct irregular example strategy. 100 laborers were chosen as an example from a populace of 8334 staff individuals utilizing the Cochran equation (1963), with a 95 percent certainty level and a 3 percent room for give and take.

Information Gathering

Essential information was utilized in the examination. Self-controlled surveys were utilized to accumulate the primary information. The impact of ability the board on work fulfillment of Ashok Leyland representatives in Hyderabad was evaluated utilizing a changed variant of the short type of the Minnesota Job Satisfaction (MSQ), and ability the executives was surveyed utilizing the Human Capital Index Questionnaire. To consolidate every one of the subjects that were believed to be relevant to cars of Ashok Leyland laborers in Hyderabad, a changed abbreviated form of the Minnesota Job Satisfaction (MSQ) poll was utilized. Two sections made up the survey. The "Presentation," which incorporated a segment with member socioeconomics, was the primary part. The subsequent part, named "Exploration Design Section," tended to how Ashok Leyland laborers saw what the nine abilities the board factors meant for work fulfillment. These included preparation, the ability assessment process, recruiting, staffing, drawing in ability, creating ability, conveying ability, execution of the executives, and ability maintenance. This apparatus' constancy has recently been shown. The MSQ short structure has 20 things, one for every angle, partitioned into inborn and outward work settings. The things were changed so as not to modify the first things to outline the impact of the board on proficient auto work fulfillment. Throughout 90 days, 947 surveys were shipped off respondents, and 598 of them were returned. Just 580 of these reactions — addressing a reaction pace of 61.2 percent — were relevant to examination.

Morals related issues

Prior to starting the exploration technique, consent to lead the review was mentioned from the North-West University and Directors of Selected Automotive in Hyderabad by means of their Research Ethics Committees. After an exhaustive depiction of the review's objective was given to the members, polls were circulated truly and irregularly by being given to them in the hand. The respondents' personality and secrecy were safeguarded all through the examination, which was led with their assent.

Treatment of Information

Prior to being brought into Stata variant 16.1 for factual examination, the information was physically coded, cleaned, and recorded on a success sheet. Recurrence tables, structured presentations, and rates were made utilizing the information synopses. Cronbach Alpha Coefficients were utilized to survey the estimation gadgets' reliability. Underlying condition displaying was utilized to approve the legitimacy utilizing corroborative variable investigation (CFA) (SEM). Preceding executing CFA, the example's appropriateness was checked utilizing the Kaiser Mayer Olkin (KMO) proportion of inspecting sufficiency. Utilizing Bartlett's trial of sphericity, the factorability of the connection network was analyzed.

2.1 LIMITATIONS OF THE STUDY

- The review utilized a cross-sectional overview plan which limits the concentration as far as delivering cause and outcome derivations over the significant stretch of time.
- Moreover, the review was directed in auto especially focal medical clinics of ashok Leyland workers Hyderabad just, as such the discoveries can't be summed up to other public and confidential medical clinics.

- The other impediment was to do with the unit of study that zeroed in on Ashok Leyland representatives as it were. This denied study gives the chance of acquiring various perspectives from other wellbeing laborers like specialists, clinic heads, clinicians and dental specialists.
- Future examination should seriously mull over a near report on the ability of the executives and its effect on work fulfillment for Ashok Leyland representatives Hyderabad.
- Future investigations ought to consider consolidating all wellbeing laborers.

3. REVIEW OF LITERATURE

1. There has been a ton of study accomplished on representative work fulfillment, as indicated by Inegbedion et al. (2020). The following are a couple of outlines of late writing. have suggested that, to all the more likely comprehend how representatives see task equilibrium and occupation fulfillment at work, an exploration was led. It tried to determine the degree to which laborers' view of responsibility balance influenced their degree of occupation fulfillment.
2. As per Cherif (2020), the objective of this exploration was to look at how worker work fulfillment and human asset the executives connect with foreseeing authoritative responsibility in the Saudi financial industry. Quantitative review research was utilized to accomplish the review's goal. Authoritative responsibility is the reliant variable, though human asset the board and worker work fulfillment are the free factors. Representative work fulfillment and authoritative responsibility were well associated with human assets the board.
3. As per Haralayya (2021), the point picked for the exploration at Big Bazaar is "Representative Job Satisfaction." The perusing was permitted to decide the level of worker work fulfillment in the organization. The exploration was important to comprehend worker work fulfillment and representative coordination in the work environment.
4. Representative efficiency is a vital determinant of firms' prosperity, guarantee Zardasht et al. (2020). Furthermore, exceptionally powerful laborers work on the nature of client associations. Considering its ideal effect on the authoritative achievement both inside and remotely, scientists and specialists have been examining its circumstances and end results increasingly more as of late.
5. Almohtaseb et al. (2021) express that the most recent exploration is to analyze the effect of groundbreaking authority on the work fulfillment of government representatives in Jordan. Utilizing a reasonable choice strategy, the specialists picked an example of 52 human asset laborers from public area undertakings. The expected relationship between the examination factors was likewise supported with the assistance of primary condition demonstrating.

4. DATA ANALYSIS AND INTERPRETATION

Table No 1 : Survey in Purchase Department:

Option	Responses	Percentage
Yes	70	70
No	30	30

(Source: Primary data: Questionnaire)

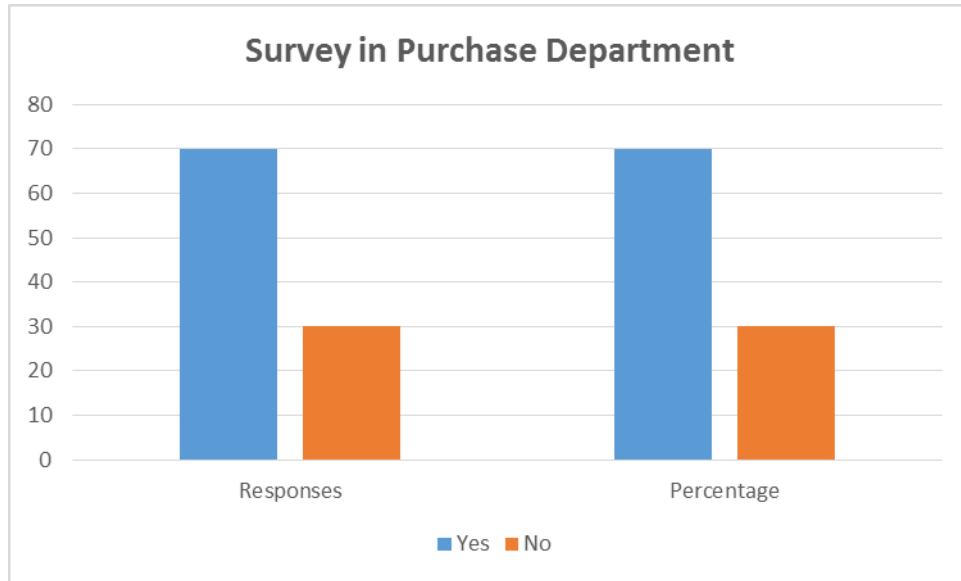


Figure No. 4.1 (Source: primary data survey questionnaire)

Translation: The pie-outline above uncovers that 70% of purchase division laborers are extremely content with the Talent Management process. Subsequently, we can reason that the ability of the board in the Purchase office is an effective cycle for the two workers and the firm.

Survey in Finance Department:

Option	Responses	Percentage
Yes	72	72
No	28	28

(Source: Primary Data: Questionnaire)

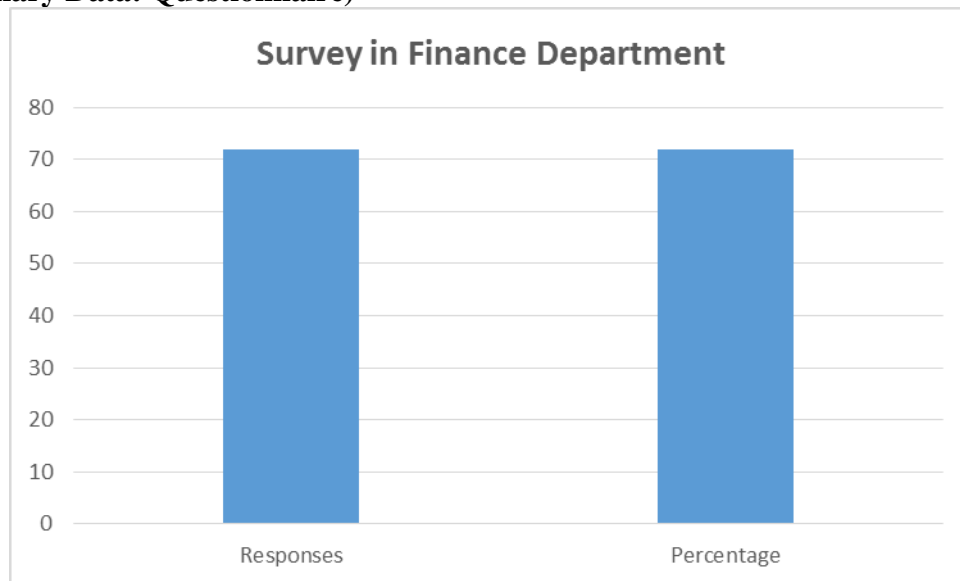


Figure No. 4.2/7 (Source: primary data survey questionnaire)

Understanding: The pie-chart above reveals that 80% of money division representatives are extremely content with the Talent Management process, 10% are fulfilled, 6% are normally fulfilled, and 4% are disappointed. Thus, we can reason that the ability of the executives in the money office is a fruitful cycle for the two representatives and the firm.

Survey in Production Department:

Option	Responses	Percentage
Yes	65	65
No	35	35

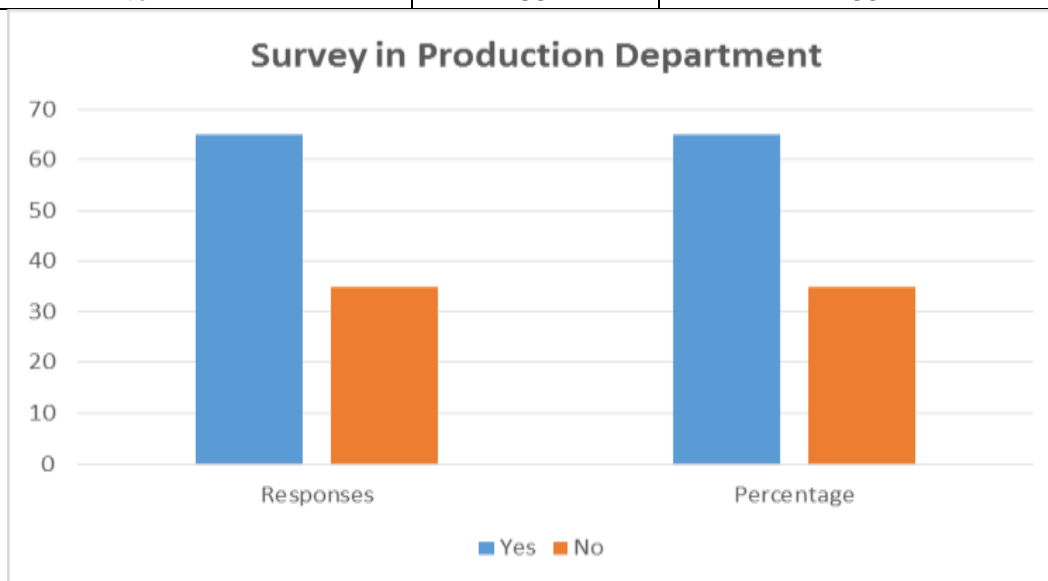


Figure No. 4.3(Source: primary data survey questionnaire)

Translation: In the creation area, we can see that 65% of the workers are answering "Yes," acquiring a potential open door to exhibit their abilities inside the association. Also, 35% of the labor force is answering "No." means that in this division, the ability of the board cycle is effective if over 60% of the workers answer "Yes."

Survey in packing and dispatch Department:

Option	Responses	Percentage
Yes	86	86
No	14	14

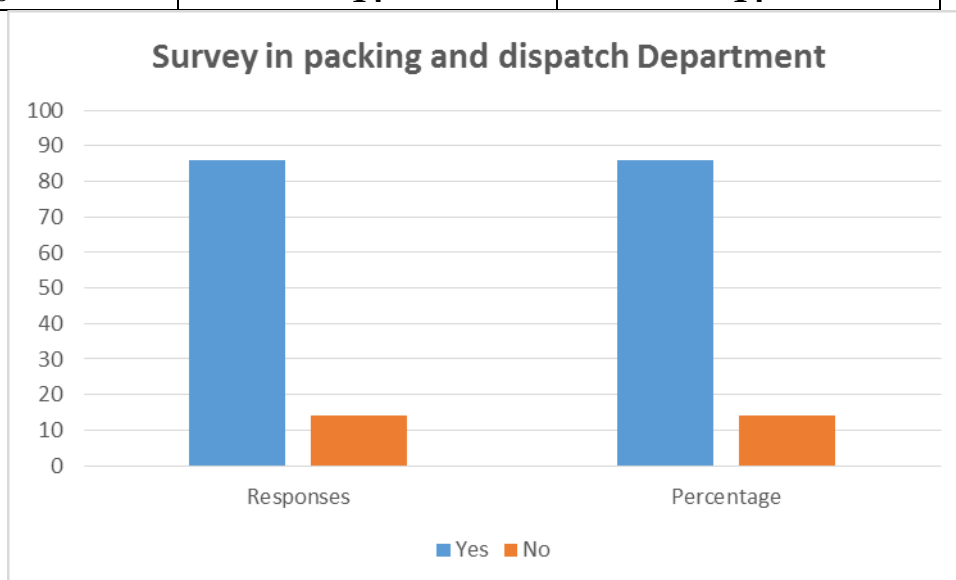


Figure No. 4.4(Source: primary data survey questionnaire)

Understanding: In the creation area, 86% of the representatives are demonstrating that they are getting valuable open doors to feature their abilities. Furthermore, 14% of laborers answer "No." means that in this division, the ability of the board cycle is effective if over 60% of the workers answer "Yes."

The reliability of the estimation gadget was evaluated utilizing the Cronbach Alpha Coefficients. In many occurrences of social examination, an alpha of 0.70 or above is viewed as OK. There was compelling reason to erase inquiries to increment dependability since the outcomes showed that the general Alpha was better compared to 0.9, demonstrating that the things of the Minnesota Job Satisfaction Questionnaire (MSQ) abbreviated form were extremely reliable. Likewise, every Corrected Item-Total Correlation esteem was higher than 0.3. Gliner, Morgan, and Leech contended that such qualities are suitable and that no things ought to be prohibited from the review.

TABLE 1: Item-Total Statistics for Minnesota Job satisfaction Questionnaire.

Item for job satisfaction	Scale Mean if item deleted	Scale Variance if item deleted	Corrected item-total correlation	Cronbach's Alpha if item deleted
I am able to keep busy all the time in this hospital because of talent management	50.91	195.264	0.5065	0.9426
In this hospital, I have the chance to work alone on the job because of talent management	50.81	192.696	0.5676	0.9417
Talent management ensures that I get the chance to do different things at this hospital	50.95	191.615	0.649	0.9403
Talent management has given me chance to become some body and a ctive at work	50.87	190.715	0.6778	0.9398
The way my supervisor handles his or her workers has improved because of talent management	50.94	191.478	0.6657	0.94
Because talent management intervened the skills gap in management has been closed	50.99	193.572	0.6217	0.9407
Talent management has taught me to be able to do things on my own without much help	50.79	190.385	0.6741	0.9398
The use of talent management by management ensures steady employment	51.00	190.214	0.6948	0.9395
Talent management has given me the chance to do things for other people by involving them fully	51.02	189.565	0.7024	0.9394
I have the chance to tell people what to do because of the skills I got from talent management	50.81	188.434	0.7095	0.9392
I was enlightened about policies with the help of talent management	50.95	189.820	0.706	0.9393
Talent management ensures that hospital policies are put into practice	50.86	189.797	0.6704	0.9399
Talent management has negotiated for a good pay against the amount of work I do	51.48	196.271	0.4906	0.9428
Talent management has increased the chances for advancement on this job in this hospital	51.30	192.909	0.6075	0.9409
I have the freedom to use my own judgment in this hospital because of talent management	51.02	191.817	0.6348	0.9405
The implementation of talent management in this hospital has given me the chance to grow	51.14	192.355	0.6394	0.9404
Talent management has created good working conditions for me in this hospital	51.13	189.737	0.7015	0.9394
The way my co-workers get along with each other is a result of talent management	51.09	189.164	0.722	0.939
The praise I get for doing a good job is a result of talent management	51.07	189.020	0.7032	0.9393
I feel a great sense of accomplishment from my job because of talent management	51.07	189.172	0.7075	0.9393

Factor examination was consequently useful with MSQ since the factorability of the 20 things of the MSQ was likewise surveyed, and the KMO was viewed as bigger than 0.7 appearance test sufficiency. The things might be considered since Scott and Bartlett's trial of sphericity was huge ($2 [190] = 6720.306$, $p 0.01$) (Elmi et al., Gliner et al., Similar to CFA, which was likewise finished, three MSQ factors were kept and in this way examined to foster a build for work fulfillment in view of Kaiser's measure of Eigenvalues bigger than 1. In the first place, 61.065 percent of the complete is made sense of by three parts joined.

The exploration utilized Hooper, Coughlan, and Mullen's principles for assessing fit files. The normalized root mean squared lingering (SRMR = 6.598) was over the edge of 0.08, as per the outcomes. Low (CFI = 0.678) was the near fit record. The root mean squared mistake of estimation (RMSEA) esteem (0.14) was high (> 0.08), while CFI upsides of 0.90 or more are viewed as proof of a solid match (Hooper, Coughlan and Mullen). Each marker highlighted a disappointing model fit to the information.

TABLE 2: Confirmatory factor analysis for job satisfaction.

Fit summary	
Standardised root mean squared residual (SRMR)	6.598
Root mean squared error of approximation (RMSEA)	0.14
Comparative fit index (CFI)	0.678

As shown, the outcomes showed that the coefficient gauges were genuinely critical ($p 0.001$). In this manner, the ways were not generally eliminated from the model on the grounds that the proposed

parts were legitimate. Every single individual thing (position fulfillment 1 to work fulfillment 20) were positive and huge in making sense of the connection between ability of the executives and occupation fulfillment through the parts of work itself, pay and government assistance, and relational connections. Yung,

TABLE 3: Path coefficients.

Path	Parameter	Estimate	Std. Error	Z	p> z
Work itself -> d_job_satisfaction_1	d_job_satisfaction_1	0.965688	0.00318	303.69	< 0.0001
Work itself -> d_job_satisfaction_2	d_job_satisfaction_2	0.974051	0.00256	380.55	< 0.0001
Work itself -> d_job_satisfaction_3	d_job_satisfaction_3	0.976486	0.002352	415.19	< 0.0001
Salary_and_Welfare -> d_job_satisfaction_4	d_job_satisfaction_4	0.971073	0.002494	389.37	< 0.0001
Salary_and_Welfare -> d_job_satisfaction_5	d_job_satisfaction_5	0.970329	0.002553	380.07	< 0.0001
Salary_and_Welfare -> d_job_satisfaction_6	d_job_satisfaction_6	0.967606	0.00277	349.28	< 0.0001
Salary_and_Welfare -> d_job_satisfaction_7	d_job_satisfaction_7	0.97179	0.002434	399.34	< 0.0001
Salary_and_Welfare -> d_job_satisfaction_8	d_job_satisfaction_8	0.971672	0.002446	397.23	< 0.0001
Salary_and_Welfare -> d_job_satisfaction_9	d_job_satisfaction_9	0.969509	0.002616	370.56	< 0.0001
Salary_and_Welfare -> d_job_satisfaction_10	d_job_satisfaction_10	0.973119	0.00233	417.59	< 0.0001
Salary_and_Welfare -> d_job_satisfaction_11	d_job_satisfaction_11	0.971913	0.002427	400.54	< 0.0001
Salary_and_Welfare -> d_job_satisfaction_12	d_job_satisfaction_12	0.96762	0.00277	349.34	< 0.0001
Interpersonal_Relations -> d_job_satisfaction_13	d_job_satisfaction_13	0.936264	0.005282	177.25	< 0.0001
Interpersonal_Relations -> d_job_satisfaction_14	d_job_satisfaction_14	0.957863	0.003592	266.69	< 0.0001
Interpersonal_Relations -> d_job_satisfaction_15	d_job_satisfaction_15	0.966726	0.002889	334.67	< 0.0001
Interpersonal_Relations -> d_job_satisfaction_16	d_job_satisfaction_16	0.967347	0.002842	340.33	< 0.0001
Interpersonal_Relations -> d_job_satisfaction_17	d_job_satisfaction_17	0.970508	0.002584	375.59	< 0.0001
Interpersonal_Relations -> d_job_satisfaction_18	d_job_satisfaction_18	0.974032	0.002305	422.61	< 0.0001
Interpersonal_Relations -> d_job_satisfaction_19	d_job_satisfaction_19	0.969841	0.002642	367.15	< 0.0001
Interpersonal_Relations -> d_job_satisfaction_20	d_job_satisfaction_20	0.969882	0.002638	367.65	< 0.0001

Generally speaking, the discoveries propose that 47% of members affected work fulfillment. A sum of 32.5 percent and 6% of members, individually, communicated disappointment and incredibly disappointment. Under 1% of members detailed being extremely satisfied, while 13.8% of them said they were happy with the job ability the board plays in work fulfillment.

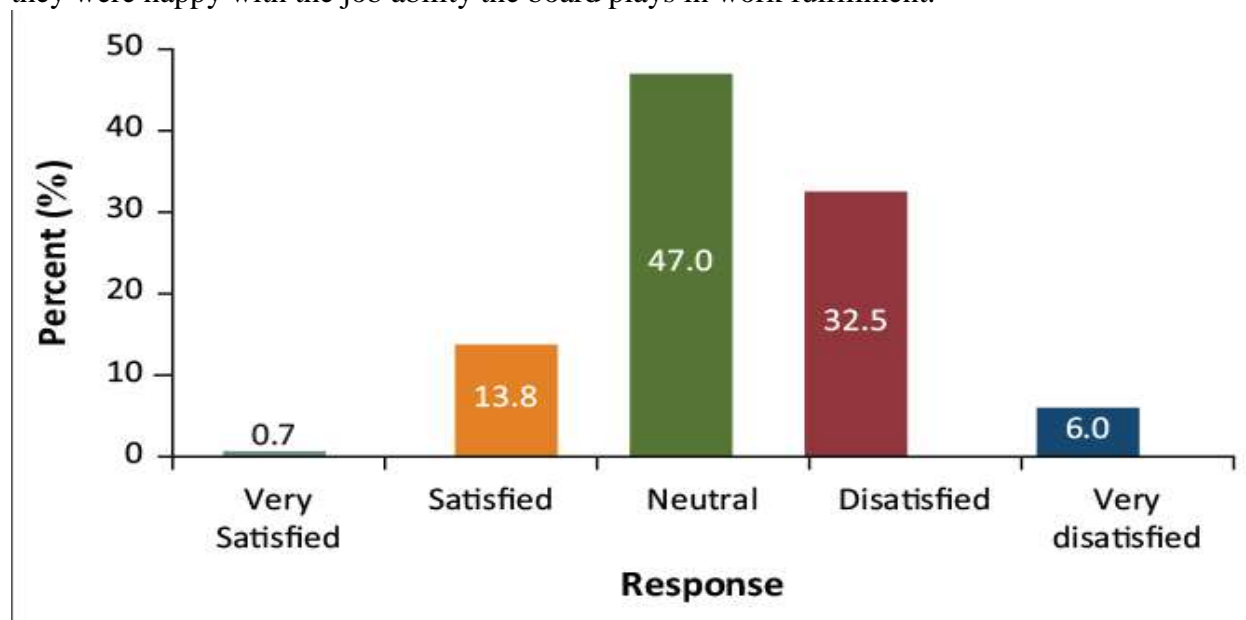


FIGURE 1: Overall participant's responses regarding the impact of talent management on job satisfaction.

5. FINDING OF THE STUDY

The review's objective was to learn what ability the executives meant for the work fulfillment of Ashok Leyland representatives in Hyderabad's car division.

As indicated by the exploration speculation, the discoveries are talked about:

H1: Job fulfillment and ability the executives are emphatically related.

The review's discoveries, in any case, were not in accordance with the hypothesis and existing exploration since a huge part of respondents communicated disappointment with how much ability the board adds to work bliss.

It is critical to take note that few scholastic explorations have shown a great relationship between ability on the board and work fulfillment.

There aren't many explorations that have been finished on the association between ability on the board and work joy.

Subsequently, the aftereffects of this exploration significantly advance comprehension; we might interpret the ability of the board and work fulfillment.

The discoveries of this examination add as far as anyone is concerned to the ability of the executives' methods in the car business and may assist the business with overseeing staff.

Furthermore, it gives more noteworthy information on the ability the board systems utilized in the vehicle business and what they mean for representative fulfillment, which may be profitable to the entire wellbeing industry.

5.1 SUGGESTIONS AND RECCOMENDATIONS

The accompanying ideas are given to vehicles in view of the review's outcomes. It is exhorted that administration focus on the ability of the board by guaranteeing that car ability the executives' frameworks are incorporated into their well defined courses of action simultaneously, and there is a need to give adequate assets to the ability of the board framework. To expand the work satisfaction of wellbeing experts, particularly Ashok Leyland representatives, the executives ought to help proficient ability the board techniques. Subsequently, the executives in the auto business should recognize the essential commitment that productive ability the board makes to representative work fulfillment and make a suitable move in the car of Ashok Leyland representatives in Hyderabad.

Hypothesis related ramifications

This exploration assists with understanding how Ashok Leyland laborers in Hyderabad are impacted by the ability of the executives systems regarding position fulfillment in the car business. The review brings issues to light of this peculiarity since there haven't been many examinations done in this field. The review's discoveries support the ability of the board and work fulfillment. The study adds as far as anyone is concerned of how blissful Ashok Leyland laborers in Hyderabad are with the ability of the executives methodology that are at present set up.

5.3 CONCLUSION

The objective of this examination was to learn the board's impact on Ashok Leyland laborers' work fulfillment. A review of the writing uncovered an information hole in the space of work fulfillment in the auto business. The review's decision was that representative work fulfillment at Ashok Leyland was not impacted by the ability of the executives systems. The outcomes featured the difficulties in involving the board methods in the car business. Since it increases worker bliss, supervisors in the auto business ought to give close consideration to the great faculty of the board.

SUMMARY

Job satisfaction is the key determinant of whether employees are likely to leave or stay with a firm. Talent management, a key element of human resources management, is necessary if employees are to be content at their positions and stay with the organization. This study sought to understand how Ashok

Leyland Hyderabad workers felt about their jobs as a result of talent management. The desire to learn: The relationship between Ashok Leyland's people management strategies and job satisfaction has to be investigated. Studies have been conducted in the Hyderabad setting despite significant voluntary staff turnover in the employee profession, which has led to a severe lack of workers. Methodology, research approach, and design: The study used a quantitative methodology and a cross-sectional survey technique to determine the impact of talent management practices on employee job satisfaction at Ashok Leyland. A sample of 100 specifically selected employees from the four main Ashok Leyland facilities in Hyderabad were used to collect the data. Along with the Human Capital Index survey, 100 workers took a modified version of the Job Satisfaction Questionnaire for Automotive Professionals. Ultimately, 580 responses were considered appropriate for study. Main conclusions: The study's findings indicate that talent management practices in Hyderabad's automotive sector do not increase employees' job satisfaction. Staffing, talent development, and talent deployment are the three most trustworthy measures of an employee's job satisfaction out of the nine talent management techniques, according to a regression analysis. Since they show how difficult it is to carry out talent management processes at Ashok Leyland Company of Hyderabad, the study's results have practical and managerial ramifications. Given that inadequate talent management strategies may reduce employee work satisfaction, management should be happy with these results.

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**A STUDY ON AWARENESS OF MUTUAL FUNDS WITH REFERENCE TO
ADITHYA BIRLA MONEY**

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Abstract

A mutual fund is an investment company that pools money from shareholders and invests in a variety of securities, such as stocks, bonds, and money market instruments. Most open-end Mutual funds stand ready to buy back (redeem) their shares at their current net asset value, which depends on the total market value of the fund's investment portfolio at the time of redemption. Most open-end Mutual funds continuously offer new shares to investors. Also known as an open-end investment company, to differentiate it from a closed-end investment company. Mutual funds invest pooled cash of many investors to meet the fund's stated investment objective. Mutual funds stand ready to sell and redeem their shares at any time at the fund's current net asset value: total fund assets divided by shares outstanding. The study focuses on understanding the composition of the selected funds which determines the scope of performance for the funds, followed by use of ratios that are relevant in quantifying and understanding the risk and return relationships for each mutual fund scheme under consideration. The aim of the study is to analyze the awareness levels of the investors on the existing mutual fund schemes so as to identify the key sales driving forces of mutual fund schemes managed by Adithya Birla Money.

Keywords: Mutual Fund, Investment, Stock Markets, Stock Returns.

1. Introduction

Mutual fund is a mechanism for pooling the resources by issuing units to the investors and investing funds in securities in accordance with objectives as disclosed in the offer document. Investments in securities are spread across a wide cross-section of industries and sectors and thus the risk is reduced. Diversification reduces the risk because all stocks may not move in the same direction in the same proportion at the same time. Mutual fund issues units to the investors in accordance with the quantum of money invested by them. Investors of Mutual funds are known as unit holders. The profits or losses are shared by the investors in proportion to their investments. Mutual funds normally come out with a number of schemes with different investment objectives which are launched from time to time. In India, A Mutual fund is required to be registered with the Securities and Exchange Board of India (SEBI) which regulates securities markets before it can collect funds from the public. In Short, a Mutual fund is a common pool of money in to which investors with a common investment objective place their contributions that are to be invested in accordance with the stated investment objective of the scheme. The investment manager would invest the money collected from the investor into assets that are defined/ permitted by the stated objective of the scheme. For example, an equity fund would invest in equity and equity-related instruments and a debt fund would invest in bonds, debentures, gilts, etc. A mutual fund is a suitable investment for the common man as it offers an opportunity to invest in a diversified, professionally managed basket of securities at a relatively low cost.

II. Review of Literature

ShivamTripathi (2020) Mutual fund industry in India is rising and investment in a mutual fund is less risky than financing in other risky instruments and is, therefore, a safer option for risk aggressive investors. Mutual Funds offer a stage for an investor to contribute to the Indian capital market with specialized fund management regardless of the amount invested. This paper attempts to study the outlook of citizens towards awareness with special reference to mutual funds. The population of the

study is selected from the Ahmedabad city of Gujarat state of the country. The sample size is 100 and the researcher has used a convenient sampling method for the study. The findings of this study are that people are aware of mutual funds but still, people are not investing in mutual funds. It is expected that this study will help in India to plan successful strategies for increasing investment in mutual funds and they can spread more awareness about mutual funds.

CA Jyoti J Patel (2020) This paper attempts to study the outlook of citizens towards awareness with special reference to mutual funds. The population of the study is selected from the Gandhinagar city of Gujarat state of the country. The sample size is 60 and the researcher has used a convenient sampling method for the study. The findings of this study are that people are aware of mutual funds and people are also investing in mutual funds. The researcher also found that the majority of investors are considering mutual funds as risk-free Instruments. It is expected that this study will help Gujarat to plan successful strategies for increasing investment in mutual funds and they can spread more awareness about mutual funds.

Dr. R. Thamilselvan (2021) Investment is done with the motive of earning a regular return, risk-free. In our country, a number of investment measures can be seen ranging from insurance policies to shares or debentures. The type of investment chosen depends upon the income level and the risk-taking ability of the investor. Mutual Funds are an emerging model of investment with great potential as it's got diverging investing modes with regular return and minimized risk. But the awareness level it has with respect to the citizens of our country is really low. The vague knowledge of the same has forced many to stay away or even opt-out from such a mode of investment. This study has been adopted with the aim to study the awareness level mutual funds have among the investing population in India and to suggest better remedies to familiarize them among the population.

NehaChaudhary (2016) The amount of investor knowledge and confidence is critical to a mutual fund's performance. Age, education, gender, and profession all influence investing patterns. The current survey is being carried out with the goal of determining the degree of investor knowledge. The research had a sample size of 99 respondents and was done in Tezpur. Investors were found to have a poor degree of knowledge regarding mutual funds, according to the survey. There was also a substantial disparity in the degree of awareness among investors with various educational backgrounds and genders.

SailajaVedala (2018) The evaluation was conducted with the goal of quantifying "Client Awareness towards Different Types of Mutual Funds." It focuses on the potential effects of evaluating the demands and levels of fulfillment of more shared reserve goods. It also seeks to provide recommendations on how to improve the current level of recognition. The evaluation will assist the company in gaining a better knowledge of the buyers' aspirations, future demands, and necessities, as well as their objections. The evaluation was mostly focused on the progress of a product or concept in the Chennai market. In her review, the scientist used a Descriptive research strategy. In her evaluation, the analyst used the primary information-gathering strategy by restricting a structured Questionnaire. In her review, the scientist used a beneficial type of examining method. The professional interprets the example as 204. The expert used the following measuring apparatuses for Analysis and Interpretation, specifically Simple Percentage Analysis, Chi-Square Test, Karl Pearson's Correlation, and One Way Anova. The scientist touched base with the true findings in her evaluation based on the analysis and interpretation, and suggestions are made in such a way that the customers may achieve wealth development.

Dr.RamandeepSaini (2011)Over the last several years, Indian mutual funds have grown in popularity. Previously, only UTI had a monopoly in this business, but as time has passed, numerous new competitors have joined the market, causing the UTI monopoly to crumble and the industry to confront fierce competition. With the passage of time, this business has become a household name in India's financial system. As a result, it's critical to understand how investors see the sector. The current research looks at mutual fund investments and how they relate to investor behaviour. Investors' opinions and perceptions on a variety of topics have been investigated, including the type of mutual fund scheme, the main goal of investing in a mutual fund scheme, the role of financial

advisors and brokers, investors' opinions on factors that attract them to invest in mutual funds, sources of information, deficiencies in the services provided by mutual fund managers, and the challenges that the Indian mutual fund industry faces, among others.

Binod Kumar Singh (2009) A mutual fund is a professionally managed pooled investment vehicle that pools money from a number of participants and invests it in stocks, bonds, short-term money market instruments, and/or other assets. A mutual fund is essentially a financial intermediary that enables a group of investors to combine their money with the goal of achieving a certain investment goal. The mutual fund will be managed by a fund manager who will be in charge of investing the pooled funds in certain securities (usually stocks or bonds). Mutual funds are one of the most cost-effective and simple to invest in assets ever devised. The amount of mutual fund awareness, acceptance, reasons driving mutual fund investment, elements that investors would evaluate before investing in mutual funds, and knowledge of systematic investment plans have all been investigated in this article. The form of the mutual fund, its operation, the comparison of mutual fund and bank investments, and the computation of NAV are all discussed in this article.

Dr. Komati Durga Prasad (2019) The investor's knowledge of mutual funds in Bengaluru is examined in this research. Because the population of Bengaluru city is so huge, it is difficult to choose group the investors in a sample. In comparison to prior times, investment opportunities are shifting from low-risk to higher-risk ventures. The data also demonstrate that in comparison to other traditional investments with lower risks and returns, the rise of investments in the stock market has grown to a substantial level. Investors' lack of expertise with mutual funds, along with aggressive marketing by promises bigger returns, has resulted in a loss of investor trust owing to the failure to provide larger returns. This necessitates Asset Management Companies (AMCs) to comprehend the speculators' reserve/conspire determination/changing behavior in order to form suitable products to fulfill the financial experts' shifting budgetary demands. With this as a basis, research was conducted among 128 mutual fund investors in Bengaluru to investigate the variables that influence their fund/scheme selection. Z-Test and One-way ANOVA analysis were used to examine the differences in mutual fund awareness using SPSS. As a result, the purpose of this research is to assess investor knowledge about mutual funds.

Dr. B. Ravi Kumar (2017) The capital market has benefited from a rise in small and medium-sized investors' investments in mutual funds. Most investors are aware of mutual funds and their advantages, such as tax advantages, lower risk, and lower costs. In the past 15 years, India's mutual fund sector has seen unprecedented growth. The increase in the number of schemes provided by Indian mutual funds from 403 in 2002-03 to 1294 in 2011-12 demonstrates investors' preference for mutual funds. The resources mobilized by public sector funds ranged from Rs. 314706 crores in 2002-03 to Rs. 10, 019,023 crores in 2009-10, with public sector mutual funds accounting for almost 80% of the total money mobilized. The purpose of this research is to find out how knowledgeable investors are about mutual funds.

Rabia Shah (2016) Advertising, regardless of the sector in which it operates, plays a key role in raising awareness about a company's services. This article investigates the impact of advertising on mutual fund products in terms of raising awareness. The influence of advertising on fund awareness was investigated using ArifHabib Investment Limited as a case study. For this reason, employees were questioned. The qualitative research approach is employed by the researchers due to the investigative character of the study. According to the findings, advertisements have a good influence on consumers' awareness of mutual fund products. Throughout the research, the importance of advertising in building brand recognition in the financial industry is demonstrated.

III. Need for the study

- The study focuses on the composition of the selected funds which determines the scope of performance for the funds.
- Followed by the use of ratios that are relevant in quantifying and understanding the risk and return relationships for each mutual fund scheme under consideration.

- A comparative analysis of the mutual fund schemes is done to see which fund has performed the best.
- This study is significant to the company as it looks into the minute details that differentiate the performances of funds of different companies with the same theme or sector under similar market conditions. This would help the company to develop.

IV. Scope of the study

- To study the Awareness of Mutual funds the data is confined to five years (i.e) 2017-2021.
- Study is conducted at Adithya Birla Money-Hyderabad wing.
- Measures of Growth fund- Beta, Standard Deviation, R Squared, Sharpe Ratio, Portfolio Turnover Ratio are used to analyze the data.
- The sample data comprises of five years balance sheets of Adithya Birla Money.

V. Objectives of the study

- ❖ The objective of the research is to study and analyze the awareness level of investors of mutual funds.
- ❖ To measure the satisfaction level of investors regarding mutual funds.
- ❖ An attempt has been made to measure various variables playing in the minds of investors in terms of safety, liquidity, service, returns, and tax saving.
- ❖ To get insight knowledge about mutual funds
- ❖ Understanding the different ratios & portfolios so as to present distributors with these terms, by this, managing the relationship with the distributors.

VI. Research methodology

RESEARCH DESIGN

This is a systematic way to solve the research problem and it is an important component of the study without which researchers may not be able to obtain the format. A research design is the arrangement of conditions for the collection and analysis of data in a manner that aims to combine for collection and analysis of data relevant to the research purpose with economy in procedure.

- DATA SOURCES:** Only Secondary data sources are used to collect the relevant data for the study. The secondary data has been used to make things clearer.
- (i) **Secondary Data:** Indirect collection of data from sources containing past or recent past information like Annual publications, Fact sheets of mutual funds, newspapers & Magazines, etc.

VII. Limitations for the study

- ✓ The study is restricted to a few funds managed by Adithya Birla money.
- ✓ Future plans of the company can't be anticipated.
- ✓ The Study duration is limited to
- ✓ The analysis is depending upon annual reports of the company only.

VIII. Empirical Results

This section is dedicated to presenting the results of the data analysis performed on different funds managed by different fund managers during the study period.

ICICI GROWTH FUND (an open-ended equity growth scheme) Objective:

The essential speculation target of the plan is to accomplish long-haul development of capital by interest in value and value-related security through a exploration-based venture approach.

<i>Type of instrument</i>	<i>Allocation (% of net assets)</i>
---------------------------	-------------------------------------

Equity and equity-related instrument	65-100%
Debt & Money market instrument	Up-to 35%

Asset allocation pattern of the scheme: Benchmark index: BSE 100

Name of the fund manager: Mr. Sunil Singhania

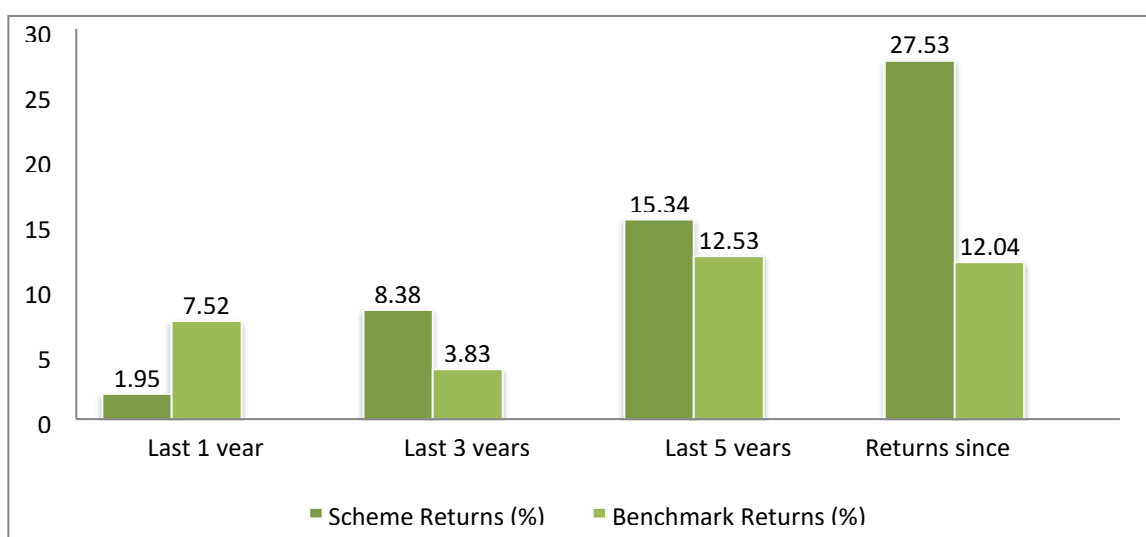
Plans and options_ Growth plan: growth option

Bonus option _Dividend plan: reinvestment option_ Dividend payout option

<i>Period</i>	<i>Scheme Returns (%)</i>	<i>Benchmark Returns (%)</i>
Last 1 year	1.95	7.52
Last 3 years	8.38	3.83
Last 5 years	15.34	12.53
Returns since inception	27.53	12.04

Table No: 1.1 Performance of ICICI growth fund

Source: Author's Compilation Graph NO: 1.1.a Performance of ICICI growth fund Source:



Author's Compilation

Plan Returns since initiation is 27.53% and benchmark returns are 12.04%. When contrasted with benchmark returns and plan restores, the exhibition of the plan returns is acceptable. It is observed from the data that the performance of ICICI growth fund is quite good in four out of five years Scheme Returns since inception is 33.37% and benchmark returns are 28.35%. When compared to benchmark returns and scheme returns, the performance of the scheme returns is good. From the analysis we came to know that taking 100% assets equity and equity-related instrument if the investment of 0-80%. Then debt and money market instrument will be 0- 20% with this the performance of the ICICI has brought a compound annualized returns for the last 1 year the scheme returns i.e., -11.6% and benchmark returns is -14.3%. In the same way, the last 3 years' scheme returns is 3.26% and benchmark returns are -1.32%. The last 5 years' scheme returns are 21.24% and benchmark returns are 9.77%. Scheme returns since inception are 31.42% and benchmark returns are 14.84%. When compared to benchmark returns and scheme returns, the performance of the scheme returns are good. Analysis resulted in taking 100% assets equity and equity-related instrument if the investment of 0-80%. Then debt and money market instrument will be 0- 20% with this the

performance of the ICICI has brought a compound annualized returns for the last 1 year the scheme returns i.e., 14.53% and benchmark returns is 16.44%. In the same way, the last 3 years' scheme returns are 34.06% and benchmark returns are 13.28%. In the last 5 years, scheme returns are 26.69% and benchmark returns are 13.53%. Scheme returns since inception are 28.49% and benchmark returns are 16.18%. When compared to benchmark returns and scheme returns, the performance of the scheme returns is good. Data analysis revealed that taking 100% assets equity and equity-related instrument if the investment of 0-80%.

Then debt and money market instrument will be 0- 20% with this the performance of the ICICI has brought a compound annualized returns for the last 1 year the scheme returns i.e., 3.71% and benchmark returns is 3.01%. In the same way, the last 3 years' scheme returns are -0.19% and benchmark returns are -2.62%. The last 5 years' scheme returns are 8.05% and benchmark returns are 7.26%. Scheme returns since inception are 16.26% and benchmark returns are 11.90%. When compared to benchmark returns and scheme returns, the performance of the scheme returns is good. From the analysis we came to know that taking 100% assets equity and equity-related instrument if the investment of 75--100%. Then debt and money market instrument will be 25% with this the performance of the ICICI has brought a compound annualized returns for the last 1 year the scheme returns i.e., 14.85% and benchmark returns is 7.52%. In the same way, the last 3 years' scheme returns are 16.71% and benchmark returns are 3.83%. The last 5 years' scheme returns are 15.97% and benchmark returns are 12.53%.

Scheme returns since inception are 23.01% and benchmark returns are 18.11%. When compared to benchmark returns and scheme returns, the performance of the scheme returns is good. Scheme Returns since inception is 5.71% and benchmark returns are 9.86%. When compared to benchmark returns and scheme returns, the performance of the scheme returns is good. Analysis revealed that taking 100% assets equity and equity-related instrument if the investment of 80-100%. Then debt and money market instrument will be up to 20% with this the performance of the ICICI has brought a compound annualized returns for the last 1 year the scheme returns i.e., 10.32% and benchmark returns is 7.52%. In the same way, the last 3 years' scheme returns are 12.39% and benchmark returns are 3.83%. The last 5 years' scheme returns are 11.72% and benchmark returns are 12.53%. Scheme returns since inception are 13.83% and benchmark returns are 15.17%. When compared to benchmark returns and scheme returns, the performance of the scheme returns is good. Analysis of the information, we came to know that taking 100% assets equity and equity-related instrument if the investment of 80-100%. Then debt and money market instrument will be up to 20% with this the performance of the ICICI has brought a compound annualized returns for the last 1 year the scheme returns i.e., 6.85% and benchmark returns is 7.82%. In the same way, the last 3 years' scheme returns are 16.01% and benchmark returns are 6.31%. The last 5 years' scheme returns are 10.21% and benchmark returns are 9.01%. Scheme returns since inception are 15.56% and benchmark returns are 8.20%. When compared to benchmark returns and scheme returns, the performance of the scheme returns is good.

IX. Findings, Suggestions & Conclusion

Findings

Out of Eight Selected Mutual reserves conspires, the profits of six plans surpassed their separate Benchmark lists, for example, BSE SENSEX-100; S%P CNX, and so forth.

- ICICI Growth subsidize is an open-finished value development plot. The principal target of the plan is to accomplish the long-haul development of capital. In the event that we take the exhibition of this plan, it has arrived at the benchmark file by 12.04%.
- ICICI Vision finance is an open-finished e-development plot. The primary target of the plan is to accomplish the long-haul development of capital. On the off chance that we take the presentation of this plan, it has arrived at the plan list by 12.04% for the present year.
- ICICI banking store is an open-finished financial area plot. The financial specialist in this plan

just puts resources into the banking segment, and venture system between 0-100percent.

Suggestions

- The investigation has taken a stab at demonstrating that negligible returns of a store or the past presentation aren't sufficient to settle on a dependable choice on venture for what's to come.
- There is a need to comprehend different accessible instruments of similar examination and their essentialness in settling on a speculation choice.
- These devices help in dissecting the consistency of execution of the assets over some stretch of time. Along these lines while giving a proposal to a potential financial specialist on speculations.

Conclusion

In the first place, making of investment Rs 1,000 or Rs 2,000 in an excessive number of plans doesn't really bring about broadening. Solicit yourself: what is the reason for expansion? You are expanding across resources to cut down the general hazard and amplify what comes back from your venture portfolio. Does the above methodology offer you these two advantages? Not so much. One, take a gander at these assets. Every one of them is from a similar resource class: value. That implies every one of them may fall simultaneously – just the degree of harm would vary. For instance, the huge top or worth reserve classifications fall not as much as, state, the mid-top or little top classifications. Two, do these speculations cut down the general hazard in the portfolio? At the point when you include each conceivable class without focusing on your profile, you may be doing the inverse. For instance, a traditionalist financial specialist including mid-top and little-top classifications could be counterproductive. Also, including segment subsidies only for expansion may reverse discharge. Three, now and again it may assist with cutting down the general hazard, yet it may likewise drag the general returns. For instance, if a shared reserve financial specialist enhances a lot into gold assets could assist him with bringing on the hazard, yet it will likewise cut down the profits.

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**ANALYSIS OF RISK MANAGEMENT IN DERIVATIVES WITH REFERENCE TO
ANGEL ONE PRIVATE LIMITED**

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Abstract

Derivatives markets have existed in India in some form or another for a long time. The Bombay Cotton Trade Association began trading futures in 1875, and by the mid-nineteenth century, India had one of the world's largest prospects endeavours. Money settlement and options trading were prohibited by the regime in 1952, and derivatives trading was pushed to the informal advances markets. Recently, the government's attitude has shifted, with more emphasis on showcase-based estimating and less scepticism towards derivatives trading. Beginning in the mid-2000s, restrictions on the fates trading of a variety of products were loosened, allowing for national electronic ware transactions.

For a long time, in the value displays, an arrangement of exchanging known as "badla," which included a few components of advancements exchanging, had been present. In any event, the framework generated a number of nefarious actions, and it was occasionally prohibited until the Securities and Exchange Commission and a clearinghouse ensured the execution of an agreement by acting as purchaser to each vendor and dealer to each purchaser. In 2001, the Securities Exchange Board of India (SEBI) placed a permanent ban on it. Between 1993 and 1996, a series of modifications to the share trading system paved the way for the development of trade traded value derivatives markets in India. The NSE was established in 1993 by the legislature in collaboration with state-owned money-related institutions. The NSE improved the securities exchanges' productivity and transparency by providing a fully automated screen-based exchanging platform and ongoing value dispersal. The prohibition on exchanging choices was repealed in 1995. The NSE proposed to SEBI in 1996 that trade traded derivatives be posted.

Keywords: Working Capital, Operating Cycle, Profitability, Operating Profit.

I. Introduction

All commodities and capital markets have the defining trait of risk. The combination of supply and demand forces over time causes price changes for both agricultural and non-agricultural commodities. Due to the ever-growing globalisation and liberalisation tsunami sweeping the globe, the volume of international trade and business has multiplied during the past two decades. Due to these quick changes in interest and currency rates as well as stock market prices, the corporate world is now exposed to an increase in financial risk. An otherwise lucrative organisation experiences losses due to increased financial risk. This emphasises how crucial risk management is as a hedge against uncertainty.

The issue of risk brought on by the unpredictability and volatility of the underlying asset is successfully solved by derivatives. A company can successfully transfer risk by using derivatives, which are risk management tools. Instruments with no inherent value are known as derivatives. The underlying asset determines their worth. The underlying asset may be financial or non-financial. Derivatives are legal and essential tools for banks, but they, like all financial instruments, come with risks that must be managed. Managing these hazards is not a one-of-a-kind or solitary task. Rather, it should be a part of the bank's entire risk management strategy. Derivatives-related risks are nothing new or unusual. They are similar to those encountered in traditional activities (e.g., price, interest rate, liquidity, credit risk). Fundamentally, the risk associated with derivatives (like with all financial instruments) is determined by the timing and variability of cash flows.

Futures, forwards, swaps, options, structured debt obligations and deposits, as well as various combinations of these, are all examples of financial derivatives. Others are privately negotiated agreements, while some are exchanged on formal markets. Because derivatives can serve a variety of economic tasks, they have become an important feature of the financial markets. Derivatives can be used to lower business risks, increase customer product offers, trade for profit, manage capital and finance expenses, and change the risk-reward profile of a single item or an entire balance sheet.

The fundamental reason that derivatives are seen as more risky than physical investment instruments is that they allow for more gearing and diversification. Short selling is a term used to describe the act of selling. The ability to gear is the result of this skill. Obtain exposure to high-risk assets with a high value higher than the first payment made to carry out the transaction position. A dramatic downturn in the market can occur.

II. Review of literature:

Mary Jones (2018) Derivatives would be the most crucial tools in the financial markets in the current times. They're working hard for lowering the risk for company corporate. The fundamental reason for these instruments is providing commitments to rates for later dates for offering protection against adverse motions in succeeding costs, in order to minimize the scope of fiscal risks. Derivative markets have been novel until the 1970s. Nevertheless, with the description of Bretton Woods system in 1973, there was an unexpected rise in the volatility of exchange rates as well as interest rates therefore rendering it needed for investors and companies to look for methods to lessen these risks. There's a requirement for proper knowledge as well as orientation programmes have to boost the development of derivatives in India.

Kobilarev Mina (2017) In this paper we analyse re-search results on business threat management methods, particularly in light of the derivatives use in the massive Serbian non-financial businesses. The primary goal of this particular paper is examining if Serbian businesses use derivatives to handle danger and also to what level, also to examine the primary rationale behind the companies' not employing these tools and to recommend attainable enhancements of risk management practices. Moreover, we've examined the major reasons economic derivatives are extremely helpful for Serbian businesses for hedging monetary risks. Furthermore, this particular paper offers a relative introduction to the usage of derivatives between The companies and serbian companies in Slovenia and Croatia in an effort to determine if Serbian businesses use derivatives to be able to control risk to the exact same amount as their Croatian along with Slovenian counterparts. This newspaper includes findings and also give proof that Referent interest and fx rate rates (such as 1w- 2w repo fee, Belibor and Beonia) are markedly volatile, that opens huge chances for the utilization of fiscal derivatives, since these monetary parameters figure out the cost of a credit arrangement for businesses and also the quality of import as well as export money flows.

III. Need of the study:

- To know the factors that influence the derivatives market.
- To know which type of derivative market gives comparatively unlimited profit/loss to investor.
- To study the pros and cons of investing in derivative market to investors.
- To understand derivative market regulatory frame work.

IV. Scope of the study

- The study was carried out at Angel one broking limited of the investment industry to assess the risk management in derivatives.
- This study was conducted in 45days.
- As derivative market is unpredictable and it is difficult to analyze recent years data due to pandemic, we took previous years data like in between 2017 to 2020.

- To study the collected data we used techniques like futures and options.

V. Objectives of the study

- To study Indian Derivative market.
- To study the trading mechanism of Derivative market with the special reference to Futures & Options.
- To study the awareness of Derivatives among the investors in Hyderabad city.
- To analyze performance of derivative products
- To know pay off of selected derivative products.

VI. Research methodology

RESEARCH DESIGN

The type of research is chosen based on the challenges that have been identified. The type of research used in this case is descriptive research. Fact-finding and many types of inquiries are all part of descriptive research. The primary goal of descriptive research is to provide a detailed description of the current state of affairs. The purpose of this dissertation is to investigate various topics linked to derivatives in the Indian market and how they assist in risk mitigation.

SOURCES OF DATA

- For the study the data was collected through both primary and secondary sources.
- The secondary data sources are general library research, textbooks, journals, articles from newspaper, brochures, and internet websites.
- The primary data sources are brokers of Bangalore Stock Exchange.

VII. Limitations Of the Study

- The Statement of the problem of the study is, the derivatives market in India is still in a growth stage.
- In modern countries also people are not interested to invest in derivative products in this project we emphasis the investment in derivative system.
- Study is conducted only during 2017-2022 which can be extended further.

VIII. Empirical Results

FUTURES OF ACC CEMENTS

Futures: The buyer of a futures contract is taking on the obligation to buy and receive the underlying asset when the futures contract expires. The seller of the futures contract is taking on the obligation to provide and deliver the underlying asset at the expiration date.

FORMULA:

$$F_o = S_o (1+r-d)^T$$

S_o = the day's closing price of a market.

r = Rate of return

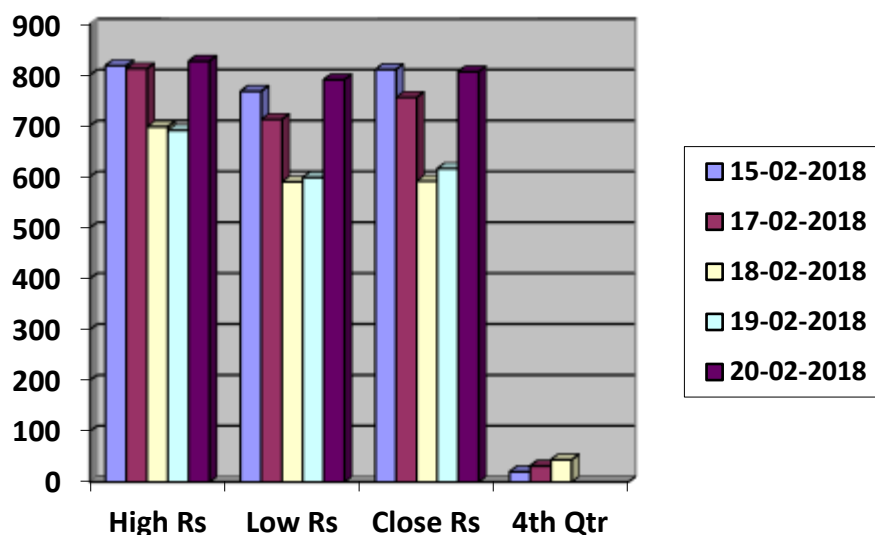
d = Dividend

T = Time period

Date dd/mm/yy	High Rs	Low Rs	Close Rs	Open Int (‘000)	Trd Qty (‘000)	N.O.C.	FO
15 /02/22	818.34	768.00	810.65	7146	986	2781	88582.23
17 /02/22	812.45	712.60	755.95	7322	1012	3482	89881.33
18 /02/22	698.30	589.80	591.40	1800	1943	2591	89858.54
19 /02/22	691.00	598.50	615.85	8158	891	2270	90154.83
20 /02/22	827.00	790.50	806.20	1785	1465	1953	90132.04

Table: 1.1 Futures trade of ACC Cements.

Source: Author’s Compilation



Graph No: 1.1.a Futures trade of ACC Cements.

Source: Author's Compilation

The future price has risen significantly due to an increase in closing price, a fall in open interest, and a decrease in the value and volume of futures in case of ACC Cements. The future price (Fo) of Arvind Mills has decreased as a result of lower closing prices and lower open interest, while volume and value have increased. The future price (Fo) of BHEL has shown fluctuation due to fluctuation in closing price and volume, value is increase and it is observed that open interest is decrease. The call option and put option tables that the writer makes money when the striking price is higher than the spot price and loses money when the strike price is lower than the spot price, and vice versa for the buyer In case of profit or loss position of call option buyer of ACC Cements, where as in case of put option buyer of ACC Cements makes a profit when the strike price is less than the spot price, and the writer makes a loss when the strike price is greater than the spot price. In case of call option buyer of Arvind Mill if the strike price is less than the spot price, the buyer will profit and if the strike price is more than the spot price, the buyer will lose. Obviously, the opposite is true for the writer, where as in case of put option buyer of Arvind Mill the strike price is less than the spot price, the buyer will profit and if the strike price is more than the spot price, the buyer will lose. Obviously, the opposite is true for the writer. In case of profit or loss of call option buyer of BHEL the writer makes money when the striking price is higher than the spot price and loses money when the strike price is lower than the spot price, and vice versa for the buyer in case of profit or loss position of call option buyer, where as in case of put option the writer makes money when the striking price is higher than the spot price and loses money when the strike price is lower than the spot price, and vice versa for the buyer.

IX. Findings, Suggestions and Conclusion:

Findings:

- The aforementioned study of ACC, ARVINDMILLS, and BHEL futures and options showed a bullish market in the week.
- The cash market, foreign institutional investor engagement, news linked to the underlying asset, national and international markets, and researchers' perspectives are all key influences on the futures and options market.
- The profit/loss in the cash market is restricted, however in the future and option markets, an investor can make an endless profit/loss.

- SEBI should take initiatives to increase public understanding of the futures and options market, which was only recently launched. The derivatives market has risen to a significant position in the current context. Its daily turnover is comparable to that of the cash market. The NSE's average daily derivative turnover is four lacks volume.
- Hedging is the primary function of derivatives. In the cash market, the investor must pay the entire amount, whereas in derivatives, the investor must pay premiums or margins that are a percentage of the overall amount.

Suggestions

- In a bearish market, it is recommended that an investor choose the put option to reduce profits.
- In a bullish market, an investor is advised to select for a call option to maximise profits.
- Before investing, an investor should keep in mind the time or expiry period of futures and options contracts. The longer the time, the lower the risk and the higher the profit. The less time you have, the higher the risk of losing money
- Futures and options are currently traded on the NSE. It is suggested that SEBI take action in futures and options trading on other regional exchanges.
- SEBI must take more initiatives to improve the risk management framework.
- Contract size should be kept to a minimum, as small investors cannot afford such high premiums.

Conclusion

Derivatives have been around for a long time, having their origins in the commodities market. Advances in financial markets and technology have made derivatives more accessible to investors in recent years. Unlike equities markets, India's derivatives industry is quickly expanding. Trading derivatives necessitates a deeper understanding of finance than the typical person. As markets have matured, the majority of investors are still unaware of the full ramifications of derivatives trading. SEBI should take steps to raise investor awareness of the derivatives sector. The use of derivatives allows for improved risk management. These markets can provide India's capital markets with more depth, stability, and liquidity. Successful derivatives risk management necessitates a thorough understanding of the 0 principles that govern financial derivatives pricing. In order to expand India's derivatives market, SEBI should alter several of its regulations, such as contract size and Fill involvement in the derivative market. Because small investors cannot afford such high premiums, contract size should be kept to a minimum. The majority of derivatives are utilized for hedging purposes. In a derivative market, the option writer's/profit/loss holder's is solely determined by the underlying's changes.

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**COMPARATIVE STUDY OF LIFE INSURANCE PLANS OF LEADING PRIVATE
INSURANCE COMPANIES IN HDFC LIFE**

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Abstract

India's economic development made it a most lucrative Insurance markets in the world. Before the year 1999, there was monopoly state run Life Insurance Corporation of India (LIC) transacting life business. Today, there are 24 private life insurance companies operating insurance business in India. The competition from these companies were threatening to the existence of LIC. Since the liberalization of the industry the insurance industry has never looked back and today stand as the one of the most competitive and exploring industry in India. In this paper, an attempt is made to analyze the performance of public and private life insurance companies in India. The objective of present study is to compare the performance of public and private life insurers in terms of their number of new policies issued; total premium income and market share in India. In year 1993 Malhotra Committee emphasized on privatization of insurance business, since then there was monopoly of LIC. In year 1999 the Insurance Regulatory and Development was established to regulate and to protect the policyholder's interest of the insurance industry. It has been observed by the study that private life insurers put efforts to improve its performance year after year and affected the LIC in many ways for initial first decade. To overcome and compete with this situation LIC introduced new and attractive insurance plans, put efforts for better customer relationship management and effective advertising. There is very high potential in life insurance sector as the population of India is very huge and still there is untapped life insurance market.

Keywords: Insurance sector, Quality, Perception of Customers, Risk and Return, Life Insurance.

I. Introduction

Insurance is a means of protection from financial loss. It is a form of risk management, primarily used to hedge against the risk of a contingent or uncertain loss. An entity which provides insurance is known as an insurer, insurance company, insurance carrier or underwriter. A person or entity who buys insurance is known as an insured or as a policyholder. The insurance transaction involves the insured assuming a guaranteed and known relatively small loss in the form of payment to the insurer in exchange for the insurer's promise to compensate the insured in the event of a covered loss. The loss may or may not be financial, but it must be reducible to financial terms, and usually involves something in which the insured has an insurable interest established by ownership, possession, or pre-existing relationship. The insured receives a contract, called the insurance policy, which details the conditions and circumstances under which the insurer will compensate the insured. The amount of money charged by the insurer to the policyholder for the coverage set forth in the insurance policy is called the **premium**. If the insured experiences a loss which is potentially covered by the insurance policy, the insured submits a claim to the insurer for processing by a claims adjuster. The insurer may hedge its own risk by taking out reinsurance, whereby another insurance company agrees to carry some of the risk, especially if the primary insurer deems the risk too large for it to carry.

II. Review of Literature

C.PARAMASIVAN (2015) Indian financial system is highly influence with the banking and insurance sector which attracts flow of savings and investments to the country. Insurance sector in India is one of the growing sectors of the economy. The insurance sector, along with other elements of marketing, as well as financial infrastructure, have been touched and influenced by the process of

liberalization and globalization in India. The customer is the king in the market. Life insurance companies deal in intangible products. With the entry of private players, the competition is becoming intense. In order to satisfy the customers, every company is trying to implement new creations and innovative product characteristics to attract customers. This research paper attempts to study the Public & Private Life Insurance Companies in India and compare the perception of customers in terms of service quality and analyze the performance of public and private life insurance companies in India.

Neha Sharma (2014) The Indian Life Insurance sector has witnessed a major revamp in 1999 with the establishment of Insurance Regulatory and Development Authority (IRDA) and subsequent entry of Private sector players. These changes are affecting the way service is being delivered. Technology usage, new innovative product introduction and competition are seen as drivers of quality of service being provided to the customers. In this study using SERVQUAL model, we have examined the importance of service based on the 5 dimensions viz, Tangibles, Reliability, Responsiveness, Assurance and Empathy. Using 120 Life Insurance policy holders from 3 Life insurance companies in Agra the study identified that the gaps exist even after 15 years of privatization of this sector. The study indicated that a lot needs to be done for improving customer focus and services activity in the Life Insurance sector. Regular customer surveys with increased sample sizes across the country will enable the Insurance companies to fill the gaps.

Vikas Sharma (2013) The insurance sector, along with other elements of marketing, as well as financial infrastructure, have been touched and influenced by the process of liberalization and globalization in India. The customer is the king in the market. Life insurance companies deal in intangible products. With the entry of private players, the competition is becoming intense. In order to satisfy the customers, every company is trying to implement new creations and innovative product characteristics to attract customers. In this research paper, an attempt is made to analyse the performance of public and private life insurance companies in India.

AMISH PATEL (2019) Insurance is a financial risk management tool in which the insured transfers a risk of potential financial loss to the insurance company that mitigates it in exchange for money compensation known as premium. Insurance sector in India is one of the fastest growing sectors in the economy. The insurance sector in India has completed a full circle from an open competitive market to nationalization and back to a liberalized market once again. With the entry of private life insurance companies in the year 2000-01, the competition is becoming cutthroat. The objective of present study is to compare public and private sector life insurance companies in India in the post liberalization span.

Sudipta Kayal (2019) Insurance is primarily a risk management mechanism. Risk of loss-income property or even human life-is transferred, in part or in full, to the insurer. That apart, insurance business helps in capital accumulation to use in nation building activities. Insurance sector not only plays a leading role within financial system in a country but also has an important socio-economic function. Insurance facilitates economic development. The objective of Nation is to build an efficient and stable insurance sector in India that will support both the needs of the real economy and the socio economic objectives of country. This paper is an attempt to analyse the performance of public and private life insurance companies in India.

Leena Dam (2017) Insurance serves the dual role of savings and investment. Life insurance primarily is a tool to mitigate the financial risk arising because of death of the insured. The capital pool arising from collection of life insurance premium is deployed in numerous nation building activities which enhance economic growth. The BRIC nations with a combined population of around 3 billion are a prosperous market for life insurance business. All BRIC nations having liberalized their insurance industry there is a level playing field for both public and private industries. In the world market, the scope for expansion has reduced in the more matured economies. Hence global insurance companies are concentrating attention in the emerging markets. In all these markets, life insurance sector represents a vibrant market, which is strongly expanding and establishing itself as a significant contributor of economic growth. India does not find a place in the top ten countries with her life insurance business.

AnshitaKandari (2018) Since 1991, Indian economy and industry has moved away from a state controlled to a competitive market with intricate financial services to the global economy. The financial sector, particularly, the Insurance has opened up to all competition. A revamp in tightly regulated and monopolized insurance sector was brought about by the passage of the Insurance Regulatory and Development Authority Act IRDA in 1999. The present paper analyses the performance of public and private life insurance companies in India. As per the total premium income, in FY 2014-15, LIC with 73% of business share still holds a significant market share. 24 private insurance companies have established footholds in the market leading to intense competition. Private Insurance companies have a higher growth rate as compared to public sector. Today, Insurance penetration is better. The Insurance companies are competing in terms of policies sold, collection of premium income and others.

DrVikasGairola(2016) The objective of present study is to compare the performance of public and private life insurers in terms of their number of new policies issued; total premium income and market share in India. The secondary data has been collected from year 2000-01 to 2015-16. In year 1993 Malhotra Committee emphasized on privatization of insurance business, since then there was monopoly of LIC. In year 1999 the Insurance Regulatory and Development was established to regulate and to protect the policyholder's interest of the insurance industry. It has been observed by the study that private life insurers put efforts to improve its performance year after year and affected the LIC in many ways for initial first decade. To overcome and compete with this situation LIC introduced new and attractive insurance plans, put efforts for better customer relationship management and effective advertising. There is very high potential in life insurance sector as the population of India is very huge and still there is untapped life insurance market.

Dr. PallaviPattan (2018) After privatization of insurance sector in India, Life Insurance Corporation of India (LIC) is facing competition from private life insurance companies. This competition affects the business of LIC. Present study is an attempt to know about the cost effectiveness of selected companies and to compare them on cost-effectiveness ratio. Cost effectiveness represents the relationship between inputs (monetary value) and outputs (unit). It is determined by cost-effectiveness analysis (CEA), in which value of inputs (cost) is in the numerator and unit of output is in the denominator. Finding shows that after facing tough competition from private sector, LIC still more cost effective as compare to other life insurance companies in India.

Dr. Vishal Soni (2014) The need for insurance is as old as commerce and trading in the civilized world. Risk is inherent to life, commerce, trading etc. The insurance will provide safety to it. Insurance sector has been playing a leading role in the financial system of India. It has also been facilitating an objective to build an efficient, effective and a stable economic environment in India. It also caters to the needs of the both real economy and socio-economic objective of the country. It is making inroads into the interiors of the economy and is being considered as one of the fast developing areas in the Indian financial sector. It has been mobilizing long-term saving through life insurance to support economic growth and also facilitating economic development. In India after a monopoly of public sector life Insurance company for decades, the sector was opened for the private players in order to bring consumerism in real sense. The healthy competition among these companies has resulted in to better quality, customizations, innovations, choice, value, and affordability of the product offerings. The current study attempts to study the product offerings of largest public sector life insurance Company of India Life Insurance Corporation of India and the private giant ICICI prudential life insurance company Ltd on the aspects of applicability of SERVQUAL dimensions to current product offering and to study and compare the perception of customers in terms of service quality. The study discovers their present levels of the product offerings on the basis of SERVQUAL dimensions. The study also attempts to compare perceived quality of product offerings of the selected life insurance companies on SERVQUAL dimensions. It is an exploratory research study, which after development of conceptual frame work deploys structured instrument and statistical analysis tools like Eigen value scores and variance to measure the output. This study shall be helpful to give a wonderful insight to the practicing managers to identify the gap and take leverage by offering the desired quality products.

III. Need for the study

- A person or entity who buys insurance is known as an insured or policyholder. The insurance transaction involves the insured assuming a guaranteed and known relatively small loss in the form of payment to the insurer in exchange for the insurer's promise to compensate the insured in the event of a covered loss.
- The loss may or may not be financial, but it must be reducible to financial terms, and usually involves something in which the insured has an insurable interest established by ownership, possession, or pre-existing relationship. The payment is made only upon a contingency.
- More specifically, insurance may be defined as a contract between two parties, wherein one party (the insurer) agrees to pay to the other party (the insured) or the beneficiary, ascertain sum upon a given contingency (the risk) against which insurance is required.

IV. Scope of the study

1. Questionnaire is circulated to the investors to know their preference to policies.
2. Out of many private life insurance players HDFC Life is considered for the study.
3. The study is conducted in HDFC Life Hyderabad branch alone.
4. Focus was on to know the grievance handling mechanism existing in HDFC Life.
5. Insurance Premiums charged by HDFC life was the area covered under study.

V. Objectives of the study

- To analyse the awareness level of customers about various products of public and private life insurance companies.
- To examine the customer experience with the premiums offered by various insurance players in the market.
- To analyse the customer satisfaction levels in public and private life insurance companies
- To study the preferences towards the types of insurances provided by public and private sectors companies.

VI. Research methodology

Data sources:

The research involved gathering secondary data as well as primary data. For the purpose two types of survey was conducted by me to collect the data-

- a. **Primary data:** In finance industry until and unless we have the knowledge of financial status of the company, companies cannot focus upon the target market. Hence a survey was done to know their wants, purchasing power using finance.
- b. **Sample size:** The size of the sample was 30 insurance agents and customers.
- c. **Location of the Study:** HDFC Life situated in Hyderabad.

VII. Limitations of The Study

1. The study is restricted to HDFC Life.
2. Secondary sources alone are used.
3. No powerful statistical tools are employed other than Percentages and graphs.
4. Sample size is limited to 30 respondents.
5. Sample data is collected only from one Outlet in Hyderabad location.

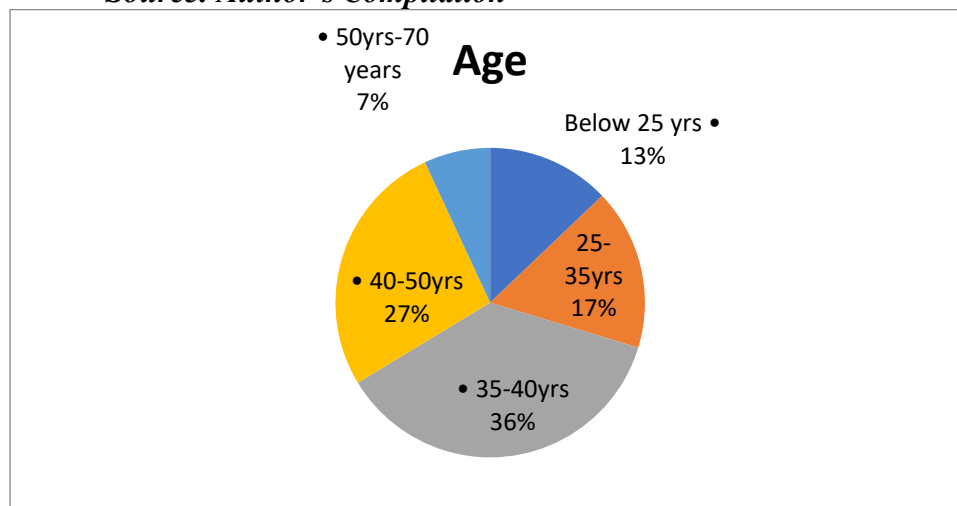
VIII. Empirical Results

The section is dedicated to present the empirical results of the data analysis and a representative result is presented in table 1.1, graph 1.1.a.

<i>Response</i>	<i>Response</i>	<i>Percentage</i>
Below 25 yrs	4	13%
25-35yrs	5	17%

35-40yrs	11	37%
40-50yrs	8	27%
50yrs-70 years	2	7%
Total	30	100%

Table: 1.1. Analysis results based on age group
Source: Author's Compilation



Graph: 1.1.a Analysis results based on age group
Source: Author's Compilation

It is observed that most of people under 35-40 years age group. Reason for most of people thinking about their health at the age 35-40. It is observed that most of people are Married. It is observed that most of people are taking for their personal and family. First preference they are giving for personal and family health risk. It is observed that most of people are preferring for Pre-medical Screening benefits. It is observed that less people are using alternative then Insurance Policy other then this LIC And HDFC LIFE. From the above observation most of people are not have any other preference of Insurance Policy other than LIC And HDFC LIFE. From the above observation most of the people are in to Insurance Policy, 27% are using SBI, 10% are using star health, 20% are ICICI 13% are using other. It is observed that most of people are feeling that it is necessary to maintain insurance policy. It is observed that most of people are aware about insurance policy benefits of between LIC And HDFC LIFE. It is observed that most of people are not satisfied sum assured and premium Ratio. From the above observation most of people are not aware of the Tax Savings under Sec 80 D against the premium of Insurance Policy. From the above observation most of people Aware of the Products available through LIC And HDFC LIFE. From the above observation most of people Satisfied level LIC And HDFC LIFE insurance claiming policy. From the above observation most of people Satisfied with the services provided by the insurance company.

IX. Findings, Suggestions and Conclusion:

Findings

Following are some of the findings from the analysis and interpretations of the parameters or features studied.

1. The Insurance policy is lagging behind among the consumers.
2. LIC leads the market in the Insurance sector at Hyderabad.
3. The preference of insurance among consumer is well balanced.
4. The major percentage of consumer feels it necessary to have a Insurance in present days.
5. The consumers dissatisfaction with the level of premium paid against sum insured are high.
6. The knowledge of the insurance benefits are among consumers is high in HDFC LIFE AIA.
7. The consumers are not even aware of the Tax benefits under sec 80D in high percentages.
8. The availability of the products through HDFC LIFE. is less percentage among consumers.

9. The consumer are well balanced in their perception that HDFC LIFE has made them easier to select the financial products
10. Most of people Satisfied level LIC Life insurance claiming policy.
11. Though consumer are satisfied in major percentage with the services of LIC

Suggestions

The corporate presentation would be an effective of creating market for the Health Insurance. The Company Head should be approached and convinced about the product. The benefit will attract the corporate heads as the Health and the accidents of the employee would be taken care of by the Insurance companies, thus leading to the Insurance of mass of people. It is always patience that leads to success. There should be slow but continuous effort to convince the customer and convert them to an active client. They may not be ready to Invest in the very first day they do need a time to decide. LIC is improving marketing strategy.

The reputation of the company is a shield for all the products to find shelter here. Company should concentrate on the 25-30 year age group, because this is the time when people show more interest in investment and are rasher in driving. LIC and HDFC LIFE need to more concentrate on 25-30 year age group.

Conclusion

Life Insurance Corporation of India, India's biggest life insurer, has made further purchase of lowly valued Public sector bank stocks. With this purchase, It has voiced hopes that the NPA (non-performing assets) and bad loans situation of these banks would not worsen in the future. As per the new purchase, LIC now owns additional stake in poorly performing PSU banks including Oriental Bank of Commerce, Development Bank of India, Syndicate Bank, Bank of Baroda, Bank of India, Central Bank of India and Allahabad Bank. This stake increase ranges from 1-7 % as compared to the stake previously held by LIC in the above mentioned banks. This purchase brings LIC's investment to an additional Rs2,200crore above the investments that LIC has already made in the PSU banking sector.

HDFC Life AIA Life Insurance has been one of the leading insurance provider in India for a consistently long period. They have been offering some of the most popular insurance solutions to a diverse customer base and specialize in offering a hassle-free and convenient experience. To further add to their services, the insurer has a robust customer support system wherein customers can not only get in touch with the customer support staff but also carry out policy related requests using the options on the website itself.

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STUDENTS AND TEACHERS PERCEPTION TOWARDS ONLINE LEARNING**GOWRIPEDDI HARI KUMAR**

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ABSTRACT

Few years ago people do not have any thought about online education. Even they are not shown interest to conduct online classes. Because we are all connected with face to face class room communication. But now online is the only one platform to conduct classes as well as business meetings too. Because it is due to covid-19 pandemic. The aim of this paper is to analyze the perception of online education in students and teachers prospective. This paper was collected opinions of 100 students and 30 teachers who were participated in online learning in Anantapur region. This paper going to highlight the SWOC of the online learning. Lecturers provide various instructions to the students, that may be synchronize (where as communication done by each other in the real time via Google meet, Zoom, WebEx) or asynchronies (where as communication done via email, sharing recorded video and upload notes at web site or blogs). This paper was collected many responses about challenges faced by the students and lecturers while online learning such as data security, economic conditions, learning, network, communication and delivering lecture so on.

Key Words: Online Learning, Online Platforms, SWOC, Perception, Synchronize, Asynchronies

INTRODUCTION

Online classes are becoming a part of the global education system. Incorporates online learning to make education convenient and accessible to all. India is one of the most important sectors in the world in terms of higher education. Online education is a medium set up to practice education at a convenient time through the internet. This online learning opportunity is provided when it is not possible to teach education to students through live class. In this current scary Covid-19 environment it is not possible to teach education through live classes, so this online education system can help a lot.

This online education is constantly available (24X 7) and it is convenient and exciting for the students. With the availability of technology and computer, it is possible to get advanced information online anytime and anywhere, not just through the traditional classroom. Some studies say that people are getting the same kind of education in the classroom as well as online.

Recent innovations in Online Learning

The online education system is showing better results than expected. Because it is possible to execute the intended plan at any time, from anywhere, according to a pre-made plan. Education is no longer limited to the classroom but is one-sided to the teacher and the student. It is worthwhile to conduct classes, feedback and exams for students from time to time in the online education system to find out their status. The online approach further improved the teaching system. Some of the features of online education are as follows:

Low cost:

The charges of online education is very low when compared to the traditional method. Because students do not have to travel to distant places for education, they do not have to spend on things like hostels and rooms and so on.

Availability of several types of groups:

With the technology currently available, everything will appear at the press of a button. From religion to business, from philosophy to fashion designing, from programming to painting, from photography to yoga, everything is possible online, not just that.

Education groups:

Everyone around the world has an equal right to share their information and ideas, to increase knowledge and to solve problems without any aspirations.

Convenience:

Online education does not require much money, time and meeting. Teachers and students can meet online, get feedback, and get an education from anywhere and anytime.

Infrastructure requirements are minimal:

With the online education system, educational institutions do not have to spend large sums of money on security, cleanliness and other things

Standard Quality:

As the details are available online it can be evaluated and modified at any time, which helps maintain quality standards.

Smart phones play key role to implement online education successfully. It will help accelerate the pace of education in rural areas as well. The Massive Open Online Course

(MOOC) is a new chapter in providing education online. Although it was launched in 2008, it has been prevalent meanwhile 2012. It is estimated that over 100 million students have joined the MOOC so far. There have been many changes in online education in recent times due to some of the reasons mentioned below.

- New Smartphone Technology
- High-speed internet
- New education policy
- Growing number of students in the field of e-learning

REVIEW OF LITERATURE

Beatty and Ulasevich, 2006; Li and Akins, in their 2005 research, found that the admiration of online classes has improved in current years, and that schools and colleges have also tended to growth of online courses to make available education. Corresponding changes in technology and student passion have had a profound effect on online education in schools and colleges (Bennett and Locker, 2004; Brit, 2006). According to Augustina and Kahino, 2017 online education will be a tool to effectively address the current situation and provide education.

Bond et al., 2018 and Sandkuhl & Lehmann, 2017 said that most of the areas are suffering network issues. And another most issue is to set up online education system in higher education institutions. First we have to focus on those issues to implement online education successfully.

Abad-Segura et al., 2020, advocated that they need particular management system to make changes and to adopt new technological advances in the present conditions.

Hodges et al., 2020; Bozkurt & Sharma 2020 during their research they added teaching methods, practices, focus on research papers, rules and regulations, theories, morals and course design, assessment or evaluation should be focused.

Branch & Douse, 2015 successful implementation of online education needs well organized structure, planning and norms, instruction are required.

Cope et al. 2019 according his research, there are few elements which make it difficult to setup online education in higher education organization. Those are financial situations, network, technology, rapidity and adjustments.

Means et al., 2009 online learning is a tool or technology to provide education in higher education institutions. According to him using digital in higher education is not to online learning.

Hodges et al 2020. Online education is something to be discussed because the implementation of online education does not result in a face-to-face relationship between

teacher and student. Online courses, however, require careful planning. It is never equal to traditional system of education.

Many schools and colleges are implementing online teaching in their course without proper planning and procedures. However, he said that first the faculty development program should be set up for the teachers and they should be made aware (Abhinandan, 2018).

OBJECTIVES OF STUDY

- To analyze the SWOC of online learning
- To investigate the perception of online education in students and teachers perspective.
- To understand the challenges towards online learning
- To find out the reasonable solutions to overcome the issues related to online learning.

RESEARCH METHODOLOGY

This study was done by collecting both primary and secondary data. The primary data was collected from 100 students and 30 teachers. We were prepared a structured questionnaire to collect primary data. Total sample size for primary data was 130. We had gone through the academic literatures, journals, magazines and also various sources of secondary data were used for the study.

ONLINE EDUCATION – SWOC

STRENGTH:

Online education methods and processes are very flexible. These act as a bridge between students and teachers in times of crisis as online education enables students to receive an education regardless of time and place.

During this crisis, teachers use a combination of audio, video, and text to help their students maintain human relationships. Study materials can also be sent to everyone via Gmail. The availability of video in online education creates a face-to-face relationship between teacher and student. So students can ask their opinion and questions and it is also worth getting the answer right away. Due to the current Covid-19 effect, students are not able to move to other areas and stay there to get an education. So it makes sense to stay home and get an education instead of wasting time during these critical times. This online education has led to new avenues in the education system.

WEAKNESS

Online education involves face-to-face relationships but it is not the equivalent of a pleasant atmosphere in the classroom. It is worthwhile to come across interruptions due to some network issues. Although both time and space are a strength to online education, they are not. Technical problems such as video or voice misalignment. It is not possible to develop discipline and confidence as much as in the classroom in online education. Online education teaching is very slow. Also the screen on the system or phone is small which makes it

difficult to understand the information thoroughly. Links used for online class are likely to be misused. The big issue is who is joining and what.

OPPORTUNITY

Due to the current Covid-19 pandemic, no one is allowed to go out and get things done. Online can be very useful for building human relationships and completing tasks efficiently. Online education is a great opportunity for all types of educational institutions (schools, colleges and universities). This allows educational institutions to educate teachers without having to stop their classes and allow students to learn education online. This online education allows students to engage in activities such as providing study material along with education, conducting exams, quizzes and group discussions.

CHALLENGES

There are many challenges ahead to implementing online education. The main problem is the participation of students in online classes. Another challenge is for teachers to switch from offline mode to online mode. Because it is not as easy to tell online as the lessons in the live classroom. Offline involves face-to-face communication with the wider board and students, but, despite the video facility online, the network and voice are more likely to be disturbed. And one of the biggest challenges is how well students understand through online classes. There are no government regulations on online education. So there is a possibility of quality defect in education, lack of control, lack of resources and lack of standards. Teachers and students need to spend more time and money for online education. Appropriate steps should be taken regarding training and online delivery methods for teachers to take online classes. Teachers and students will have to spend large sums on appropriate equipment (like computer or electronic devices) and internet services for online classes.

CHALLENGES OF ONLINE EDUCATION

Challenges encountered by Students

Flexibility:

Those who are accustomed to offline classes from an early age find it very difficult to switch to an online environment at as soon as. Comfort, convenience, freedom and satisfaction do not come in online class as much as in the classroom.

Technical issues:

Most students do not have the proper requirements for online classes i.e. computer or smart phone and speed internet. For this reason many students are unable to attend online classes. In addition the children must have the technical and computer knowledge to use them. Problems such as video and voice breaks in the middle of class are very troublesome.

Time Management:

Another problem faced by online classes is time management. Despite the convenience of taking classes online at any given time, scheduling a timetable online is just as difficult as scheduling a regular classroom.

Self-Motivation:

Students lose patience due to the lack of an online class that allows as much as in a normal classroom. Establishing a good atmosphere in online class is very difficult. Also, constantly looking at a computer screen or phone cannot focus on the subject.

Communication

There is no proper communication between teachers and students in the online classroom. Not being able to talk to them in an online class like in a normal classroom, answer questions asked and find out if the lessons are well understood or not. This is usually due to lack of interest, lack of technical skills with apps and video calls, and inability to express themselves through live chats, emails or text messages.

Challenges encountered by Teachers**Participation of students:**

Engaging students in online classes is becoming more and more difficult as in a normal classroom. Teaching in online classes does not have much impact on students. By spending more time in front of the computer screen, you are more likely to lose interest and concentration quickly.

Time obligation:

It is very difficult online to convey the complete information of the subject to the students in an orderly manner. It takes more time to tell the subject to the students online. And raising motivation and interest in students is also a challenge. It takes some time for teachers to teach classes online and learn how to deliver content.

Students Assessment:

Evaluating the ability of students online is an important part. Students are more likely to be stressed during this process. Teachers have to face more questions from students to undertake tasks like assignment and project work. Teachers have difficulty examining homework, assignments and project work online as there is a communication gap between teacher and student. Teachers cannot conduct exams via online successfully. Because they cannot find whether the student is writing exam genuine or copying. As a result, students are more likely to lose proficiency.

Teaching Techniques:

Most teachers are accustomed to teaching in the classroom with a spacious board and chalk piece. However, it is not possible to make full use of the board online. It is especially difficult for teachers to explain mathematics, accounts, and statistics and computer programs online.

Possibility of Cheating:

Students are more likely to commit scams in online education. Teachers expect that the students to commit scams to get higher marks in assignments and exams. Also turning off the video option, sharing online links with others and interrupting classes.

Technical Concerns:

Many teachers are struggling with technical issues. Both the teacher and the student are having a hard time communicating with them if the internet service is not working properly while telling the class online. This leads to interruption to class and declining interest in students.

Course Content:

The current course content is related to the general class. However it is not allowed to add it to online classes. Course contents need to be modified to suit online classes. This needs energy and time. So the existing course content will bring good results to the normal class but not to the online class.

ANALYSIS**TEACHERS' PERCEPTION TOWARDS ONLINE LEARNING**

Are online classes more effective than offline classes?	Yes	09
	No	17
	Can't say	4
Are online classes more convenient than offline classes?	Yes	14
	No	8
	Can't say	8
Lack of interaction between teacher and student in online classes.	Yes	23
	No	3
	Can't say	4
Is it difficult to engage students in online classes?	Yes	17
	No	7
	Can't say	6
Are technical concerns effect the flow and pace of online classes?	Yes	27
	No	3
	Can't say	0
Is it difficult to control group interaction during online classes?	Yes	23
	No	5
	Can't say	2
Lack of job satisfaction while taking online	Yes	19
	No	6

classes?	Can't say	5
Can you justify that the lack of computer skills makes it difficult to use the online teaching method effectively?	Yes	10
	No	14
	Can't say	6
Will it be harder to conduct online classes longer time?	Yes	22
	No	5
	Can't say	3
Are online classes help me to use innovative teaching methods for effective teaching?	Yes	15
	No	8
	Can't say	7
Do you feel that students do not take online classes seriously?	Yes	21
	No	3
	Can't say	6
Do you feel that Students make a lot of excuses for not attending online classes	Yes	24
	No	3
	Can't say	3
Do you feel that students do not show interest and consideration through online classes?	Yes	23
	No	4
	Can't say	3

Most probably teachers were felt the online classes not much effective then the off line classes. But it reduces the time and travel expenses of teachers and students. But more than 50% said that the online classes are not more convenient than offline classes. Because Lack of interaction between teacher and student in online classes and it is difficult to engage students in online classes for longer time. 90% of the respondents said "Yes" Technical issues result the movement and bound throughout the online classes. 80% of them said it was difficult to control group interaction during online classes. Most of the teachers were not get job satisfaction while taking online classes. Because it is not comfort to teach subject like as a normal class room. 50% of the respondents said that the online classes help them to use innovative teaching methods for effective teaching in online mode. But they felt that the students do not take it serious of online classes and students make a lot of excuses for not attending the online classes (80%).

STUDENTS' PERCEPTION TOWARDS ONLINE LEARNING

Are online classes more effective than classroom mode	Yes	20
	No	75
	Can't say	5
Are online classes more convenient than classroom method	Yes	20
	No	70
	Can't say	10
	Yes	61

Lack of interaction during online classes	No	20
	Can't say	19
Do you feel that the quality of discussion in online classes is low compared to off line?	Yes	80
	No	10
	Can't say	10
Effective Learning and knowledge sharing happens more in online classes	Yes	24
	No	70
	Can't say	6
Are online classes less structured than off line mode	Yes	70
	No	10
	Can't say	20
Do you feel that the technical issues disrupt the flow and pace during the online classes	Yes	85
	No	5
	Can't say	10
Is it difficult to clarify doubts in online classes compared to off line mode	Yes	70
	No	15
	Can't say	15
Do you feel comfort to participate in online class discussion when compared to off line mode.	Yes	17
	No	70
	Can't say	13
Is it difficult to follow and understand the classes via online?	Yes	70
	No	15
	Can't say	15
Is it easy to distracted and have difficulty concentrating during online classes	Yes	72
	No	20
	Can't say	8
Are you feeling lazy and not interested online classes	Yes	70
	No	27
	Can't say	3

From the above analysis we found that the online classes not effective to compare off line classes (class room mode). 75% of students felt that the online classes are not more effective than classroom mode and 70% said online classes not more convenient than classroom method. 61% students said there was lack of interaction during online classes. So that they cannot communicate properly that too 85% said the technical issues disrupt the flow and pace during the online classes. Students felt that the online classes were not comfort to participate and they could not stay longer. 70% of respondents found it very difficult to understand the concept online compared to off line as well as very much difficulty to clarify doubts in online classes. And they are getting lazy and not showing interest to come online classes due to technical issues, video buffering, unclear voice, small screen and bad network so on. Finally,

online classes are not much effective than the class room mode. But it is useful to increase the knowledge to some extent.

Overcomes problems encountered through online education

- Switching from face-to-face class to online classes is the hardest. Because it is not possible to create a pleasant classroom environment online. However, they must accept new learning situations with an open mind and heart. Understanding and discussing the benefits of e-learning can also change this way of thinking and prepare students better for online classes.
- Another major hurdle to online classes is technical opportunities. You need to set up a high-speed internet connection in your home. You need to distinguish where to get technical provision for your connection and other technical issues connected to software and tools for effective learning.
- Students need a minimum of computer knowledge when attending classes online. They need to be motivated by video or voice calling and chatting. This means that if the call is shown on the screen, he can solve the problem to some extent.
- Time management is very important in online education. There are a few things to keep in mind in order to achieve better results. There are many different platforms online to keep and communicate with students longer. As well as having to prepare in advance about the activities to be done. Through which a discipline is formed. Apart from that all matters should not be discussed at once. This increases the pressure on students.
- By setting up a faculty development program for teachers, they learn how to teach students in a very simple way by using new methods.
- Students usually ask in the classroom. But online it is so much more. Because of the technical issues that keep coming up online. Teachers should therefore answer their questions with great patience.
- You need to set up a plan before setting up the exam online. Also the convenience of the students should be taken into consideration.

FINDINGS

- Students take online education very lightly for personal and other reasons.
- Only a handful of students are interested in an online class. But most students prefer offline (classroom).
- Some Students like Independence in Online Classes. However, it is very important to develop discipline.
- Students usually develop knowledge by discussing with each other in the classroom. But this facility is not available online. However, you can discuss with

each other through chat board, chat box, email. This requires some computer knowledge.

- Students are getting more stressed by telling classes online for a longer period of time like offline classes. So it is better to change the time schedule somewhat.
- In many cases the problem faced by students and teachers is bad internet connectivity. This makes it very difficult to complete teaching in a timely manner.
- There are some difficulties in conducting exams for students online. For example Chemistry Lab, Physical Lab Exams and Computer Practical's etc.
- Proper technical support is require to make online learning effective.

CONCLUSION

Over the past few years online learning has led to a new shift in education policy. This led to a new change in the lives of teachers and students. However for some reason it is not going to be successful. They include online class design, structure, level of interaction between students and faculty, quality and amount of class content, technical support, etc. Lack of smart phone and laptop and proper internet facility is a major problem especially among students in rural areas.

Offline learning involves teachers' motivation and personal care. But nothing is allowed online. More research should be done on the issues expressed to teachers and students and appropriate suggestions should be made. Colleges and universities need to take appropriate steps to ensure that structured planning and a conducive environment for online education are made available to all, without placing a greater financial burden on teachers and students. To make online education a success, teachers need to set up a faculty development program and provide appropriate awareness. This will make teaching online easier. Teachers and colleges should strive to change the thinking trend of students. Similarly colleges and government and teachers need to set up appropriate training and awareness programs for students to make this online education a success.

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**ANALYSIS OF MUTUAL FUNDS PERFORMANCE WITH REFERENCE TO
NET WORTH STOCK BROKING LTD.**

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Abstract

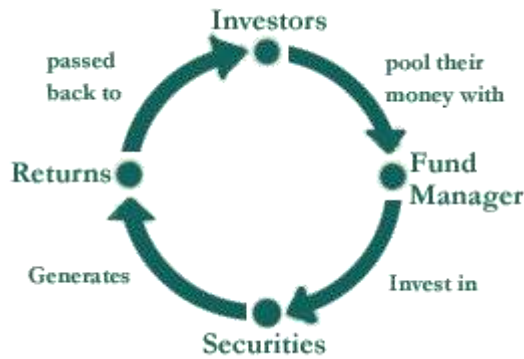
Mutual funds are a trust that collects money from a number of investors who share a common investment objective. Then, it invests the money in equities, bonds, money market instruments and other securities. Each investor owns units, which represent a portion of the holdings of the fund. The income generated from this collective investment is distributed proportionately amongst the investors after deducting certain expenses, A Mutual Fund is one of the most viable investment options for the common man as it offers an opportunity to invest in a diversified, professionally managed basket of securities at a relatively low cost. Mutual funds are created as baskets of investments, which invest in financial instruments like stocks and bonds according to their defined investment objectives. Investing in them allows an investor to gain access to asset classes like equities, bonds or fixed income securities, commodities, and even bullion. The biggest advantage of investing in mutual funds is that they are managed by qualified and professional expertise that are backed by a dedicated investment research team which analyses the performance and prospects of companies and selects suitable investments. Mutual funds make money by charging investors a percentage of assets under management and may also charge a sales commission upon fund purchase or redemption. Fund fees, called the expense ratio, can range from close to 0% to more than 2% depending on the fund's operating costs and investment style. Owing to the importance of the mutual funds to a firm that present paper aims at analysing the mutual funds in Net worth stock broking Ltd., located in Hyderabad.

Keywords: Net Asset Value, Fund Manager Report, Trustworthy, Focus on the long term, Established, Alternatives, Nationalize.

I. Introduction

A mutual fund is a professionally managed investment fund that pools money from many investors to purchase securities. These investors may be retail or institutional in nature. Mutual funds have advantages and disadvantages compared to direct investing in individual securities. The primary advantages of mutual funds are that they provide economies of scale, a higher level of diversification, they provide liquidity, and they are managed by professional investors. On the negative side, investors in a mutual fund must pay various fees and expenses. Primary structures of mutual funds include open-end funds, unit investment trusts, and closed-end funds. Exchange-traded funds (ETFs) are open-end funds or unit investment trusts that trade on an exchange.

Mutual funds are also classified by their principal investments as money market funds, bond or fixed income funds, stock or equity funds, hybrid funds or other. Funds may also be categorized as index funds, which are passively managed funds that match the performance of an index, or actively managed funds. Hedge funds are not mutual funds; hedge funds cannot be sold to the general public and are subject to different government regulations. In Mutual fund industry has developed by leaps and boundaries, A proper evaluation measure will remove misunderstanding and help small investors to decide approximate level of investment in various mutual fund schemes, so as to minimize the risk maximize the returns. Further the growing rivalry in the market forces the fund managers to work hard to satisfy investor and the management. A regular performance assessment of the mutual funds is essential for the investors and the fund manager also on the basis of the returns associated with the riskfree security and stock market directories.



II. Review of literature:

Norma Gonzalez (January 1, 1995) Conceptualizing the households of working-class Latino students as being rich in funds of knowledge has had transformative consequences for teachers, parents, students, and researchers. Teachers' qualitative, ethnographic study of their own students' households has unfolded as a viable method for bridging the gap between school and community. The focus of the home visit is to gather details about the accumulated knowledge base that each household assembles in order to ensure its own subsistence. Teachers also participate in study groups that offer a forum for the collective analysis of the household findings, and they form curriculum units that tap into the household funds of knowledge. New avenues of communication between school and home foster confianza, or mutual trust.

M. F. Kaplan (11, 1, 1967) The Griffith crack theory of fracture strength is discussed. Tests were performed on concrete beams with crack simulating notches, and two methods, which have been called the analytical and the direct experimental methods, were used to determine the critical strain-energy-release rate associated with the rapid extension of the crack. There was good agreement between Go values for beams with different notch depths and which were loaded both by the third-point and centre-point methods. However, 3 x 4 x 16 in. beams gave somewhat larger Cc values than did 6 x 6 x 20-in. beams. Although further research is necessary, the indications are that the Griffith concept of a critical strain-energy-release rate being a condition for rapid crack propagation and consequent fracture, is applicable to concrete. The critical strain-energy-release rate may be ascertained by suitable analytical and experimental procedures and the fracture strength of concrete containing cracks can thereby be predicted.

Michael F. Good child (20 November 2007) In recent months there has been an explosion of interest in using the Web to create, assemble, and disseminate geographic information provided voluntarily by individuals. Sites such as Wikimedia and OpenStreetMap are empowering citizens to create a global patchwork of geographic information, while Google Earth and other virtual globes are encouraging volunteers to develop interesting applications using their own data. I review this phenomenon, and examine associated issues: what drives people to do this, how accurate are the results, will they threaten individual privacy, and how can they augment more conventional sources? I compare this new phenomenon to more traditional citizen science and the role of the amateur in geographic observation.

Mark F. Pittance (02 Apr 1999) Human mesenchymal stem cells are thought to be multipotent cells, which are present in adult marrow, that can replicate as undifferentiated cells and that have the potential to differentiate to lineages of mesenchyme tissues, including bone, cartilage, fat, tendon, muscle, and marrow stromal. Cells that have the characteristics of human mesenchyme stem cells were isolated from marrow aspirates of volunteer donors. These cells displayed a stable phenotype and remained as a monolayer in vitro. These adult stem cells could be induced to differentiate

exclusively into the adipocytes, chondrocytes, or osteocytes lineages. Individual stem cells were identified that, when expanded to colonies, retained their multiline age potential

Shanti, N. S In this paper, an attempt has been made to evaluate the performance of 32 growth-oriented open-ended Equity Linked Savings Schemes (ELSS) of tax-saving mutual funds in India. Performance has been analysed by comparing the monthly returns of the funds with that of Indian stock market benchmark Sample CNX NIFTY. For this purpose, risk-adjusted performance measures suggested by Sharpe, Treynor and Jensen have been used. The Net Asset Value (NAV) of tax saving schemes from 2006-07 to 2011-12 has been considered. There was volatility in the performance of all the funds during the entire period of study. All the schemes follow the same pattern in returns and move along with the stock market index Sample CNX NIFTY. As expected, all the funds showed negative returns during 2008-09 and it was higher than that of the stock market index. The average return of most of the schemes is higher and the average risk is lower than the benchmark Sample CNX NIFTY.

Raphie Hayat & Roman Kraus's (2, June 2011) Islamic equity funds (IEFs) differ fundamentally from conventional equity funds since Muslims are prohibited to invest in certain companies/sectors and pay or receive interest. This paper analysis the risk and return characteristics of a sample of 145 IEFs over the period 2000 to 2009. Our results show that IEFs are underperformers compared to Islamic as well as to conventional equity benchmarks. This underperformance seems to have increased during the recent financial crisis. We also find that IEF managers are bad market timers. They try to time the market, but in doing so, reduce the return rather than increasing it. An important implication of our results is that Muslim investors might improve their performance by investing in index tracking funds or ETFs rather than to invest in individual IEFs.

Gruber and Christopher R. (2 Apr., 1996) We examine predictability for stock mutual funds using risk-adjusted returns. We find that past performance is predictive of future risk-adjusted performance. Applying modern portfolio theory techniques to past data improves selection and allows us to construct a portfolio of funds that significantly outperforms a rule based on past rank alone. In addition, we can form a combination of actively managed portfolios with the same risk as a portfolio of index funds but with higher mean return. The portfolios selected have small but statistically significant positive risk-adjusted returns during a period where mutual funds in general had negative risk-adjusted returns.

Jenny Jordan (01 November 2002) Effective advertising strategies are of growing importance in the mutual fund industry due to keen competition and changes in market structure. But the dominant variables in financial decision making, investor's perceived investment risk and expected return, have not yet been analysed in an advertising context, although these product related evaluations can be influenced by advertising and therefore serve as additional indicators of advertising effectiveness. In this study, the authors use a large-scale experimental study (n=499) to detect how risk-return assessments of private investors are influenced by specific elements of print ads. In this context, judgmental heuristics used systematically by private investors play a crucial role.

Mahesh K Patelin this paper the performance evaluation of Indian mutual funds is carried out through relative Performance index, risk-return analysis, Treynor's ratio, Sharp's ratio, Sharp's measure, Jensen's Measure, and Fame's measure. The data used is daily closing NAVs. The source of data is website of Association of Mutual Funds in India (AMFI). The study period is 1st January 2007 to 31st December, 2011. The results of performance measures suggest that most of the mutual fund have. Given positive return during 2007 to 2011.

BURTON G. MALKIEL. June 1995 Several recent studies suggest that equity mutual fund managers achieve superior returns and that considerable persistence in performance exists. This study utilizes a unique data set including returns from all equity mutual funds existing each year. These data enable

us more precisely to examine performance and the extent of survivorship bias. In the aggregate, funds have underperformed benchmark portfolios both after management expenses and even gross of expenses. Survivorship bias appears to be more important than other studies have estimated. Moreover, while considerable performance persistence existed during the 1970s, there was no consistency in fund returns during the 1980s.

Kavitha Ranganathan Consumer behaviour from the marketing world and financial economics has brought together to the surface an exciting area for study and research: behavioural finance. The realization that this is a serious subject is, however, barely dawning. Analysts seem to treat financial markets as an aggregate of statistical observations, technical and fundamental analysis. A rich view of research waits this sophisticated understanding of how financial markets are also affected by the financial behaviour of investors.

With the reforms of industrial policy, public sector, financial sector and the many developments in the Indian money market and capital market, Mutual Funds which has become an important portal for the small investors, is also influenced by their financial behaviour. Hence, this study has made an attempt to examine the related aspects of the fund selection behaviour of individual investors towards Mutual funds, in the city of Mumbai. From the researchers and academicians point of view, such a study will help in developing and expanding knowledge in this field.

III. Need for the study:

The principal objective of every investor is to maximize his investments and to earn more from his savings.

The study has been done using the statistical tools like Sharpe's and Treynor's Ratios.

The main purpose of doing this project was to know about mutual funds and its functions.

The project study was done to ascertain the asset allocation, entry load, exit load

IV. Scope of the study:

- The study is confined to five years.
- For the study data collection is done at net worth stock broking, Hyderabad area.
- Analysis is carried out using Sharpe's Ratio, Treynor's Ratio and Beta are computed on data.
- The sample data comprises of assessing performance of mutual funds with duration of five years.

V. Objectives of the study:

- The basic objective of the present study is to evaluate the performance of selected mutual funds in India.
- To analyse the risk and return of the selected mutual funds traded in Indian mutual funds industry.
- To compare the performance the mutual funds using sharpe and Treynor ratios.
- To study the performance of top 10 equity mutual fund schemes in various categories
- To study the best mutual fund house in Equity Mutual Fund category
- To compare the performance of top 10 equity mutual fund schemes according to the performance parameters .

VI. Research Methodology:

Research design:

Research methodology is a collective term for the structured process of conducting research. There are many different methodologies used in various types of research and the term is usually considered to include research design, data gathering and data analysis.

Sources of Data

Data we collected based on two sources.

- Primary data.
- Secondary data.

Secondary data:

- Annual report of the company.
- Material provided by the company.
- The internet sources.
- The secondary data is obtained from the various mutual fund scheme and investor's magazines and websites.
- For this project work I have taken data from research paper, journal, websites and articles. For historical data I collected from AMFI website.

VII. Limitations of the study

- The data provided by the investor and the agents can't be held true as 100% correct.
- The study was conducted to understand with respect to Risk involved in broking firm and investors, which is a part of the equity share market.
- To understand the overall working of mutual funds, the period of 45 days is not enough.
- The analysis depending upon annual reports of the industry only.
- Analysis done is limited to the availability of the data.
- Non-availability of confidential financial data.
- The study is limited by the detailed study of various schemes.

VIII. Empirical Result

This section is designated to present the results of data analysis on the data collected. For conducting analysis Treynor's and sharpe ratios on the data collected are computed and are presented here,

UTI MUTUAL FUNDS				NIFTY		
DATE	OPEN	CLOSE	RR	OPEN	CLOSE	RR
1 Mar 2016 to 30 Jun2016	69.21	85.4	23.39	6729.5	6696	-0.49
1 July 2016 to 30 Sep 2016	86.44	91.94	6.36	7629	7721	1.21
1 Oct 2016 to 31 Dec 2016	91.81	98.58	7.37	7990.4	8322	4.15
1 Jan 2017 to 31 Mar 2017	99.14	102.94	3.83	8272.8	8809	6.48
1 Apr 2017 to 30 Jun 2017	104.11	101.6	-2.41	8953.9	8182	-8.63
1 July 2017 to 30 Sep 2017	102.69	100.46	-2.17	8376.3	8533	1.87
1 Oct 2017 to 31 Dec 2017	101.01	99.9	-1.10	7992.1	8066	0.92
1 Jan 2018 to 31 Mar 2018	100.3	96.62	-3.67	7938.5	7564	-4.72
1 Apr 2018 to 30 Jun 2018	96.47	104.25	8.06	7718.1	7850	1.71
1 July 2018 to 30 Sep 2018	104.81	109.83	4.79	8313.1	8639	3.91
1 Oct 2018 to 31 Dec 2018	111.86	101.04	-9.67	8666.2	8626	-0.47
1 Jan 2019 to 31 Mar 2019	100.84	114.61	13.66	8210.1	8561	4.28
1 Apr 2019 to 30 Jun 2019	114.83	118.22	2.95	9220.6	9304	0.91
1 July 2019 to 30 Sep 2019	119.54	121.85	1.93	9588	10077	5.10
1 Oct 2019 to 31 Dec 2019	122.52	131.45	7.29	9893.3	10335	4.47
1 Jan 2020 to 31 Mar 2020	130.39	128.5	-1.45	10532	11028	4.71
1 Apr 2020 to 30 Jun 2020	130.68	138.5	5.98	10152	10739	5.79
1 July 2020 to 30 Sep 2020	138.54	134.83	-2.68	10732	11357	5.82

1 Oct 2020 to 31 Dec 2020	135.36	136.08	0.53	11752	10930	-6.99
1 Jan 2021 to 31 Mar 2021	136.28	140.46	3.07	10843	11514	6.19
		AVG	3.30		AVG	1.93
		S.D	6.90		S.D	4.22
		VAR	47.60		VAR	17.83

Table:1.1 Pperformance of selected mutual funds in India from March-2016-Mar 21.

Source: Author's compilation

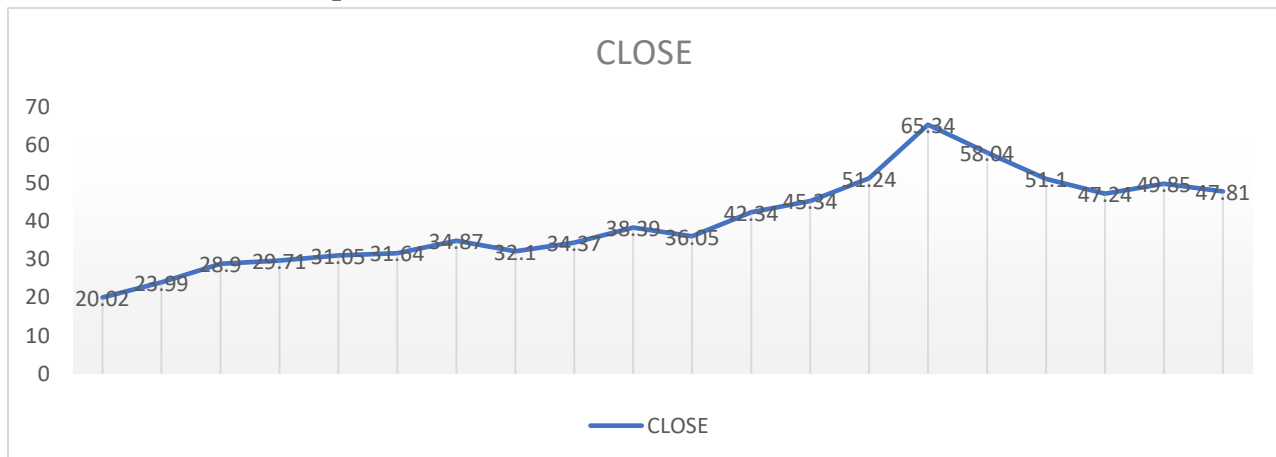


Figure: 1.1.a Performance of selecte mutual funds in India from March 2016- Mar 21

Source: Author's Compilation

Treynor's Ratio $= \frac{(Rp - Rf)}{Bp} = \frac{(3.30 - 1.81)}{0.37} = 3.67$ Treynor ratio is a measure of returns earned in excess of the risk-free return at a given level of market risk. It highlights the risk-adjusted returns generated by a mutual fund scheme. This ratio was given by Jack Treynor thereby expanding the contribution of William Sharpe towards modern portfolio theory. The calculated Treynor's ratio is 3.67 which means 3.67 time's higher market and volatility rate. Sharpe's Ratio $= \frac{(Rp - Rf)}{\sigma p} = \frac{(3.30 - 1.81)}{6.90} = 0.19$ Components of the Ratio. When analysing the Sharpe ratio, the higher the value, the more excess return investors can expect to receive for the extra volatility they are exposed to by holding a riskier asset. Similarly, a risk-free asset or a portfolio with no excess return would have a Sharpe ratio of zero. The calculated Sharpe's ratio is 0.19 which means 0.19 time's higher market and volatility rate. Beta $= \frac{(covar.rp,rm)}{covar.m} = \frac{(6.54)}{17.83} = 0.37$ From the above calculation UTI Mutual Fund is from the year March 2014 to Jan 2019. The rate of return highest in the quarter of March 2014 to June 2014 with rate of return as 23.39 and the lowest rate of return in the quarter of Oct 2016 to Dec 2016 as -9.67 and from the above calculation of The overall positive total return of UTI Mutual Fund is 3.30. The Beta Value 0.37.

XI. Findings, Suggestions and Conclusion

Findings:

- The SBI Magnum FMCG Fund is launched on Jul 31, 1999 the mutual fund is offering only exit load of 1% And last dividend paid on 03rd march 2006 paid Rs 6/-per one unit of NAV, Minimum Investment of 2000/-
- The UTI banking sector fund is launched on Apr 07, 2004 the mutual fund is offering only exit load of 1% Minimum Investment of 5000/-
- The UTI CRTS 81G is launched on Oct 01, 1981 the mutual fund is offering only exit load of 1% Minimum Investment 10000/-

- The UTI BOND FUND G is launched date Jun 17, 1998 the mutual fund is offering only exit load of 1.50% Minimum Investment 1000/-
- Most of the investors belong to the age group of 26 years to 40 years & above. Through this we can infer that the investment activity in this age is more compared to the investors whose age is below 25 years.
- Most of the investors do take advice from Brokers while investing in mutual funds.
- Most of the investors are trading in mutual funds for less than one year. This means that derivatives trading are unfamiliar & they consider it as too risky
- Most of the investors trade on Monthly basis in systematic investment plan.
- Most of the investors rated services provided by AMC companies Services as Good.

Suggestions:

- The study has tried proving that mere returns of a fund or the past performance is not good enough to make a sound decision on investment for the future.
- There is a need to understand various available tools of comparative analysis and their significance in making an investment decision.
- These tools help in analysing the consistency of performance of the funds over a period of time.
- Thus while giving a suggestion to a potential investor on investments.
- The investor needs to observe
- Take the beta ratios of various funds and suggest whether the fund is volatile or not
- Use correlations and suggest whether the benchmark taken by the company for judging the performance is good enough or not.

Conclusion:

Mutual fund makes you disciplined in your savings. Every month you are forced to keep aside a fixed amount. As you see above, it helps you make money over the long term. Since you get more units when the NAV drops and fewer when it rises, the cost averages out over time. So you tide over all the ups and downs of the market without any drastic losses. Also, a number of mutual funds do not charge an entry load if you opt for mutual funds. This fee is a percentage of the amount you are investing. And if you do not exit (sell your units) within a year of buying the units, you do not have to pay an exit load (same as an entry load, except this is charged when you sell your units). If, however, you do sell your units within a year, you would be charged an exit load. So it pays to stay invested for the long-run. The best way to enter a mutual fund is via an SIP. But to get the benefit of an SIP, think of at least a three-year time frame when you won't touch your money. Of Course you would lose money if your units lost value over time.

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Tools for Conducting Effective Online Learning

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Abstract - Online teaching and learning denote education that takes place over the Internet. An important number of colleges in India and abroad are switching from out-of-date face-to-face classes to entirely online, web-based courses. Online education, often mentioned as distance education or web-based education, is currently the latest, most popular form of distance education. It has, in recent times, become an essential part of many university curriculums. This paper delivers a brief overview of online learning and the selected communication tools for online teaching and learning.

Index Terms – Online Teaching, Web Base Courses, Online Learning Tools, MOOCs.

INTRODUCTION

Online teaching and learning are intended to reach and involve modern learners anytime. Many researchers and research institute widely hold massive Open Online Courses (MOOCs). Reasons to propose an online course include easy and suitable access to students, high degree completion rates, and such courses' pull for non-traditional students. Likewise, the hurdles to accepting online courses are the lack of faculty assurance and the high course execution and delivery cost.

They were bearing in mind that student characteristics are vital to successfully implementing online teaching and learning. Approaches that work for traditional full-time students may not be as practical for adult trainees with full-time jobs and family responsibilities. These students are practically-oriented with a greater interest in tools and techniques.

Remote Learning Tools

Getting familiar with how the tool or platform you're using works is just as important as selecting the right tool. Explore each resource and learn how to maximize

its usefulness to create a better teaching experience. Your students will depend on you to teach them how to use the platform themselves. There is a range of distance learning software available, and from them, we have chosen the best and ranked them according to their primary purpose.

Online communication tools

Effective communication is the key to successful teaching and learning, whether physical or virtual classrooms. Communicating online with not one but more than twenty students is undoubtedly a challenge. Communication platforms help overcome it; they enable communication with larger groups, video conferencing, instant messaging, audio calling, virtual rooms, etc., with any device and from any location.

Some of the requested tools are,

- Zoom
- M.S. teams
- Skype
- Google Meet
- Webex

For a better learning experience with these tools,

- Create an agenda or plan for any online course and share it before class
- Explain clearly what online etiquette students should follow during the lesson and what expected of them before or at the start of the lesson
- Mute all microphones except the speakers. This helps to suppress disturbing noises and keep the students' attention. Anyone who needs to talk can make gestures to get the speaker's attention without interrupting him.

- When giving a presentation or sharing an image, document, or file, give students time to take notes, review, or scroll through them.

Online whiteboards

Online whiteboards or digital whiteboards can mimic students' classroom whiteboard/blackboard experience. Most of these tools provide an endless canvas of shape libraries for creating various types of diagrams, charts, graphs, and other visualization purposes (i.e., creating posters, graphic organizers, etc., 2020 was a year of transformation. Everything has changed, including the way children and students go to school. During the pandemic, most countries have introduced social distancing rules, 20-second hand washing practices, and preventive wearing of masks in public. It has influenced the way teachers and students interact is an understatement. In March, millions of children moved from face-to-face classrooms to virtual education set up at home. During the early months of the pandemic, teachers had to scramble to find the best ways to set up a virtual classroom that would keep their students engaged. During these months, educators of all levels tested tools and programs until they found their favourites. We scanned the Internet to find out what it was. We've collected 15 versatile online learning resources for this article to enrich your classroom.

REVIEW OF LITERATURE

Beatty and Ulasevich, 2006; Li and Akins, in their 2005 research, found that the popularity of online classes has increased in recent years and that schools and colleges have also tended to increase online courses to provide education. Corresponding changes in technology and student passion have profoundly affected online education in schools and colleges (Bennett and Locker, 2004; Brit, 2006). According to Augustina and Kahino, 2017 online education will be a tool to address the current situation and provide education effectively.

Bond et al., 2018; According to Sandkuhl & Lehmann, 2017, Establishing online education in higher education institutions is problematic, with technology becoming a part of all areas of human life. We need to

look at the problems and solutions encountered in setting up online education accordingly.

Abad-Segura et al., 2020, suggested that there should be a specific management mechanism to adjust to changes in technology to adapt to these dire conditions.

Hodges et al., 2020; Bozkurt & Sharma said that their research in 2020 will include teaching and practice in effective online education, assessment of benchmark concentrations on numerous research papers and case studies, principles, models, theories, ethics and quality online course design, teaching and learning.

Effective online learning is defined as applying an organized model established for the design and development of instruction and a by-product of instruction planning. (Branch & Douse, 2015).

There are five types of barriers to providing online education in higher education institutions: (i) changes, (ii) speed, (iii) technology, (iv) economic conditions, and the need for appropriate assistance to deal with them, Cope et al. (2019) said in their research.

Online learning is a tool or technology to provide higher education institutions. So they explained that digitalization in higher education should not be called online learning (Means et al., 2009).

Online education is something to be discussed because the implementation of online education does not result in a face-to-face relationship between teacher and student. Online courses, however, require careful planning. In their research, Hodges et al. (2020) said that online education is considered alternative teaching in this dire situation and that the approach to online education is somewhat different from effective and quality education.

Many schools and colleges implement online teaching in their course without proper planning and procedures. However, they said that first, the faculty development program should be set up for the teachers, and they should be made aware (Abhinandan, 2018).

OBJECTIVES OF THE STUDY

1. To know a brief about online teaching and online learning.

2. To be aware of communication tools for online learning.
3. To know the communication tools performance in online learning
4. To understand the benefits and challenges of online learning

RESEARCH METHODOLOGY

This study is conducted based on Secondary and Primary Data. We have gone through the various articles, journals, academic reviews, and educational reports for this study.

Online Platforms	No of Respondents
Zoom	200
Google Meet	200
Webex	200
M.S. Teams	50
Skype	72
Total	722

Source: Primary data

Hypotheses of the study:

H0: There is no statistical significance in the online education platforms and online learning acceptance.

H1: There is statistical significance in the online education platforms and online learning acceptance.

Statistical tools used:

Regression

Regression is a statistical method used in finance, investing, and other disciplines to determine the strength and nature of the relationship between a dependent variable (commonly called Y) and several other variables (called independent variables).

The two basic types of regression are simple and multiple linear regression, although nonlinear regression methods allow for more detailed data and analysis. Simple linear regression uses the independent variable to explain or predict the dependent variable of Y, while multiple linear regression uses two or more independent variables to predict the outcome.

The general form of each type of regression is:

Simple linear regression: $Y = a + bX + u$

Multiple linear regression: $Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_tX_t + u$

Or:

- Y = the variable is trying to predict (dependent variable).
- X = the variable the researcher uses to predict Y (independent variable).
- a = the ordinate in origin.
- b = the slope.
- u = the regression residue.

ONLINE TEACHING

Online teaching offers thrilling opportunities to enlarge the learning environment for a diverse student population. As the request for online education grows, college professors may be asked to reflect teaching their classes online. Online teaching is connected to face-to-face instruction, focusing on skills and requirements. The two methods are alike in content, excluding pace and delivery. Instead of emerging courses from abrasion, an organization has developed to take care of the courses. Professors must use Course Management System (CMS) software to prepare and deliver their courses. Using the software allows the instructor to get it right from the start.

For online teaching to be successful, the teacher is suggested to follow the following six principles: (1) Inspire student participation, (2) Encourage student teamwork, (3) Encourage active learning, (4) Highlight work, (5) Emphasize work time, (6) Stating high opportunities.

Respecting different aptitudes and ways of learning. Another seven can be added to these principles: (1) determining personal differences, (2) motivating the student, (3) evading information overload, (4) creating the real-life setting, (5) indorsing social interaction, and (6) providing new activities and (7) Encourage student likeness

ONLINE LEARNING

The learning process is compound and includes the auditory, visual, and tactile senses. The traditional method of learning at a campus university is not for everybody. Online learning is for those who want to study for a degree and work or other promises. Online learning is a form of distance education and is referred to as web-based learning, e-learning and digital

learning. It is provided over the Internet and uses web-based materials and activities.

The student must be theoretically practical to use the necessary technical tools. Students in the digital age appear to be more independent, disciplined, and technologically savvy, better suited online. Practising online at your own pace can benefit a high-quality college degree.

Whether offered on campus or delivered online, each course offered must meet the same strict standards and strict academic standards. The only difference is the method of delivery of the course. Generally, students should access a computer system with high-speed Internet connections. They can also expect electronic academic support services such as registration, financial assistance, libraries, training and advice.

TOOLS FOR CONDUCTING EFFECTIVE ONLINE LEARNING

Remote Teaching Tools

It is essential to familiarize yourself with the tool you are using or how the platform works and choose the right tool.

Explore each tool and find ways to maximize its usefulness to create a better teaching experience. Your students depend on you to guide them on using the platform.

There is a range of remote teaching software available, and from them, we select the best ones and classify them based on their fundamental purpose.

Online Communication Tools

Effective communication is key to successful teaching and learning in physical or virtual classrooms. However, maintaining online communication with more than twenty students, not just one, is undoubtedly challenging.

Communication platforms help to overcome it; They enable communication with large groups, video conferencing, instant messaging, audio calls, virtual rooms and more with any device and from anywhere. Some tools in demand,

- Zoom
- MS Teams
- Webex

- Google Meet

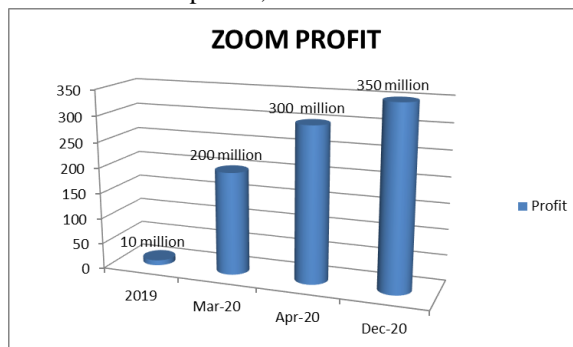
For healthy teaching practice with these tools,

- Create an agenda or plan for each online class and share it before the lesson
- Explain online etiquette students should follow during class and what is expected of them before or at the beginning lesson
- Mute all microphones except the speaker. It helps to eliminate distracting noises and retain students' attention. Those who need someone to speak can gesture to get their attention without interrupting the speaker.
- When delivering a presentation or sharing an image, document, or file, give students some time to take notes, view, or view them.

Zoom Video Communications, Inc.:

(Commonly shortened to Zoom and stylized as zoom) is an American communications technology company headquartered in San Jose, California. It provides videotelephony and online chat services through a cloud-based peer-to-peer software platform and is used for teleconferencing, telecommuting, distance education, and social relations

Eric Yuan, a former Cisco engineer and executive, founded Zoom in 2011 and launched its software in 2013. Zoom's aggressive revenue growth, along with the perceived ease of use and reliability of its software, led to a valuation of \$1 billion. A "unicorn" company first became profitable in 2019 and completed an IPO that year. The company joined the NASDAQ-100 stock index on April 30, 2020.



Online Whiteboards

Online whiteboards or digital whiteboards help students simulate the classroom whiteboard/blackboard experience. Many of these tools provide an infinite canvas with format libraries for creating a wide variety of diagrams, charts, graphs and other visualization purposes (i.e. posters, graphic organizers, etc.).

Work Planning Tools

Maintaining a work schedule is even more critical when working from home; A solid routine can help you make the most of your time, especially during stressful times. You can use time management and scheduling apps like Google Calendar and Calendly to sort:

- Create schedules to use in your online classes or for personal use
- Creating online class schedules and letting everyone know about dates and times.
- Schedule appointments with parents and students; Avoid booking the slot twice
- Inviting parents, students or coworkers to online events (i.e. webinars)
- Develop curricula and share them with students, administrators and colleagues.

Social Media Channels

Social media channels deliver countless stages for teachers, students and parents to stay linked. The platforms like Facebook, LinkedIn, WhatsApp, etc., permit you to make inimitable groups.

- Communicate and continue to exist after online class hours
- Share and store important information, presentations and resources related to the lessons
- Conduct Q&A sessions
- Encourage students to communicate with each other and keep in touch with each other while studying or doing homework.
- Organize live events like webinars (with Facebook or Instagram Live)

Document Management Tools

From exam papers to lesson plans, teachers need to maintain various documents regularly. Keeping track of all these documents properly, especially when

teaching remotely, requires a central place to store, manage and support them.

Tools like GSuite, MS office, OneDrive, Dropbox and Evernote make the process of managing your documents more accessible.

- Store all documents, files, etc. in the cloud, allowing you and your students to access them from anywhere with any device
- Manage documents well in relevant folders and subfolders, making them easy to retrieve
- Quickly share files and documents with anyone with a single link or file. You can also adjust the permissions settings, turning them into edit, view and activity mode in the GSuite app.
- Cooperate by students on excision and studying documents, add commentaries and proposals, and path changes with form history

Online Video Tools

- Record your online classes or lectures and share them with students
- Students can watch videos again in their absence or during test revisions. You can record a video before the lesson and share it with students while you are on vacation
- If you are teaching the same address to different classes, you can use a pre-recorded speech to avoid repetitive teaching
- Inspire students to study self-sufficiently with pre-recorded video programs. Students are more likely to learn better when they understand a concept on their own

Online Quiz Makers

Whether you are teaching online or teaching in a physical classroom, quizzes are a great way to check student performance. Online quiz makers make it easy,

- Create, format and share assessments online
- Create answer sheets that allow you to track and score each student's answers easily
- Many free and paid online quiz makers, starting with Google Forms.

Online Homework Platforms

Keeping track of students' homework is difficult while teaching from home. Assignment can come in many

forms; Essays, speeches, tests, etc. You can use a combination of the above platforms to submit their homework.

- Google Docs - for articles and other written assignments
- Skype, Zoom and other video conferencing apps - for verbal assignments
- Loom, YouTube, Prezi, Google Slides - for videos and presentations
- Google Classroom - Distribute, grade and send feedback on assignments

BENEFITS AND CHALLENGES

Online education offers great opportunities and significant challenges benefits for students and instructors. It provides time and space, cost-effectiveness and flexibility. Online practice allows the student to pursue an internationally recognized degree without attending classes on campus. Students who are unable to participate in traditional classroom settings prefer online education. It is convenient as it allows you to read anywhere with internet access. Online courses are available 24/7. Although online education works for everyone, some underdeveloped countries view online education as costly. Online teaching and learning (in a contemporary or asynchronous manner) apply to all disciplines such as engineering, computer science, medicine, nursing, business, music and the social sciences. Online teaching and learning are also common in business organizations. Problems faced by the online instructor include effectively delivering the course, responding to student emails, and getting accustomed to online tools and infrastructure. Critics question its value, impact and quality on online teaching and learning. Because online teaching and learning systems fail to communicate interactions between instructor and student, its educational impact is less than a traditional face-to-face lecture. Responding to student email messages promptly can be challenging because it requires a lot of instructor time. It takes much time to prepare and teach an online course. The challenge of online education largely depends on online tutors. Problems faced by online students require self-directed learning and self-discipline, which can affect

the success or failure of online learners. They may be tempted to postpone working on their assignments. The quality issue is raised in online learning, and it is as complex as the reality of online learning.

Data Analysis:

Variables Entered/Removed			
Model	Variables Entered	Variables Removed	Method
1	Zoom, Google Meet, M.S. Teams, Skype, Webex ^b		Enter

a. Dependent Variable: Online learning Acceptance

Model Summary				
Model	R	R Square	Adjusted Square	Std. Error of the Estimate
1	.106 ^a	.011	.004	.15557

a. Predictors: (Constant), Zoom, Google Meet, M.S. Teams, Skype, Webex

ANOVA					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	.198	5	.040	1.635	.148
Residual	17.354	717	.024		
Total	17.552	722			

a. Dependent Variable: Online learning acceptance

b. Predictors: (Constant), Zoom, Google Meet, M.S. Teams, Skype, Webex

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error			
1	(Constant)	.978	.045		21.869	.000
	Google Meet	.002	.011	.007	.148	.882
	Webex	-.025	.018	-.125	-1.378	.169
	M.S. Teams	.027	.019	.126	1.405	.160
	Skype	.021	.010	.101	2.114	.035
	Zoom	-.014	.009	-.066	-1.491	.136

a. Dependent Variable: Online learning acceptance

Interpretation: The above regression shows the statistical significance in online education platforms and online learning adoption, and the $R = 0.198$, the asymptotic significance value 0.148, is higher than the significance level of 0.05. Therefore, the null hypothesis is accepted, and the alternative hypothesis rejected, which means no statistical significance in online education platforms and online learning adoption.

CONCLUSION

Online teaching and learning are relatively new. It has exploded as an option at colleges and universities in India and abroad in recent years. Most universities and colleges agree that online education is key to their long-term strategy. Online courses are best taught when engineering is complete to take advantage of the learning opportunities offered by online technologies. As the demand for online education increases from those who need work and lifelong learning, expectations regarding implementing the education and learning system differ. In our article, respondents agree that there is no statistical significance between online education platforms and e-learning adoption. There is still a gap in online education platforms and education adoption of selected online platforms such as Zoom, Webex, M.s meetings, Skype. This means that users of these platforms always want more features with convenient use of these platforms, and almost 85% of Indian students in tertiary institutions think they have only learned half of what they need to learn since online teaching started with the onset of the pandemic, while about 88% of university leaders believe it would take up to three years to close the learning gap.

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ANALYSIS OF WORKING CAPITAL MANAGEMENT AT KESORAM INDUSTRY LIMITED

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Abstract

Working capital can be considered the most important factor in a business. Its effective delivery and use can go a long way in ensuring the success of a business. While efficient management can not only lead to the loss of projects, but also the demonstrable demise of what would otherwise be considered a promising problem. A working capital study is of paramount importance, due to its close relationship with a firm's current day-to-day operations. Working capital stands for that form of capital which is required for the business or current financial needs of the company. It is usually invested in commodities, work in progress, finished assets, active accounts and salvable securities. The management of working capital usually involves the planning and control of current assets, i.e. cash and negotiable securities, credit assets and inventories, as well as the administration of current liabilities. The management of working capital or current assets is one of the most important aspects of overall financial management. It deals with the problem that arises in trying to manage current assets. The reporting year includes the creditors account payable and outstanding expenses. The purpose of working capital management is to manage the current assets and liabilities of a company in such a way as to cover its current liabilities in order to ensure that they are received and used in the best possible way. Owing to the importance of the working capital to a firm the present paper aims at analyzing the working capital management at Kesoram Industry Private Ltd., located in Hyderabad for the duration 2017-2021. The study used ratio analysis to analyze the working capital management system prevalent in the company during the afore-mentioned period.

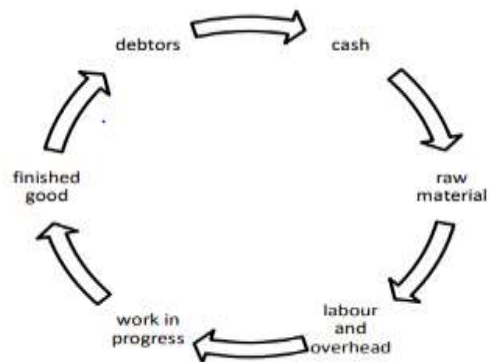
Keywords: Working Capital, Operating Cycle, Profitability, Operating Profit.

I. Introduction

The life or death of any business firm depends on the cash availability. A Firm or business enterprise that incurs losses still survives due to the sufficiency of cash. Likewise, a lack of cash can lead to failure in the face of actual or future earnings. Efficient cash planning through relevant and timely cash budgeting can enable a business obtain optimal working capital and alleviate the stress of cash shortages, making it easier cash investment and test funds for normal growth. Many organizations / firms are interested in increasing their profits. However, there are only a few Companies are worried about managing working capital. Many firms fail because they are bad Working capital management. They can be profitable, but they unable to pay their invoice. The management of working capital involves the relationship between a company's short-term assets and its liabilities.

The goal of working capital management is to ensure that a company is able to continue as a going concern and that has sufficient capacity to satisfy both short-term debt and upcoming operating expenses. Working capital management includes accounts receivable, payable and management of inventory and cash. Working capital is the amount of capital that is readily available to an organization. The organization needs both a long-term and short-term funds. Funds are needed for the long-term purposes of fixed assets such as machinery, equipment, building, land and furniture. Funds also needed for short-term purposes such as purchasing raw materials, paying wages and other daily expenses. The motive of working capital management is to maintain the optimal ratio of each of the components of working capital.

Working capital operating cycle:



II. Review of literature:

Nufazil Altaf and Farooq Ahmed Shah (2018) found that how does working capital management affect the profitability of Indian companies, the purpose of this paper is to examine the relationship between working capital management (WCM) and firm profitability for a sample of 437 nonfinancial Indian companies. The study based on secondary financial data obtained from capital database pertaining to a period of ten years this study employer's two-step generalized methods of moments (GMM) technique to arrive at results. The result of the study confirms the inverted U-shape relationship between WCM and firm profitability.in addition complete it's CCC on an average by 63 days.

MrShivakumar And Dr N BabithaThimmaiah (2016) in their paper titled working capital management its impact on liquidity and profitability a study of coal India ltd makes an attempt to give a conceptual insight on working capital management and assess its impact on liquidity and profitability of coal India ltd the liquidity and profitability trade of has becomes an important aspect for all the organization the attempt also has been made to test the liquidity and profitability position by using correlation and spearman's rank method the correlation spearman ranking method indicates weak correlation and negative relationship between liquidity and profitability the total's test has also been applied to test the liquidity performance.

Mukti R Barot (2016) In this study the researcher tried to carry out a comparative analysis on working capital management © JUN 2021 | IRE Journals | Volume 4 Issue 12 ISSN: 2456-8880 IRE 1702800 ICONIC RESEARCH AND ENGINEERING JOURNALS 257 of reymond and vardhman textile limited the aim of this study is to analyze which companies performance is better than other company for this analysis researcher have use only of secondary data of ten years 2006-2015 for data analysis researcher have selected the technique of ratio analysis.

Apurba Kumar Sharma (2015) examined the efficiency of working capital management of some select proprietary tea estates registered under tea board on India, operation in Jordan district of assume during 200809 to 2012- 13.instead of calculating common method of analyzing different working capital management ratio three index value performance index, utilization index and efficiency index have been to working capital requirement of a firm where as operating cash flows and sales growth are positively related to working capital to recruitment.

Hina Agha (2014) reviewed the impact of working capital management of profitability the main purpose of the study is to empirically test the impact of working capital management on profitability, keeping in mind this objective he studied the Glaxo-smith –line pharmaceutical company registered in Karachi stock exchange for the period of 1996-2011.the interpretation of the result is that by

increasing the debtor's turnover, inventory turnover by decreasing creditor's turnover ratio's the company can increase its profitability but there is no significant effect of increasing or decreasing the current ratio on profitability therefor the result of the research indicate that through proper working capital management, the company can increase its profitability.

Madhavi K. (2014) makes an empirical study of the co-relation between liquidity position and profitability of the paper mills in Andhra Pradesh. it has been observed that inefficient working capital management makes a negative impact on profitability and liquidity position of the paper mills. Gurumurthy N. And Reddy Jayachandra K. (2014): have conducted a study on the working capital management of four pharmaceutical companies APSPDCL, APEPDCL, APNPDCL and APCPDCL and have come to the conclusion that the existing system of working capital management was not up to the mark needed to be improved.

Joseph Jisha (2014) closely examines the study of working capital management in also Leyland and point out that the liquidity and profitability position of the company is not satisfactory and needed to be strengthened in order to be able to meet its obligation in time. Rahman Mohammad M. (2011): focuses on the co-relation between working capital and profitability. an effective working capital management has a positive impact on profitability of firms from the study it is seen that in the textile industry profitability and working capital management position are found to be up to the mark. Uyar Ali (2009): examines the relationship of cash conversion cycle with firm size and profitability of the corporations listed in the Istanbul stock exchange (ISE) for the year 2007.

Davoudi (2013) asserted there is a significant and negative association between the inventory time and profitability evaluated by return assets at the industrial enterprises listed on Istanbul securities. Furthermore, the workshop experimental result demonstrates that the total inventory period and total firm operating income have a statistically significant relationship; this result indicates that businesses may be active with less benefit as a result of decreasing sales because the firm's inventory volume is expanding.

According to Abuzayed (2012), cash capital management assessed by receivables, the currency conversion cycle, and credit account maintenance have a significant beneficial impact on organizational performance as evaluated by both return on assets and return on investment. However, as evaluated by the inventory conversion period, working capital management has a statistically significant and favorable impact on investment returns, but a minimal influence on the performance of sample enterprises in Ethiopia as measured by asset returns.

III. Need for the study:

- ✓ Understanding the financial health performance and profitability of the firm is essential to leverage the capabilities.
- ✓ Analyzing the balance sheets using ratios so as to know firms assets and their allocation status which again depicts the financial health of the firm.
- ✓ Financial analyst analyses the financial statements using various tools of analysis before commanding upon the financial health of the firm.
- ✓ The study can assist the management in expansion decisions.

IV. Scope of the study

- To study the Working Capital Management the data is confined to five years (i.e) 2017-2021
- Kesoram Industries Private Ltd-Hyderabad.
- Ratio analysis-Liquidity ratio, Leverage ratio, Current ratio, Activity ratio, Profitability ratio.

- The sample data comprises of five years balance sheets of kesoram industry limited
- ❖ **Objectives of the study**
- ❖ To understand the planning and management of working capital at “Kesoram Industry LTD”.
- ❖ The study delivers better understanding of the concept “Working Capital Management”.
- ❖ To improve the allocation of working capital within the business.
- ❖ To evaluate the financial performance of the company in terms of cash flows.

V. Research methodology

RESEARCH DESIGN

This is a systematic way to solve the research problem and it is important component for the study without which researches may not be able to obtain the format. A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine for collection and analysis of data relevance to the research purpose with economy in procedure.

SOURCES OF DATA

Data we collected based on two sources.

- Primary data.
- Secondary data.

Primary data:

The Primary data are those information's, which are collected afresh and for the first time, and thus happen to be original in character.

Secondary Data:

The Secondary data are those which have already been collected by some other agency and which have already been processed. The sources of Secondary data are Annual Reports, browsing Internet, through magazines.

1. It includes data gathered from the annual reports of Kesoram.
2. Articles are collected from official website of Kesoram.

VI. Limitations Of the Study

- The study is limited to four years only.
- The study is restricted to Kesoram Industries Ltd only.
- Future plans of the company will not be disclosed.
- There are other tools are also available for conducting the same analysis but we are restricted only to ratio analysis.
- The Sample data only four years is considered we can extend it further ten years or a decade to better understand the cash flow management inside the organization.
- The analysis is depending upon annual reports of the industry only.

VII. Empirical Results

APPRAISAL OF WORKING CAPITAL PERFORMANCE THROUGH RATIO ANALYSIS

Ratio analysis is used as a technique of analyzing the financial information, contained in the balance sheet and profit and loss accounts, for a more meaningful understanding of the financial position and performance of a firm.

The relationship between two accounting figures, expressed mathematically, is known as a financial ratio. A ratio helps the analyst to make qualitative judgment about the firm's financial position and performance. Several ratios were calculated from the accounting data contained in the financial statements. A representative analysis carried out is presented in table 1.1 and figure 1.1(a).

Particulars	Mar '21	Mar '20
Inventories	734.06	894.13
Sundry Debtors	766.72	904.00

Cash and Bank Balance	140.27	77.21
Total Current Assets	1,641.05	1,875.34
Loans and Advances	1,626.12	332.74
Fixed Deposits	0.00	0.00
Total CA, Loans & Advances	3,267.17	2,208.08
Current Liabilities	1,475.24	1,644.47
Provisions	69.42	73.23
Total CL & Provisions	1,544.66	1,717.70
Net working capital	1,722.51	490.38
Increase\decrease in net working capital	1232.13	

Table No: 1.1 Statement of changes in working capital 2020-21

Source: Author's Compilation

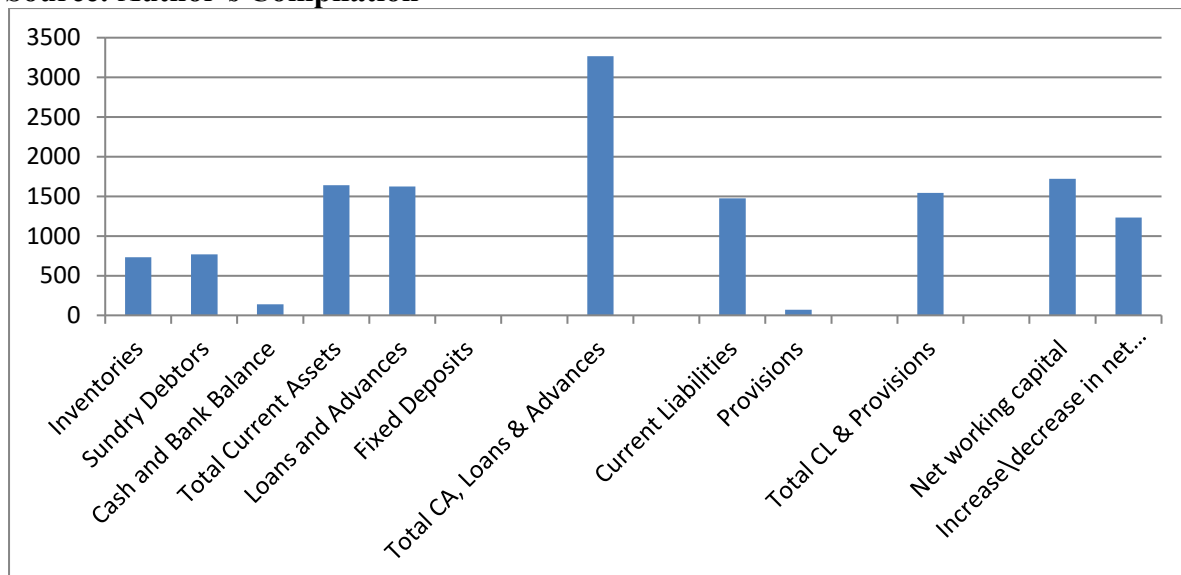


Figure: 1.1.a Statement Of Changes In Working Capital 2020-21

Source: Author's Compilation

The Net working capital of kesoram has been increased to 1232.13 that is the performance of kesoram has increased and the current assets exceeds its currently liability. And in years 2018-2020 the capital of a company has been decreased to 418.04. An overall every year cash and bank balance were increased fixed deposits receipts are decreased inventories on average are in good position. The ratios of a company are driven well and quite considerable in this study.

Findings, Suggestions and Conclusion

Findings

- I found that sales are increasing in a consistent pace every year. It's a positive indicator for the company. Due of competitiveness and high fixed asset spending, it only varies for one year.
- The gross profit was decreased every year. This occurred as a result of the rising cost of items sold each year.
- In the year 2019, they spend more money towards raw material sealing and distribution transportation and administration expenses and debtors also increased. The shows results in reduction of operating profit in 2019.

- Overall, cash and bank balances have climbed every year, although fixed deposit receipts have fallen, and inventories are in good shape on average.
- In the year 2019 they minimized the exp .of stores maintenance. However, additional costs such as packing materials and transportation costs grew quickly.

Suggestions

- In the Annual Report, the corporation should include notes to clarify things that do not match the profit and loss and balance sheet.
- Funds should be used properly to improve the position.
- It will be more meaningful to disclose the combined flows of debtors and loans advances as a decrease/(increase) in trade and other receivables rather than as a decrease/(increase) in trade and other receivables.
- With the globalisation of economies and the demand for shares from investors in the capital market, the annual report must provide a clear and detailed picture of the company's financial status to a varied and demanding audience.
- Control expenses to improve cash flow.

Conclusion

The working capital position of Kesoram is quite comfortable with a judicious mix of debt and equity. The overall assessment signifies efficient utilization of funds available. The company's profitability appears to be excellent, based on the increase in reserves and surplus. The management discussions and analysis by Director's report and opinions expressed by Auditor's report through analysis statements are true and fair view in accordance with the provisions of the companies Acts, and Accounting standards. The overall working capital of the company appears to be more than satisfactory. The working capital is properly maintained by the Kesoram Organization and the overall position of the firm is satisfactory.

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INVESTMENT PATTERNS AND CUSTOMER PERCEPTION TOWARDS MUTUAL FUNDS WITH REFERENCE TO ZERODHA STOCK BROKING LTD

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Abstract

Mutual fund industry has seen a lot of changes in past few years with multinational companies coming into the country, bringing in their professional expertise in managing funds worldwide. In the past few months there has been a consolidation phase going on in the mutual fund industry in India. Now investors have a wide range of Schemes to choose from depending on their individual profiles. There are a lot of investment avenues available today in the financial market for an investor with an investible surplus. He can invest in Bank Deposits, Corporate Debentures, and Bonds where there is low risk but low return. He may invest in Stock of companies where the risk is high and the returns are also proportionately high. The recent trends in the Stock Market have shown that an average retail investor always lost with periodic bearish trends. People began opting for portfolio managers with expertise in stock markets who would invest on their behalf. Thus we had wealth management services provided by many institutions. However they proved too costly for a small investor. These investors have found a good shelter with the mutual funds. The study is basically made to analyse the various open-ended equity schemes of different Asset Management Companies to highlight the diversity of investment that Mutual Fund offer. Thus, through the study one would understand how a common man could fruitfully convert a pittance into great penny by wisely investing into the right scheme according to his risk taking abilities.

Keywords: Mutual Funds, Investor, Investor Behaviour and Investment.

I. Introduction

Mutual fund industry has seen a lot of changes in past few years with multinational companies coming into the country, bringing in their professional expertise in managing funds worldwide. In the past few months there has been a consolidation phase going on in the mutual fund industry in India. Now investors have a wide range of Schemes to choose from depending on their individual profiles. Today an investor is interested in tracking the value of his investments, whether he invests directly in the market or indirectly through Mutual Funds. This dynamic change has taken place because of a number of reasons. With globalization and the growing competition in the investments opportunity available he would have to make guided and rational decisions on whether he gets an acceptable return on his investments in the funds selected by him, or if he needs to switch to another fund. In order to achieve such an end the investor has to understand the basis of appropriate preference measurement for the fund, and acquire the basic knowledge of the different measures of evaluating the performance of the fund. Only then would he be in a position to judge correctly whether his fund is performing well or not, and make the right decision. The project's idea is to project Mutual Fund as a better avenue for investment on a long-term or short-term basis. Mutual Fund is a productive package for a lay-investor with limited finances, this project creates an awareness that the Mutual Fund is a worthy investment practice. Mutual Fund is a globally proven instrument. Mutual Funds are "Unit Trust" as it is called in some parts of the world has a long and successful history, of late Mutual Funds have become a hot favourite of millions of people all over the world. The driving force of Mutual Funds is the 'safety of the principal' guaranteed, plus the added advantage of capital appreciation together with the income earned in the form of interest or dividend. The various schemes of Mutual Funds provide the investor with a wide range of investment options according to his risk bearing capacities and interest besides; they also give handy return to the

investor. Mutual Funds offers an investor to invest even a small amount of money, each Mutual Fund has a defined investment objective and strategy. Mutual Funds schemes are managed by respective asset managed companies sponsored by financial institutions, banks, private companies or international firms. A Mutual Fund is the ideal investment vehicle for today's complex and modern financial scenario.

II. Review of Literature

Dr. R. Abdul Muthalif (2019) a mutual fund is resourcefully managed investment scheme allows more investors to invest with prearranged investment objective. The mutual fund manager is the sole responsible for investing the collected money from the investors. The collected money will be invested as per the investor's choice of scheme preferred. A Mutual fund is simply a financial relationship that allows a group of investors to collect their money together with a prearranged investment objective. The study covers the customers' awareness and perception towards Mutual Funds in Dharmapuri District. This research will initiate the customer perception with regard to mutual funds that is the schemes they prefer, the plans they are opting, the reasons behind such selections and also this research dealt with different investment options, which people prefer along with and apart from mutual funds. Like postal saving schemes, recurring deposits, bonds, and shares. The study also reveals that Mutual fund is a trust that team up the savings of Number of investors who share a common economic goal. They are investment vehicles and one can use them to invest in asset classes such as equities or fixed income. It provides risk diversification Benefits of making investment in MF are reduction of risk, liquidity, affordability, convenience flexibility and variety. Customer has to identify the best MF management companies and also the suitable schemes among the various schemes floated by the MFs.

Arpitha Naik (2020) A Mutual fund is the ideal investment vehicle for today's complex and modern financial scenario. There has been growing importance of mutual fund investment in India, when compared with other financial instruments. Investments in mutual funds are safer and also yields more returns on the portfolio investment. Mutual fund is said to be the best channels for mobilizing the funds of the small investors and contribute significantly to the capital markets. The present study explains briefly about the mutual fund industry. The study also helps to understand the role of investment pattern and preferences of investors behind investing in mutual fund. Financial markets are constantly becoming more efficient by providing more promising solutions to the investors. Being a part of financial markets although mutual funds industry is responding very fast by understanding the dynamics of investor's perception towards rewards, still they are continuously following this race in their endeavours to differentiate their products responding to sudden changes in the economy. Thus, it is high time to understand and analyse investor's perception and expectations, and unveil some extremely valuable information to support financial decision making of mutual funds. In few years Mutual Fund has emerged as a tool for ensuring one's financial wellbeing. Mutual Funds have not only contributed to the India growth story but have also helped families tap into the success of Indian Industry. As information and awareness is rising more and more people are enjoying the benefits of investing in mutual funds. In India, when thinking about investment, the first and foremost challenge that all investors face is an overabundance of options. From bonds to fixed deposits, gold to stocks, money market securities and a combination of all these, each has its set of benefits and challenges. Furthermore, investors need to consider the time horizon of their investments, risk appetite and returns based on the goals they want to achieve. Mutual Funds are having so many advantages like; Comparatively higher Return on Investment (ROI), Managed by experts, Built-in Diversification, Ease of investing and monitoring, Tax Benefits and Liquidity and Systematic Withdrawal Plan. The analysis and advice presented in this paper is based on market research on the saving and investment practices of the investors and preferences of the investors for investment in Mutual Funds. The findings of the study mentioned in the paper will help to know about the investors' Preferences in Mutual Fund means as to whether they prefer any particular Asset Management Company (AMC), Which type of Product they prefer, Which Option (Growth or

Dividend) they prefer or Which Investment Strategy they follow (Systematic Investment Plan or One Time Plan).

Somabhusana Janakiballav Mishra (2019) in this paper attempt is made to know the preferences towards mutual fund and analyse the importance of demographic factors that influence the decision of investor towards making investments. This study attempts to find out the significance of demographic factors of population such as gender, age, education, occupation, income over investment decisions. The hypotheses have been developed considering its relevancy to the research objectives. Investment decision making behaviour has been taken as dependent variable and demographic factors (age, gender and education) are considered as independent variables. Data were classified; tabulated and tested. Statistical inferences were drawn by the use of hypothesis and Pearson's Chi-square technique.

Rajan Bilas Bajracharya (2017) A Mutual Fund is an investment vehicle that pools funds from various investors and invests the funds in stocks, bonds, short-term money-market instruments, other securities or assets or some combination of these investments. The primary goal behind investment in mutual fund is to earn goods return with comparatively low risk. The main objective of this research is to identify investors' preference towards mutual fund in Kathmandu metropolitan city. By using in structured questionnaire, Description statistical tools like chi-square test have been used for analysing the data. The findings from this research are that the most of the investors are doubtful to invest the new age investment like mutual funds.

Rajeev V. Jain (2021) "Small drops of water make a big ocean" on this concept mutual fund works. Small investors can also invest in mutual fund and earned a fair rate of return with less risk compare to shares. Mutual fund also provides the benefits of specialized services, expert knowledge, tax benefits etc. Consumers don't spend all his income into various goods and services. Certain amount he will save and out of saved amount he will invest certain proportion in mutual fund. Mutual fund is expected a better option for the Consumers at present. They are financial intermediaries concerned with channelizing the saving of those individual who have excess surplus. There are many investment options available with the Consumers, but mutual fund is different from other in terms of risk, return, liquidity, profitability, transparency etc. and that is it has become more popular nowadays. This study focused on the consumer's perception towards mutual fund as an investment option in Valsad city from Gujarat. They revealed that Consumers perception were positive towards investment in mutual funds.

Shilpa Sampath Kumar (2019) Mutual funds are most appropriate investment for an investor as it offers a chance to invest in a diversified, professionally managed basket of securities at a reasonably low cost. It has become important to study mutual funds from a different angle, which is to emphasis on investor's perception. This research paper attempts to focus attention on the influence of various factors influencing investors' perception towards mutual funds. A survey was conducted and data was collected by applying Convenience method of sampling. Statistical tools like "Chi-Square Test" and "Correlation" were applied to analyse the data. The results of Chi-Square test revealed an association amongst the demographic variables like gender and monthly income with factors like tax benefit and liquidity influencing the investment in mutual funds. The Correlation test also revealed that there is a significant relationship amongst the various factors which influence the Investor's perception towards performance of mutual fund.

Ajinkya Kumawat (2020) Rigorous financial investment is the need of the hour. For the Indian economy to grow at the desired rapid pace, more capital formation and hence rigorous capital mobilization by the investors is required. Like institutional investors, retails investors too need to have an organised portfolio in modern investments instead on relying on traditional methods of investment. Many a times these traditional investment overlap with what is also called as unorganised investments. In this paper we have tried to understand the factors that leads to an investment in a particular investment avenue (modern investment and traditional investment avenue along with unorganised investment options) based on factors like AGE, INCOME and EDUCATION. The study is based on primary data collected from 157 respondents in Mumbai

district. Karl Pearson's Co efficient of correlation was calculated using SPSS. And a strong positive correlation was found among "income and mutual fund investment" and "income and equity shares investment". A strong negative correlation was found between "Age and Equity Share Investment". Findings of the paper clearly indicate that Age, Income and Education are primary factors that affects the decision of investment of a particular individual.

Priyanka Zanvar (2016) the diversification of the financial services sector has provided the individual investor with a wide range of opportunities to invest. Savings are the mantras that any investment advisor will recite. Savings are the difference between the amount investor earns and the amount investor spends. One reason could be that there are certain materials goals that they want to save for. Indian investor's behaviour has been changing drastically in the post-economic reforms era in investment activity, preferences in selecting various financial instruments, evaluating and in analysing the investment avenues. The objective of the study was to understand investment pattern among the investors of Pune (India). The data was collected through structured questionnaire distributed to 770 peoples from different Socio Economic Classes in Pune. It was found from the analysis there is significant difference into safer investment and riskier investment avenues. Analysis has been done through One Way ANOVA. It was propounded here that the most preferred investment options are Insurance and bank deposits and most of the factors influencing investment decisions were high returns, tax benefit and safety.

Sushil Kumar Mehta (2019) this study is conducted to look into the investor rationality by examining the pattern of saving and investment in the city of Jammu situated in Jammu and Kashmir, India. The objective of this study is to see the association of saving and income; reasons for saving; and preferences of investors for different investment instruments through administering the structured questionnaire. Respondents are conveniently selected based on judgment. One -Way ANOVA, ANCOVA, and MANOVA are used to identify and understand the patterns of saving and investment and underlying triggers for the same. A relationship between saving and income is found, after controlling for the effects of variables, namely, age, gender, and occupation. Likewise, the impact of gender on financial literacy and awareness is found. This study also finds that people prefer safe and liquid investments with tax benefits, higher returns, and fewer lock-in-periods. The outcome will help financial consultants and investment managers to know more about the psyche and the level of financial literacy of people, and thus to help them in their objective of garnering funds and invest at a significant level and, finally helping in the capital formation.

S. Umamaheswari (2013) saving is a desire to reserve certain portion of income for future needs. In the recent findings it has been found that saving rate for household is affected not only by their ability to save but also their willingness to save. In the last few years it is evident that middle class Indians have paid attention only to their work for the entire duration. But it is tragically that only at the time of retirement they consult friends and relatives for investment for their future. Few years before there were only limited a number of options for investments like bank deposits and post office schemes. Only few percentages of rich and adventurous Indians have knowledge about Stock market and Securities. Now, the modern investment trend has a different scenario, various options of investment and best return for the investors. This would bring into light the awareness of investment patterns of salaried class investors in Coimbatore district.

III. Need for the study

- Mutual fund market for India, nowadays with approximately thirty five kinds and over 6 100 systems, is among the many ideal investment decision avenues. Nevertheless, having a plethora of systems to select through the list investor faces difficulties within choosing money.
- The collected data on the individual investor's perception, will give a valuable insight regarding their expectation about an ideal fund and scheme.
- This study is an attempt to study the perception of investors towards investment in mutual funds.

IV. Scope of the study

- A big boom has been witnessed in Mutual Fund Industry in recent times. A large number of new players have entered the market and trying to gain market share in this rapidly improving market. The research was carried on in Hyderabad. I had been sent at one of the branch of Zerodha Stock Broking Ltd, Hyderabad Branch.
- Hyderabad where I completed my Project work. I surveyed on my Project Topic “A study of performance of Mutual Fund” on the visiting customers of the Zerodha Stock Broking Ltd, Hyderabad Branch. The sample consisted of 50 respondents
- The study will help to know the preferences of the customers, which company, portfolio, mode of investment and option for getting return and so on they prefer. This may help the company to make further planning and strategy.
- Thus, the study provides a complete picture of investor’s intention on the mutual fund which includes its risk analyses, various schemes they have invested, profit earned or any losses incurred.

V. Objectives of the study

- To study about the investment pattern and customer perception towards mutual funds.
- To make a comparison between direct investment in equity and investment through Mutual funds.
- To analyse the awareness and investment pattern in mutual funds in Zerodha Stock Broking Ltd.
- To find out factors influencing investment in Mutual Funds.
- To understand the behavioural aspects of fund selection techniques of individual investors with regards to Mutual Funds

VI. Research methodology:

My research project has a specified framework for collecting the data in an effective manner. Such framework is called “RESEARCH DESIGN”. The research process which was followed by me consisted following steps.

A. Research Problem:

The problem at hand was to study and measure the awareness level of people regarding mutual funds in the city.

B. Research plan:

The development of Research Plan has the following Steps:

1. Data sources: Two types of data were taken into consideration i.e. Secondary data & primary data. My major emphasis was on gathering the primary data. The secondary data has been used to make things more clear.

Primary Data Sources: Direct collection of data from the source of information, technology including personal interviewing, survey etc.

2. Research instrument

A close friend questionnaire was constructed for my survey. Questionnaire consisting of a set of questions made to be filled by various respondents.

3. Sampling plan

The sampling plan calls for three decisions.

a) Sampling Unit: I have completed my survey in Hyderabad.

b) Sample Size: The sample consisted of 50 respondents. The sample was drawn from walk in customers of Zerodha Stock Broking Ltd. The selection of the respondents was done on the basis of simple random sampling.

4. Data Analysis Tools

The next step is to extract the pertinent findings from the collected data. I have tabulated the collected data & developed frequency distributions. Thus the whole data was grouped aspect wise and was presented in tabular form.

- Frequencies & percentages were used to analyze the collected data.

VII. Limitations of the study

- This study has not been conducted over an extended period of time having both ups and downs of stock market conditions, which would have a significant influence on investors' buying pattern and preferences.
- The study's drawback can be considered a restriction of the secondary data employed in the study.
- The sample size was restricted to 50 respondents due to time constraints and unwillingness on behalf of the respondents to provide information for the study.
- This research doesn't study any specific group of people belonging to a particular occupation or profession.
- The survey was completed in Hyderabad.
- The data was obtained through questionnaire and it was The data was obtained through questionnaire and it.

VIII. Empirical Results

Basis for Analysis

Net Asset Value (NAV) is the best parameter on which the performance of a mutual fund can be studied. We have studied the performance of the NAV based on the compounded annual returns of the schemes in terms of appreciation of NAV, dividend and bonus issue. We have compared the Net asset values of various schemes to get an idea about their relative standings. A representative of results obtained from data analysis is presented in table 1.1 and graph 1.1.a.

Age of the Investors			
	Frequency	Percent	Valid Percent
Below 25 years	9	18	18
26 to 30 years	16	32	32
31 to 40 years	12	24	24
40 years & above	13	26	26
Total	50	100	100

Table No: 1.1.Age of the investors.

Source: Author's Compilation

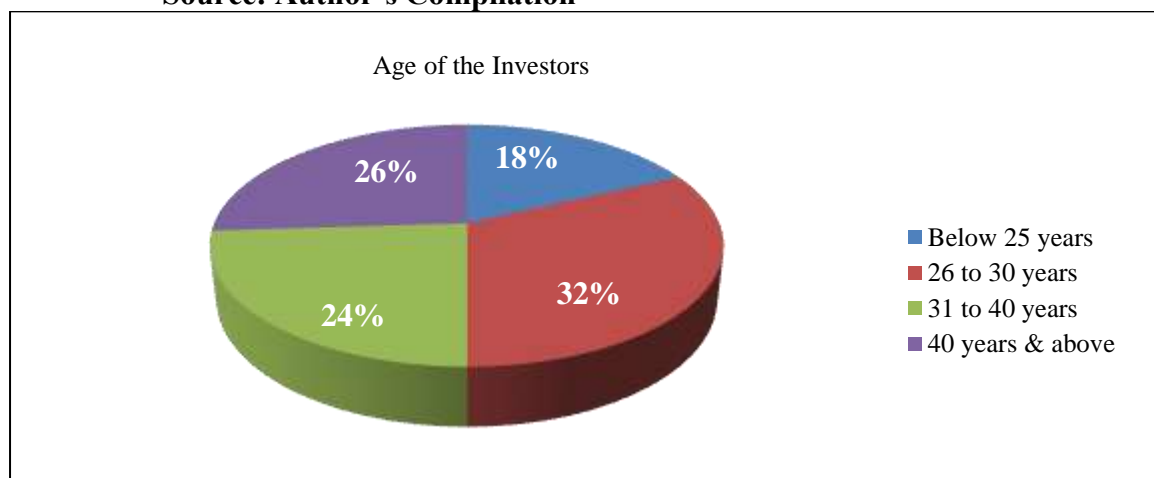


Figure: 1.1.a Age of the investors

Source: Author's Compilation

Out of 50 Investors majority of investors falls between the age of 26 to 30 years, & later followed by 40 years & above. There is no investment activity between the age of below 25 years, it may be because of the people in this age are found to be students or employees. Were in the investment activity is not so active in this age. Majority of investors are Employees, Businessman & later followed by others. Very less investment activity is seen with retired, Students & others, the interesting outcome is the investment activity among the students also, and even students are keen of saving their money. Majority of investors annual income fall in the group between the Rs. 1,00,000 to Rs. 5,00,000 & later followed by below Rs. 50,000 & between Rs. 50,000 to Rs. 1,00,000. A very less percentage of investment is seen investors with annual income of above Rs. 5,00,000. Majority of investors monthly savings are below Rs.5,000 & later followed by investors savings between Rs. 5,000 to 10,000 very less percentage Is seen investors savings with above Rs.20,000. [Majority of investors invest still in bank & later followed by Stock market; investors still consider banks as a safe way to invest & where the returns are assured when compared to stock market because of. Majority of investors are aware of Mutual Funds & there is hardly difference of unawareness therefore educating about Mutual Funds is a must to the investors. Majority of investors are not investing in derivatives & there are less percentage of investors investing in Mutual Funds. Majority of investors still prefers or follows the traditional form of investing the money in Bank Deposits because of the Safety concern & guaranteed returns, & same percentage of investors Savings are in Equity & Insurance, & very less savings is seen in Mutual funds. [Majority of investors has invested in others, 12% investors have invested in Debt Funds, & only 8% investors have invested in Equity Oriented Funds. Majority of investors consider returns as the factor while investing in derivatives, & 4% each consider Hedging & Arbitrage as a factor while investing in derivatives. The main objective of very investors to earn money from their investment therefore it is very obvious to consider return as a factor while investing in Derivatives. Majority of investors came to know about mutual Fund from Brokers & Brokers are considered as a best mean or way for educating the investors while investing in mutual Fund 10% of investors take advice from Family, 2% take advice from friends, & 4% investors came to know about mutual Fund from others. Majority of investors takes advice from brokers, 6% investors take advice from family, & 2% each take advice from Friends & others while investing in derivatives. the outcome says that Brokers can educate well to the investors while investing in derivatives. Majority of investors are less than 1 year in mutual Fund, 10% investors are from 3 to 5 years, 8% investors are there more than 5 years in mutual Fund. The outcome of the above graph shows that majority of investors has limited their investments after the major downfall in the stock market. Investors were more in numbers when the stock market was at 21,000 points, & very less investors were there in mutual fund to invest. Majority of investors' investing in sip plan 54% stp, 33% of investors trade daily, & swp% trade weekly in derivative market. Majority of investors rated services provided by AMC COMPANY services as Good & it can be improved further by taking the necessary steps by filling the gaps by conducting programs like clients meeting or investors meeting.

IX. Findings, Suggestions & Conclusion

Findings

- The SBI Magnum FMCG Fund is launched on Jul 31, 1999 the mutual fund is offering only exit load of 1% And last dividend paid on 03rd march 2006 paid Rs 6/-per one unit of NAV , **Minimum Investment of 2000/-**
- The UTI banking sector fund is launched on Apr 07, 2004 the mutual fund is offering only exit load of 1% **Minimum Investment of 5000/-**
- The UTI CRTS 81G is launched on Oct 01, 1981 the mutual fund is offering only exit load of 1% **Minimum Investment 10000/-**
- The UTI BOND FUND G is launched date Jun 17, 1998 the mutual fund is offering only exit load of 1.50% **Minimum Investment 1000/-**

- Most of the investors belong to the age group of 26 years to 40 years & above. Through this we can infer that the investment activity in this age is more compared to the investors whose age is below 25 years.
- Most of the investors are Employees & Businessman. Even student investors are investing more compared to retired investors.
- Most of the investors annual income fall under the group between Rs. 1,00,000 to Rs. 5,00,000.
- Most of the investors belong to the savings group of below Rs. 5,000.
- Most of the investors prefer investing in Bank Deposit. Through this we can infer that people still invest in bank & not in MUTUAL FUNDS.
- Most of the investors consider Safety as a factor while investing. Investors are concerned about safety of their money & not return.
- Most of the investors invested their savings in Equity. We can infer that equity is still in the topmost priority when it comes to investing.
- Most of the investors are unaware of mutual funds. It may be because of it being a new arena for investment, at least in Indian market & ill promotion of the same.
- Most of the investors did not invest in mutual funds because of Most of the investors consider.
- Most of the investor's came to know about mutual funds through Brokers.
- Most of the investors do take advice from Brokers while investing in mutual funds.
- Most of the investors are trading in mutual funds for less than one year. This means that derivatives trading are unfamiliar & they consider it as too risky.
- Most of the investors trade on Monthly basis in systematic investment plan.
- Most of the investors rated services provided by AMC companies Services as Good.

Suggestions

- Since the entire fund's returns are beating the market returns and the funds are giving good returns, investing is quite helpful to investors.
- Since most of the investors are working in the private sector it is all the more necessary to give equity flavour to one's investment portfolio so that they can have a comfortable post retirement life.

If there is a chance of withdrawal of investment, it should be made in debt instruments.

- It is important to select the fund carefully. The most important factor while selecting a fund is the suitability. A fund may be best available in the market if it doesn't match the requirement, skip the fund.
- The performance of the mutual fund over a long time horizon should be taken into consideration. Short-term performances are like a flash in the pan and should not be the guiding factor for any investment decision.
- Diversification is the best strategy to mitigate the downside risk in an investment portfolio. Investments should be made in various funds so that one is exposed to all market capitalizations.
- Investors should invest in equities for a long term, which generates higher returns and should invest in debt funds for short term.

Conclusion

It can be said that, falling interest rates and recent developments in the investment climate in the country, have led to investment avenues dwindling drastically. But Mutual Funds are any day a safe bet for investors of different groups, motives and other preferences. Since Asset Management companies offer a range of Funds respective Investment philosophies, an investor can benefit only by investing in appropriate fund, which shall meet his requirements. Manager should try to reduce the

risk by investing in efficient or he should be able to differentiate between the efficient and inefficient securities. The mutual fund company should concentrate on cash rich companies like the Trusts, cash rich private companies, etc. to generate, more funds for the investment.

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A REPORT ON “QUALITY OF WORK LIFE” WITH SPECIAL REFERENCE TO HETERO LTD (HYDERABAD)

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ABSTRACT

Quality of work life is a critical concept with having lots of importance in employee's life. Quality of work life indicates a proper balance both in work and personal life which also ensure organizational productivity and employee's job satisfaction. This research study attempted to find out the factors that have an impact and significance influence on quality of work life of employees. Quality of work life is a process in an organization which enables its members at all levels to participate actively and effectively in shaping organizational environment, methods and outcomes. This study focuses on the subjective matter of QWL i.e. its key elements like job security, job performance, employee satisfaction etc. The study concluded that an appropriate organization culture, compensation policy, career growth and relative facilities can leads to a satisfied employee mindset which ensure the overall organization productivity.

Keywords: Quality of work life, Job Performance, Employee Satisfaction, Job Security

1. INTRODUCTION

Quality of Work Life (QWL) is a philosophy, a set of principles, which holds that people are the most important resource in the organization as they are trustworthy, responsible and capable of making valuable contribution and they should be treated with dignity and respect. The elements that are relevant to an individual's quality of work life include the task, the physical work environment, social environment within the organization, administrative system and relationship between life on and off the job.

QWL consists of opportunities for active involvement in group working arrangements or problem solving that are of mutual benefit to employees or employers, based on labor management cooperation. People also conceive of QWL as a set of methods, such as autonomous work groups, job enrichment, high-involvement aimed at boosting the satisfaction and productivity of employees[3]. It requires employee commitment to the organization and an environment in which this commitment can flourish[4]. Thus, QWL is a comprehensive construct that includes an individual's job related well-being and the extent to which work experiences are rewarding, fulfilling and devoid of stress and other negative personal consequences. Accordingly, the rising number of two-income households is heightening the concern for employees' quality of work life. Given that female participation at work is increasing, it is apparent that males and females independently will need to take care of both work and home. Therefore, quality of work experience rather than work per se became the focus of attention and workplace wellness is crucial in promoting healthier working environments

1.1 NEED FOR THE STUDY:

Due to the work norms, the managerial personnel at the middle and higher levels in the organization hierarchy face a variety of problems. Not only the managerial personnel but also the employees at the grass root level experience a sense of frustration because of low level of wages, poor working conditions, unfavorable terms of employment, inhuman treatment by their superiors. Now a days peoples attitudes and values have been changed towards earning money. So the people are working too hard in order to get more money.

1.2 SCOPE OF THE STUDY:

Private schools Ranga Reddy Divisions are leading with four locations namely Jeedimetla and Casually. The scope of the study is confined to only Ranga Reddy unit (private school). Hyderabad and it includes all employees from the employees category to executive category.

1.2 OBJECTIVES OF THE STUDY:

- To study out the working conditions of both employees and employers.
- To analyze out the infrastructure facilities of the organization.
- To find out the opinion of each and every one regarding their work life in the organization.
- To know out the satisfaction levels in each and every one with regard to remunerations they are getting.
- To know out the developmental programmes in the **organization**

The questionnaire used is a structured and closed-end one. It is one on which there are definite, concrete and predetermined question. 'Likert scale' is used in the questionnaire. The respondents are given a scale of "SATISFACTORY or AVERAGE or UNSATISFACTORY".

2. RESEARCH METHODOLOGY:

POPULATION AND SAMPLE:

The total number of employees and employers engaged in the organization are 250 in number out of total manpower the investigator has taken 80 were taken as the sample from all the categories of the organization.

SAMPLING TECHNIQUE:

A convenience sampling method was adopted to conduct the study.

DATA COLLECTION:

Primary Data: The data was collected from various employees and employers who were selected on the basis of simple random sampling by administering the structured questionnaire upon them and through general observation.

Secondary Data: The data was also collected from the company's practices, manuals, records etc.

RESEARCH INSTRUMENTS:

The investigator has used questionnaire as the research instrument. The types of questions used in the questionnaire are multi-ended questions. In this type of questions the respondents will be given three choices for answer in which they have to choose one.

LIMITATIONS OF THE STUDY:

- ❖ However inspire of completing the study successfully, there are certain limitations for the study. They are as follows:
- ❖ Study has not covered all the employees of the organization since the Study is confined to only one unit.
- ❖ Some of the employees hesitated to answer some questions. Some of the employees are not interested to fill the questionnaire

3. LITERATURE REVIEW

According to Stein (1983) and Reid (1992) have also recognized the importance of compensation in determining QWL. Stein (1983) identified pay as being one of five important components of QWL. Stein includes pay under the category of external rewards, which in addition to pay includes promotion or position, and rank or status.

Like Walton (1973) and Orpen (1981), (Newell, (2002); Stein, (1983); Kerce& Booth- Kewley, (1993); Bertrand, (1992) and Harrison (2000), agree that safe and healthy work conditions have a significant impact on QWL. Newell (2002) highlights that QWL involves making improvements to the physical working conditions under which employees operate in order to make their work setting more favorable.

Walton (1973) asserts that experiencing a high QWL is dependent upon the extent to which jobs allow the employee to use and develop his/ her skills and competencies. In light of the above - mentioned, jobs should contain a number of features that would allow employees the opportunity to use and develop their human capacities and eventually experience QWL. These features include autonomy, skill variety, task significance and feedback, meaningfulness and wholeness

H.C. Ganguly (1964) in his study explains on Indian workers attempted to examine various factors leading to job satisfaction or dissatisfaction and ranked adequate earnings at the first place. Other factors which are ranked high are job security and opportunity for advancement. Other factors such as job status and prestige, working hours, relation with colleagues etc. have been ranked as low motivators.

Skrovan (1983) stated that the involvement and participation of employees in the creation of their workplace were a central focus of every QWL process. Through this process, all members of the organization, through appropriate channels of communication set up for this purpose, have some say about the design of their jobs in particular and the work environment in general.

According to Kotze (2005) work-family balance enhances an individual's QWL, as involvement in multiple roles protects or buffers individuals from the effects of negative experiences in any one role. Beyond this buffering effect, work-family balance is thought to promote well-being in a more direct manner. Balanced individuals experience low levels of stress when enacting roles, presumably as they are participating in role activities that are salient to them.

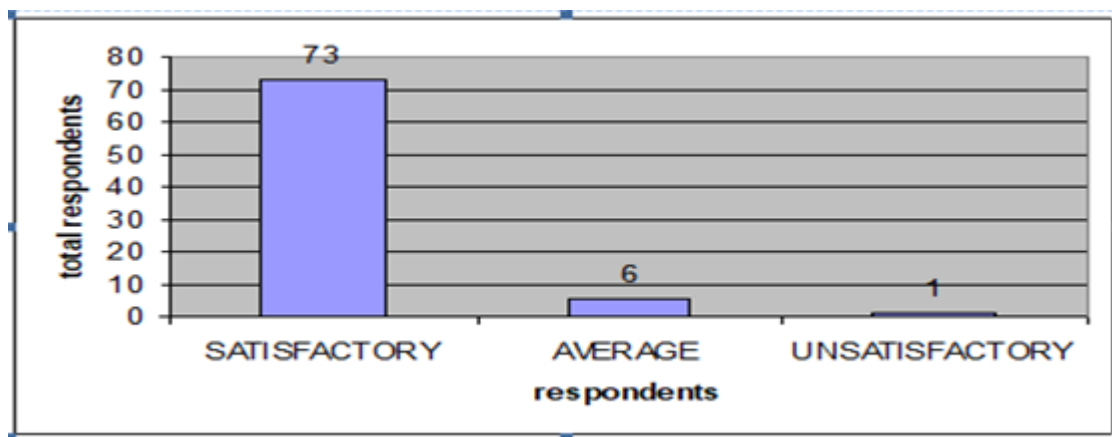
4. DATA ANALYSIS AND INTERPRETATION

To analyse the data percentage of analysis was done with the help of MS Office, the analysis and interpretation shown in the form of graph and tables.

Table - 1: Opinion on healthy conditions of the organization

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	73	91.3
AVERAGE	6	7.5
UNSATISFACTORY	1	1.2
TOTAL	80	100

GRAPH NO 1



INTERPRETATION:

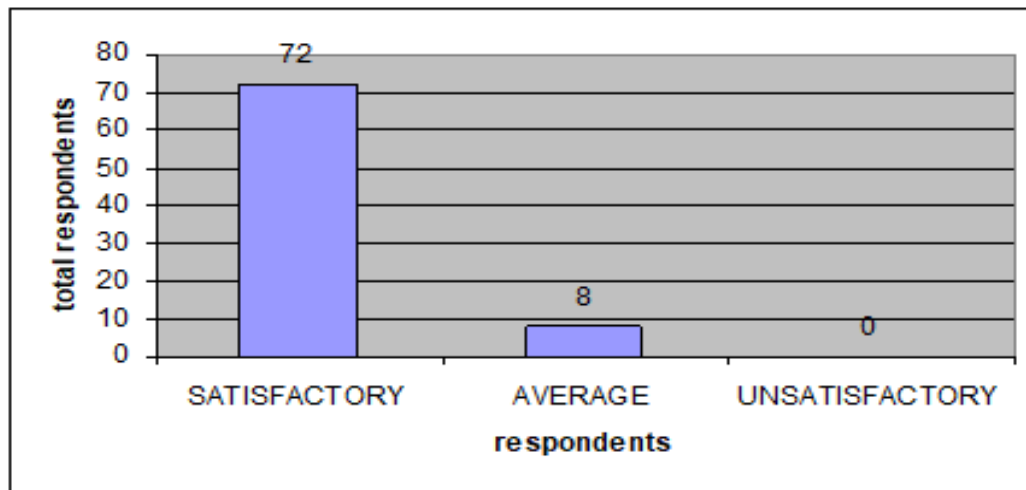
From the above table 20. We can interpret that majority 86.3% are satisfied with the quality of work in the organization, but 13.7% are not fully satisfied and 0% are fully dissatisfied. Based on it we can conclude (hat most of them are satisfied with the quality of work in the organization.

2) Opinion on Infrastructure provided to work

Table - 2:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	72	90
AVERAGE	8	10
UNSATISFACTORY	0	0
TOTAL	80	100

GRAPH NO 2



INTERPRETATION:

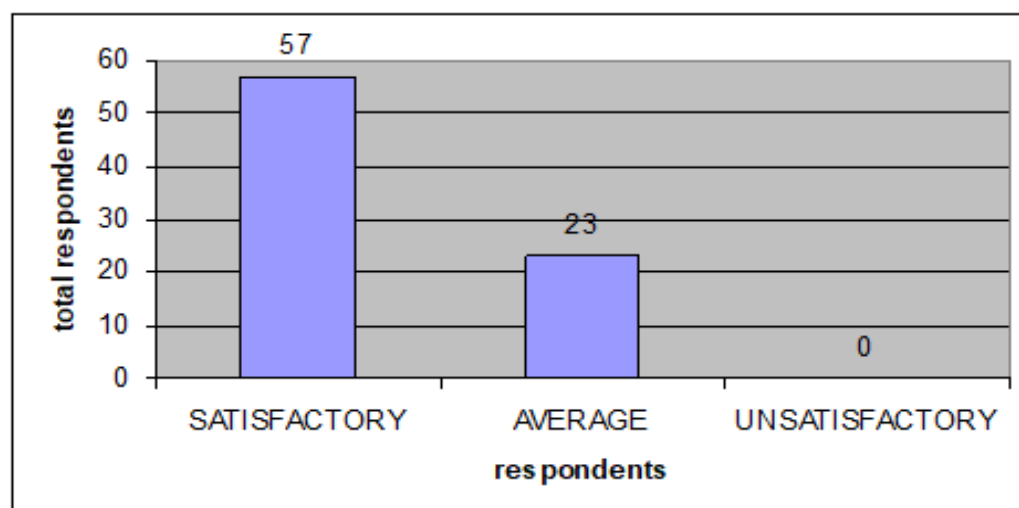
From the above table-2. we can interpret that majority 90% of the respondents stated that they are really satisfied with the infrastructure provided to them, but 10% of the respondents are not fully satisfied and 0% of them are really dissatisfied. Based on it we can conclude that most of them are satisfied with the infrastructure provided to them.

3) Opinion on general conditions

Table - 3:

RESPONSE	NO OF RESPONDENTS	PERCENTAGE
SATISFACTORY	57	7.13
AVERAGE	23	28.7
UNSATISFACTORY	0	0
TOTAL	80	100

GRAPH NO 3



INTERPRETATION:

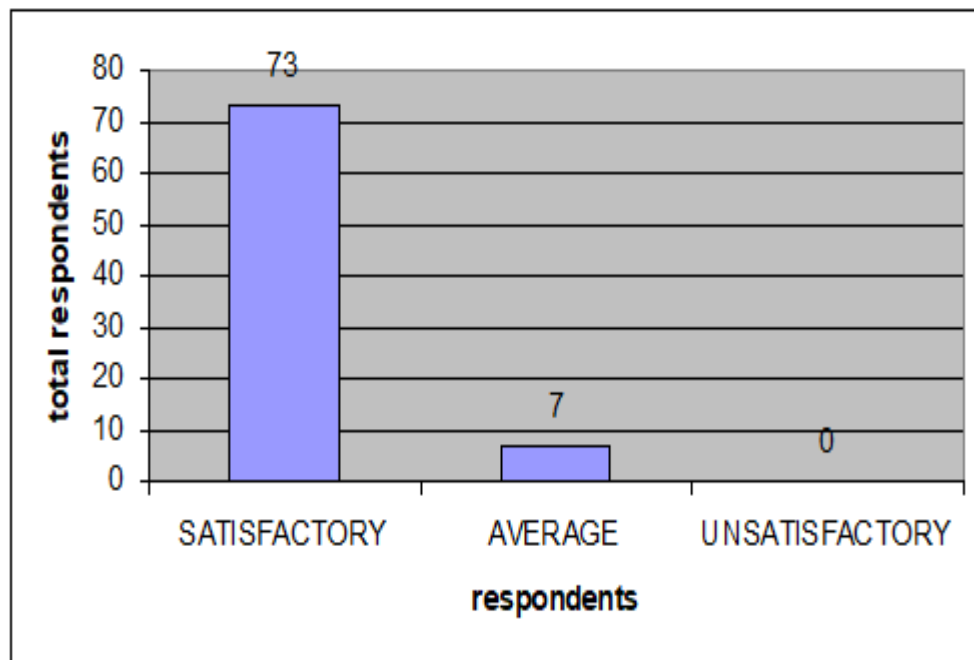
From the above table: we can interpret that majority 71.3% of the respondents stated that they are satisfied with the general conditions of the organization but 28.7% are not fully satisfied and 0% are fully dissatisfied. Based on it we can conclude that most of them are satisfied with the general conditions of the organization Based on it we can conclude that most of them are satisfied with the general conditions of the organization.

4) Opinion on the relations with co-worker: sub-ordinates & superiors

Table - 4;

RESPONSE	NO-OP RESPONDENTS	PERCENTAGE
SATISFACTORY	73	91.3
AVERAGE	7	8.7
UNSATISFACTORY	0	0
TOTAL	80	100

Graph no 4



INTERPRETATION:

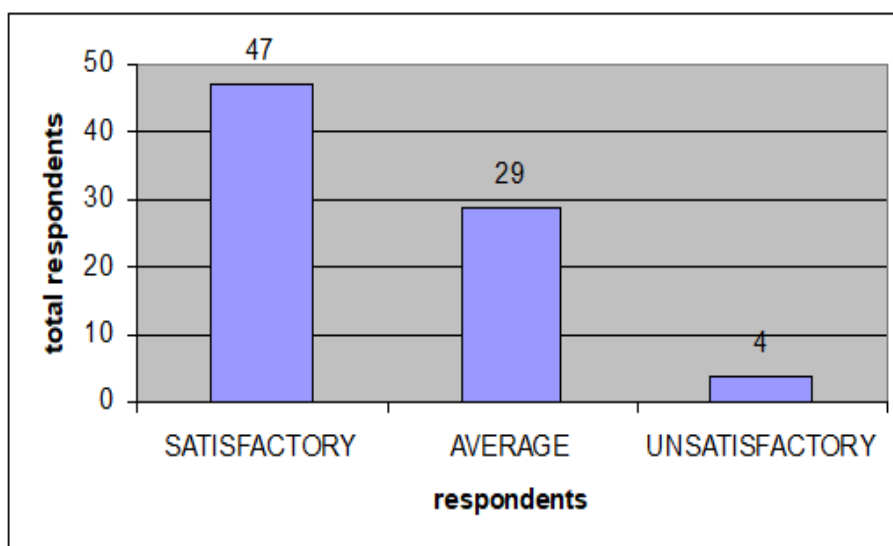
From the above table-4: we can interpret that majority 91.3% are fully satisfied with the maintenance of relationship with their co-employees, but 8.7% of them are not fully satisfied and 0% are completely dissatisfied. Based on it we can conclude that most of them are satisfied with the relation with their co-employees. Based on it we can conclude that most of them are satisfied with the relation with their co-employees.

5) Opinion on the remuneration

Table - 5:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	47	58.7
AVERAGE	29	36.3
UNSATISFACTORY	4	5.0
TOTAL	80	100

Graph no 5



INTERPRETATION:

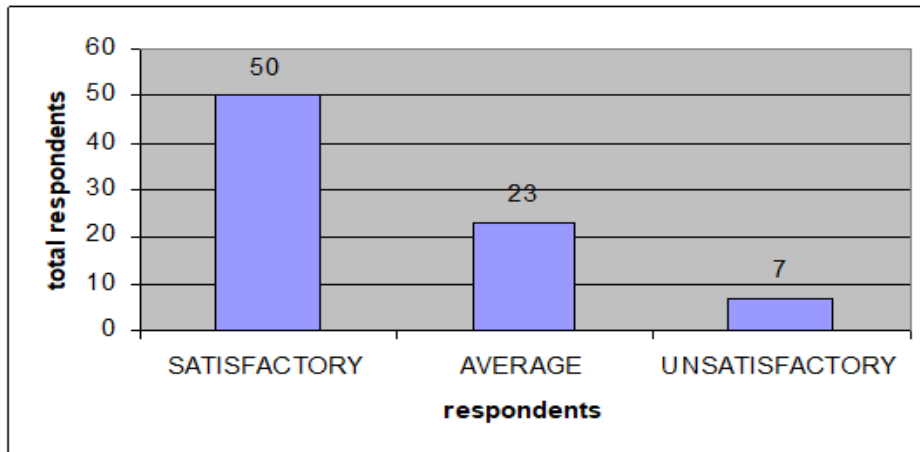
From the above table - 5, we can interpret that majority 58.7% are fully satisfied with the remuneration they are getting, but 36.3% of them are not fully satisfied and 5% are completely dissatisfied. Based on it we can conclude that most of them are satisfied with the remuneration they are getting.

6)Opinion on the fair compensation

Table - 6:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	50	62.5
AVERAGE	23	28.8
UNSATISFACTORY	7	8.7
TOTAL	80	100

Graph no 6



Interpretation:

From the above table – 6: we can interpret that majority 62.5% are satisfied with the fair compensation but 28.8% of them are not fully satisfied and 8.7% are fully dissatisfied. Based on it we can conclude that most of them are satisfied with the fair compensation..

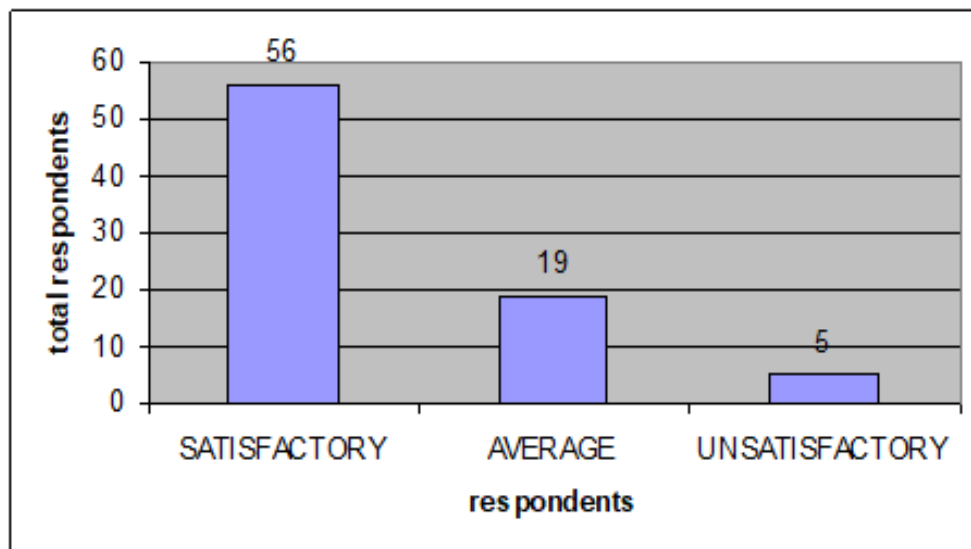
7) Opinion on the different types of benefits

Ex-bonus etc

Table - 7:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	56	70
AVERAGE	19	23.7
UNSATISFACTORY	5	6.3
TOTAL	80	100

Graph 7:



INTERPRETATION:

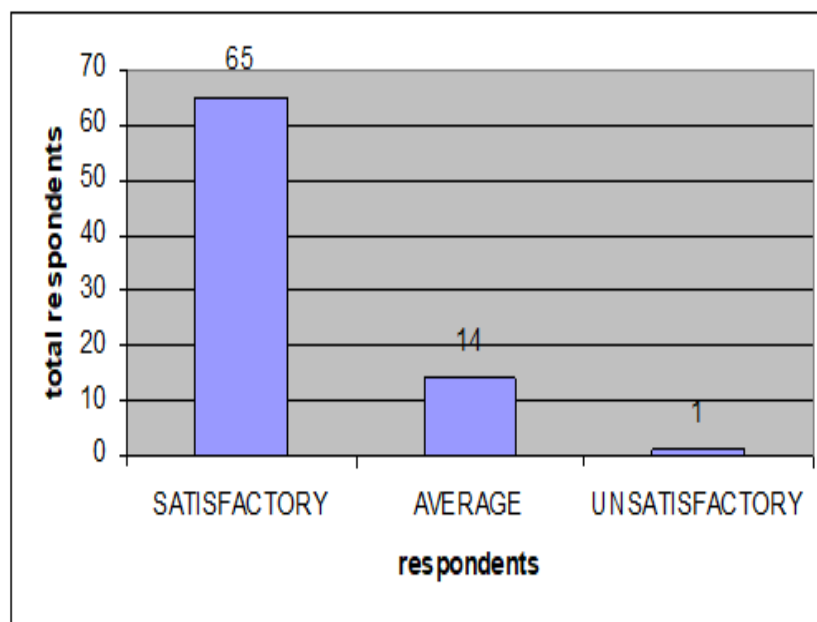
From the above table – 7: we can interpret that majority 70% are fully satisfied with the different benefits they are getting from the company, but 23.7% not fully satisfied and 6.3% are fully dissatisfied. Based on it can conclude that most of them are satisfied with the different benefits they are getting from the company.

8) Training that was given till now is

Table - 8:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	65	81.2
AVERAGE	14	17.5
UNSATISFACTORY	1	1.3
TOTAL	80	100

Graph no 8



INTERPRETATION:

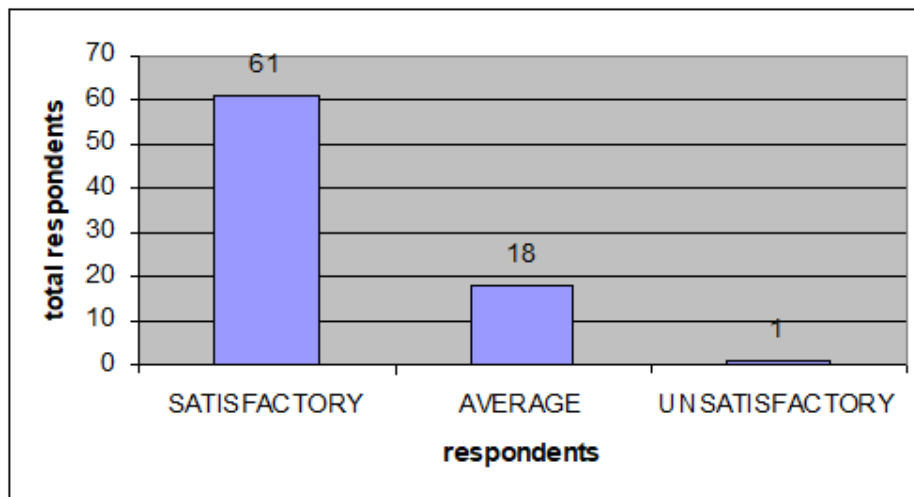
From the above table - 8, we can interpret that majority 81.2% are satisfied with the provision of training by the organization, but 17.5% are not fully satisfied and 1.3% are completely dissatisfied. Based on it can conclude that most of them are satisfied with the training facilities provided by the company.

9) Opinion on the opportunities to develop capabilities towards job.

Table - 9:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	61	76.3
AVERAGE	18	22.5
UNSATISFACTORY	1	1.2
TOTAL	80	100

Graph no 9



INTERPRETATION

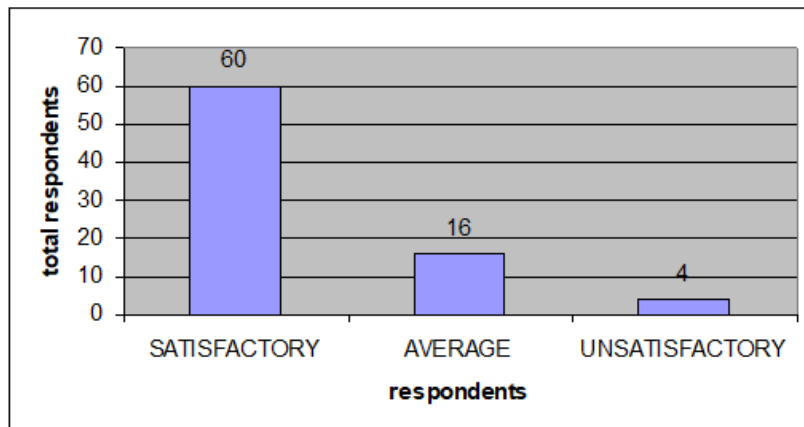
From the above table – 9: we can interpret that majority 76.3% are satisfied with the opportunities to develop the capabilities towards the job, but 22.5% are not fully satisfied and 1.2% are fully dissatisfied. Based on it can conclude that most of them are satisfied with (he opportunities to develop the capabilities towards the job.

10) Opinion on the career developmental opportunities of the command

Table - 10;

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	60	75
AVERAGE	16	20
UNSATISFACTORY	4	5
TOTAL	80	100

Graph no 10



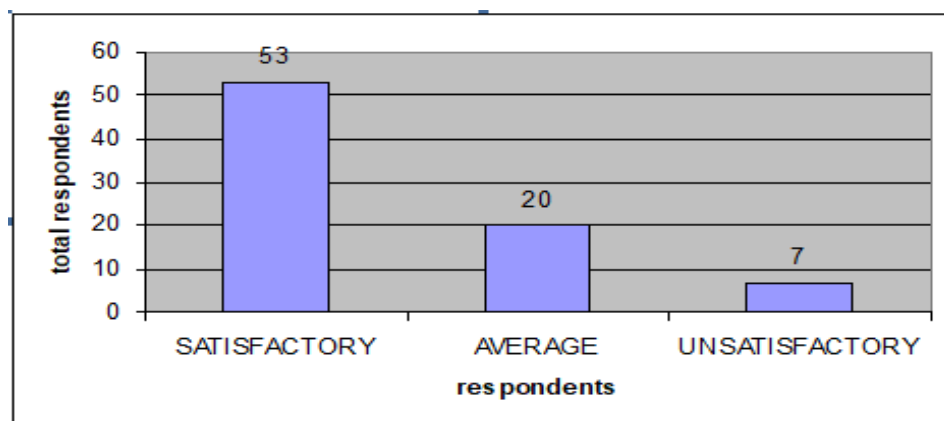
INTERPRETATION:

From the above table - 10, we can interpret that majority 75% are satisfied with the career developmental opportunities, but 20% are not fully satisfied and 5%% are fully dissatisfied. Based on it we can conclude that most of them are satisfied with the career developmental opportunities.

**11) Opinion on the procedures and promotion polices of the Conman
Table -11**

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	53	66.3
AVERAGE	20	25.0
UNSATISFACTORY	7	8.7
TOTAL	80	100

Graph no 11



INTREPRETATION:

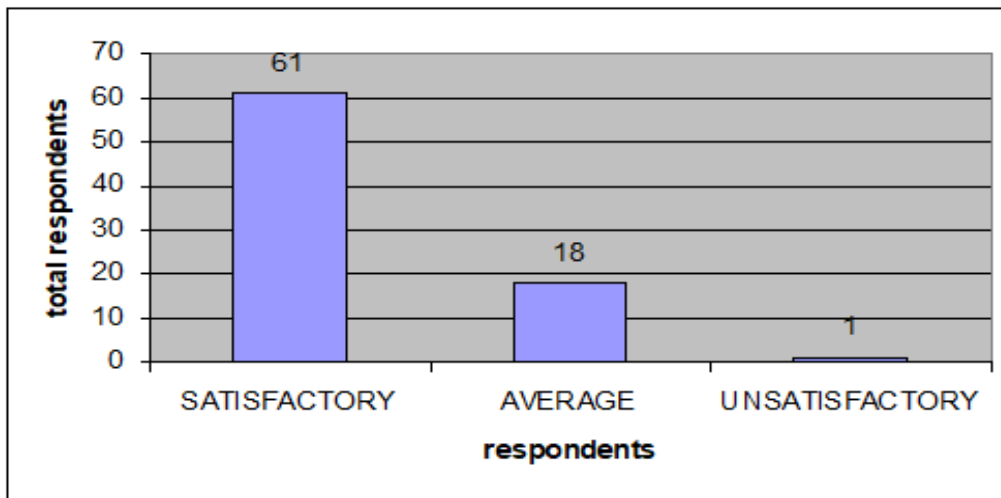
From the above table - 11. we can interpret that majority 663% are satisfied with the company's policies and practices of promotions, but 25% are not fully satisfied and 8.7%% are fully dissatisfied. Based on it can conclude that most of them satisfied with the company's policies and practice of promotions.

12) Opinion on the neighbors

Table - 12:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	61	76.3
AVERAGE	18	22.5
UNSATISFACTORY	1	1.2
TOTAL	80	100

Graph no 12



INTERPRETATION:

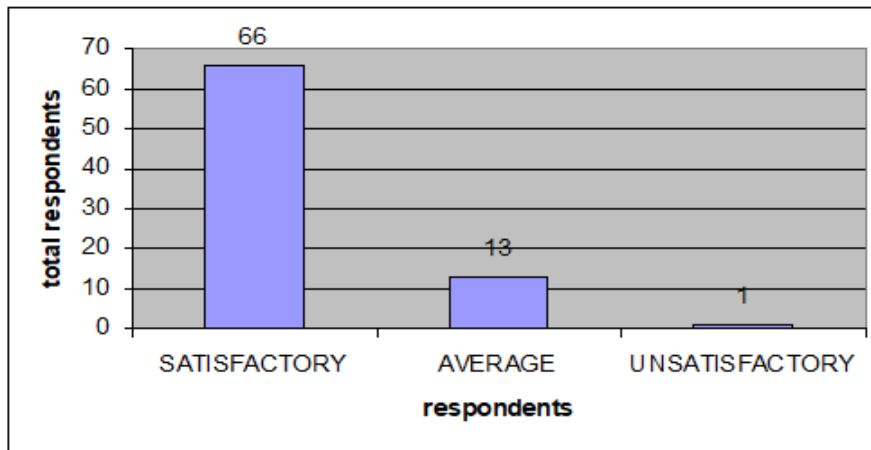
From the above table – 12: we can interpret that majority 76.3% are satisfied with the good relation with their neighbors working with them, but 22.5% are not fully satisfied and 1.2% are fully dissatisfied. Based on it can conclude that most of them are satisfied with the good relation with their neighbors working along with them.

13) Opinion on job security given by the company

Table - 13:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	66	82.5
AVERAGE	13	16.3
UNSATISFACTORY	1	1.2
TOTAL	80	100

Graph no 13



INTERPRETAION:

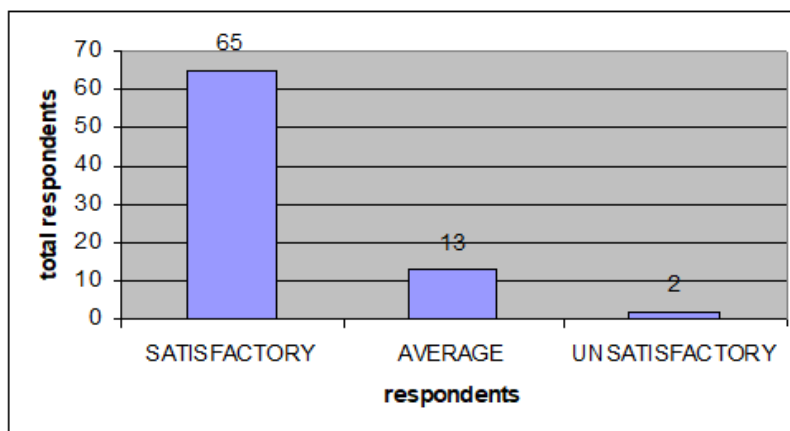
From the above table 13: we can interpret that majority 82.5% are satisfied *with the* job security given by the company, but 16.3% are not fully satisfied and 1.2%% are fully dissatisfied. Based on it can conclude that most of them are satisfied with job security given by the company.

14) Opinion on the authority given to do a job.

Table - 14

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	65	81.3
AVERAGE	13	16.2
UNSATISFACTORY	2	2.5
TOTAL	80	100

Graph no 14



INTERPRETATION:

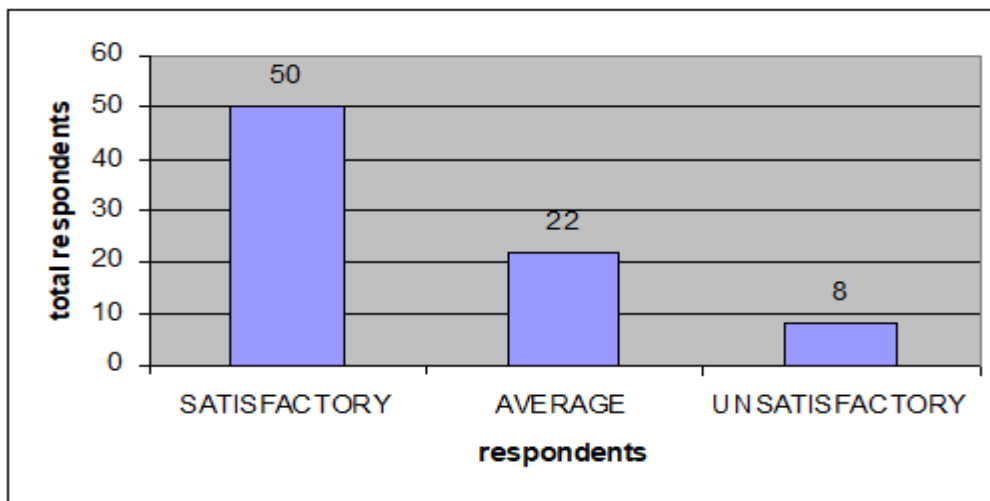
From the above table – 14: we can interpret that majority 81.3% are satisfied with the authority that was given to them to do a job, but 16.2% are not fully satisfied and 2.5%% are fully dissatisfied. Based on it we can conclude that most of them are satisfied with the authority that was given to them to do a job.

15) Opinion on employee participation in decision-making

Table – 15

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	50	62.5
AVERAGE	22	27.5
UNSATISFACTORY	8	10.0
TOTAL	80	100

Graph no 15



INTERPRETATION:

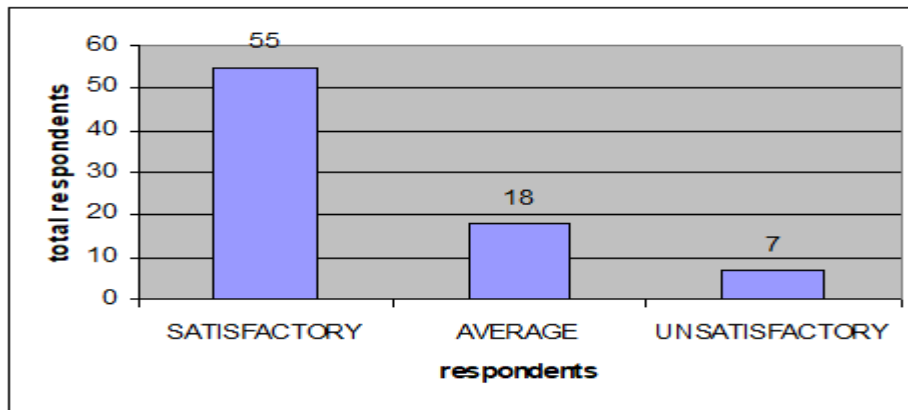
From the above table - 15, we can interpret that majority 62.5% are satisfied with the employee participation in decision making; but 27.5% are not fully satisfied and 10%% are fully dissatisfied. Bused on it we can conclude that most of them are satisfied with the employee participation in decision making.

16) Opinion on the ethicality of work within the company

Table - 16:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	55	68.7
AVERAGE	18	22.5
UNSATISFACTORY	7	8.8
TOTAL	80	100

Graph no 16



INTERPRETATION:

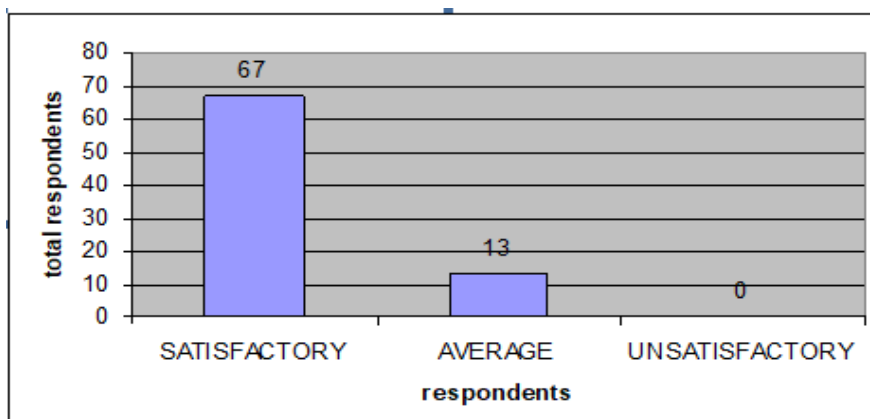
From the above table – 16: we can interpret that majority 68.7% are satisfied with the ethicality of work within the company, but 22.5% are not fully satisfied and 8.8% are fully dissatisfied. Based on it can conclude that most of them satisfied with the ethicality of work within the company.

17) Opinion on the practices and procedures of work in the Command

Table – 17

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	67	83.7
AVERAGE	13	16.3
UNSATISFACTORY	0	0
TOTAL	80	100

Graph no 17



INTERPRETATION:

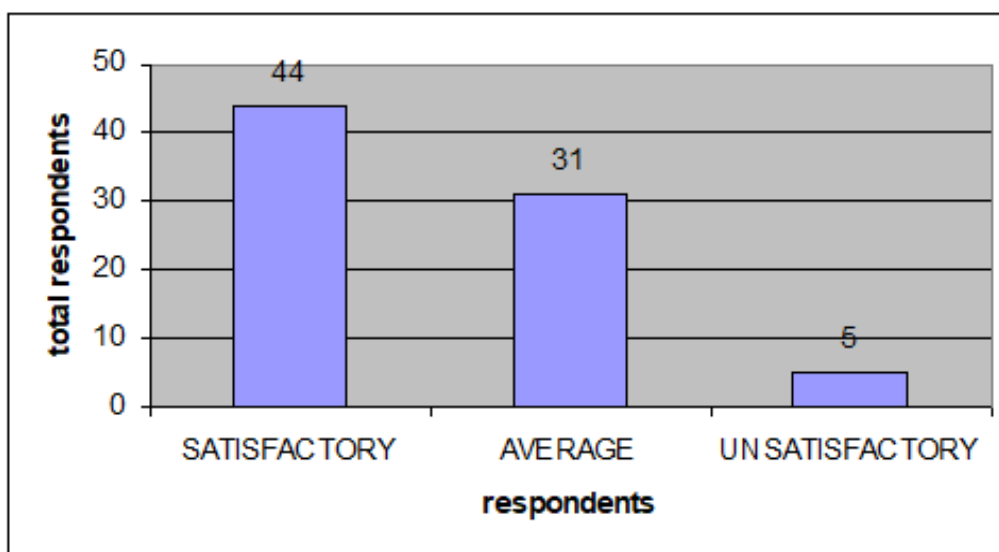
From the above table – 17: we can interpret that majority 83.7% are satisfied with the practices and procedures of work in the organization, but 16.3 are not fully satisfied and 0% are fully dissatisfied. Based on it we can conclude that most of them are satisfied with the practices and procedures of work in the organization.

18) Opinion on the welfare amenities provided by organization

Table - 18:

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	44	55
AVERAGE	31	38.7
UNSATISFACTORY	5	6.3
TOTAL	80	100

Graph no 18



INTERPRETATION

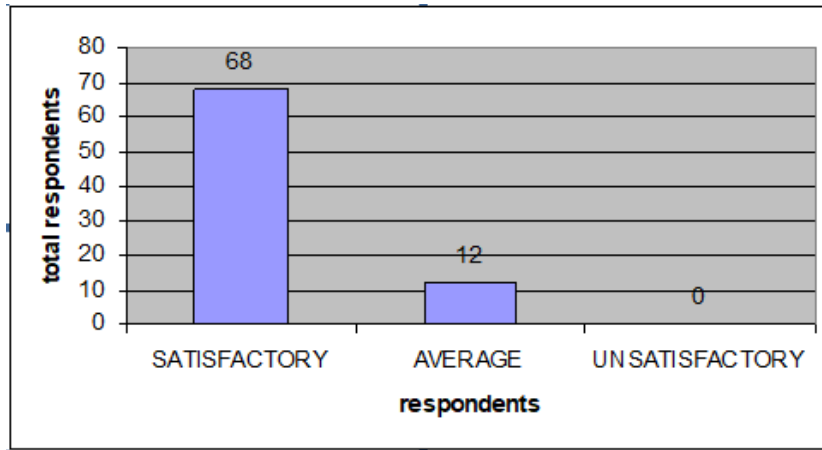
From the above table - 18, we can interpret that majority 55% are satisfied with the welfare amenities provided to them, but 38.7% are not fully satisfied and 6.3% are fully dissatisfied. Based on it we can conclude that most of them are satisfied with the welfare amenities provided to them.

19) Opinion on the organization objectives

Table – 19

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	68	85
AVERAGE	12	15
UNSATISFACTORY	0	0
TOTAL	80	100

Graph no 19



INTERPRETATION

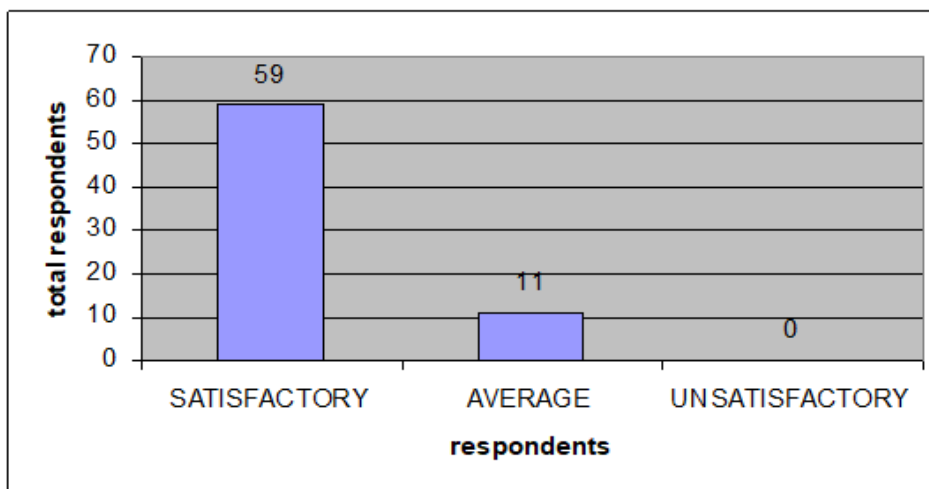
From the above table – 19: we can interpret that majority 85% are satisfied with the company's objectives, but 15% are not fully satisfied and 0% are fully dissatisfied. Based on it we can conclude that most of them are satisfied with the company's objectives.

20) Opinion on the opportunities to develop capabilities towards job.

Table –20

RESPONSE	NO. OF RESPONDENTS	PERCENTAGE
SATISFACTORY	59	86.3
AVERAGE	11	13.7
UNSATISFACTORY	0	0
TOTAL	80	100

Graph no 20



INTERPRETATION:

From the above table 20. We can interpret that majority 86.3% are satisfied with the quality of work in the organization, but 13.7% are not fully satisfied and 0%% are fully dissatisfied. Based on it we can conclude (hat most of them are satisfied with the quality of work in the organization.

FINDINGS & SUGGESTIONS

- It is found that the management is not involving its employees in decision-making.
- So the company should give more importance for employee's participation in the management decisions to achieve more qualitative results.
- It is found that the company is not caring about the satisfaction levels of its employees. So the company should give more importance to the employee satisfaction.
- It is found that the internal conflicts are existing in the company. So the company should take measures to create a healthy working environment which minimizes the role, goal & line and staff conflicts.
- It is found that the people in the company are not assigned to newer jobs, so the company should encourage the ideas of employees in order to improve their creativity.
- It is found that most of them need new techniques in training. So the company should conduct new training programmes to develop the unawareness in the employees about the quality of their work and services.

5. CONCLUSIONS

It was concluded that, most of the people were satisfied for the facilities provided by the company. It was informed that, most of the employees satisfied with health and safety measures followed by the company. It is observed that most of the employees are satisfied with training and development activities. It is observed that most of the people are satisfied with the procedures of work. It is observed that most of the people are satisfied with the relationship with co-employees. It is observed that most of the employees support their participation in the management decisions. It is observed that most of the people are satisfied with employee benefits. It is observed that most of the people are satisfied with quality of work. Finally the hypothesis is proved to be null from the above observations and interpretations.

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A STUDY ON PERFORMANCE EVALUATION SYSTEM IN PHOENIX MOTORS PVT LTD. HYDERABAD

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Abstract

The skills and aptitudes that people possess vary. When two different employees are hired to complete the same task, there will always be some variation in the quality and quantity of their labour. Understanding each employee's skills, knowledge, and relative value to the company is possible only with a thorough understanding of their performance management. Employees are rated according to their performance under performance management. A large portion of society uses performance management. The second world war, when the merit rating was first utilised, is when performance management can be traced back to the 20th century. It's not new for a business to evaluate their workforce. The measuring of performance is not complete without performance managements. Measurement of employee and organisational performance is required to monitor the organization's progress toward its targeted goals and objectives. The phrase "be paid according to what you give" has recently become the motto of organisations all over the world. The focus of these firms is now performance management, and more specifically, individual performance. Employee performance is rated, and their contribution to the organization's goals is assessed, with the aid of performance management. When the performance management process is formal and well-structured, it aids in the employees' understanding of their duties and responsibilities and provides guidance for each person's performance. It is beneficial to review each individual's performance as well as connect it with the company goals. The goal of performance management is to improve employees' future performance while taking into consideration their past performance. The present global trends in performance management have been attempted to be studied.

Keywords: Performance Evaluation, Performance Assessment, Performance Appraisal.

I. Introduction

In the performing arts, a performance is typically an occasion where a performer or group of performers act in a specific style for an audience. Ballet and choral music are two examples. Pre-performance rehearsals are typically attended by the performers. Audience members frequently cheer afterward.

Cultures can have different ways of expressing gratitude. Chinese performers will reciprocate the audience's applause at the conclusion of a performance as a way of saying "thank you." Folk performing arts events are frequently photographed by onlookers in Japan, who will occasionally approach the stage and get as close as possible to the performers' faces.

When audience members participate in a performance, such as in "participatory theatre," the distinction between the performers and the audience can sometimes become hazy.

Daily or at another regular interval, theatrical performances may be held. Performances may take place in formal performance venues (such theatres or symphony halls) or in less formal settings, like subway stations, public places, or private residences.

Are you curious as to why businesses assess the performance of their employees? Both an evaluation procedure and a communication tool, employee performance evaluations. Employee performance reviews conducted the old-fashioned way are generally despised by managers and staff. On the other hand, performance management offers the benefits that businesses are looking for in employee performance appraisal. However, performance management that is carried out well and with the right attitude achieves these objectives as well as more. Additionally, performance management offers benefits to the manager and the employee.

Every organisation should place a high priority on making a constructive contribution to the attainment of its goal. Managerial efficiency and organisational effectiveness are frequently equated. Only by guaranteeing the maximum exploitation of the human resources available through specific personnel under his direction can a manager achieve organisational effectiveness. As a result, a manager must constantly keep an eye on and evaluate staff performance.

Additionally, as the organisation exists to achieve the goals, the degree of success that each person has in achieving this particular goal is crucial in determining the efficacy of the business. An essential component of human resource management is the evaluation of how well people have performed in achieving their unique goals. This results in the performance evaluation idea.

The definitions of performance evaluation are served by a performance evaluation system.

Performance evaluation is a technique for assessing how people behave at work. It takes into account both qualitative and quantitative components of job performance to show how an employee is meeting job requirements, and it is always results-based. Performance evaluations take into account an employee's performance as well as his potential for growth.

"Performance Evaluation is a systematic description of an employee's job relevant strengths and weaknesses".

When performing All of the formal processes employed in working organisations to assess the personalities, contributions, and potential group members are referred to as evaluation or merit rating. The employee's merits, such as initiative, dependability, personality, etc., are compared to others and graded to be rated in the evaluation system. Evaluations may take into account an employee's capacity to manage, delegate, undertake responsibility, and exercise leadership as well as their skills in communication, creativity, decision-making, and interpersonal relations.

An evaluation inspires a worker to put forth more effort with the goal of improving the assessment's results. It explains to a worker whose behaviours or characteristics are regarded as desirable by the company.

The following information on an employee must be collected, examined, and recorded in a methodical manner:

For efficient corporate management.

By the jobholder to aid him in assessing his own performance and developing himself; • By the manager to assist him in enhancing the jobholder's performance and planning his career.

By persuading employees that their career advancement is correlated with the company's performance, the evaluation system serves as a tool for enhancing the workplace culture.

II. Need for the study:

- The purpose of evaluation is to decide which parts of performance need to be examined.
- To determine who is doing their assigned duty well and who is not, as well as the cause of such performance.
- To share data on the performance rankings that are used as the foundation for decisions about wage fixing, conformation, promotion, demotion, and transfer.
- To provide feedback on an employee's behaviour and degree of accomplishments.
- To give the employee advice and information.
- To assess variations between standards and actual performance (positive and negative)
- To establish and keep up a high standard of performance.
- To avoid complaints and disciplinary action.
- To enable equitable and fair pay.
- To make sure the organisation is effective. It ensures accurate information on workers and the nature of their responsibilities.

III. Scope of the study

- The goal of the current study is to learn more about how performance evaluation approaches are actually used in the workplace, as well as related topics such worker awareness and the effectiveness of the performance evaluation system.
- Evaluation-based estimates for human resources are valid. Employees can advance their careers and get ready for more responsibility by upgrading their job abilities.
- The management will be able to identify any shortcomings by conducting a thorough review of the performance evaluation system. Additionally, it assists the business in determining whether or not performance assessment strategies are fully utilised, allowing the researcher to comprehend how the performance evaluation system should be implemented.

IV. Objectives of the study

- The goal is to determine how effectively Hero MotoCorp Ltd.'s PHOENIX MOTORS PVT LTD., Hyderabad, is operating its evaluation system.
- The main goal of most performance evaluation programmes is to examine how each employee sets his own goals for the upcoming period after considering his prior performance.
- To adopt various performance levels on an objective basis and to find executives with room for advancement inside the company.
- To properly assess each employee's strengths and shortcomings and determine how best to help them develop to reach their maximum potential in keeping with the company's objectives and goals.

V. Limitations of the Study

- In this instance, the superior only evaluates the individual on their positive traits. The shortcomings are not taken into account. Such an evaluation won't paint an accurate portrait of the employee. Additionally, employees who don't deserve promotions occasionally do so.
- In this instance, the employee's only flaws are taken into account, and an evaluation is made as a result. Again, this won't be helpful to the company because the employee may not be accurately represented in the appraisal.
- In this instance, the superior provides an evaluation by outlining key values. As a result, some individuals who don't deserve any promotions may also receive them, while a very exceptional person is prevented from receiving the advancements he deserves.
- Some employers are forgiving when it comes to assigning grades, while others are extremely strict. Employee who genuinely deserves advancements may lose the opportunity owing to severe employers while those who may not deserve may obtain benefits due to lenient boss.
- Depending on their prior performance, the employer will either give this employee a positive or negative evaluation. Therefore, even if the employee's performance has improved, he can still not receive the benefit.
- Many supervisors do not want to sour their relationship with their employees. As a result, they can end up awarding higher scores than necessary when they evaluate the employee. This is unfair to the truly worthy workers.
- A overly strict evaluation can occasionally harm the relationship between the senior and junior. Comparing individuals also becomes particularly challenging when various departments within the same organisation utilise various techniques of evaluation.

VI. Review of literature:

(Ashima Aggarwal & Gour Sundar Mitra Thakur-2013) Performance appraisal system is used in the organizations to measure the effectiveness and efficiency of their employees. Performance Appraisal system is needed because every employee has a different attitude to handle the work. Performance Appraisal tends to improve the work performance, communication expectations, determining employee potential and aiding employee counseling. In this paper we present the review of some popular performance appraisal techniques along with their pros and cons. Ranking,

Graphic Rating Scale, Critical Incident, Narrative Essays, Management By Objectives, Assessment Centers, BARS, 360 Degree and 720 Degree are some performance appraisal techniques.

(Sang-Bing TSAI and Kai WANG²,2019)The essence of low-carbon logistics is to make logistics capacity grow moderately to meet the requirements of social and economic developments and the goals of energy conservation and carbon reduction through logistics planning and policies, logistics rationalization and standardization, logistics informationization, low-carbon logistics technologies, etc. This study evaluates the performances of human resources in low-carbon logistics enterprises from three assessment facets: work ability, work performance, and work attitude. It adopts the AHP method to reasonably determine an indicator system of performance evaluation and its weight to avoid certain human-caused bias. According to the results herein, the low-carbon work attitude of the case company in recent years has produced good performance, but its low-carbon work performance and low-carbon work ability are both poor. The case company should practically implement and strengthen these indicators so as to enhance human resource performance in low-carbon logistics enterprises. This study establishes a human resources performance evaluation system for low-carbon logistics enterprises to measure the low-carbon working ability, work performance, and working attitude of their general staff. In this way, enterprises may understand their development status, improve development plans, and formulate the best human resources management and development decisions, thus positively guiding their future development.

(Kevin R. Murphy, 2019)A wide range of systems for evaluating performance have been used in organizations, ranging from traditional annual performance appraisals to performance management systems built around informal, real-time evaluations, and these systems almost always fail. Rather than continuing to make cosmetic adjustments to this system, organizations should consider dropping the practice of regularly evaluating the performance of each of their employees, focusing rather on the small subset of situations in which evaluations of performance and performance feedback are actually useful. Four barriers to successful performance evaluation are reviewed: (a) the distribution of performance, (b) the continuing failure to devise reliable and valid methods for obtaining judgments about performance, (c) the limited utility of performance feedback to employees, and (d) the limited utility of performance evaluations to organisations. In this paper, I propose ways of managing performance without relying on regular performance evaluation, refocusing managers' activities from performance management to performance leadership.

(Wu,2005) mentions performance measurement is a complex problem and it involves various kinds of judgment about which performance measure to use. Indeed, for any kind of evaluation, it is necessary to have a well-defined set of criteria. Evaluation scores depend upon these criteria heavily.

(Sidin et al.2003) have stressed on identification of the relevant and important criteria for any kind of evaluation exercise.

(Roberts 2003) has highlighted the importance of employee participation in the appraisal process. In his article, he has summarized the conceptual foundation of participation including its intrinsic motivational value, the expansion of available information, and the opportunity to interject employee voice. He argues that if employees are confident in the fairness of the appraisal process, they are more likely to accept performance ratings, even adverse ones, if they perceive fair decision making process. In any case, if the employees perceive the process as unfair and not systematic and thorough, it is unlikely that they will accept the outcome of the appraisal exercise.

(Suwignjo et al.,2000) have developed Quantitative Models for Performance Measurement Systems (QMPMS), a model for measuring performance with respect to a factor. The model

utilizes cognitive maps and analytic hierarchy process to identify factors affecting performance and their relationships, quantify the effect of the factors on performance, and express them quantitatively. However, the model has the limitation to be used as an evaluation tool.

(**Meyer 1995**) describes the employee evaluation procedure adopted by a nursing home. The criteria considered are: employee's job attitude, communication skills, and clinical skills. The evaluators used the scoring key for each criterion: Excellent = 4, Good = 3, Fair = 2, and Poor = 1. However, the author did not elaborate on how the ratings on various criteria were synthesized and converted into a percentage score.

(**Vallance, 1999**) describes the performance appraisal methods used in Singapore, Thailand and Philippines (in the context of appraising civil servants) and examines the role of organizational culture on the appraisal process in those countries. Singapore adopts the Potential Appraisal System (PAS) developed originally by Shell Petroleum Company in 1960s. In its present form, it has the following criteria: 'helicopter quality' (meaning that an individual's ability to examine the problems or issues taking all important factors into account), 'intellectual qualities' (power of analysis, imagination and sense of reality), 'results orientation', 'leadership quality' (capacity to motivate, delegate and communicate). In the Thai context, the criteria used are: output of work in terms of quality, quantity and application of work outputs; the ability to manage and perform the work in terms of planning and implementation; the ability to direct and make decisions including meeting deadlines, taking control, coordinating efforts with other organizations, solving problems and resolving conflicts and helping to accomplish the goals of the organization; ability to improve work and services, demonstrating new ideas and solutions, identifying and addressing problems and performing work efficiently and effectively. In the Philippines setting, the criteria consists of six areas: management of work, management of people, management of resources, management of linkages, management of constraints and innovativeness.

VII. Research methodology

Without the research technique, the researcher might not be able to get the facts and statistics from the workers. The research methodology is a methodical approach to solving the problem.

SOURCE OF DATA: The study is based on primary as well as secondary data collected from different sources:

A). Primary Data: Using surveys with a total of 20 questions each, the primary data is gathered. The choice of questionnaires was made due to their reliability and simplicity. The questions can be expected to have straightforward responses. The significance of the study is explained to the respondents, who are then asked for their honest comments.

B). Secondary Data: Secondary data is collected through the documents provided by the personnel department. The documents include personnel manuals, books, reports, journal, etc.

SAMPLING PROCESS:

A). Sample Unit: The executives and employees at **PHOENIX MOTORS PVT LTD.**, Hyderabad constitute 'universe' of the present study. A part of it is taken as sample unit for the present study. It includes JGMS, AGMS, manager and other employees of **PHOENIX MOTORS PVT LTD** Hyderabad.

B). Sample Size: The sample size consists of 100 respondents employed in **PHOENIX MOTORS PVT LTD**, Hyderabad. Of these 30 are executives, 20 are senior executives and the remaining 50 are employees.

PERIOD OF THE STUDY: Since so many years **PHOENIX MOTORS PVT LTD** Hyderabad has been following the same procedure of evaluation for their executives and employees and for the study of my project last on-year data has collected on performance

evaluations.

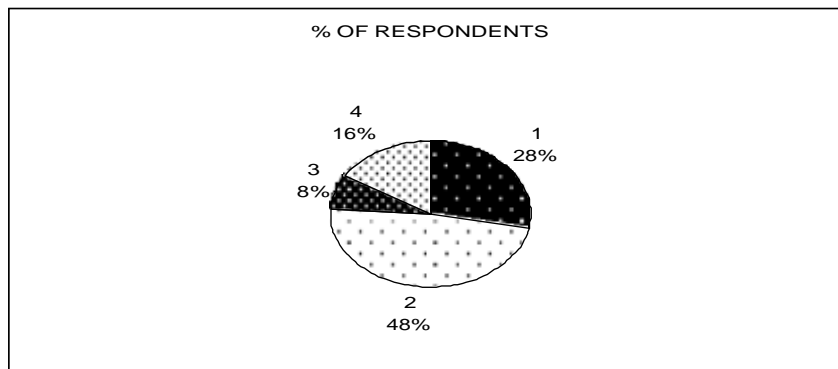
VIII. Empirical Results

Data analysis was completed by presenting the data in a straightforward tabular format and computing percentages. Where applicable, charts have been drawn to represent the quantitative data

Ratings from performance evaluations are employed to

- (a) Identify areas for improvement (b) Determine the level of quality for a given unit of work
(c) Setting performance goals (d) All of the above

s.no	Options	No. of Responses	Percentage
1	Identify areas of improvement	28	28
2	Identify areas of training & development	48	48
3	Set performance target	8	8
4	All the above	16	16
	Total	100	100



Interpretation

Regarding the usefulness of the performance evaluation system, 28 percent of respondents said it helped them identify areas for improvement, 48 percent said it helped them identify training and development needs, 8 percent said it helped them set performance goals, and 16 percent said it was helpful in all of the aforementioned ways. As a result, we can conclude that P.A. benefits employees in some way.

IX. Findings, Suggestions and Conclusion

Findings

- It is made known that the executive receives performance feedback so they can assess their own performance. Sort out the issues so you can go through the challenges.
- The management is keen to address worker issues as they arise and has a clear grasp of the issue that the workers are the best at resolving.
- Workers were receiving the necessary training from management in their weak areas.

- The percentage of employees who were aware that the evaluation was one of the criteria for promotion was 100%.
- Performance assessment systems are seen as a way to create performance goals for the future, highlight areas that need improvement, and identify training and development needs.
- The management wants friendly relations with the workforce so that they can have discussions together.
- The performance evaluation system is now in place and has been correctly developed. This was evident from the majority of employees' opinions..

Suggestions

Following are some potential comments and recommendations based on the study's findings and direct conversations with various executives and workers at PHOENIX MOTORS PVT LTD., Hyderabad:

- It is recommended that staff be informed right away.
- The evaluation's findings, especially when they are unfavourable.
- It is advised that the manager make an effort to assess an employee's strengths and limitations and offer advice on how to improve the flaws.
- Appropriately addressing the employees' strengths and limitations and assisting in their development to reach their full potential in line with the company's objectives are encouraged.
- The top management is steadfastly committed to using the current performance evaluation system. The performance evaluation system is regarded as a crucial tool for closing the communication gap between executives and top management; as a result, it aids in the growth of amicable relationships and mutual understanding.
- It is advised that the employee receive feedback on his performance, confirm his acceptance of it, and, if necessary, develop a plan for future improvement.
- It is advised that the rater be extremely knowledgeable about the concept and rating system. The definition, analysis, and discussion of factor sales must be in-depth.
- In order to reinforce the system, it is crucial to immunise against issues or obstacles.

Conclusion

- The rating instruments are generated from job analysis, which should aim for simplicity rather than complexity.
- Managers and all staff are given training on how to use the systems.
- The appraisal is based on truthful job descriptions, and the scores themselves are determined by demonstrable performance.
- Evaluations are carried out in accordance with standards and are risk-free.
- The rate is informed of the preliminary findings.
- There are mechanisms in place to prevent a single manager from having complete control over a worker's career, such as an appeals process.
- Services for corrective assistance and performance counselling are available.

Even though many systems might not perform well in comparison to these benchmarks, keep in mind that system architecture is not the main source of the assessment issue. The difficulty lies in how the strategy and the data it produces are employed, as evaluation is a matter of human judgement. Personnel evaluation will either get more or less complex as we look into the next century.

Downsizing of organisations and changes in the workforce are likely to make evaluations more difficult if the long-standing preference for person-centered evaluations continues. It's likely that the time and space-free virtual office will make things worse.

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**A STUDY ON CONSUMER BEHAVIOUR
TOWARDS
LG - PVT LTD**

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ABSTRACT

Customers make purchases in order to satisfy needs. The wealth of products and services produced in a country make our economy strong. The behaviour of human beings during the purchase may be termed as “buyer behaviour”. In this article there is a view about birth of buying ideas, what is buyer behaviour, how consumer buy, why consumer buy, types, Decision process, Motives, Conclusion.

Consumer is the king and it is the consumer determines what a business is; therefore a sound marketing program start with a careful analysis of the habits, attitudes, motives and needs of consumers. In particular a marketer should find answer to the following questions:

Mr. A owns scooter. The scooter is causing dissatisfaction because of some defects or troubles in it. He decides to replace it with another scooter. He anticipates the idea of a trouble free and dependable scooter. He decides not to buy a scooter of the same make, because of dissatisfaction and lack of confidence. Thus a thought seed about a new scooter is born in him, the moment he thinks, “I must replace the scooter “the buying ideas come up. With the thought in his mind, he thinks of the benefits. And this leads to further

thinking: what sort of a scooter will give the benefits, he wants. The benefits make the desire. He may buy any one of many makes of scooter, which can give the desired benefits. He makes enquiries and observe through talking to his friends. He reads advertisement about the new scooters. He chooses one with all the possible advantages and which is wholly dependable. Mr. A is a prospective customer to a dealer.

Customers make purchases in order to satisfy needs. Some of these needs are basic and must be filled by everyone on the planet (e.g., food, shelter) while others are not required for basic survival and vary depending on the person. It probably makes more sense to classify needs that are not a necessity as wants or desires. In fact, in many countries where the standard of living is very high, a large portion of the population’s income is spent on wants and desires rather than on basic needs.

KEY WORDS:

Consumer Satisfaction, Consumer Behaviour, Customer Satisfaction.

INTRODUCTION:

Consumer behaviour refers to the mental and emotional process and the observable behaviour of consumers during searching, purchasing and post consumption of a product or service.

Consumer behaviour involves study of how people buy, what they buy, when they buy and why they buy. It blends the elements from psychology, sociology, sociopsychology, anthropology and economics. It also tries to assess the influence on the consumer from groups such as family, friends, reference groups and society in general.

Buyer behaviour has two aspects: the final purchase activity visible to any observer and the detailed or short decision process that may involve the interplay of a number of complex variables not visible to anyone.

What influences consumers to purchase products or services? The consumer buying process is a complex matter as many internal and external factors have an impact on the buying decisions of the consumer.

When purchasing a product there several processes, which consumers go through?

REVIEW OF LITERATURE:

N.Bharathi and V.Bharathi (2019) “A Study on Consumer Behaviour towards TV Brands Special Reference to LG Television” This paper is an attempt to study the consumer behaviour towards various television brands. The level of satisfaction of consumers varies with each brand of the products. Everyone is unique in his/her tastes and preferences. They all cannot be extraordinarily satisfied every second and all the time but they can be managed with best quality.

Type of buying behaviour are classified namely quality conscious, economic conscious and bargain conscious. Tamilselvi And Gomathipriya (2019) “A Study On Customer Satisfaction Towards LG Televisions With Special Reference To Secundrabad”. The standard of livingalsoboostsTV manufacturing these days thatfacing challenges in technological development and every day invention with new features is coming in the market and making the old tools and feature unqualified. When LED television industrialists are given a quality product at realistic price, the mass sales will be upraised significantly.

The manufactures should be fulfilled the updated knowledge as well as the eco-friendly concept.

Dr.Mallikarjuna Reddy conducted a study “Marketing strategy:Linkages with consumer behaviours” .It reveals the consumer behaviour models and their relevance to consumer electronic industry linkages of buying behaviour with marketing strategies of consumer electronics firms and concluded that studying the consumer behaviour that provides a sound basis for identifying and understanding consumer needs

NEED FOR THESTUDY

Customers consider various factors for purchasing Products in LG Electronics. The factors they consider are based on certain demographic variables such as income, age, occupation etc. It also depends on attributes and life Performance of the customer buying behaviour becomes essential to get a competitive edge.

OBJECTIVE OF THE STUDY

MAIN OBJECTIVE: The main objective of the study is to study the buying motives of the customers regarding Products in LG Electronics.

SPECIFIC OBJECTIVES:

1. To find the age group, educational background, occupation / profession and income and income level of the respondents.
2. To know whether the customer is interested to buy the Products in LG Electronics or not.
3. To find respondents reason for purchasing the Electronics Products.
4. To know the importance reason the respondents give to each factor for Purchasing Products in LG Electronics.
5. To know the customer service satisfaction from the respondents.
6. To know the awareness of the brand LG Electronics.

RESEARCH METHODOLOGY;

PRIMARY METHOD:

Primary data are those, which are collected fresh and for the first time and this happen to be original in character. In this study primary data was collected by interview schedule method.

SECONDARY METHOD:

Secondary data are those, which are collected from existing data. Secondary data for this study include appropriate material from newspaper, Magazines, Broachers, Company Reports, Standard Text Books, and information from Internet has also been acquired wherever necessary.

DATA COLLECTION INSTRUMENTS:

The instrument used for this study is an interview schedule. Questions related to objectives of the study from the major portion of the interview schedule. It mainly consists of multiple-choice questions so that the respondents can mark one or more of the several choice of answers. Secondary data has been gathered from many published sources such as Newspapers, Journals, Magazines, Company Reports, standard textbooks and information from Internet has also been acquired wherever necessary.

FIELD WORK:

The project involved a fieldwork of around 1 month 15 days where in the survey was carried out of around

The survey was conducted in different of Hyderabad and secunderabad such as Koti, Bowenpally, Ameerpet, L.B Nagar, Picket.

METHODOLOGICAL ASSUMPTIONS:

- a) The primary data has been collected by an interview schedule.
- b) The sample for the study was selected on a convenience basis
- c) All primary data collected is true and reflects the actual actions of the respondents.
- d) The data collected has been coded, tabulated and analysed into logical Statement using simple statistical methods, pie charts, etc.

DESCRIPTION OF THE RESEARCH DESIGN:

A research design is a logical and systematic plan prepared for directing a research study it specifies the methodology and technique to be adopted for achieving the objectives. It constitutes the blueprint for the collection, measurement and analysis of data. The main aim of the study is to evaluate the brand image of LG Electronics. The study is descriptive in

nature. Surveys are best-suited method for descriptive research. So survey method is used for the study. The preparation of a research plan for a study aids in establishing direction to the study and knowing exactly what has to be done and how and when it has to be done at every stage. A research plan describes the boundaries of research activities and enables the research to channel his energies in the right work. With clear research objectives, in view the research can proceed systematically towards his achievements.

SAMPLING PROCEDURES:

Sampling is a systematic approach for selecting a few elements from an entire collection of units (population) in order to make some inference about the total population it is a small specimen or a segment of the whole population representing its general qualities as far as possible. The study was undertaken by convenience sampling.

CONVENIENCE SAMPLE:

Convenience sampling is a non-profitability sampling. It means selecting sample units in just hit and miss fashion

i.e., interviewing people whom you happen to meet.

SAMPLE SIZE:

The study is conducted on a sample of 100 respondents.

SAMPLING FRAME:

The population for the study consists of LG Electronics shore room owners in the cities of Hyderabad and Secunderabad.

RESEARCH INSTRUMENTS:

An interview schedule was used to conduct the study.

LIMITATIONS

1. The Time Period Of Project Is 45 Days.
2. Though The Customers Wanted to Give Information They could not give as It Wastes Their Business Time.
3. The Accuracy Of The Answers Depends Upon The Mode Of Interest Of Respondents.
4. Though the customers wanted to give information they could not, as they felt it takes away their business time.

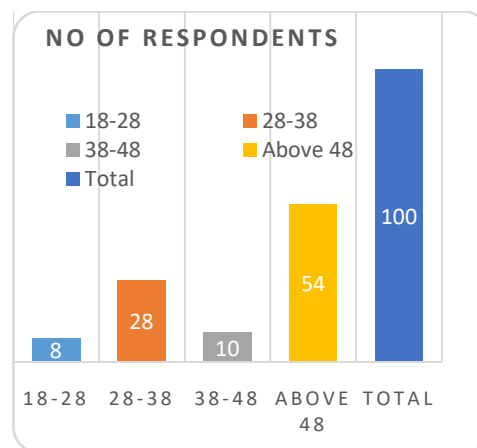
5. The accuracy of the answers depends upon the mode of interest of respondents.
6. The opinions of the sample may or may not depict the exact opinions of the total population.

DATA ANALYSIS

AGE GROUP OF THE RESPONDENTS:

The below table shows the age group of the respondents surveyed:

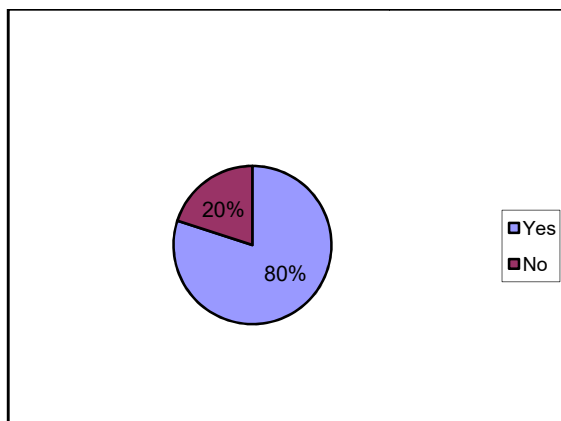
AGE	No Of Respondents
18-28	8
28-38	28
38-48	10
Above 48	54
Total	100



INFERENCE: From the above table, 8% of the respondents belong to the age group of 18-28 years, 28% of the respondents belong to the age group of 28-38 years, 10% of the respondents belong to the age group of 38-48 years, and 54% of the respondents belong to the age group of above 48 years.

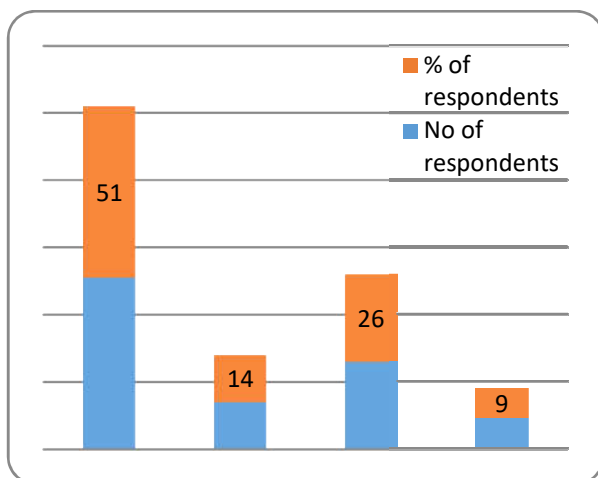
The below table shows that whether the respondents are wanting to purchase

Wanting to Purchase	No. of respondents
Yes	80
No	20
Total	100



INFERENCE:

From the above table 80% of people wanting to buy and 20% do not want to buy the products of LG Electronics.



INFERENCE:

From the above table 51% of the respondents are wanting LG Electronics Products. 14% of the respondents want Cosmetics. 26% of the respondents want Dress. 9% of the respondents want others.

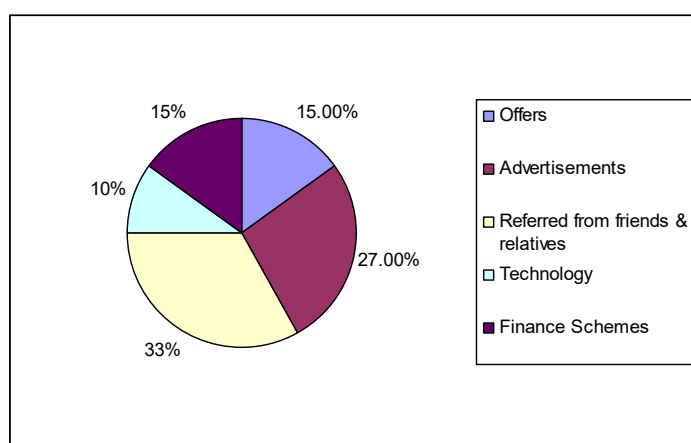
The below table shows the type of Goods that the respondent is wanting.

Type of Goods	Number of respondents	Percentage of respondents
Electronics	51	51
Cosmetics	14	14
Dresses	26	26
Others	09	9

SOURCES OF INFORMATION

The below table shows, from where did the respondent get the information about the LG Electronics.

Sources of information	Number of respondents
Offers	15
Advertisements	27
Referred from friends & relatives	33
Technology	10
Finance Schemes	15
Total	100



INFERENCE:

From the above table 15% of people known from offers, 27% of people known from advertisements, and 33% of people known from their friends and relatives, 10% of people known from technology, 15% of people known from finance schemes.

RELIABILITY as their main motive, 21% of the respondents preferred BRAND IMAGE as their main motive.

FINDINGS

- 50% of the LG ELECTRONICS customers are business people and 32% of the customers are private employees.
- Most of the respondents belong to the age group of 18-50 years.
- LG ELECTRONICS is the most preferred shop in the market.
- Most of the respondents getting information through the Media and friends before purchasing the products.
- Most of the respondents are motivated by their friends and family members.
- Most of the respondents have good satisfaction with the performance of their strength.
- 64% of the respondents are satisfied with the quality of their products.
- Most of the respondents felt that the price is reasonable.
- Cent percent of the respondents satisfied with the response of the sales executive at first visit.
- 60% of the LG ELECTRONICS users have good satisfaction with the performance given by the company.
- Most of the respondents are satisfied with the response of the company to the complaints given by the customers.
- Most of the respondents are satisfied with the fulfilment of promises by the company.

SUGGESTIONS

- The products recently introduced by LG ELECTRONICS are mostly concerned about home base. So, they should also consider commercial people while manufacturing.
- Indian market is a price sensitive market's the Products should be at Minimum price with maximum quality.
- The standard of pricing should be improved.
- Advertisements in Televisions, offers should be increased to attract the People.
- If LG ELECTRONICS can improve in Performance and brand image it will be the best in all the other competition brands.

CONCLUSIONS

- 40% of the respondents are LG Electronics customers and hence Preferred products of various brands
- LG ELECTRONICS is the most preferred brand out of all products
- 60% of the respondents are considering LG ELECTRONICS brand before
Purchasing there for use.
- Most of the respondents are getting information through friends before purchasing the products.
- Most of the respondents are wanting good satisfaction with dealer Service comparing to other brands.
- Most of the respondents are giving more preference to quality.
- 60% of the respondents are affecting by their friends and relatives.

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ANALYSIS ON NON – PERFORMING ASSETS OF BANK OF INDIA

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ABSTRACT

To know the level of non-performing assets (NPAs) best indicates the soundness of the banking firm or sector of a country. In order to understand the financial strength of any banking company analysing the Non-performing assets over its life is critical. Thus, the objective of this study is an effort to look into the contribution of the different banks individually to the NPA in the industry by looking into its growth pattern during the period 2018-2022. Growing non-performing assets is a recurrent problem in the Indian banking sector. Over the past twenty years, there have been two such episodes when the banking sector was critically impaired by balance sheet problems. In this NPA we do a comparative analysis of the two banking crisis episodes-the one in the late 1990s and one that started within the aftermath of the 2008 national Financial Crisis and is yet to be resolved. We explain the macroeconomic and banking environment preceding the episodes, the degree and nature of the crises and also discuss the policy responses that are undertaken. We finalise drawing policy lessons from the discussion and advice some precautions that can be adapted to better deal with a forth coming balance sheet related crisis in the banking sector such that the effect on the real economy is minimised.

Keywords: Non-performing assets, loan payment, Balance Sheet, Banking Industry.

I. INTRODUCTION

For any country, saving money framework assumes an imperative part in the development of its sound economy. Saving money is an essential portion of the tertiary segment and goes about as a spine of financial advance. Banks should be more specific in finding the execution of the economy. Banks go about as an advancement organization and are the wellspring of expectation and desires of the majority. Business banks are the major player to build up the economy. A not worthy danger to saving money segment is commonness of Non-Performing Assets (NPAs). NPAs mirror the execution of banks. An abnormal state of NPAs recommends high likelihood of an extensive number of credit defaults that influence the productivity and total assets of banks and further more dissolves the estimation of the advantage. The NPA includes the necessity of arrangements, which decreases the general benefits and shareholder's esteem. In current situation NPAs are at the centre of money related issue of the banks. Solid endeavours must be made to enhance convalescence execution. The principle reasons of expanding NPAs are the objective situated approach, which decays the subjective part of loaning by banks and headstrong defaults, ineffectual supervision of credit accounts, absence of specialized and administrative mastery with respect to borrowers.

A nonperforming asset (NPA) refers to route for a classification instead of loans by the side of the books of pecuniary institutions to rage evasion otherwise is arrived amount overdue next to scheduled payments of principal or else interest. Featuring in a good number cases, debt is classified to non-performing at what time advance payments take place is not been through designed for interval of 90 days. Although failures to pay in the meantime of clock designed for debt towards are categorized at the same time as nonperforming, the quantity of gone era may perhaps transpire shorter or else longer depending on the guidelines and terms set by the bank.

CLASSIFICATION OF NPA'S:

- 1.) **STANDARD ASSET:** The assets which spawn ordinary pay packet are called standard assets.
- 2.) **SUB-STANDARD ASSET:** The asset which is overdue on behalf of a time of added than 90 existences other than with a reduction of than 12 months
- 3.) **SUSPECT (DOUBTFULL) ASSET:** The asset which is overdue designed for an interlude of new than 12 months.

- 4.) **DEBIT (LOSS) ASSETS:** The assets which are fishy afterward are measured while non-recoverable not later than banks

KINDS OF NPA

- a. **Gross NPA:** Gross NPAs are the entirety of all credit resources that are delegated NPAs according to RBI Guidelines as on Balance Sheet date. NPA mirrors the nature of the advances made by banks. It comprises of all the nonstandard resources like - sub-standard, suspicious, and misfortune resources. It can be figured with the assistance of following proportion:

$$\text{Gross NPAs Ratio} = \text{Gross NPAs} / \text{Gross Advances}$$

- b. **Net NPA:** Net NPAs are those sorts of NPAs in which the bank has deducted the arrangement with respect to NPAs. Net NPA demonstrates the genuine weight of banks. Since in India, bank accounting reports contain a gigantic measure of NPAs and the procedure of recuperation and discount of advances is extremely tedious, the banks need to make certain arrangements against the NPAs as indicated by the national bank rules. It can be ascertained by following:

$$\text{Net NPAs} = \text{Gross NPAs} - \text{Provisions} / \text{Gross Advances} - \text{Provisions}.$$

II. REVIEW OF LITERATURE

Kumar (2003) in his paper titled, "The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002", revealed in detail the need, process, summary, positive as well as negative aspects of the Act. Pradhan Tanmaya Kumar (2013) observed that "gross advances and NPA of old private sector banks and foreign banks are rising so RBI initiated several measures like self-appraisal of different risk management system by banks for introduction of BASEL II."

Selvaraj an B. and Vadivalagan, G. (2012) Over the few years Indian banking, attempts to integrate with the global banking has been facing lots of hurdles in its way due to certain inherent weakness, despite its high-sounding claims and lofty achievements. In a developing country, banking is seen as an important instrument of development, while with the demanding Non-Performing Assets (NPAs), banks have become burden on the economy. Non-Performing Assets are not simply non gainful, but rather they add cost to the credit Management. The dread of Non-Performing Assets saturates the brain science of bank administrators in engaging new activities for credit development. Non-Performing Assets isn't an issue confronting only the brokers; it is in actuality an all-unavoidable national scourge influencing the whole Indian economy. Non-Performing Asset is a sore throat of the Indian economy all in all. Non-Performing Assets have influenced the gainfulness, liquidity and focused working of banks and formative of monetary establishments lastly the brain research of the investors in regard of their mien towards credit conveyance and credit development. NPAs don't create any pay for the banks, however in the meantime banks are required to make arrangements for such NPAs from their present benefits. Aside from inner and outer complexities, increments in NPAs specifically influences banks' productivity now and then even their reality

Lakshmanan, C and Dharmendra, A (2007)

Examined the effect of Non-Performing Assets (NPAs) on performance factors in Chennai Central Co-agent Bank. They analysed execution factors to be specific, net profit, investment, legitimate costs and spread. They watched that the aftereffects of NPAs on all the above execution factors were negative and irrelevant at 5 percent level in all the condition. They reasoned that the compelling administration of NPAs is essential to reinforce the money related position of the bank.

Mandira Sarma and Rajiv Kumar (2008)

Carried out essential examinations on the provincial here and now co-operative credit structure. They watched that the Non-Performing Assets (NPAs) level in the Rural Short-term Co-agent Credit Structure (RSTCCS) was high contrasted with that in the business keeping money framework in India. They reasoned that in spite of huge advancement in India's money related segment in the course of the most recent decade, countless, especially large and peripheral groups remained "fiscally prohibited" even today.

III. Need for the Study:

- Bank's profitability relies heavily on the banks' ability to get back its funds lent at appropriate time.
- The recent turn of Bankruptcy pills filled so far it is quint essential to study and analyse the Status of non-performing assets of various public and private banks at a greater length.
- Perhaps, bank of India is one of the fastest going banks of the country and studying NPAs status of this bank is of at most importance owing to the growth rate of Indian banking industry.

IV. Scope of the study

- The study is conducted for the financial years from 2018-2022.
- The focus of study is to analyse the Non-Performing assets of Bank of India during the study period.
- The profitability impact of Non-performing assets(NPAs) is analysed using various statistical tools.
- Gross and Net non-performing assets ratio is computed to draw meaningful conclusions on the data.
- Secondary data sources are used to collect the relevant data for the study.

V. Objectives of the study

1. To understand the current scenario of NPA'S in the banking sector.
2. To know about the impact of NPA'S on banks performance in the form of profits
3. To know the recovery of NPAS through different channels.
4. To make appropriate suggestions to avoid future NPAs and to manage existing NPAs in Banks.

VI. Research methodology

The research is primarily both exploratory as well as descriptive in nature. The sources of information is only secondary in nature.

a. Hypothesis Of the Study:

H_0 : There is no relationship between the non-performing assets of bank and the banks overall performance.

H_1 : There is a relationship between the non-performing assets of bank and the banks overall performance.

b. Sources of Data:

Secondary data: This is the information gathered from sources like-Internet, Books, Journals, Newspaper, Annual report, Database accessible in the library, Catalogues and introductions.

c. Data Analysis Tools: As no study is complete without the use of tools and techniques. For the better presentation and right explanation, I used tools of statistics and computer very frequently

- Gross Non-performing asset Ratio
- Net Non-Performing asset Ratio.

VII. Limitations of the study

The important limitations are as follows;

- The study is focused on the non-performing assets of BANK OF INDIA only.
- The basis for finding non-performing assets is taken from the Reserve Bank of India Publications.
- NPAs are varied with the time. The study is done in the present environment without foreseeing future changes.

- The study is limited only for a particular period and the result may change from time to time based on the changes in the banks functioning.

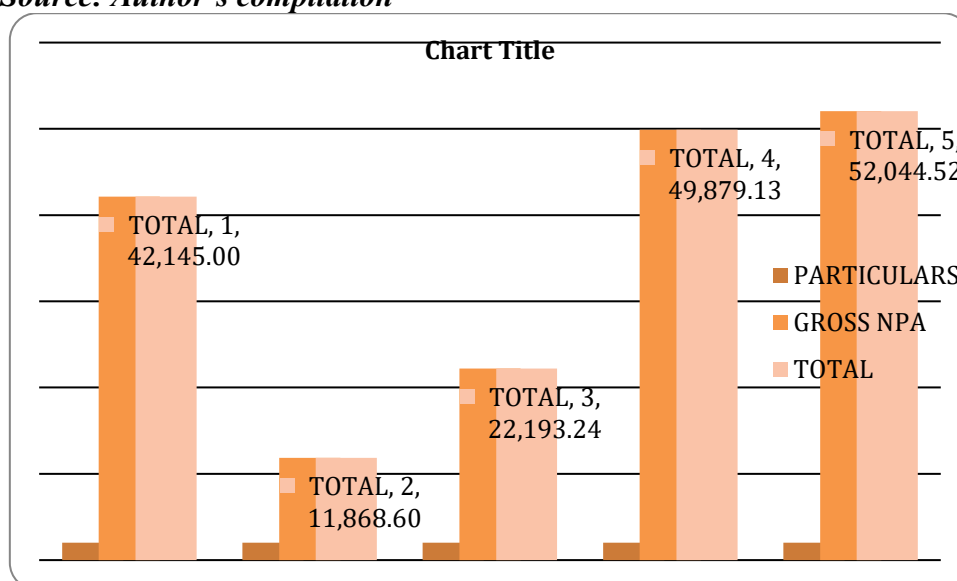
VIII. Empirical Results

The section is dedicated to present the analysis reports of Bank of India's Gross Non-performing assets for the duration 2018-2022. The results include, Net and Gross non-performing assets ratios are calculated using relevant formulae. A representative table of analysis is presented below,

PARTICULARS	2018	2019	2020	2021	2022
GROSS NPA	42,145.00	11,868.60	22,193.24	49,879.13	52,044.52
TOTAL	42,145.00	11,868.60	22,193.24	49,879.13	52,044.52

Table:1.1 Tabular representation of gross non-performing assets

Source: Author's compilation



Graph No :1.1.a Graphical representation of gross non-performing assets

Source: Author's compilation

The gross non-performing asset has decreased on 2019 (11868.60) and after that it is continuously increasing and the highest non-performing asset was in the year 2022 (52044.52). The gross non-performing ratio was least in 2019 that is 3.20% and highest in the year 2018 14.56%, in the year 2022 gross non-performing ratio is 14.20%. In the year 2018 net NPA are least that is 5947.31 and highest in the 2021 27996.40

Testing of Hypothesis: NPA'S effect on the Profitability of the company.

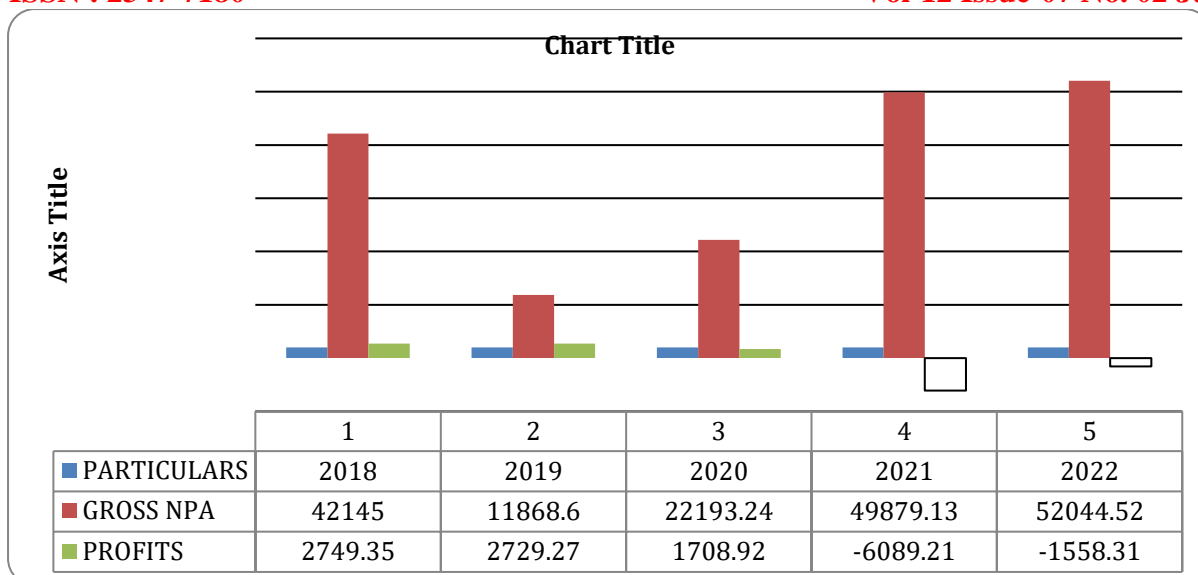
H₀: There is no relationship between the non-performing assets of bank and the banks overall performance.

H₁: There is a relationship between the non-performing assets of bank and the banks overall performance.

PARTICULARS	2018	2019	2020	2021	2022
GROSS NPA	42145.00	11868.60	22193.24	49879.13	52044.52
PROFITS	2749.35	2729.27	1708.92	-6089.21	-1558.31

Table No:1.2 Tabular representation of NPAs from 2018-2022

Source: Author's Compilation



Graph No:1.2.a Graphical representation of NPAs from 2018-2022

Source: Author's Compilation

As the NPA's are increasing the total profits of the bank are decreasing where in the year 2020 the bank has to undergo losses. Hence it is proved that NPA's effect the profitability of the bank. H_1 is accepted, there is a relation between non-performing assets and profits of the bank.

IX. Findings, Suggestions & Conclusion

Findings:

1. The gross npa as well as the net NPA is increasing year by year in terms of money where a continuous growth in the study which was conducted based on the last five years of the data from 2018 -2022.
2. The gross and net npa ratios are also having a continuous increase in them where in the year 2019 it had a huge decrease in the ratio and again it started increasing from the year 2020 only.
3. The provisions ratio was the highest in the year 2019 which indicates that the bank made a huge number of provisions in that year and a very less losses were faced by the bank.
4. The amount of the advances given has also increased and the defaulters are also increasing.
5. There is a relation between the increasing non-performing assets and the banks overall performance.

Suggestions:

1. Powerful review framework should to be executed.
2. Working staff ought to investigate the level of inventories/receivables routinely.
3. Bank should stress upon credit appraisal
4. Timely checkout should be made on the interest payments and the npa declared accounts
5. There are different measures implemented by government to control the rapidly increasing npa's those measures should be followed by the banks.

Conclusion:

This particular study non-performing assets of bank of India are studied in detail for the last five years (2018-2022) in terms of GROSS NPA and NET NPA both in rupees as well as percentage along with which certain findings are also presented.

NPA's depict the overall performance of the bank. As there is continuous increase in the NPA's from the past few years it has become a big worry for the government and the banks. There has been a drastic increase in the defaulters list of the NPA in last years. The government and RBI has put some measures to recover NPA's and is also trying to put forward better ways to recover NPA and to improve the banks decreasing position to increase the profitability of the bank.

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Design and analysis of Helicopter Rotor Blade

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Abstract:

Rotor blades of helicopters must be stiff and strong enough to maintain structural loads within working limits. The rotating cycles change the aerodynamic and structural stresses created by the blade revolution. In this project, you will discover the structural stresses of the blades as well as the vibration frequencies studied using the Ansys programme, taking into consideration environmental consequences. This material was tested utilising Kevlar 49, carbon-epoxy, and advanced carbon fibre composite materials and found to be a lightweight, high-strength, and long-lasting material. catia v5 software was used to create the design.

Keywords: aerodynamics forces, helicopter blades, ansys, structural analysis, vibration analysis.

1. INTRODUCTION:

Helicopters are available in a range of sizes and shapes, based on their intended use and payload requirements. However, the majority of them have similar portions and sections. The helicopter rotor or rotor frame is one of the most significant components (Fig. 1). Its goal is to build lifting helicopters and payloads, as well as to reduce the drag generated during forwards flight. The rotor frame's primary sections are the pole, centre, and sharp edge. The rod is linked to the gearbox via a hollow in the metal shaft of the tube. The connecting rotor edges are focused on the top pole. Sharp rotor edges are critical components of the rotor structure and are attached to the centre at various angles. There are three types of rotor framework: stiff, semi-rigid, and completely voiced. This sequence is determined by the rotor edges' connection to the centre and their speed in relation to the pole.



Fig. 1: Helicopter rotor system

1.2 TYPES OF ROTOR SYSTEMS:

1.2.1 Rigid:

The flexible rotor frame is sometimes known as a hinged rotor frame since it has no pivot points and the edges are smartly joined in the centre (Fig. 2). Over the boundaries of the adjustable region, there will be mid-pull and fold movement. The totally essential rotor frame is substantially more stiff than this sort of rotor frame.



Fig. 2: Rigid rotor system

1.2.2 Semi-rigid:

Currently, a swaying or fluttering pivot is used to link the two sharp edges in the opposite direction. As a consequence, the sharp edge illuminates in the other direction (Fig. 3). On the pull, there is also a wing pivot for pitching the rotor blade.



Fig 3: Semi-rigid rotor system

1.3 Rotor Blade Design

1.3.1 Airfoil, lift and drag:

The lift / drag ratio of a rotor construction is perhaps the most critical characteristic, which should be greater than predicted.

This ratio is determined by the plan profile, and before we go into some of the alternatives, let's start with the delectable ratio. It's a thick air filler that's roughly the length of the placenta's rated length. The outer chamber is roughly a quarter of the way from the driving edge on large L / D type cutting edges, which have a tiny ratio of around 15%. The standard L/D ratio for helicopter rims is 30:1.

Rotor blade airfoils come in a variety of shapes and sizes (pictured below). Large chunks of them were in balance for a long period. Higher L / D ratios are predicted in the event of uneven fluctuations. These forms of cutting blades arose while producing rational alloys because of their greater internal strength. They have the ability to withstand high internal loads while remaining light in weight.



Symmetrical aerofoil



Asymmetrical aerofoil

1.4 Forces Acting on the Aircraft:

Four soft forces trail the helicopter as it takes off from the ground: thrust, drag, lift, and weight. Flight is essential to understanding how these forces are exerted via violence and flight control. The following is a list of them:

Thrust is the forwards thrust generated by the engine, propeller, or rotor. It either limits or surpasses the resistance's intensity. It usually operates in comparison to the longitudinal centre. However, as will be discussed later, this is not a broad context.

- Rear - Pulling back owing to wing, rotor, centre, and other expanding items obstructing air flow. Relatives and race pushers struggle against the wind.
- Weight - The total weight of an aircraft, a group of aircraft, fuel, and cargo or property. The shop pushes the aircraft into the abyss in the face of this gravitational attraction. Through the aircraft point of gravity (CG) convergence, it rejects and operates vertical lift.
- Lift is a property determined by weight, dynamic action on airfoils working out of the air, and inverse to the trajectory at the convergence point.



Four forces acting on a helicopter in forward flight.

2. Literature review:

China made the most detailed allusions to the vertical plane. BC Since about 400 BC, Chinese teens have been playing with bamboo toys. Swinging the rod linked to the rotor cuts the bamboo copter. When the twist breaks and the toy flies away... "Ace Who Grows Effortlessly" [1] by J. Gordon Leishman has several concepts that are supposed to have existed in Rottercraft in Bapuji'sdopist book in the fourth century AD. Anchored.

Gustav de PontondOncourt [2], a French inventor who displayed miniature, steam-powered models, invented the name "chopper" in 1861. Despite the fact that the new metal is indicated as a hypothetical application of aluminium, the model never develops from the ground up. D'Arto lived long enough to symbolise the vertical plane he envisioned, thanks to his etymological commitments. Inventors have known about the power of steam for a long time.

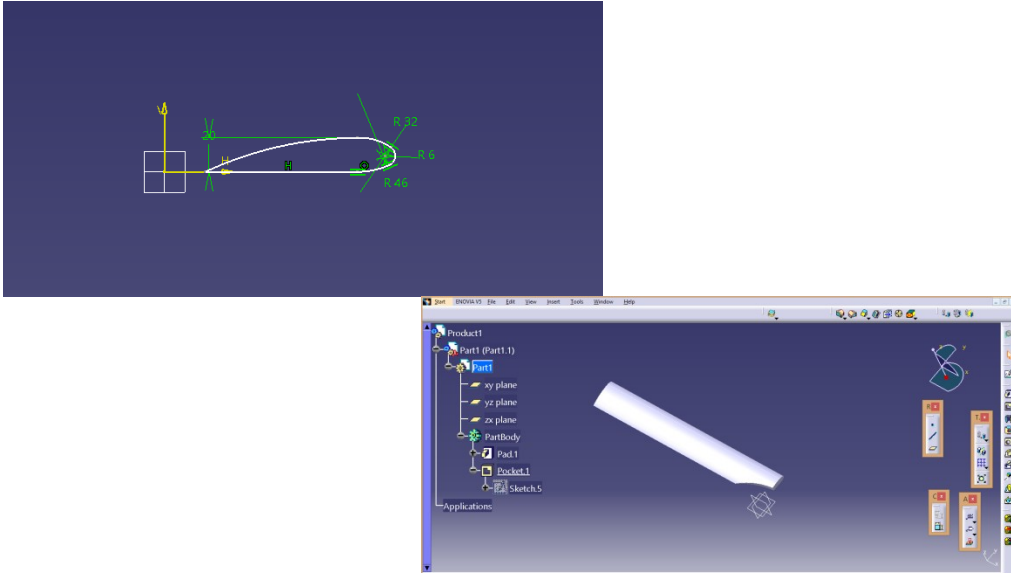
In 1906, two French brothers, Joseph Needham [3], started researching various helicopter routes for the Luftwaffe. These investigations led to the development of Gyroplane No. 1 in 1907. However, the data has certain flaws: between August 14 and September 29, 1907, Gyroplane No. 1 hoisted its pilot 0.6 metres into the air. The No. 1 Autogyro is the most vulnerable and fundamental individual in any aeroplane. As a result, the Zeroplane # 1 aircraft are essentially autonomous aerial helicopters, but not free or cruel planes. Two planar main rotor groups are installed one after the other on the connected rotor, with the rear rotor somewhat higher than the front rotor.

Anderson, John D. [4] At helicopter speeds, a mechanism known as pitch mindset changes and differential mass pitch reduces the dual rotors. The rear rotor builds up the whole pitch, expands the tail, and lowers the entire pitch to make the front rotor nose-sink for additional and quicker pitch. The front rotor widens the nozzle by extending the whole pitch while lowering (or going rearward), and the complete pitch reduces to minimise the total rotor. The rotor features right-rear rotor tilts in front of the clockwise rotation, and front rotor tilts and rear rotor tilts in the left rotation; Ya control is created by opposing cyclic contributions from each rotor.

Alexandre Savin, [5] Coaxial rotors are a pair of revolving rotors that are positioned one on top of the other on a rod with the same pivot point. The lift contradiction is eliminated by the bit coaxial rotor of the wiggle chamber, which balances the elevator offered to the other section where each of the rotor development parts on the forwards flight comes in. Blade regression is slowed. Coaxial rotors, on the other hand, are affected by additional design issues. Because both rotor frames need connection and self-plate, the mechanical unpredictability is increased.

3. DESIGN:

CATIA offers a solution for mould configuration, styling, surface work process, and rendering to construct, configure, and approve complicated, inventive designs from mechanical structure to Class A surface using ICEM surface innovations. CATIA supports all phases of item production, whether they are started from scratch or from 2D blueprints. CATIA can identify and utilise STEP location data by reading and providing them.



4 Ansys:

The approach of establishing characteristic frequencies and mode configurations is known as modular analysis.

The structure oscillates under "fit" discharge conditions.

In one of its resonant frequencies,

The scalar variable of the mode form is vibration state.

The next vibration is a "quiet" vibration for "quiet" input circumstances.

Mode forms are superimposed one on top of the other.

Determines the auxiliary components' vibration properties (normal frequencies and mode states).

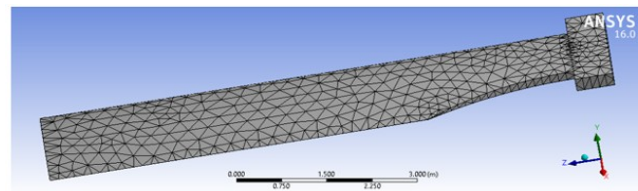
- The study of temporal or symphonic music begins with natural frequencies and mode forms.

Material data:

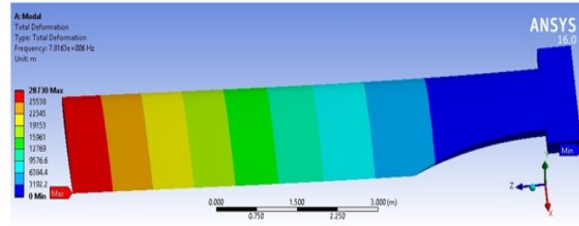
Carbon Fiber Composite Materials:

Density	1.6 kg m ⁻³
Coefficient of Thermal Expansion	2.15 C ⁻¹
Thermal Conductivity	78.8 W m ⁻¹ C ⁻¹
Specific Heat	1.13 J kg ⁻¹ C ⁻¹

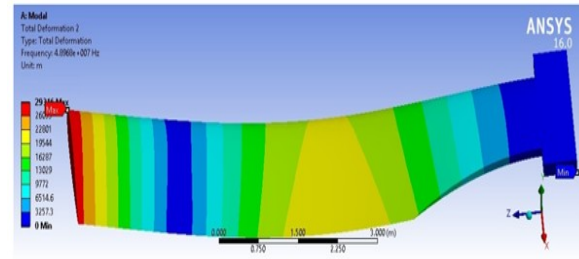
MESH:



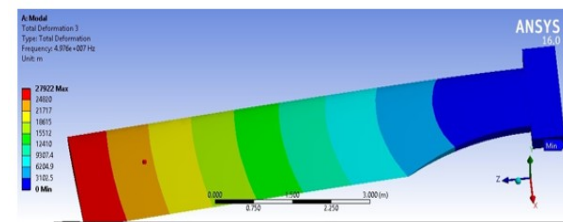
Total Deformation



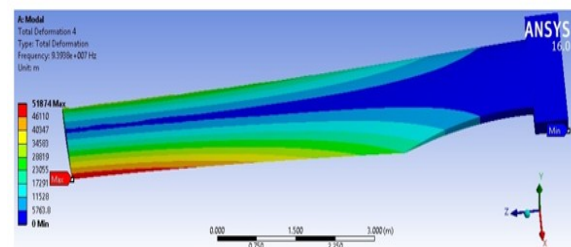
Total Deformation2:



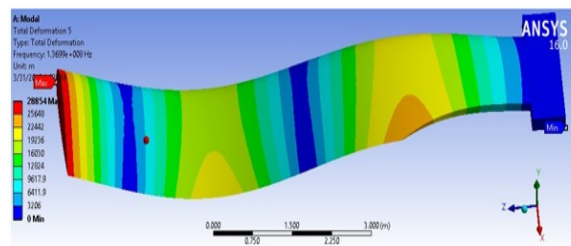
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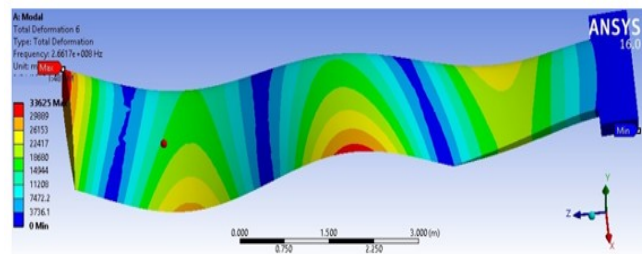
Total Deformation4:



Total Deformation5:



Total Deformation6:

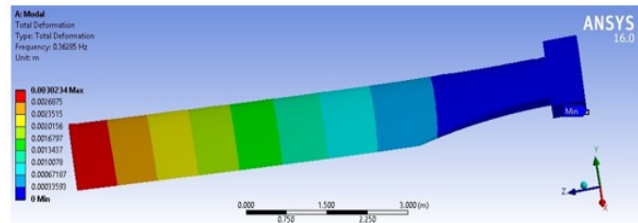


Materials:
kevaler 49:

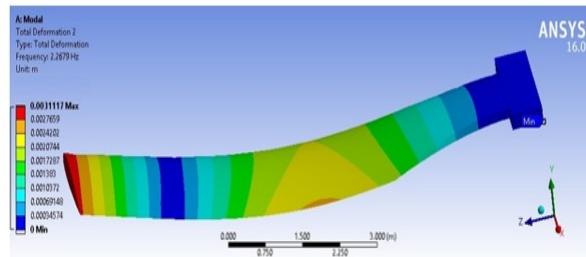
Density	1.45e+005 kg m ⁻³
---------	------------------------------

Young's Modulus Pa	Poisson's Ratio	Bulk Modulus Pa	Shear Modulus Pa
1.35e+011	0.36	1.6071e+011	4.9632e+010

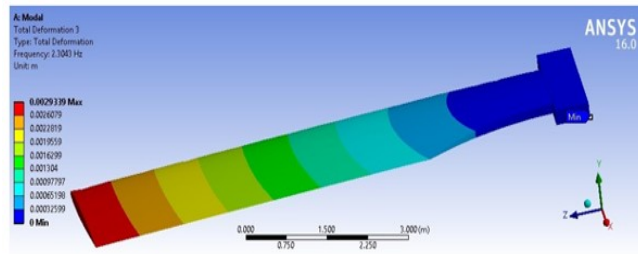
Total Deformation



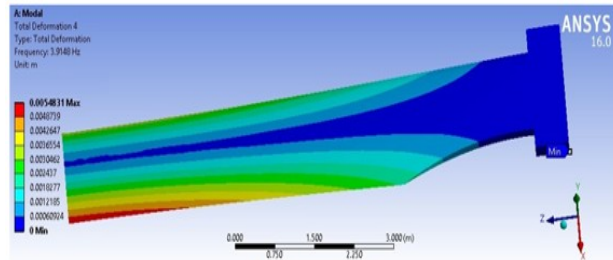
Total Deformation2:



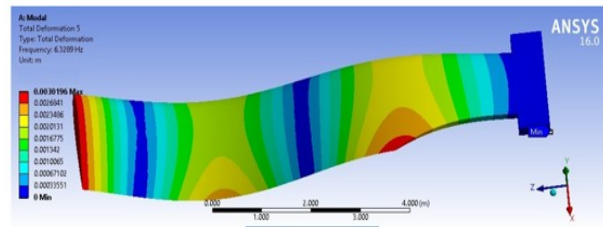
Total Deformation3:



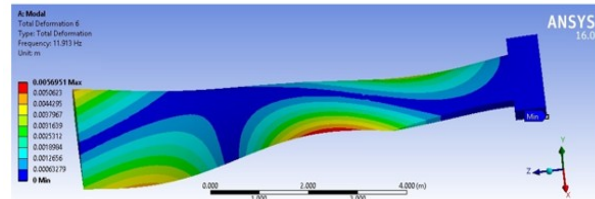
Total Deformation4:



Total Deformation5:



Total Deformation6:



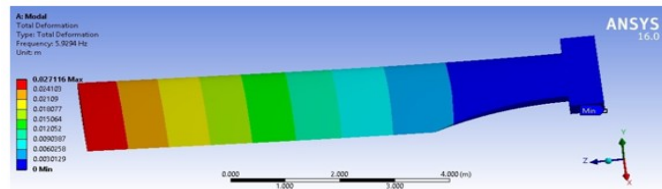
Material Data

0

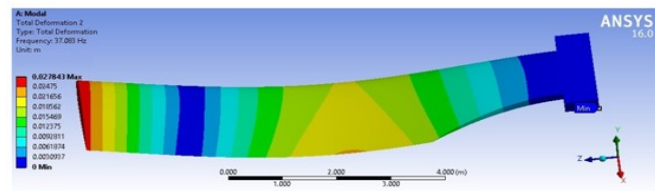
carbon epoxy

Density	1800 kg m ⁻³		
Young's Modulus Pa	Poisson's Ratio	Bulk Modulus Pa	Shear Modulus Pa
4.5e+011	0.3	3.75e+011	1.7308e+011

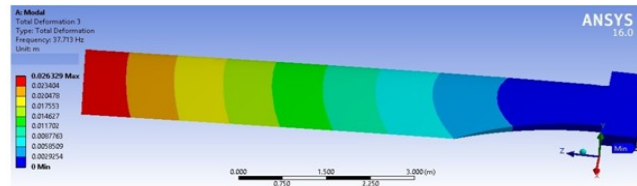
Total Deformation



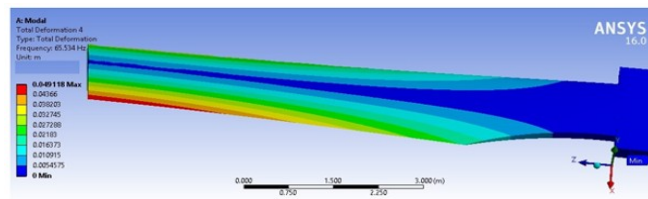
Total Deformation2



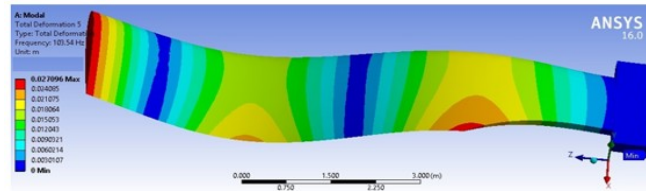
Total Deformation3



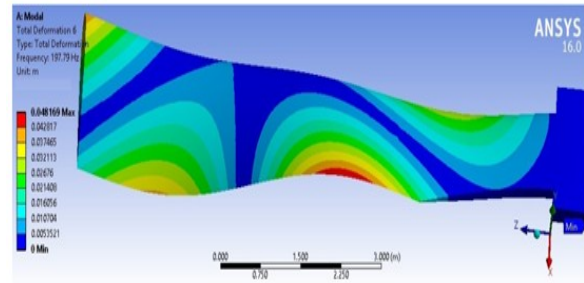
Total Deformation4



Total Deformation5



Total Deformation6



Results:

Object Name	Total Deformation	Total Deformation 2	Total Deformation 3	Total Deformation 4	Total Deformation 5	Total Deformation
State	Solved					
Results						
Minimum	0. m					
Maximum	28730 m	29316 m	27922 m	51874 m	28854 m	33625 m
Information						
Frequency	7.8163e+006 Hz	4.8968e+007 Hz	4.976e+007 Hz	9.3938e+007 Hz	1.3699e+008 Hz	2.6617e+008 Hz

Object Name	Total Deformation	Total Deformation 2	Total Deformation 3	Total Deformation 4	Total Deformation 5	Total Deformation 6
State	Solved					
Results						
Minimum	0. m					
Maximum	3.0234e-003 m	3.1117e-003 m	2.9339e-003 m	5.4831e-003 m	3.0196e-003 m	5.6951e-003 m
Information						
Frequency	0.36285 Hz	2.2679 Hz	2.3043 Hz	3.9148 Hz	6.3289 Hz	11.913 Hz

Object Name	Total Deformation	Total Deformation 2	Total Deformation 3	Total Deformation 4	Total Deformation 5	Total Deformation 6
State	Solved					
Results						
Minimum	0. m					
Maximum	2.7116e-002 m	2.7843e-002 m	2.6329e-002 m	4.9118e-002 m	2.7096e-002 m	4.8169e-002 m
Information						
Frequency	5.9294 Hz	37.083 Hz	37.713 Hz	65.534 Hz	103.54 Hz	197.79 Hz

Conclusion

The rotor blade of a helicopter must be replaced with a sharp three material in this article. With CATIA V5, the building process was evaluated and several key factors were found. Helicopter rotor blades are made of carbon-epoxy, Cavalier 49, carbon fibre composite, multi-level alloys with high modulus and strength. The inherent frequencies of helicopter rotor blades are investigated using a sample analysis. On carbon fibre epoxy power rotor blades, Cavalier 49, carbon fibre composite material, the influence of boundary conditions and the stacking sequence of composite layers is examined. On the blade and blade, we noticed the maximum load the helicopter could endure. When compared to the current materials, the weight of the composite materials was dramatically reduced. The frequency and MRS values of carbon fibre are greater than the other two materials. The largest elastic stress and the least amount of deformation are found in carbon epoxy materials. Cavalor 49 is more effective than carbon epoxy and carbon fibre.

FUTURE SCOPE

Various additional merging resources may be investigated, as well as the helicopter rotor blades for various flocks, i.e. for symmetrical placements. The rotor blades may be evaluated using model analyzers for additional investigation. On the same problem, a regression analysis may be performed. Analysis of a single geometry model Rotor blades have a natural frequency.

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FABRICATION AND WORKING PERFORMANCE ANALYSIS OF DRILL BIT TOOL

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Abstract:

Drilling is cutting technique that involves using drill bit to create or expand circular hole in solid materials. The drill bit is multipoint rotary cutting tool. The bit is pushed against work piece and spun at speeds ranging from hundreds to thousands per minute. As the hole is drilled, the cutting edge is forced against work piece, cutting off chips (swarf).

The purpose of this research is explore influence of process variables such as spindle speed and feed, drill diameter and point angle, and material thickness on thrust force and torque generated during drilling of high HRC material using ansys software. We may utilise three types materials in this thesis: high-speed steel, aluminium silicon carbide, and materials produced with catia v5. As a result, the goal of this study's trepanning tool is to reduce thrust force and torque when drilling HIGH HRC materials. After we've compiled our results, we'll evaluate each material to see which one is the greatest match for drill bit, and then prototype model will be manufactured.

Keywords: silicon carbon; drilling; thrust force; analysis; bearing test.

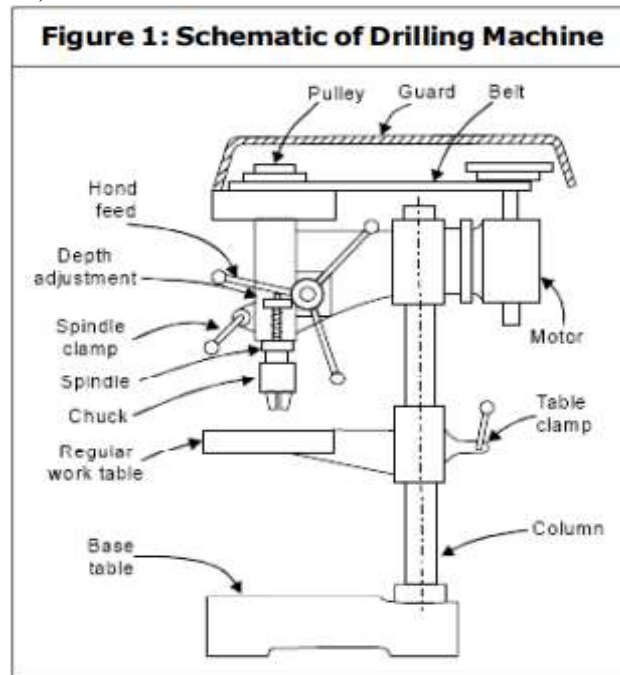
CHAPTER 1

1. INTRODUCTION:

A drill is tool having cutting tool attachment or driving tool attachment, most often drill bit or driver bit, that is used to bore holes in various materials or connect various materials together using fasteners. A chuck at one end drill grips attachment, which is spun while pushed against target material. The cutting tool's tip, and occasionally its edges, do task cutting into target material. Slicing off thin shavings (twist drills or auger bits), grinding off small particles (oil drilling), crushing and removing work piece fragments (SDS masonry drill), countersinking, counterboring, and other processes are examples.

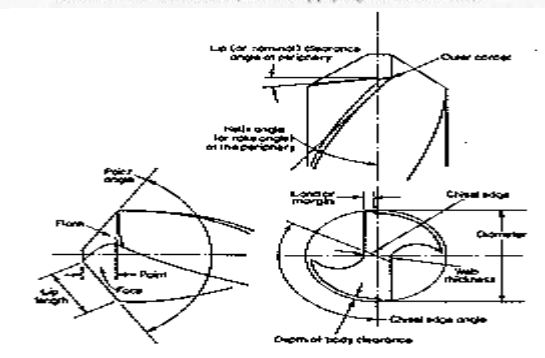
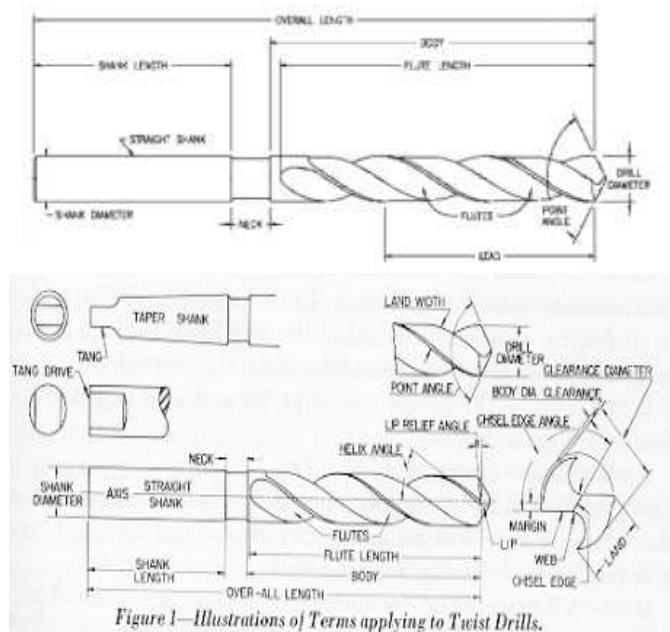
Woodworking, metalworking, building, do-it-yourself tasks all require drills. Drills with unique designs are also utilised in medical, space missions, other fields. Drills come in wide range performance qualities, including power and capacity. There are several different types drills: some are operated by hand, while others are powered by electricity (electric drill) or compressed air (pneumatic drill). Percussive drills (hammer drills) are often employed in hard materials like masonry (brick, concrete, and stone) or rock. Drilling rigs are used to drill holes in ground for purpose of extracting water or oil. Large drilling rigs are used to drill oil wells, water wells, and holes for geothermal heating. Screws and other fasteners are also driven using several types of hand-held drills. Drills can be used to power some tiny equipment that don't have their own engine, such as small pumps and grinders. A Drilling Machine (also known as pedestal drill, pillar drill, or bench drill) is stationary kind drill that can be installed on stand or fastened to the floor or workbench. The steel work pieces are gripped by portable versions with magnetic basis. A Drilling Machine is made up base, column (or pillar), table, spindle (or quill), drill head, all which are powered by an induction motor. The head features three handles extending from a central hub that, when rotated, move spindle and chuck vertically, parallel to column's axis. A Drilling Machine's size is usually expressed in terms swing. Swing is equal to twice throat distance, which is distance

between spindle's centre pillar's nearest edge. For example, 16-inch (410 mm) Drilling Machine has a throat distance of 8 inches (200 mm).



Drill Bit:

1.2 Anatomy of the drill bits:





This operation is carried out in order to create big holes. While the hole is being made, fewer chips are removed and more material is conserved.

Because the tool's vibration in diameter is restricted by thin cutting edge, it may be used at greater speeds. The drill spindle is shaped like hollow tube with cutting blades on one end solid shank on other. This is one most effective ways to make a hole.

2. Literature Review

Existing depleting mechanical assembly diagram, an exhausting establishment for exhausting either tube moulded or level workpieces has been discovered.

Ismail Ucin and Serder Kaplan et al. (2015) Determination of tool wear and chip production in AISI 1045 material drilling using plasma-nitrided high-speed steel drill bits.

Tool wear and chip formation during drilling of AISI 1045 material with plasma-nitrided high-speed steel drill bits were examined experimentally in this work. The studies employed two drill types: uncoated and plasma-nitrided. The plasma nitriding method was first used on commercial drill bits. Following that, various feed rates and cutting speeds were used in the drilling operation. In the trials, sensitive computer numerical control equipment was employed. SEM microscopy was used to assess tool wear, and chips from the drilling operation were examined under microscope. Finally, statistical analysis was used to evaluate the connection between chip cross section and tool wear. The plasma nitriding technique considerably improves the mechanical characteristics of uncoated high-speed steel drill bits, according to the findings. With the enhancement of the mechanical characteristics, there was less tool wear and better chip formation. There is a link between the chip section and wear, according to the findings.

Ismail Ucin and Serder Kaplan et al. (2015) Determination of tool wear and chip production in AISI 1045 material drilling using plasma-nitrided high-speed steel drill bits.

231(10)DOI:10.1177/0954405415608105 Proceedings of the Institution of Mechanical Engineers Part B Journal of Engineering Manufacture

G. Manoj Reddy, D. Pinakapanireddy, K. Jagdeesh, M. Eswarsai, and Y.V.Hanumantha Rao et al (2019) Drill Bit Finite Element Stress Analysis in Ansys

Drilling is slicing process that uses boring instrument to narrow or widen circular move-location gap in solid materials. A revolving cutting instrument, generally multipoint, is used as boring equipment. The bit is pressed against the painting piece rotated at rates ranging from hundreds to thousands cycles per second. As it's far bored, this powers front line against painting piece, eliminating chipping from gap. With the aid Finite Factor Exam, we are analysing dull instrument. The dull device is immediately shown in Catia, and the same is imported into ANSYS for modular and auxiliary testing current Tungsten carbide device and D2 metallic cloth tool. As result examination, it is clear that when specified conditions are satisfied, D2 metallic material is used instead of cloth to make drill. Within the auxiliary study, recurrence generated by D2 steel drill modular exam is very similar to that tungsten carbide, as same strain, full misshapening, and shear pressure are also apparent concentrated.

G. Manoj Reddy, D. Pinakapanireddy, K. Jagadeesh, M. Eswarsai, and Y.V.Hanumantha Rao et al (2019), International Journal of Innovative Technology and Exploring Engineering (IJITEE), Volume-8 Issue-7, ISSN: 2278-3075

Alok Yadav, Shivani1, and Dr. L.P. Singh

Drill Bit Modeling and Analysis with Various Materials and Others (2019) Bit selection is an essential part drilling optimization process. The choice bit is regarded as crucial aspect of drilling. In this study, we used an HSS twist drill bit as model to compare the outcomes of generating more safe and efficient material from beta titanium alloy and alpha titanium alloy. SOLIDWORKS 2018 is used to model drill bit, and ANSYS WORKBENCH 19.2 is used to do the analysis. Both materials have same geometrical form and input process conditions. The titanium alloy, which is widely utilised in biomedical applications, is being compared to the HSS, which may be employed in wide range of applications. In comparison to the alpha titanium alloy, the beta titanium alloy exhibits the highest effective strain with the lowest equivalent stress, according to the analytical results.

Fig 3.4 Draw the drill bit helix profile

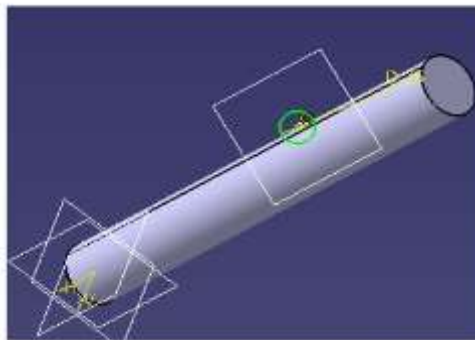


Fig 3.5 Draw the circle to create the drill cutting profile

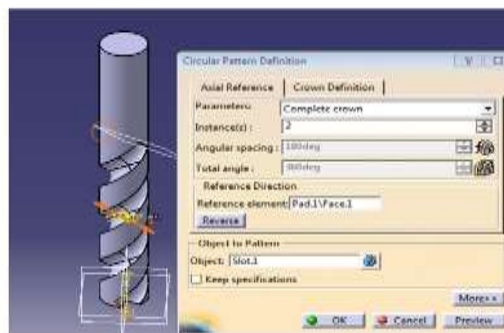


Fig 3.6 giving the circular pattern

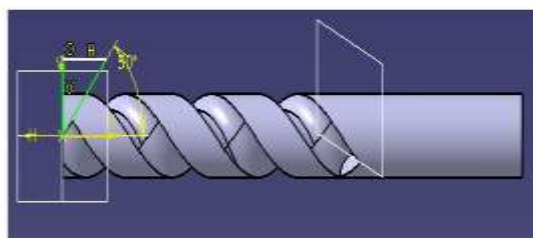


Fig 3.7 draw the edge circle



Fig 3.8 edge fillet draw

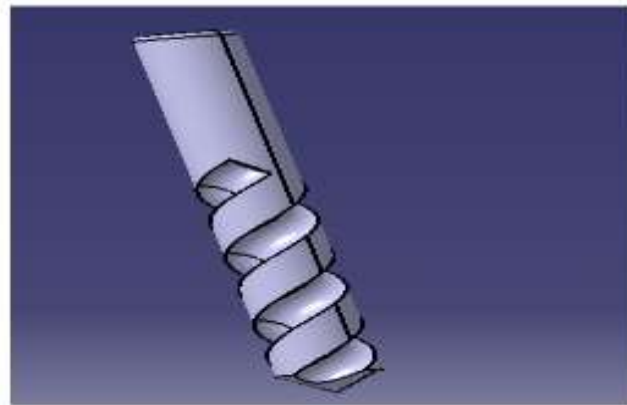


Fig 3.9 Final product of drill bit

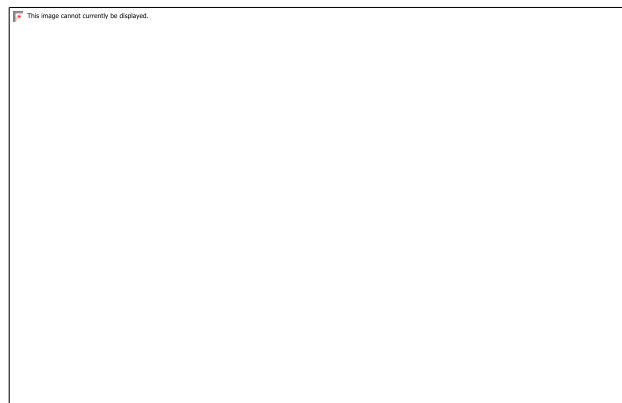
Chapter 4

4) INTRODUCTION TO ANSYS:

ANSYS is commercial finite-element analysis software package that may be used to address a wide range of problems. IRIX, Solaris, and Windows NT are among the operating systems that ANSYS supports. Like any other finite-element programme, ANSYS solves governing differential equations by breaking problem down into small chunks. The governing equations of elasticity, fluid flow, heat transfer, and electromagnetism may be solved using the finite element approach in ANSYS. ANSYS can handle both transient and nonlinear problems. The principles of ANSYS will be covered in this article, with a focus on structural examples. ANSYS is installed on all MEnet Sun and SGI machines..



Project



Transient
High speed steel
Table
Loads

Object Name	Fixed Support	Moment	Remote Force
State	Fully Defined		
Scope			
Scoping Method	Geometry Selection		
Geometry	1 Face	2 Faces	6 Faces
Coordinate System	Global Coordinate System		
X Coordinate	4.7188e-002 m		
Y Coordinate	-5.3451e-007 m		
Z Coordinate	2.9437e-007 m		
Location	Defined		
Definition			
Type	Fixed Support	Moment	Remote Force
Suppressed	No		
Define By	Vector		
Magnitude	1 N.m (step applied)		157 N (step applied)
Direction	Defined		
Behavior	Deformable		

FIGURE 1
Moment



FIGURE 2
Remote Force



Solution

FIGURE 3
Total Deformation

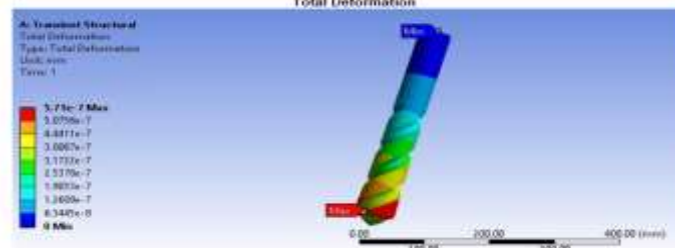


FIGURE 4
Directional Deformation

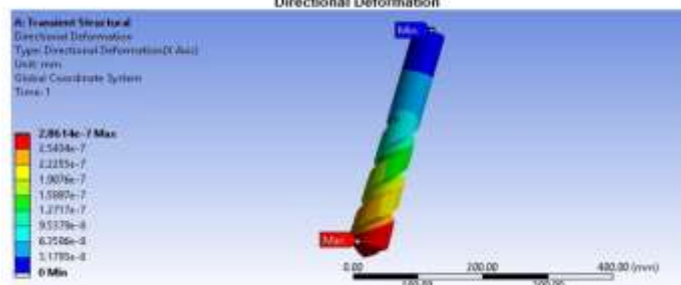


FIGURE 5
Equivalent Elastic Strain

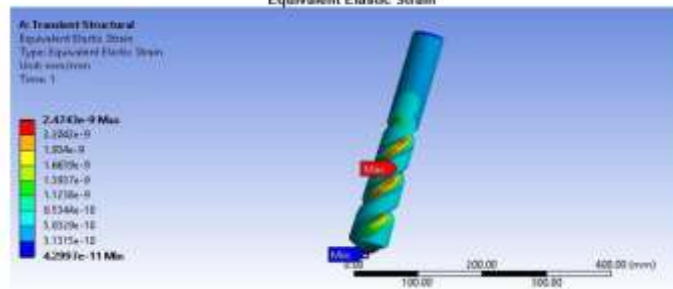


FIGURE 6
Shear Elastic Strain

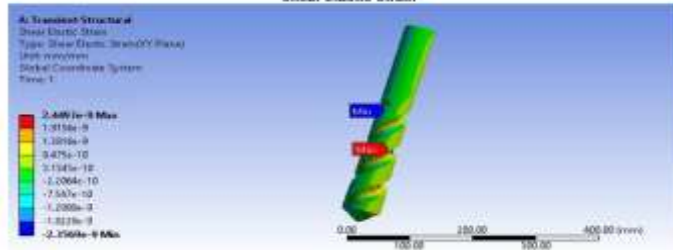


FIGURE 7
Equivalent Stress

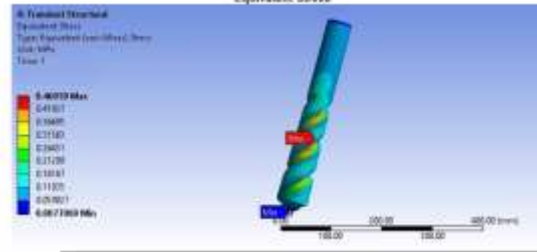


FIGURE 8
Shear Stress

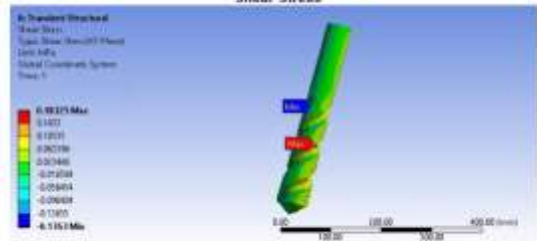


FIGURE 9
Structural Error

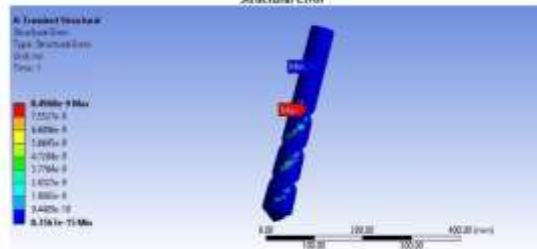
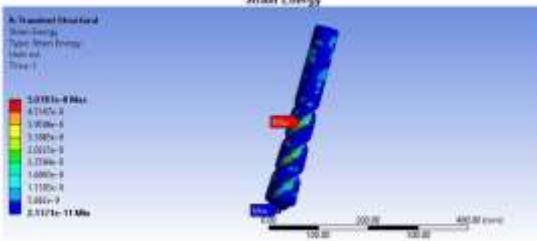
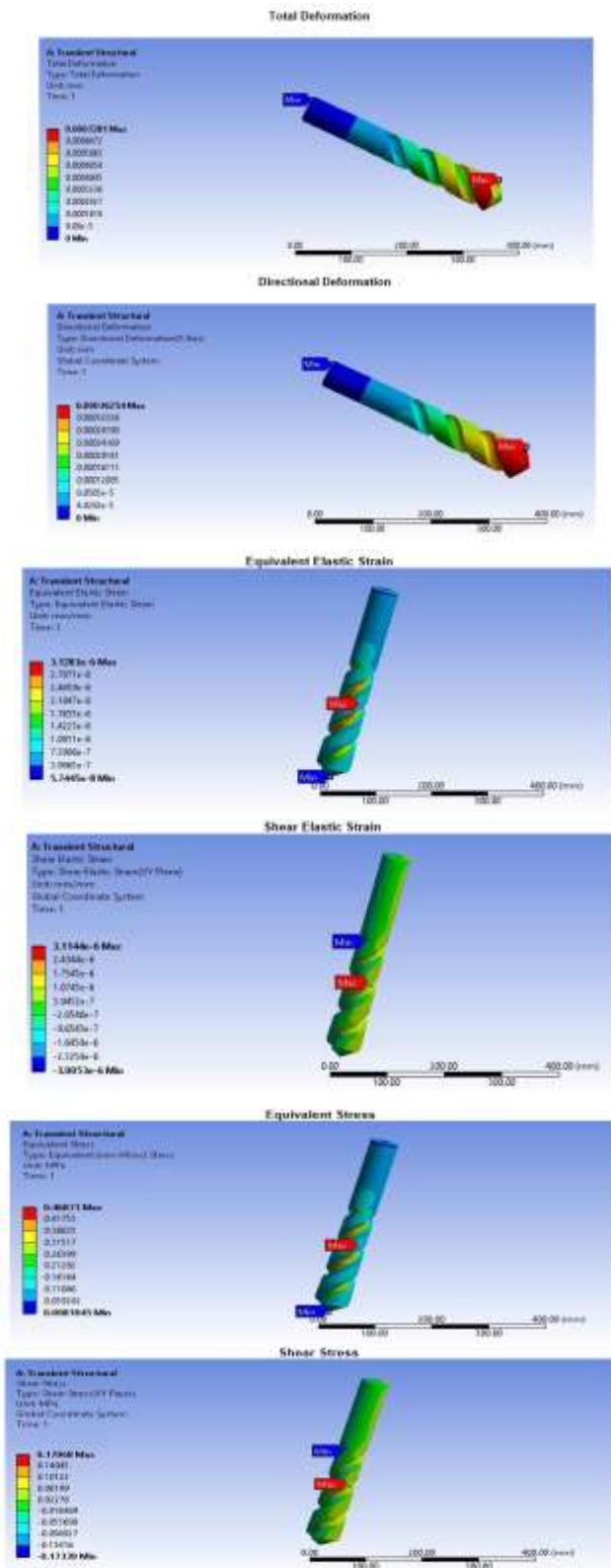
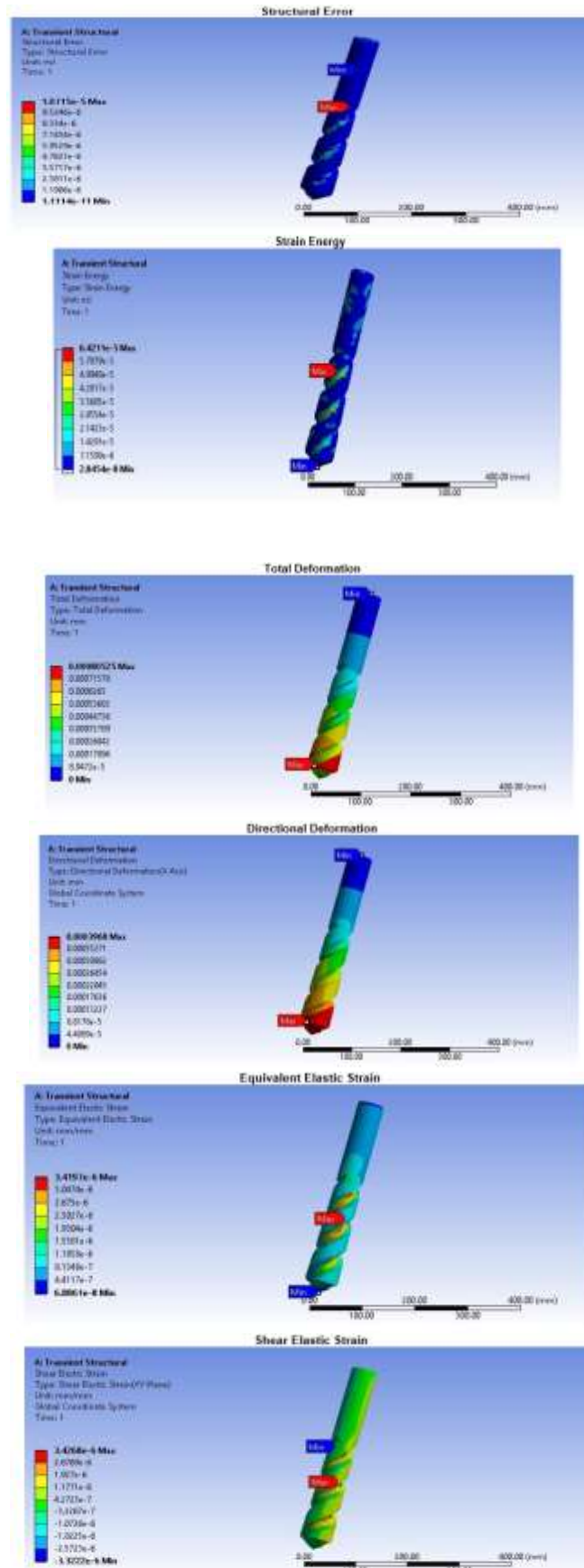


FIGURE 10
Strain Energy



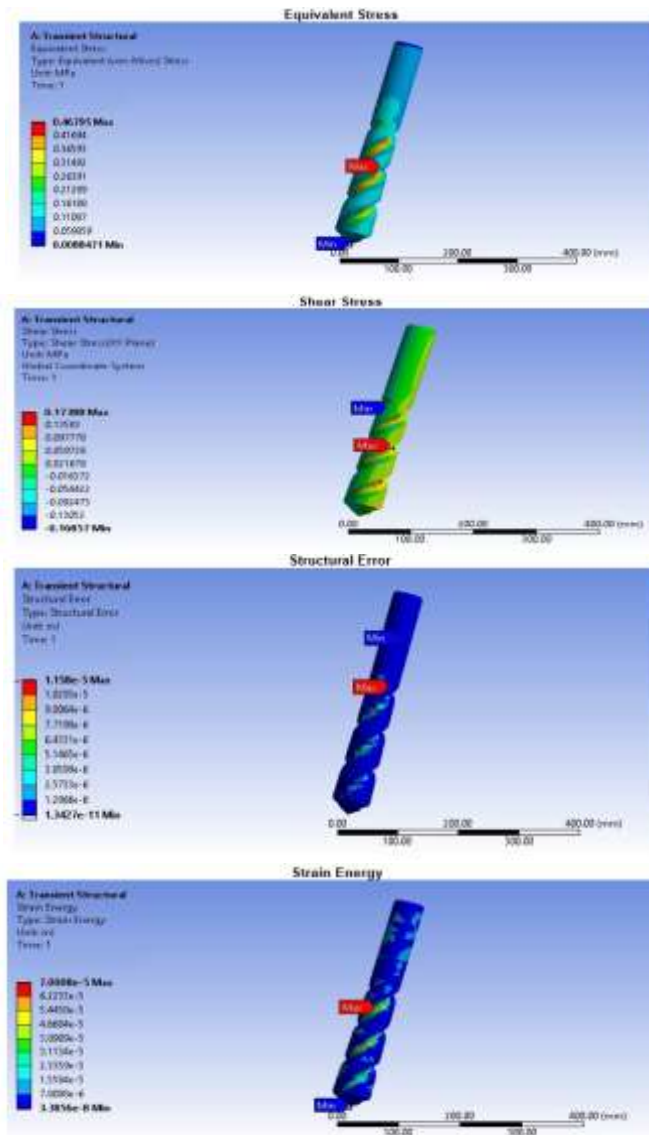
Material:
Silicon Carbide





Material:

- Alsic



Results:
High speed steel

Object Name	Total Deformation	Directional Deformation	Equivalent Elastic Strain	Shear Elastic Strain	Equivalent Stress	Shear Stress	Structural Error	Strain Energy
Minimum	0 mm		4.2997e-011 mm/mm	-2.3569e-009 mm/mm	7.7069e-003 MPa	-0.1763 MPa	8.3667e-015 mJ	2.1371e-011 mJ
Maximum	5.71e-007 mm	2.8614e-002 mm	2.4743e-004 mm/mm	2.4497e-004 mm/mm	8.46959 MPa	0.18325 MPa	8.4968e-009 mJ	5.0787e-008 mJ

Silicon Carbide

Object Name	Total Deformation	Directional Deformation	Equivalent Elastic Strain	Shear Elastic Strain	Equivalent Stress	Shear Stress	Structural Error	Strain Energy
Minimum	0 mm		5.7445e-008 mm/mm	-3.0453e-006 mm/mm	8.1045e-003 MPa	-0.17339 MPa	1.1114e-011 mJ	2.8454e-008 mJ
Maximum	7.261e-004 mm	3.6254e-004 mm	3.1283e-006 mm/mm	3.1144e-006 mm/mm	8.46871 MPa	0.17968 MPa	1.0715e-005 mJ	6.4211e-005 mJ

ALSic

Object Name	Total Deformation	Directional Deformation	Equivalent Elastic Strain	Shear Elastic Strain	Equivalent Stress	Shear Stress	Structural Error	Strain Energy
Minimum	0. mm		6.8861e-008 mm/mm	-3.3222e-006 mm/mm	8.8471e-003 MPa	0.16857 MPa	1.3427e-011 mJ	3.3856e-008 mJ
Maximum	8.0525e-004 mm	3.968e-004 mm	3.4197e-006 mm/mm	3.4268e-006 mm/mm	0.46795 MPa	0.17388 MPa	1.158e-005 mJ	7.0008e-005 mJ

CONCLUSION:

In this post, we looked into drilling of three different materials. Based on our findings, we can infer that project's results were acquired utilising ansys software with correct design and dynamic analysis, and loads were calculated using original drill bit values and design measurements, as well as drill bit design formulae, yielding the following results: When compared to other materials, deformation value aluminium silicon carbide is lower. When compared to other materials, aluminium silicon carbide has lower equivalent stress.

Aluminum Silicon Carbide Materials have greater Equivalent Total Strain than other two materials.

□ Aluminium silicon carbide materials exhibit greater Shear Elastic Strain, Equivalent Total Strain, Stress Intensity, and structural inaccuracy when compared to other materials.

Aluminium alloy has greater Equivalent Stress, Shear Elastic Strain, and Tensile Strength than other materials.

Tool Aluminium silicon carbide gave the longest tool life during pecks drilling. As a result, despite their expensive cost, using Aluminum silicon carbide drills is still feasible option to explore because to their high output levels and good hole quality.

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DESIGN AND CFD ANALYSIS OF SHELL AND TUBE HEAT EXCHANGER

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ABSTRACT: Shell and tube heat exchangers are the most common type of heat exchangers used in present scenario. Heat exchangers are widely used equipment in various industries such as power generation and transportation, refrigeration industry and chemical process industries because it suits high pressure application. Presented in this project is comparison for several shell- and- tube heat exchangers with segmental baffles. The objective of this project is to design a shell and tube heat exchanger with segmental baffles and to study the flow and temperatures inside the shell and tubes using Ansys software tool for the different baffle's assemblies and orientation also overall heat transfer is calculated for each design. This project totally contains 5 designs for comparison. The process in solving simulation consists of modelling and meshing the basic geometry of shell and tube heat exchanger using CFD package Ansys 14.5.

INTRODUCTION

Heat exchangers are one of the usually used equipment within the procedure industries. Heat Exchangers are used to transfer warmness between procedure streams. One can recognize their utilization that any technique which contain cooling, heating, condensation, boiling or evaporation would require a heat exchanger for that reason. Process fluids, commonly are heated or cooled before the process or undergo a phase exchange. Different heat exchangers are

named according to their application. For instance, warmth exchangers being used to condense are called condensers, similarly heat exchanger for boiling purposes are called boilers. Performance and efficiency of warmth exchangers are measured via the amount of warmth transfer the use of least region of heat switch and pressure drop. A better presentation of its performance is accomplished by using calculating over all heat switch coefficient. Pressure drops and place required for a sure amount of warmth transfer, offers an insight about the capital

value and power necessities (Running price) of a warmth exchanger. Usually, there is a lot of literature and theories to design a warmth exchanger consistent with the requirements.

Baffles are used to aid the tubes for structural rigidity, preventing tube vibration and sagging and to divert the drift throughout the package to obtain a better warmth switch coefficient. Baffle spacing (B) is the centre line distance among two adjacent baffles, Baffle is supplied with a cut (Bc) that's expressed as the percentage of the phase peak to shell internal diameter. Baffle reduce can vary between 15% and 45% of the shell internal diameter. In the existing look at 36% baffle reduce (Bc) is considered. In well known, conventional shell and tube heat exchangers result in high shell-side strain drop and formation of recirculation zones close to the baffles. Most of the researches now an afternoon are carried on helical baffles, which offer higher overall performance then single segmental baffles however they involve excessive production value, set up value and upkeep price.

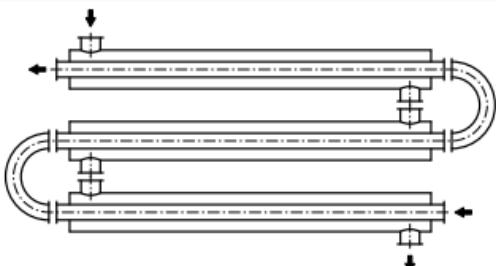
Factors Affecting the Performance of Shell and Tube Heat Exchanger

For a given shell geometry, the suitable configuration relies upon at the baffle cut, the baffle spacing, and baffle inclination perspective. Even after fixing the right baffle reduce and baffle area the overall performance may be nonetheless stepped forward by various baffle inclination angle. Having lower inclination attitude, increases heat transfer at the value of elevated shell side pressure drop. On the other hand increasing angle beyond price would possibly result in reduced strain drop however with lesser warmth switch

TUBULAR HEAT EXCHANGERS

A tubular warmth exchanger can both include a smaller-diameter tube set up internal a bigger diameter tube ("double-pipe exchanger", see Figure 1) or, greater commonly, a tube package inner a shell ("shell-and-tube exchanger", see Figure 1.1). Thus, warmth transfer surfaces are undeniable or better tubes. Additionally, shell-and-tube warmth exchangers can incorporate multiplepass tube bundles, i.E., for double-pass we've got a package deal of U-tubes, for triple-bypass the tubes in the package bend two times, and many others. Multiple-skip shells are common as properly. Baffles, both segmental or doughnut and disc ones, present in the shell

direct fluid glide in shell-side, support the tubes, and restriction feasible tube vibrations.



LITERATURE REVIEW

A.R. Mohandas, S.M. Hosseini, F. Parisian,
F. Mohamad yon, A. Behzadi Moghadam
and A. Sanaeirad

Due to the significance of warmth exchangers in chemical and petrochemical industries, heat exchangers analysis and warmth translate calculations are preceded. The traditional and widespread techniques (including KERN technique and and so on) are presented warmth translate calculation for the evaluation and choice of shell and tube heat exchanger primarily based on the acquired pressure drop and fouling factor after consecutive calculation. Also there are numerous residences and parameters in typical techniques. The present day paintings proposed a brand new approach primarily based on the artificial neural network (ANN) for the evaluation of Shell and Tube Heat Exchangers. Special

parameters for warmth exchangers analysis were acquired with the aid of neural network and the required experimental information were collected form Kern's e-book, TEMA and Perry's manual. The work used back-propagation gaining knowledge of algorithm incorporating Levenberg- Marquardt schooling approach. The accuracy and trend stability of the trained networks have been validated in keeping with their capability to are expecting unseen records. MSE mistakes assessment become used and the error difficulty is 10-three-10-6. Parameters may be received without the usage of charts, exclusive tables and complex equations. During this research, twenty-two networks have been utilized for all specific residences.

RESEARCH GAP & PROBLEM DESCRIPTION

In the studies with the aid of R. Shankar Subramanian, the shell and tube warmth exchanger is taken in the water with various temperatures. In this thesis, in conjunction with water Aluminum Al_2O_3 , silicon oxide and titanium carbide nano fluid at unique extent fractions (0.7 and 0.Eight) of the shell and tube heat exchanger is analyzed for heat switch houses, temperature, pressure ,speed and mass waft charges in CFD analysis. In thermal analysis, substances Copper and Aluminum are considered for

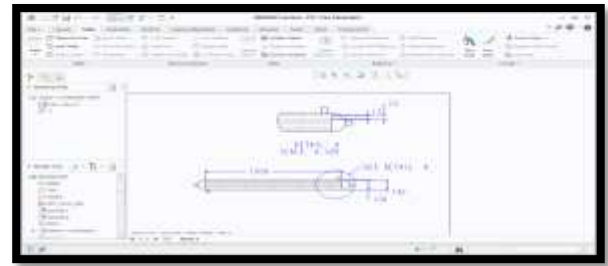
warmth exchanger. Modeling is performed in Pro/Engineer, Thermal evaluation and CFD evaluation is finished in Ansys. The boundary situations for thermal evaluation are temperatures, for CFD analysis is pressure, pace and temperature.

The Different Modules in CREO

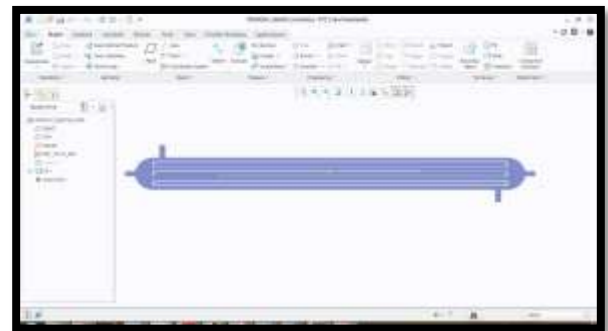
- Sketcher
- Part Design
- Assembly Design
- Drafting
- Sheet metal

3D MODEL OF SHELL AND TUBE HEAT EXCHANGER

- Tube outer dia. = 23 mm
- Tube inner dia. = 20 mm
- Number of tube = 9
- Shell inner dia. = 136 mm
- Shell outer dia. = 142 mm
- Number of baffles = 5
- Diameter of baffles = 136 mm
- Distance between baffles B = 300 mm



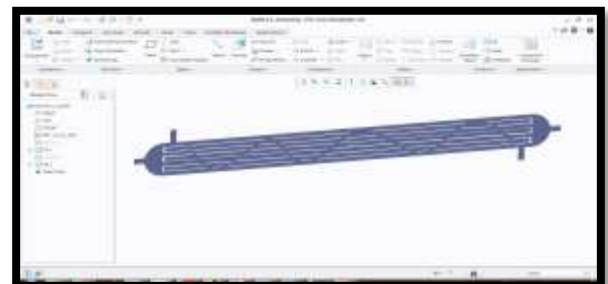
Without buffels



Baffles with 90⁰



Helix type buffels



CALCULATIONS TO DETERMINE PROPERTIES OF NANO FLUID BY CHANGING VOLUME FRACTIONS

Volume fraction= 0.4 & 0.5(taken from journal paper)

MATERIAL PROPERTIES

ALUMINUM OXIDE

Density = 3880 kg/m³

Thermal conductivity =40 W/m-k

Specific heat = 910J/kg-k

TITANIUM CARBIDE

Density = 4930 kg/m³

Thermal conductivity =330 W/m-k

Specific heat = 711 J/kg-k

WATER

Density = 998.2 kg/m³

Thermal conductivity = 0.6 W/m-k

Specific heat = 4182 J/kg-k

Viscosity = 0.001003kg/m-s

NOMENCLATURE

ρ_{nf} = Density of nano fluid (kg/m³)

ρ_s = Density of solid material (kg/m³)

ρ_w = Density of fluid material (water) (kg/m³)

ϕ = Volume fraction

C_{pw} = Specific heat of fluid material (water) (j/kg-k)

C_{ps} = Specific heat of solid material (j/kg-k)

μ_w = Viscosity of fluid (water) (kg/m-s)

μ_{nf} = Viscosity of Nano fluid (kg/m-s)

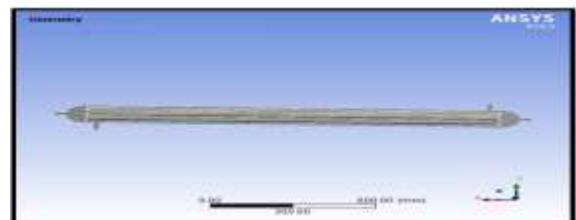
K_w = Thermal conductivity of fluid material (water)(W/m-k)

K_s = Thermal conductivity of solid material (W/m-k)

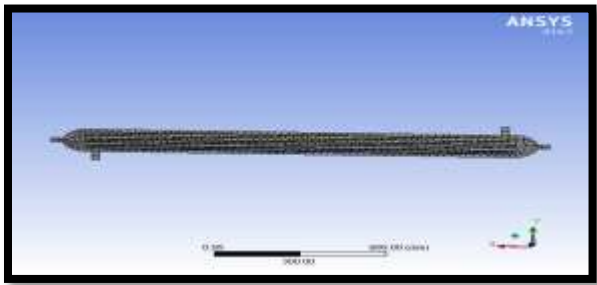
CFD ANALYSIS OF SHELL AND TUBE HEAT EXCHANGER

FLUID- WATER

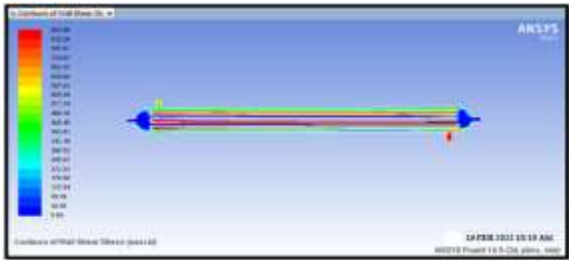
Import geometry



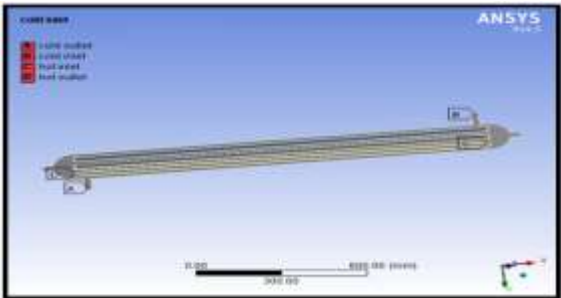
Meshing



Heat transfer co efficient



Boundary conditions

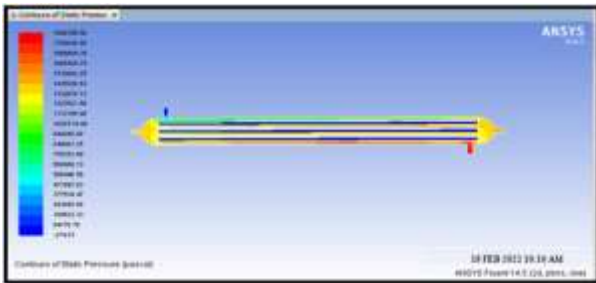


RESULTS

CFD results

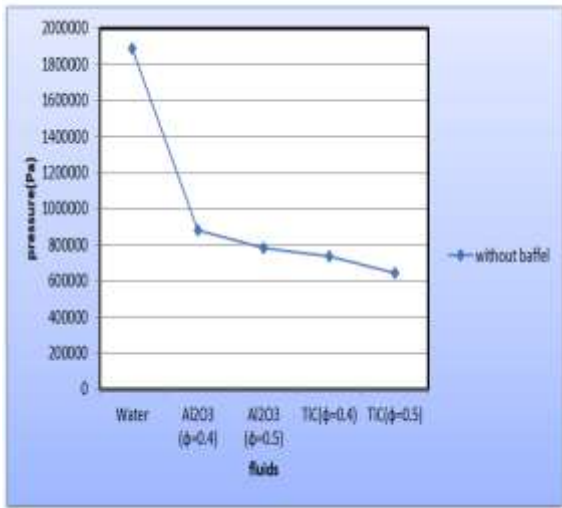
Fluid	Pressure (pa)	Velocity (m/s)	Heat transfer co-efficient (w/mm2)	Mass flow rate(kg/s)	Heat transfer rate(w)
Water	1888796.58	16.47	852.9039	2.8782	114868
Al ₂ O ₃ ($\phi=0.4$)	879565	7.65	7224170	3.249939	39747
Al ₂ O ₃ ($\phi=0.5$)	783056.75	6.75	76818.78	9.56622	63635
TiC ($\phi=0.4$)	735876.00	6.40	125314.93	3.247	117724
TiC ($\phi=0.5$)	644358.94	5.55	132492.14	9.56988	164684

STATIC PRESSURE

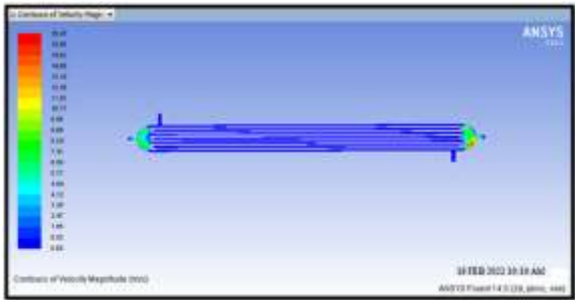


Graphs

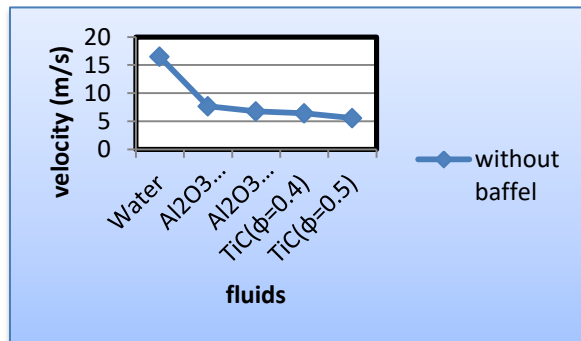
Pressure plot



velocity



Velocity plot



CONCLUSION

In this thesis, different nano fluids mixed with base fluid water are analyzed for their performance in the shell and tube heat exchanger without baffle and with baffle(900,300 and helical type baffle). The nano fluids are Aluminum Oxide and Titanium carbide for two volume fractions 0.4, 0.5. Theoretical calculations are done to determine the properties for NANO fluids and those properties are used as inputs for analysis. 3D model of the e heat exchanger is done in CREO parametric software. CFD analysis is done in ANSYS software. By observing the CFD analysis the heat transfer rate increases for titanium carbide at volume fraction 0.4 when compare with aluminum oxide and water.

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STUDY ON COOLING TOWERS IMPROVEMENT OF EFFICIENCY AND EFFECTIVENESS INDUSTRIAL UTILISATION

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ABSTRACT:

In many industries, cooling towers are used to cool space to send heat out through cooling systems and condensers. Thus, the analysis and cooling system is primarily a vapor compression cooling system, which we call a chiller or chilling system.

The use of chemicals to improve plant efficiency through the scale and corrosion removal process, reduces the fouling factor. The quick process increases this temperature and pressure for the cooling product, but there are several advantages to doing so. The properties of the chemicals increase the efficiency of the increased cooling system and expand the optimum temperatures and relative humidity. Descaling means destroying the bio-dispersant and corrosive cells or particles; It is also anti-fouling. Cooling towers are based on a pump system that leads pumps to play an important role in this system and to continue working, chemical characterization measure to the potential of hydrogen (PH) and total dissolved solids (TDS). The whole article is made of heating ventilation and air conditioning (HVAC) systems and chemicals utilization. This is based on the water-cooled chiller and induced counter-flow Cooling Tower.

Keywords: Cooling tower, Refrigeration system, Chiller plant, Descaling chemicals, Effectiveness, Efficiency, Temperatures, Relative Humidity(RH), Spray nozzle.

NOMENCLATURE:

CT:	Cooling Tower
TDS:	Total Dissolved Solids
PH:	Potential of Hydrogen
WBT:	Wet Bulb Temperature
DBT:	Dry Bulb Temperature
HVAC:	Heating Ventilation and Air-conditioning
VCRS:	Vapour Compression Refrigeration System
Range:	Difference of CT inlet to CT outlet
Approach:	Difference between CT inlet to the wet bulb temperature of air

1. INTRODUCTION

1.1. History

Cooling Tower were introduced in 19th century where condenser worked on steam engines, condenser relatively cooling refrigerant by cooling water with cooling tower. In most of the cases removing vapour from the condensed water, by doing these temperatures were reducing [1]. The power plants boiler was used to generate energy likewise steam was worked in steam turbine for run the generator

[2]. Whereat exit of steam turbine converted liquid to travel through the condenser and rejects heat from it. The Cooling tower took liquid water then reduces temperature range (3°C - 5°C). Classification of Cooling towers below tree chart art.

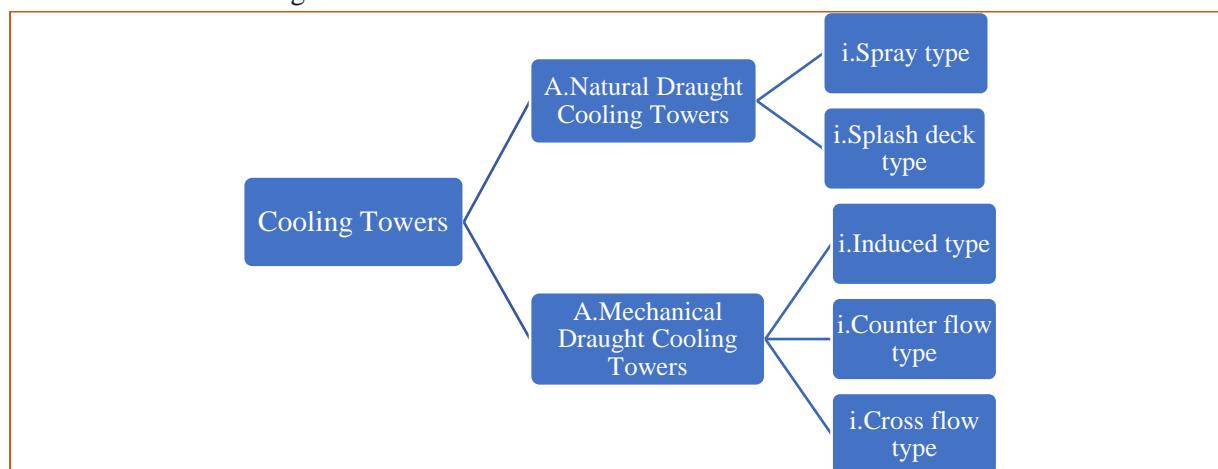


Figure 1. Illustration of Cooling towers

Cooling Towers which means that tower inside is cooling by contact of air, which is classified as Natural and Mechanical draught Cooling Towers. This is shown above the classification of cooling towers.

Natural draught which is based on fill fitting means that no external air use or atmospheric air use, made it tower-like structure, types which are Spray and Splash deck, Spray type which fills arrangement i.e., horizontal rectangular space of fill throughout of hot water and trapping of air. In Splash deck type is attached vertically faced towards the air.

Mechanical Draught Cooling Towers which are based on the external agent i.e., fan, cooling manner fan was revolving and suck air from air grills, types which are Induced, Counter and Cross flow. Induced suck air inward through crossing the fill, Counter flow which hot and cold fluid enter opposite with each other of flow and have fan, Cross flow which is the hot and cold fluid mixed to the flow with help of a fan.

1.2. Objectives of Cooling Tower

In recent scenario Cooling towers mostly and mainly used purpose of rejecting heat from the condensed liquid and so decided to compare the values of calculations.

1.3. Evaluation of Cooling Tower:

- Types of Chemicals & Chemical Composition
- Characteristics of Chemical
- Descaling Properties & Corrosion Resistance
- Measuring of PH And TDS
- Dry Bulb Temperature and Wet Bulb Temperatures of Air.
- Condenser Temperatures and Pressures Drop
- Temperature of Cold Water and Hot Water @ Cooling Tower

1.4. Methods & Materials

The water-cooled chillers respectively to the rejection of heat. Rejection of mainly thermal and hot gases sends the liquid into the atmosphere in the same way it sends through a pump to an evaporator. Most of the cooling systems were water evaporation which are been listed below.

- Chiller Plant
- Cooling Tower
- Antiscalates Chemicals
- Sling Hygrometer
- Refrigerant

2. LITERATURE SURVEY

The purpose of the study is to first determine the factors that contribute to the water quality of the cooling towers and secondly to determine the potential water quality of the high, medium, or low pollution. Questionnaires were sent to various locations with cooling towers to understand which factors contribute to possible water pollution in cooling towers [3].

The questionnaire covered geographical location, construction applications, maintenance practices, installation of cooling towers, and water treatment. In addition to completing the questionnaire, the site was also asked if it was ready to send water samples from the cooling tower [4].

After receiving the site sending water samples, the site received a sample collection kit. The kit included instructions for collecting samples, two bottles of water, bottle labels, and prepaid postal address tags for the night, two bottles were provided to the site to have enough water to conduct the necessary tests [5-7]. More than half of the bottles were received and refrigerated within 48 hours of the sample being taken.

This analysis and execution process make up water, temperature setpoints, pressure, and psychometrics properties such as specific and relative humidity, wet and dry bulbs temperature, and dew point temperature along with chemicals [8].

This is a circulating process with the above equipment and works water coolers. Cooling tower designs such as conical, spherical, and square shapes, as well as counter flow and cross-flow types [9-10].

2.1. Principal of Operation

A cooling tower is a structure for cooling water in circulating water systems. In industry, cooling towers are used for cooling of refrigeration equipment, machinery-molders, plastics, chemical refining, chemicals for the cooling equipment to protect it from rapid destruction under the influence of high temperatures (e.g., cylinders, compressors, industrial furnaces masonry), etc.

The scale was formed by the heating of water in metal tubes, which means that condenser inlet, cooling tower makeup water comes contact with tubes then transmitting while refrigerant heat absorbing in it, flow through outlet of the condenser to cooling tower inlet then the process goes on cyclically.

2.2. Chemical Characteristics

2.2.1 Characteristics

- Removing scale and destroy in it.
- Most economical and strongest acid reaction with dissolving scale.
- Efficient and safe need to maintain
- Its low odour biodegradable
- It will allow ph colour indicator.
- Improve service life
- Improve efficiency of whole system.

S.No.	PARAMETERS	COOLING TOWER ANALYSIS	
		Previous	Present
1	pH	8.1	7.7
2	Hardness as Ca (mg/ltr)	24	30
3	Total Hardness (as CaCO_3) (mg/ltr)	60	74
4	Total Dissolved Solids TDS (mg/ltr)	325	310
5	Conductivity ($\mu\text{m}/\text{cm}$)	500	550

Table 1. Chemical composition analysis with values

Above Table 1. Which values taken by specific application pH meter, TDS meter and Conductivity meter. The samples of data taken before adding of chemicals and after adding chemicals respectively.

3. EXPERIMENTAL METHODOLOGY

The below schematic diagram of Induced Cooling Tower is used for experimentation work.

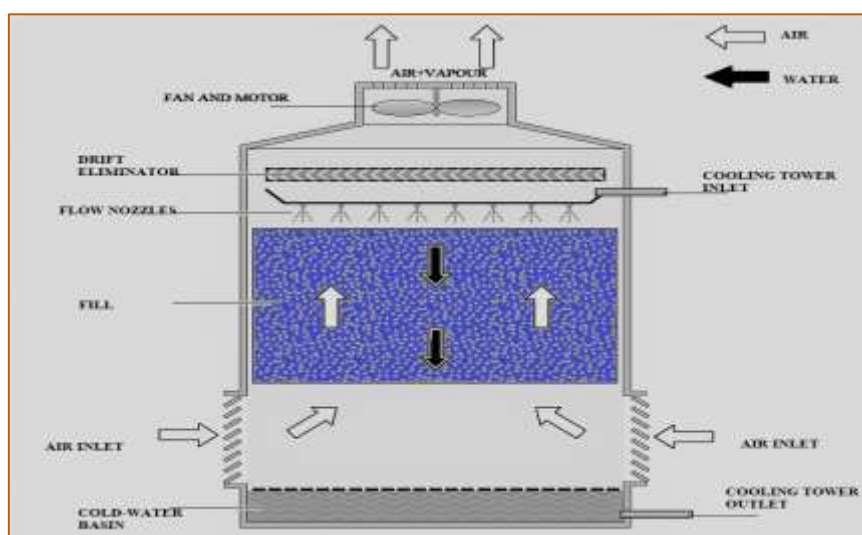


Figure 2. line diagram of Induced draught Cooling Tower

3.1. Cooling Tower Procedure:

Parameters	T ₁	T ₂	T ₃
Inlet Temperature (°C) (T _i)	27	28.1	30.1
Outlet or Discharge Temperature (°C) (T _o)	24.1	24.7	26
Dry bulb Temperature (°C)	28.2	28.6	30.1
Wet bulb Temperature (°C)	23.6	24.2	24.8
Depression (°C)	4.6	4.4	5.3
Ambient Temperature of air (°C)(T _a)	23.4	24.0	25.3
Saturation Temperature (°C)	27.3	28.5	30.7
Superheat Temperature (°C)	0.7	1.1	1.2

Parameters	A	B	C
Condenser Pressure (kPa)	610	636	685
Specific Enthalpy (kJ/kg) @ Hot Temp.	113.7603	118.3815	126.7838
Specific Enthalpy (kJ/kg) @ Cold Temp.	101.6377	104.1702	109.6497
Specific Enthalpy (kJ/kg) @ Wet Bulb temp.	99.0741	101.5836	104.0929

Table2. All Recorded Temperatures

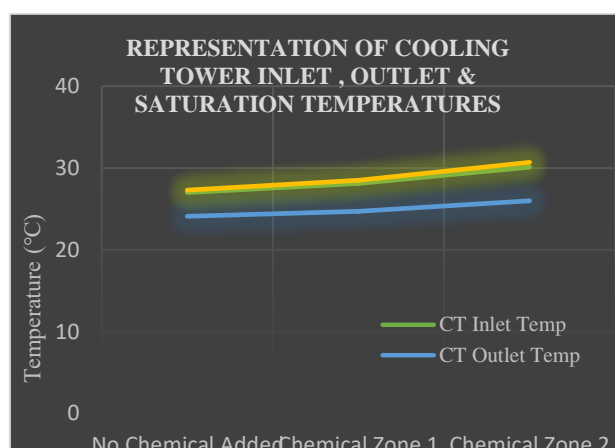


Fig.3. Graph of Temperatures of Cooling Tower with Chemical

3.2. Observation and Calculation

➤ Cooling Tower Effectiveness:

$$\text{Cooling tower Effectiveness } (\varepsilon) = \frac{\text{Range}}{\text{Range} + \text{Approach}} \times 100 (\%)$$

A. COOLING TOWER EFFECTIVENESS

$$\text{Cooling tower Effectiveness } (\varepsilon_A) = \frac{(27.0 - 24.1)}{(27.0 - 24.1) + (24.1 - 23.6)} \times 100 = 58.29 \%$$

B. COOLING TOWER EFFECTIVENESS

$$\text{Cooling tower Effectiveness } (\varepsilon_B) = \frac{(28.1 - 24.7)}{(28.1 - 24.7) + (24.7 - 24.2)} \times 100 = 87.17 \%$$

C. COOLING TOWER EFFECTIVENESS

$$\text{Cooling tower Effectiveness } (\varepsilon_C) = \frac{(30.1 - 26.0)}{(30.1 - 26.0) + (26.0 - 24.8)} \times 100 = 77.35 \%$$

➤ **Cooling Tower Efficiency**

$$\text{Cooling tower Efficiency } (\eta) = \frac{T_i - T_o}{T_i - T_a} \times 100 (\%)$$

A. COOLING TOWER EFFICIENCY

$$\text{Cooling tower Efficiency } (\eta_A) = \frac{27.0 - 24.1}{27.0 - 23.4} \times 100 = 80.55 \%$$

B. COOLING TOWER EFFICIENCY

$$\text{Cooling tower Efficiency } (\eta_B) = \frac{28.1 - 24.7}{28.1 - 24.0} \times 100 = 82.92 \%$$

C. COOLING TOWER EFFICIENCY

$$\text{Cooling tower Efficiency } (\eta_C) = \frac{30.1 - 26.0}{30.1 - 25.3} \times 100 = 85.41 \%$$

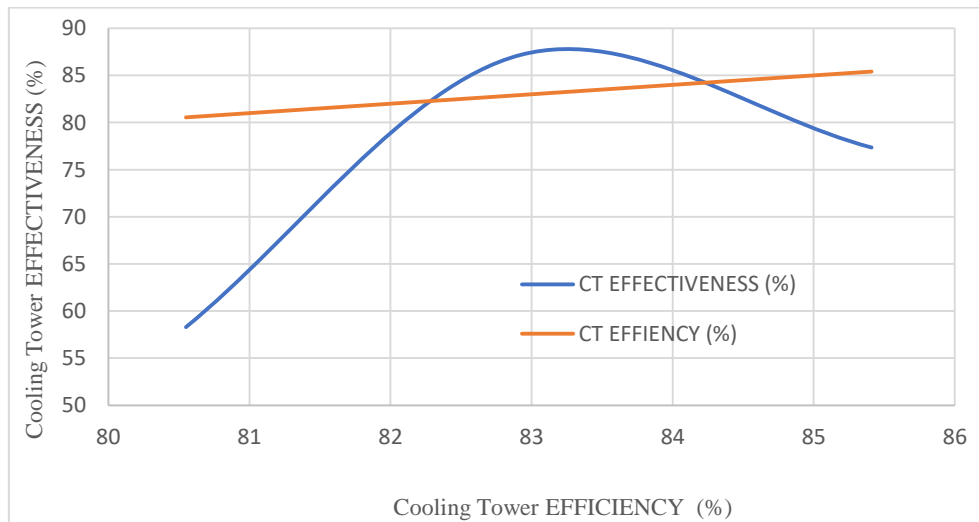


Fig.4. Cooling Tower Effectiveness vs Efficiency Graph Representation

➤ **L/G Ratio**

$$\frac{L}{G} \text{ Ratio} = \frac{h_2 - h_1}{T_1 - T_2}$$

A. L/G Ratio

$$\frac{L}{G} \text{Ratio (A)} = \frac{113.7603 - 101.6377}{27.0 - 24.1} = 4.1802$$

B. L/G Ratio

$$\frac{L}{G} \text{Ratio (B)} = \frac{118.3815 - 104.1702}{28.1 - 24.7} = 4.1797$$

C. L/G Ratio

$$\frac{L}{G} \text{Ratio (C)} = \frac{126.7839 - 109.6497}{30.1 - 26.0} = 4.1790$$

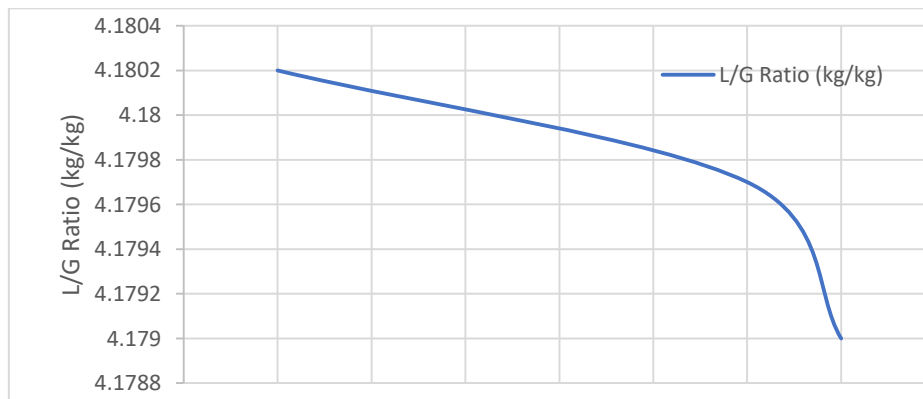


Fig.5. L/G Ratio (kg/kg) graph representation

➤ EVAPORATION LOSS

$$\text{Evaporation Loss} = 0.00085 \times 1.8 \times m \times (CT_{in} - CT_{out}) \text{m}^3/\text{hr}$$

A. EVAPORATION LOSS

$$\text{Evaporation loss} = 0.00085 \times 1.8 \times 1250 \times (2.9) = 5.54625 \text{m}^3/\text{hr}$$

B. EVAPORATION LOSS

$$\text{Evaporation loss} = 0.00085 \times 1.8 \times 1270 \times (3.4) = 6.60654 \text{m}^3/\text{hr}$$

C. EVAPORATION LOSS

$$\text{Evaporation loss} = 0.00085 \times 1.8 \times 1260 \times (4.1) = 7.90398 \text{m}^3/\text{hr}$$

➤ BLOW DOWN LOSS

$$\text{Blow Down Loss} = \frac{\text{Evaporation Loss}}{\text{Cycle of Concentration} - 1} (\text{m}^3/\text{hr})$$

1. Blow down = $1.196 \text{m}^3/\text{hr}$
2. Blow down = $1.205 \text{m}^3/\text{h}$

$$\text{Blow down} = 1.305 \text{ m}^3/\text{hr}$$

➤ MAKE UP WATER CONSUMPTION

$$\text{Make up water consumption} = \text{Evaporation loss} + \text{Blow down loss} + \text{Drift loss}$$

$$\text{Where drift loss} = 0.02\% \times \text{cooling water flow}$$

1. Make up water consumption = $5.54625 + 1.196 + 0.250 = 6.99225 \text{ m}^3/\text{hr}$
2. Make up water consumption = $6.60654 + 1.205 + 0.254 = 8.06554 \text{ m}^3/\text{hr}$
3. Make up water consumption = $7.90398 + 1.305 + 0.252 = 9.46098 \text{ m}^3/\text{hr}$

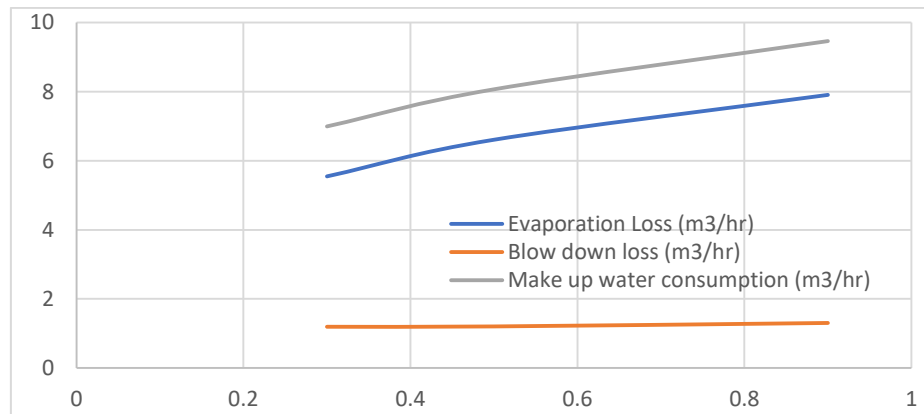


Fig.6. Evaporation loss, Blow-down and Make up water consumption variations

➤ COOLING CAPACITY OR HEAT REJECTED

$$\text{Cooling Capacity} = m_w \times \rho_w \times C_{pw} \times \Delta T \left(\frac{\text{kJ}}{\text{kg}} \right)$$

A. COOLING CAPACITY

$$\text{Heat rejected} = 1250 \times 1000 \times 4.18 \times 2.9 = 1,51,52,500 \text{ kJ/hr}$$

B. COOLING CAPACITY

$$\text{Heat rejected} = 1270 \times 1000 \times 4.18 \times 3.4 = 1,80,49,240 \text{ kJ/hr}$$

C. COOLING CAPACITY

$$\text{Heat rejected} = 1260 \times 1000 \times 4.18 \times 4.1 = 2,15,93,880 \text{ kJ/hr}$$

➤ TOTAL HEAT TRANSFER

$$Q = k \times s(h_w - h_a) \text{ (kJ)}$$

$$Q = 0.0117 \times (2.690) \times (126.7838 - 104.0929) = 415.4083 \text{ kJ}$$

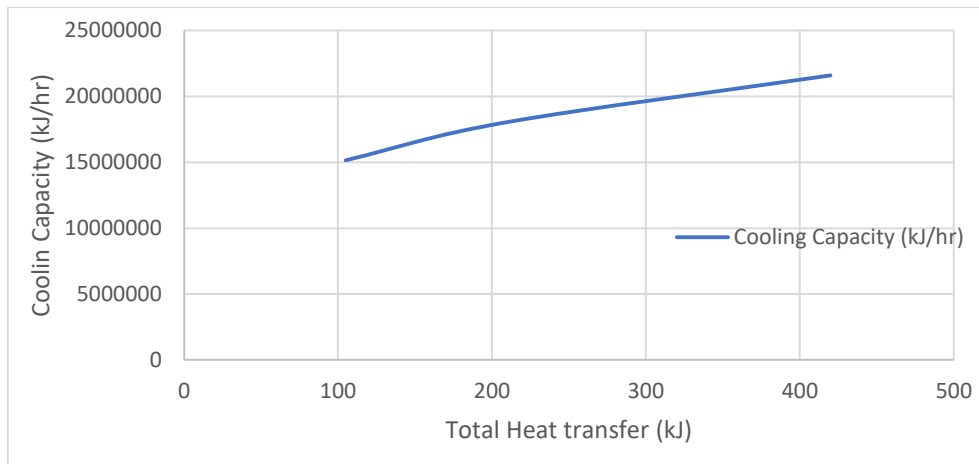


Fig.7. Cooling capacity (kJ/hr) and Total Heat transfer (kJ)

➤ COOLING LOAD

$$Q_1 = m_a \times (h_{a_2} - h_{a_1}) \text{ (kW)}$$

$$Q_1 \text{ (Avg)} = 296.8333 \times (104.0929 - 99.0741) = 1489.74697 \text{ kW}$$

➤ CONVECTIVE HEAT TRANSFER

$$Q = m_w \times C_{pw} \times (Tw_i - Tw_o) \text{ (kW)}$$

$$Q_{c1} = 256.7114 \times 4.18 \times (27.0 - 24.1) = 3111.855 \text{ kW}$$

$$Q_{c2} = 260.9017 \times 4.18 \times (28.1 - 24.7) = 3707.934 \text{ kW}$$

$$Q_{c3} = 258.7651 \times 4.18 \times (30.1 - 26.0) = 4434.716 \text{ kW}$$

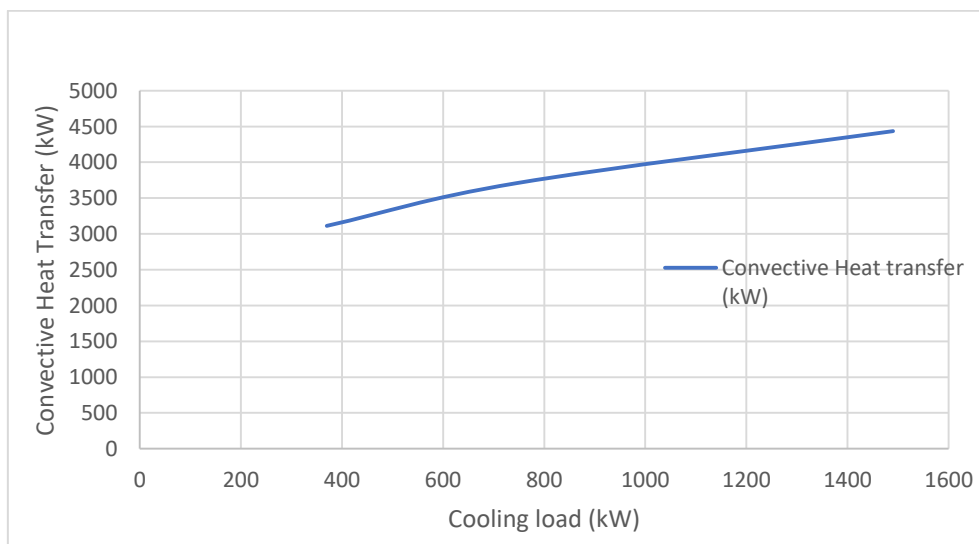


Fig.8. Cooling Load vs Convective Heat Transfer

3.3. Advantages and Disadvantages

3.3.1. Advantages

- Can be installed in any convenient location.
- Volumes of cold water
- Automation and efficiency.
- Mobility.
- High Corrosion resistance.
- Wide range of colours.
- Quick installation.
- Easy to maintain.

3.3.2. Disadvantages

- Scale destroying agent will use proper guidelines because it is a reaction agent.
- Proper handling is needed, when touching with hands it will smooth operation but allergies happening.
- Don't pour outside it will smashing space.
- Chemical kept the desired location and
- Observation will need when mixing and diluting chemical
- Don't allow to free atmosphere.

4. RESULTS

4.1. Improved Effectiveness and Efficiency of the Cooling Tower

Effectiveness which defined as the Range to Range and Approach of Cooling Tower Temperatures, where the Approach increases then effectiveness goes fall, as same as Approach decreases then lead to an increase the effectiveness. In such a way that Range increase then effectiveness increases were there directly proportional to each other. In this scenario A, B, and C's effectiveness were increased, decreased and something raised, cause of the wet-bulb temperature of the air, shown below graph fig.9. respectively.

Efficiency means the Range to the Inlet and wet bulb temperature of air (Approach), In this Efficiency, increases with decrease in Approach and increase in Range, In this A, B and C points efficiency consequently raised. So the wet-bulb temperature of the air is beyond the limits, shown below fig.9. respectively.

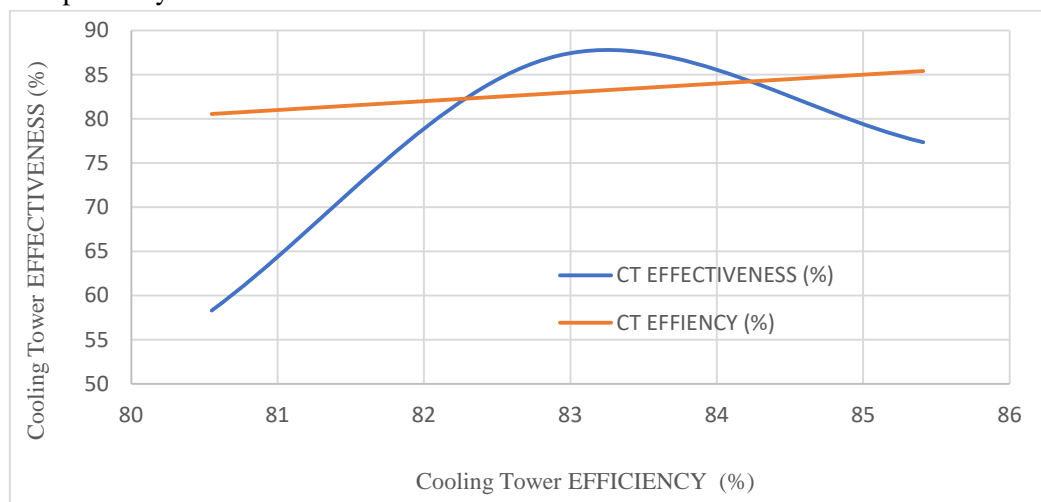


Fig.9. Cooling Tower Effectiveness vs Efficiency Graph Representation

4.2. Evaporation & Down Loss, Make up Water Consumption

Evaporation loss which includes the mass flow of water and temperature differences, give the mass flow of water raises steadily, In this scenario evaporation loss increased due to mass flow of water raised thoroughly and temperature difference comparatively low, So increased loss

Blow down loss which is increases in cycles of concentration decreases in a manner that why evaporation loss increases, the blow loss increased.

Makeup Water consumption raised very slightly increased, the chemicals which reaction in cooling water some amount of vaporization done.

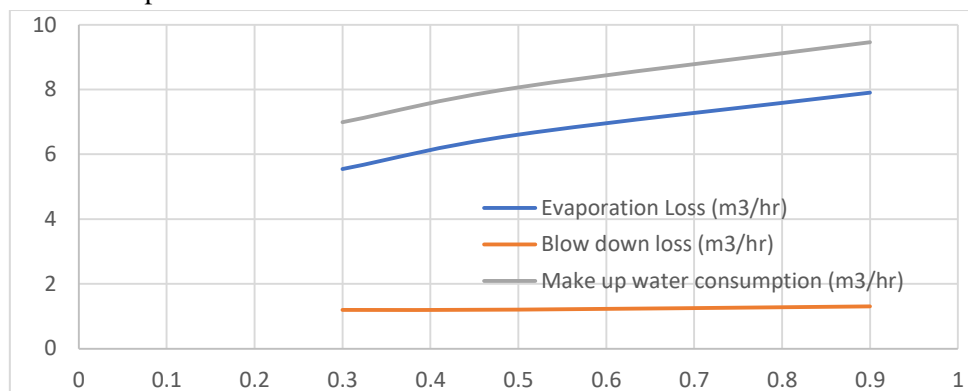


Fig.10. Evaporation loss, Blow-down and Make up water consumption variations

4.3. Liquid to Gas Ratio

Liquid to Gas ratio, which means that enthalpy and temperature differences, water to vapour this stage slightly decreased. Liquid consumption very low..

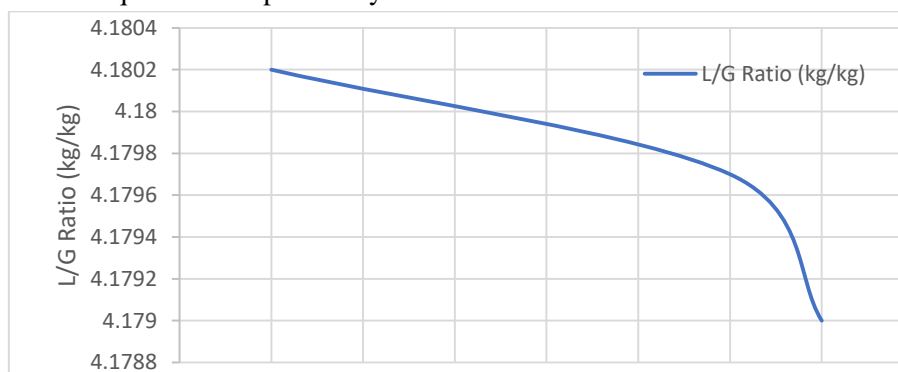


Fig.11. L/G Ratio (kg/kg) graph representation

4.4. Cooling Capacity and Total Heat Transfer

Cooling capacity and Total heat transfer, which describes that cooling was certain total heat transfer pass through it, both are directly proportional to each other, in the scenario, cooling capacity and total heat transfer increased thoroughly.

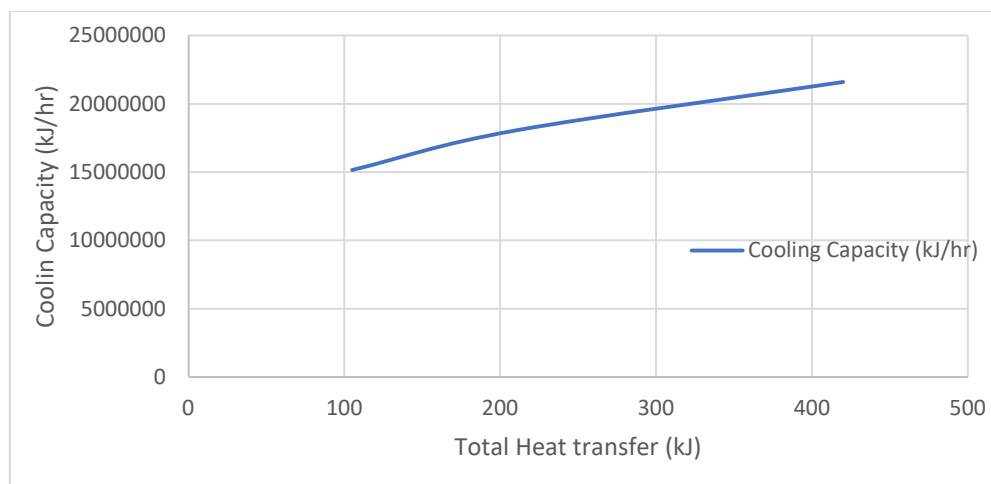


Fig.12. Cooling capacity (kJ/hr) and Total Heat transfer (kJ)

4.5. Cooling Load and Convective Heat Transfer

It describes that convective heat transfer raised cooling load, which means that Cooling Tower hot fluid cooled thoroughly by this scenario.

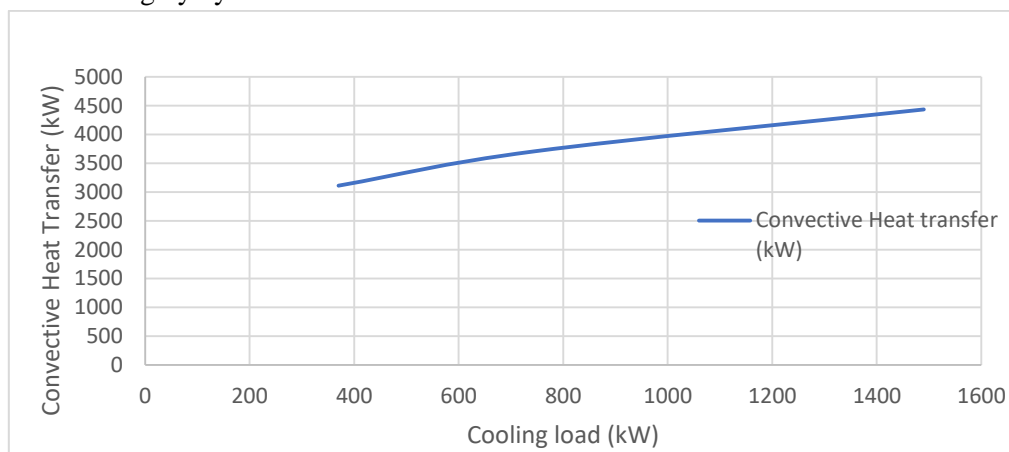


Fig.13. Cooling Load vs Convective Heat Transfer

5. CONCLUSIONS

- This Effectiveness and Efficiency improved by decreasing of scale and corrosion formation. Temperatures maintaining predominately by utilization of Chemicals of Anti-Scalants, Biocides and Conductivity of water.
- By this article studied various parameters of cooling tower, improved antiscalants, Total dissolved solids and reduce rust and biocides. Mainly PH and TDS are maintained beyond the limits of Cooling Tower.
- Evaporation loss, Blow-down loss and Make up water consumption. L/G ratio which thoroughly falling from 0.10 kg/kg
- Convective and total heat transfer was increased in desired capacity of cooling tower.

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COMPARISON AND SIMULATION OF RESIDUAL STRESSES IN CASTINGS

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ABSTRACT

Two individual high-pressure die-casting geometries were developed in order to study the influence of process parameters and different alloys on the distortion behaviour of castings. These geometries were a stress lattice and a V-shaped sample tending to form residual stress due to different wall thickness respectively by a deliberate massive gating system.

In the experimental castings the influence of the most important process parameters such as die temperature and die opening time and the cooling regime was examined. The time evolution of process temperatures was measured using thermal imaging. The heat transfer coefficients were adapted to the observed temperature distributions.

Castings were produced from the two alloys NICU30FE, EN AC-44300 alsil2 fe. The distortion of the castings was measured by means of a tactile measuring device. For the alloy AlSi10MnMg thermo-physical and thermo-mechanical data were obtained using differential scanning calorimetric, laser flash technique, dilatometer and tensile testing at elevated temperatures. These data were used for modeling the material behavior of the NICU30FE, EN AC-

44300 alsil2 fe alloy in the numerical model while for the alloy. literature data were used. Process and stress simulation were conducted using the commercial FEM software ANSYS Workbench. A survey on the results of the comparison between simulation and experiment is given for both alloys.

In this project we are doing material optimization to increase the bonding strength for two materials. here 3D model designed in CATIA V5 R20 software and analysis done on ANSYS software.

1. INTRODUCTION

The die casting process is one of the net shape manufacturing techniques and is widely used to produce high production castings with tight tolerances for many industries. In the die casting process molten metal is injected under high pressure into a die cavity through the runner and gating system. This high pressure is applied via the plunger mechanism. A toggle system is required to hold the two halves of the die closed during molten metal ejection and intensification. Castings are the final products of the die casting process, and care must be taken to guarantee their quality. A quantitative understanding of the stress distribution and the deformation pattern of parts produced by die casting will result in closer tolerances to the part design specification, a better die design and

eventually to more productivity and cost savings. To achieve these objectives the casting and the dies have to be studied together as an integrated system. This will enable practitioners to more accurately predict the deformation of the part in the final form using analytical tools and to modify the die and parting surfaces based on the simulation results so that a dimensionally sound product will result.

1.1 Casting:

Casting processes have been known for thousands of years, and have been widely used for sculpture (especially in bronze), jewellery in precious metals, and weapons and tools. Traditional techniques include lost-wax casting (which may be further divided into centrifugal casting and vacuum assist direct pour casting), plaster mold casting and sand casting.

2. LITERATURE REVIEW

Dantzig [1] explained in details the development of thermal stresses in metal casting. In his research finite element analysis was used to solve the modeling problem numerically. The finite element model was explained step by step in conjunction with the constitutive equations. The model was created for homogeneous, isotropic, material deformed under plane strain conditions.

Smelser and Richmond [2] studied the effect of the constitutive model on stresses and deformations. The application was on a solidifying circular cylinder made of pure aluminum. A finite element model was built and the finite element code ABAQUS was used to solve it. The thermal part of the model was designed based on temperature measurements.

N. Zabras et al [3] built a finite element model to be used in simulating continuous or ingot casting process of pure aluminum. This model is limited to castings of axial symmetry or plain strain casting

conditions. In this model the thermal and mechanical analyses are uncoupled.

K.C. Wang, et al [4] used both finite difference and finite element methods to analyze the thermal stresses formation in sand casting of cast iron. FDM was used to compute the temperature distribution in the casting, while the FEM was used to predict the thermal stresses depending on the temperature results. The cast iron properties were given as a function of temperature.

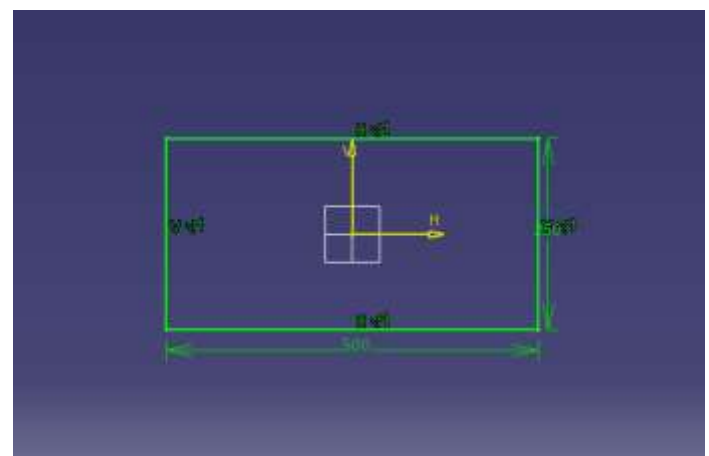
R. N. Parkins and A. Cowan [5] ran several experiments to study the mechanism of residual stress formation in sand casting. The experiments were run for different alloys.

3. INTRODUCTION TO CATIA:

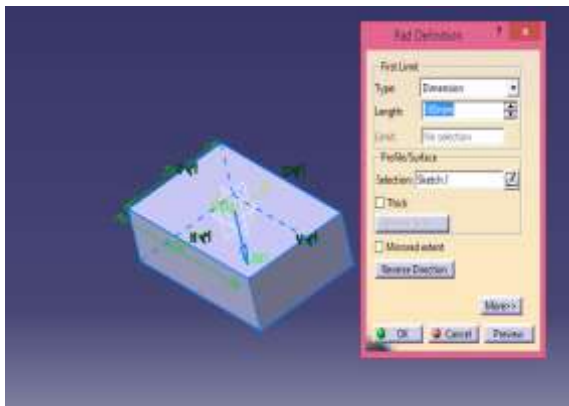
CATIA (Computer Aided Three-dimensional Interactive Application) is a multi-platform CAD/CAM/CAE commercial software suite developed by the French company Assault Systems. Written in the C++ programming language, CATIA is the cornerstone of the Assault Systems product lifecycle management software suite.

DESIGN PROCEDURE

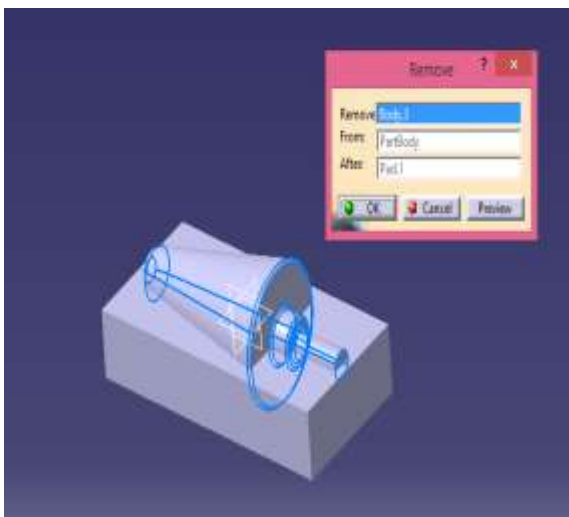
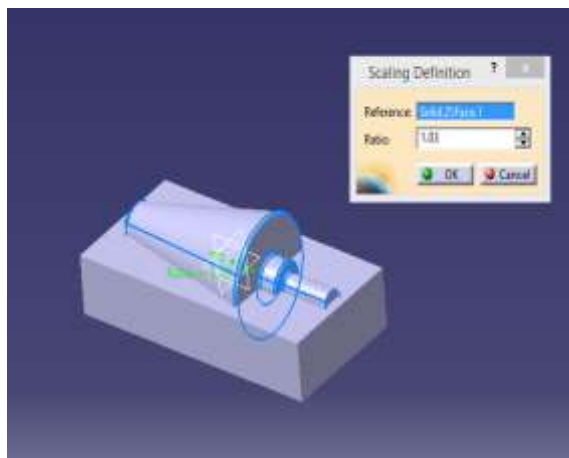
Sketch drawing: draw the skeeth in 2d



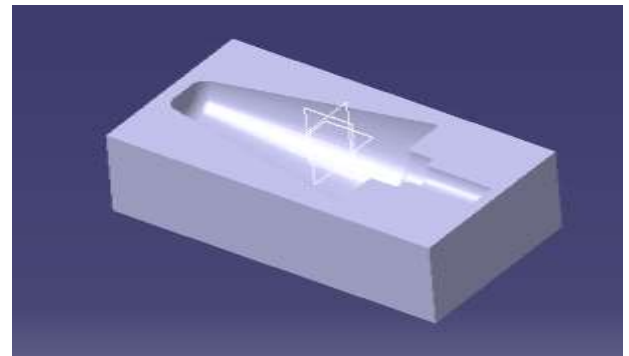
Covaretd to 3d model



To creating the pattern



Final model:



4. ANSYS

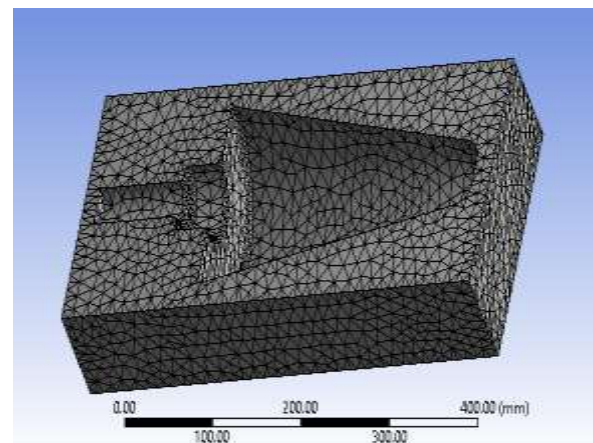
ANSYS is a universally useful limited component demonstrating bundle for numerically tackling a wide assortment of mechanical issues. These issues include: static/dynamic auxiliary examination (both direct and non-straight), warm exchange and liquid issues, and in addition acoustic and electro-attractive issues.

4.1 ANALYSIS OF RESULTS

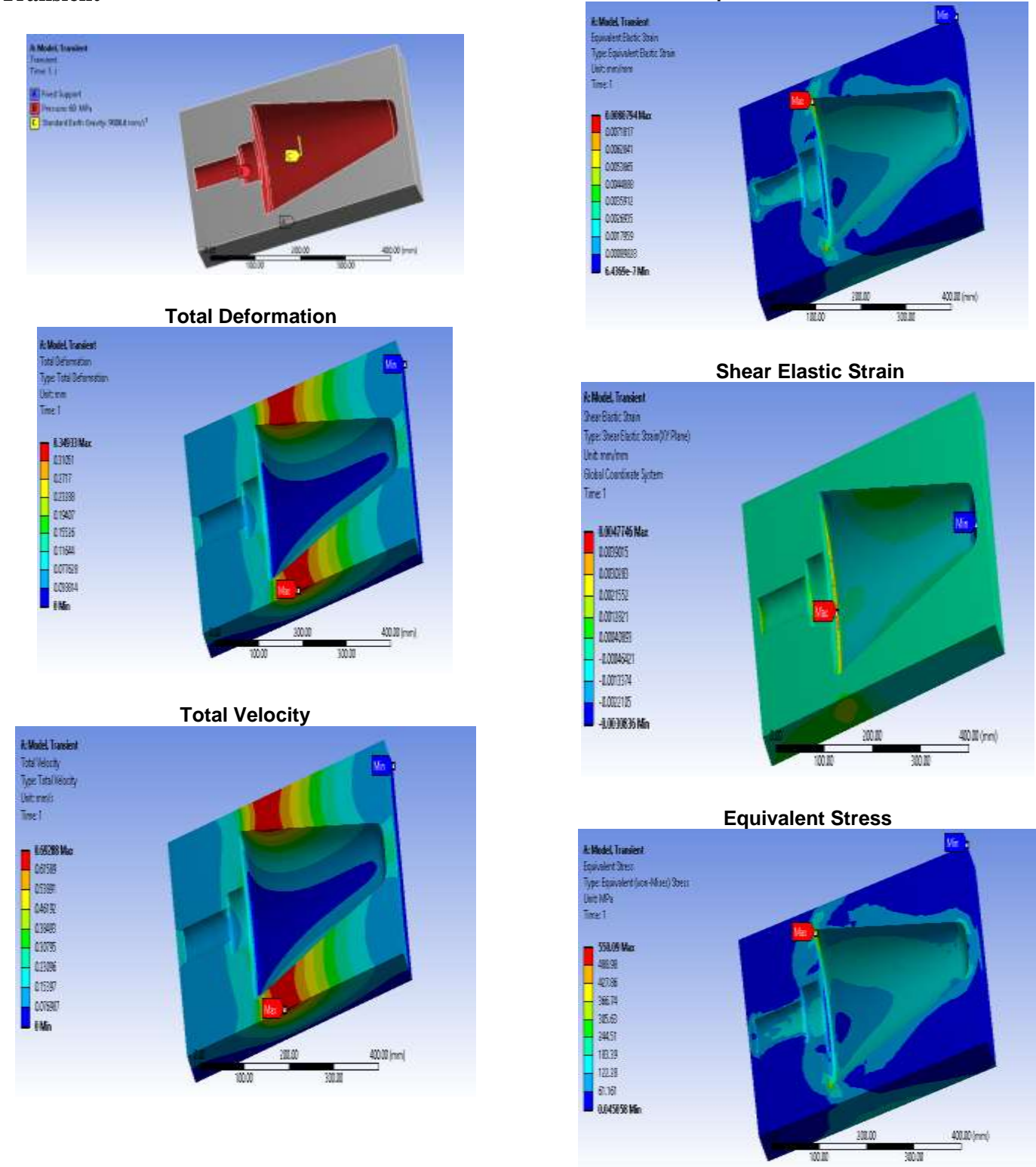


- **Material Data**
 - **EN AC-44300 alsil2 fe**

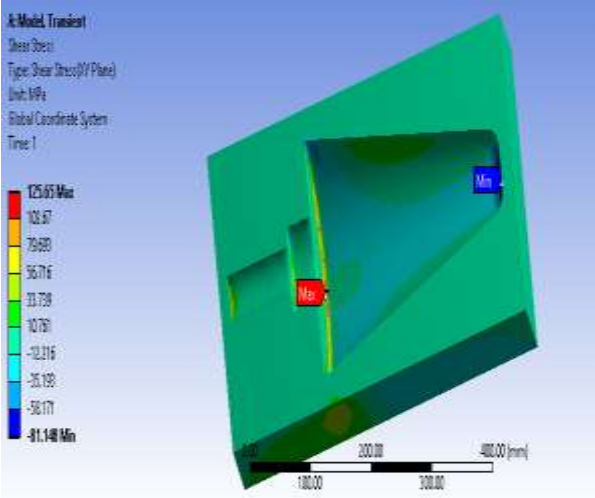
Mesh



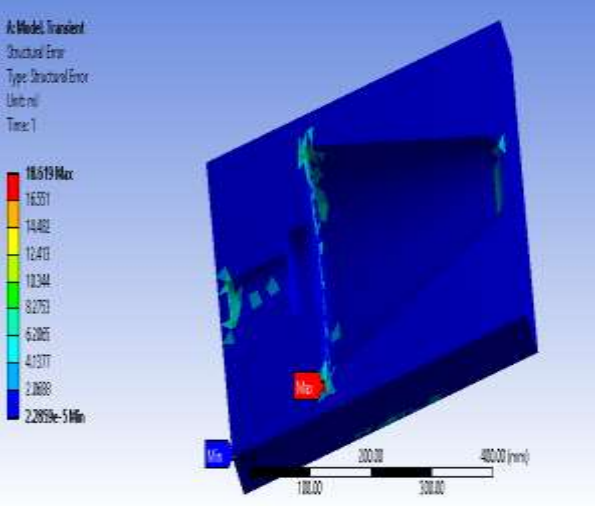
Transient



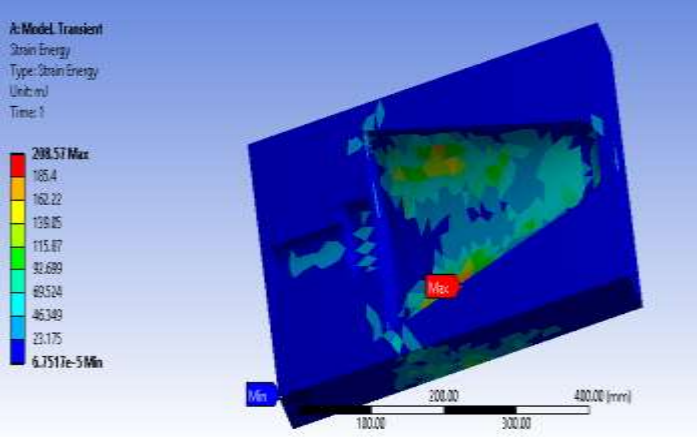
Shear Stress



Structural Error

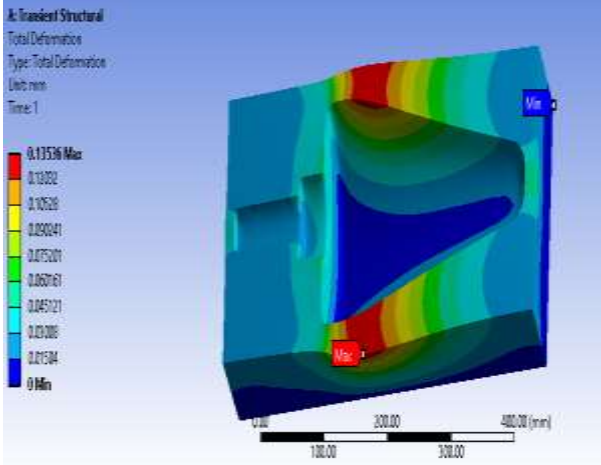


Strain Energy

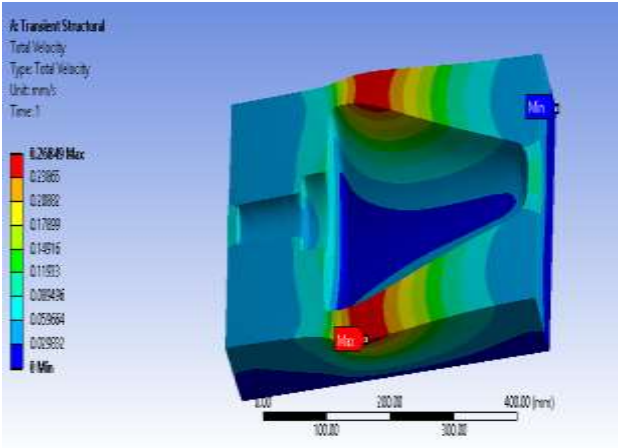


- Material Data
 - NICU30FE

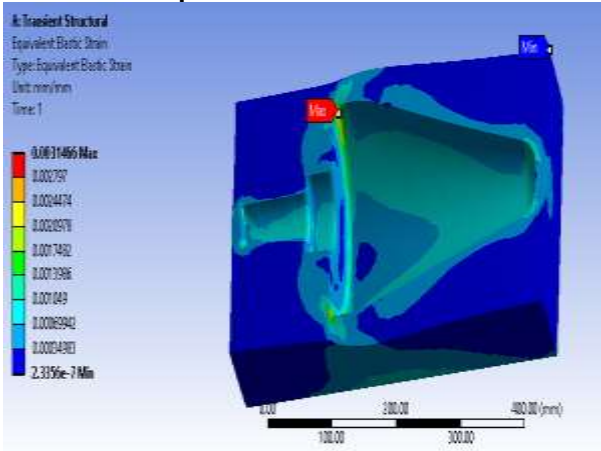
Total Deformation

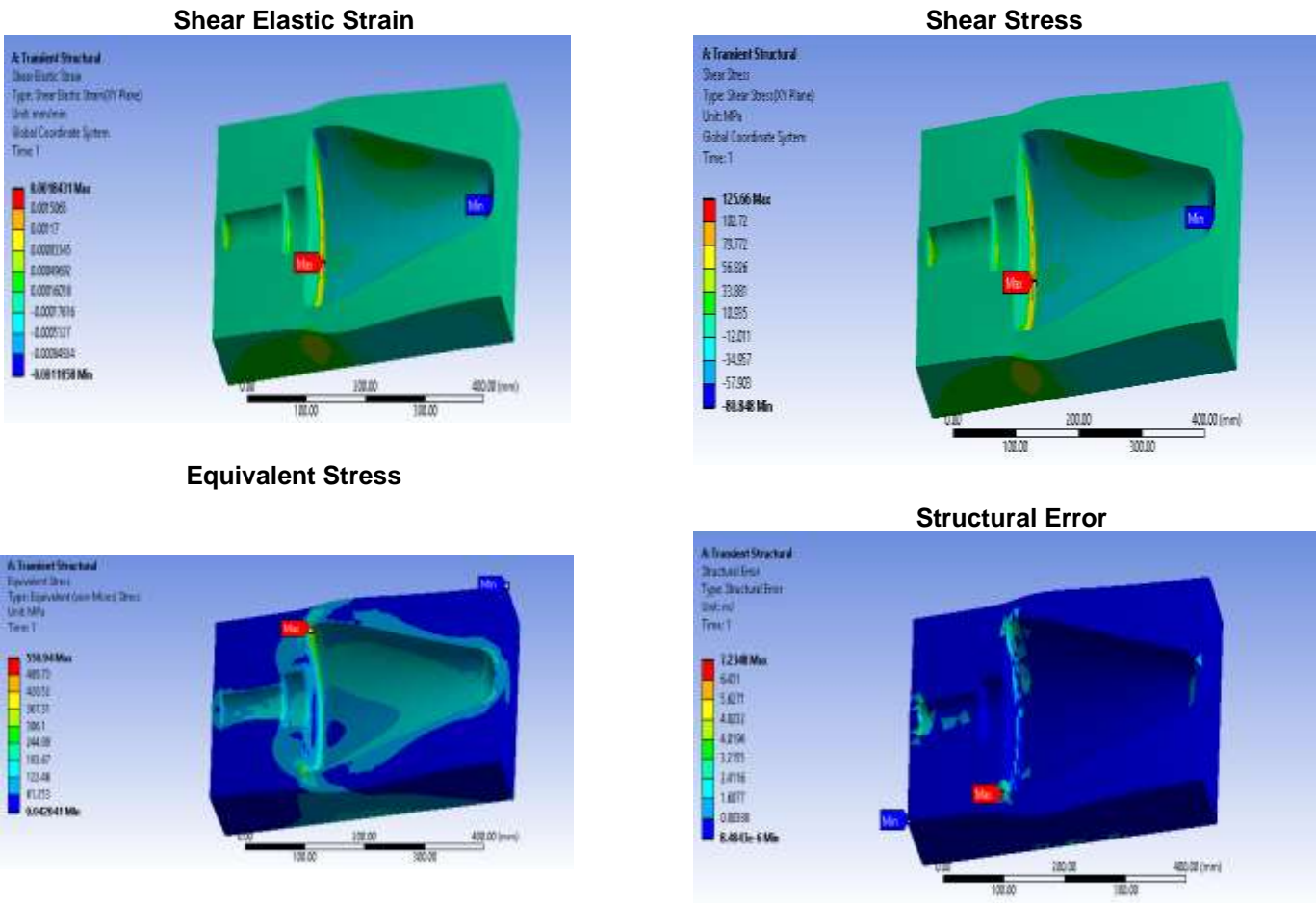


Total Velocity



Equivalent Elastic Strain





RESULTS

NICU30FE

Object Name	Total Deformation	Total Velocity	Equivalent Elastic Strain	Shear Elastic Strain	Thermal Strain	Equivalent Stress	Shear Stress	Structural Error	Strain Energy
State	Solved								
Results									
Minimum	0. mm	0. mm/s	2.3356e-007 mm/mm	- 1.1858e-003 mm/mm	0. mm/mm	4.2041e-002 MPa	- 80.848 MPa	8.4843e-006 mJ	2.5027e-005 mJ
Maximum	0.13536 mm	0.26849 mm/s	3.1466e-003 mm/mm	1.8431e-003 mm/mm	0. mm/mm	550.94 MPa	125.66 MPa	7.2348 mJ	80.454 mJ
Information									
Time	1. s								

EN AC-44300 als12 fe

Object Name	Total Deformation	Total Velocity	Equivalent Elastic Strain	Shear Elastic Strain	Thermal Strain	Equivalent Stress	Shear Stress	Structural Error	Strain Energy
State	Solved								
Results									
Minimum	0. mm	0. mm/s	6.4369e-007 mm/mm	- 3.0836e-003 mm/mm	0. mm/mm	4.5058e-002 MPa	- 81.148 MPa	2.2859e-005 mJ	6.7517e-005 mJ
Maximum	0.34933 mm	0.69288 mm/s	8.0794e-003 mm/mm	4.7746e-003 mm/mm	0. mm/mm	550.09 MPa	125.65 MPa	18.619 mJ	208.57 mJ
Information									
Time	1. s								

CONCLUSIONS AND FUTURE WORK

The research was devoted to modelling die casting process in order to predict the final casting shape. In order to achieve this goal, a simulation model was built to model the die casting process. Suggestions for research continuation and future work are also presented.

The conclusions are given for the simulation modeling. The simulation modeling conclusions are related to the modeling techniques used in the analysis, the effects of different factors on the simulation results and comparison between the casting distortion predictions.

A coupled finite element model was created to simulate the die casting process in order to predict casting distortion and residual stresses. Three material models were used to evaluate the effect of the selected material model on the simulation output. The following are the conclusions from the analysis of the simulation results:

- Most of the residual stresses in the casting are formed inside the die while the casting is restrained by the die steel. After ejection, and during cooling to room temperature, the residual stresses decrease and the casting relaxes to some extent. The amount of relaxation predicted by the simulation depends on the material model used.
- Using the elastic material model to simulate the mechanical behaviour of the casting overestimates the predicted residual stresses. The elastic-plastic material model shows much less stresses than the elastic one. The EN AC-44300 als12 fe material model predicts the lowest values of residual stresses. Using the EN AC-44300 als12 fe material models is increasing widely in the area of casting modeling, but the unavailability of the required material properties for aluminum alloys eliminates the efficient use of this model in die casting at present.

Future work

The research studied modelling the die casting process in order to predict the casting distortion. The research provided insights to different modeling techniques and criteria. The research also provided experimental work to verify and validate the simulation model. Several modifications can be added to the model to enhance its predictions:

- Modeling the rest of the machine parts. Adding more machine parts to the model will facilitate better solutions. An example for the parts that can be added is the rear platen and the toggle system.

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EXPERIMENTAL DESIGN AND STATIC, DYNAMIC AND THERMAL ANALYSIS OF BUFOR GUN'S MAZEEL BRAKE

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ABSTRACT

This project is focused on the design and analysis of forming tools for the Bofors gun Mazeel brake component. The idea of this project is to evaluate and analyse the forming process before actually developing the tools that could help to avoid expansive mistakes. to see the effect of MUZZLE deformation on the forming of sheet metals, strains, and spring back of the component and avoid the spring back by providing sufficient clearance and to find the best material of the bofors gun.

While converting a raw material to a finished product it is essential to have an accurate design of the product and also data required for manufacturing after completion of analysis.

The main objective of this project is the design and analysis of a Bofors gun Mazeel brake component based on the specifications given and with some design considerations. The modelling of the Bofors gun Mazeel brake is to be done in SOLIDWORKS. The stress and strain values induced on the various parts of the press tool will be evaluated using analysis software ANSYS 19.3.

1. INTRODUCTION

The Bofors forty-millimetre gun, typically cited merely because the antiaircraft, [is associate degree anti-aircraft auto cannon designed within the Thirties by the Swedish producer AB Bofors. It absolutely was one in all the foremost widespread medium-weight anti-aircraft systems throughout warfare II, employed by most of the western Allies furthermore as some captured systems being employed by the Axis powers. A tiny low variety of those weapons stay in commission to the current day, and saw action as late because the gulf War.

In the post-war era, the initial style wasn't appropriate for action against jet-powered craft, thus Bofors introduced a brand new model of considerably additional power, the forty metric linear unit L/70. In spite of sharing nearly nothing with the initial style apart from the calibre and therefore the distinctive round shape flash hider, this weapon is additionally wide known merely as "the Bofors". Though not as common because the original L/60 model, the L/70 remains in commission, particularly as a multi-purpose weapon for light weight armoured vehicles, as on the CV 90.

In the BAE systems Bofors is a part from March 2005



Fig 1. British Bofors 40 mm L/60 on Mk VII, Priddy's Hard, Gosport, United Kingdom

1.1 Weapon Systems

1.1.1 Dhanush



Fig 2. Dhanush

Dhanush could be a 155x45 Calibre autochthones gun developed by OFB. Dhanush as associate degree artillery system has verified to be one in every of the most effective amongst its category. a forty five Calibre towed gun system capable of targeting at long ranges incorporating autonomous egg laying options and having one in every of the foremost subtle suites of electronic and computing systems within the world. . The weapon has most vary larger than eight to ten Kms compared to the prevailing in-service 155mm x thirty-nine Cal Bofors Guns with higher accuracy. It will hearth every type of ammunition on the market with Indian Army.

1.1.2 130mm Up-Gunning



Fig 3. 130mm up gunning

130mm Gun is of Russian origin and was the most keep of the Indian Army for long. Indian Army needs to upgrade these Guns to 155/45 Cal, that will increase its vary from twenty seven click to thirty eight click.

OFB has completed the upgradation and prepared the prototypes. Internal firing trials of OFB guns conducted at PFFR from eleventh to twenty first Jan, 2016 satisfactorily. This is often AN autochthonic effort created by OFB.

1.1.3 155mm x 52 cal Towed Gun System



Fig 4 155mm x 52 Cal Towed Gun System

Indian Army features a demand of 155mm x fifty two Cal Towed Gun Systems, that RFP was floated. OFB, as a proactive approach, initiated action for developing 155mm x fifty two Cal Towed Gun Systems through in-house R&D efforts. As a neighbourhood of this effort, 155X52 Cal Towed.

Gun developed in-house by OFB has been proof dismissed with success in August 2015. This another

time proves in-house capability accessible with OFB to design/develop Artillery guns.

1.1.4 105mm vehicle mounted gun system



Fig 5. 105mm vehicle mounted gun system

In fashionable warfare the time of response and surprise component area unit are necessary to win any battle. Associate pretentious weapons mounted on a vehicle provide it with shoot-and- belt along capability to cut back latency and add the surprise component.

Considering the on top of demand, OFB has developed a Vehicle mounted 105mm gun system. Demonstration humour trial has been conducted at Artillery College, Deolali to gauge stability, accuracy, consistency and quality.

It is a very native effort with 100% sub-assemblies/components made indigenously.

1.1.5 KAVACH Chaff Launcher



Fig 6. KAVACH Chaff Launcher

Kavach could be a military service decoy system to distract radar-guided missiles from their targets and act as a system for protection. The Kavach decoy system releases chaff created of silver coated optical fibre. The chaff forms a muddle that remains suspended within the air in order that the incoming missile confuses the chaff because the actual target and gets barred onto the chaff rather than the particular target.

1.1.6 Naval Gun CRN-91



Fig 7. Naval gun CRN-91

The shut vary Naval-91 (CRN-91) may be a armed service version of the 30mm automatic gun put in on the Sarath ICV. The Gun has been developed by OF Medak in association with DGONA/Indian Navy. CRN-91 designed to be mounted on ships, and is created of special material suited to marine atmosphere.

The CRN-91 naval weaponry is gyro stabilised and is directed by electro-optic readying system (EOFCS) for day and night use. It can even be remotely operated. Because of its low its operational price, it's most suited to vessels primarily designed for period patrolling and policing, significantly for anti-insurgency, anti-smuggling, anti-pirate and maritime police work of exclusive economic zones (EEZ). It's been put in on several tiny warships. The autochthones CRN ninety one Gun with EOFCS provides them the requisite military posture to undertake their basic role of patrolling effectively.

2. Literature Review

Design optimization of Muzzle Brake for precision rifle M. Sherif same, Ossama R. Abdelsalam*, and Mohamed H. Muzzle brakes (MBs)

have an excellent result on reducing the recoil force of weapons throughout firing. During this paper, optimum MB potency, MB force and recoil force for (12.7 metric linear unit x ninety-nine mm) precision rifle are studied. The target is to get the optimum space of aspect openings, inclination angle and range of chambers for the MB so as to extend the MB potency and MB force and thereby to decrease their coil force of the weapon. Associate in nursing analytical model for conniving MB potency, MB force and weapon recoil force for MBs of 2, 3 and 4 chambers has been established. This Model is then utilised together with style of experiment and response surface methodology applied mathematics techniques to develop a swish response perform which may be with efficiency employed in improvement formulation. Finally, multi objectives generic algorithmic rule improvement methodology has been used to seek out the optimum MB style parameters.

Performance Analysis and Design Optimization of Two-Baffle Muzzle Brake of one hundred fifty five metric linear unit Artillery Gun, Anubhav Tiwari

one, Vighnesh Pawar one, Muzzle brake may be a device fitted at the muzzle finish of the tube to scale back the recoil energy by discharge some quantity of propellant gases sideways because the shot is discharged. the main focus of the study may be a two-baffle muzzle brake that has its immense application in most of the one hundred fifty-five metric linear unit bored barrel of advanced artillery guns of this generation. the target of the study is to research then optimize this style of two-baffle muzzle brake developed for one hundred fifty-five metric linear unit barrel of advanced towed artillery gun system. The performance characteristics of muzzle brake is measured in terms of its potency, instantaneous sound pressure levels (SPL) generated within the crew zone,

mechanical strength and sturdiness, considering the limitation on its weight that imposes instability at the muzzle finish and more effects the accuracy of the impact of shot on the target. The autochthonic machine ways and tools developed and valid in-house are used for the analysis and style optimisation cycles. the height pressure and also the velocity of the shot earned for intense firing condition is 450 MPa and 890 m/s, severally. The accomplishment of the study may be a three-baffle muzzle brake style efficiently 2 hundredth larger than current two-baffle muzzle brake, and alternative performance characteristics remained unrevised.

Computer motor-assisted style and analysis of a tunable muzzle brake Ekansh Chaturvedi*, Ravi K. Dwivedi,

This analysis work deals with the planning of a tunable muzzle brake [10] for a rifle divided in 5.56 a forty five international organisation ammunition. It proposes to resolve the matter of handling variations from shooter to shooter by incorporating the feature of tunability. Beside this, it conjointly solves the matter of demand of optimum recoil briefly recoil weapons. This innovation offers this style a grip over it's already existing counterparts within the market. the merchandise is meant victimization the interior ballistics calculations and also the investigations been performed victimization solid works flow simulation tool and ANSYS static structural to visualize the parameters like speed distribution, pressure growth, and muzzle brake force on the series of ports and comparison of the thus found results with those devised by the authors of the documents mentioned in references. This assures the market ability of the merchandise for satisfactory performance, once brought among its already existing counterpart, although with a small edge over them thanks to tunability. The results thus found shall be ended satisfactory concerning the performance of muzzle brake.

3. Problem Statement

The main objective of this project is to style forming press tool to manufacture a district with needed dimensional accuracy systematically over amount of your time to satisfy production needs by adopting the forming operation of a mazeel brake Bofors gun by mistreatment the high hardened steel to scale back the assembly time and price of producing of a part in single press tend. The most purpose of this press tool is to bend the high thickness (25mm) part in a very hot bending tool.

Objectives

To Design and drafting the press tool at intervals the out there press limits

To calculate the desired forming force and pad force

To static structural analysis of press tool main parts

SOLID WORKS software system for modelling of tool

Static structural analysis software system for applying hundreds on punch and die for to envision either the tool are going to be withstanding on the applied hundreds or not.

Specification

Sr.No	Specification	Value
Press Data		
1	Model No.	HS-630-2120X1800
2	Serial No.	H-1005
3	Force Capacity(max)	630 tonnes
4	Stroke (mm)	750
5	Day light (mm)	1000

6	Working pressure kg/cm ²	310
7	Bed area LRXFB (mm)	2120X1800
8	Ram rea LRXFB (mm)	2120X1800
9	Power kw	90X3.7X2.3
Cushion Data		
10	Cushion Force KN	2500
11	Cushion Stroke (mm)	350

The basic conception concerned during this technique to achieve the target of the systematic and proper tool style, a well-planned approach has been used and also the methodology consists of the subsequent.

Force Calculation

The bending load could also be calculated from the information of fabric properties and also the die characteristics as shown below:

$$F_b = \frac{KLst^2}{W}$$

F_b=bending force

K=0.33 for wiping bending die

Span W= r_d+r_p+c

r_d=die radius 15mm

r_p=punch radius 99mm

c=die clearance 25mm

For left edge

$$L=431.88$$

$$= 175 \times 1.5$$

$$W=99+25+15$$

$$=262.5 \text{ ton}$$

$$=139\text{mm}$$

$$\frac{E}{R} = \frac{M}{I} = \frac{\sigma_b}{y}$$

Left edge bending force

$$= \frac{0.33 \times 91 \times 431.88 \times 25^2}{139}$$

$$= 58315.45$$

$$=58 \text{ ton}$$

Same as right side

$$= \frac{0.33 \times 91 \times 431.88 \times 25^2}{139}$$

$$= 58315.45$$

$$=58 \text{ ton}$$

Total forming force

$$F_B = F_{B1} + F_{B2}$$

$$= 58315.45 + 58315.45$$

$$= 116630.9$$

Pad force (for ejection purpose)

$$F_P = 0.5 \times F_B$$

$$= 0.5 \times 116630.9$$

$$= 58315.45$$

Total force required

$$F_N = F_B + F_P$$

$$= 116630.9 + 58315.45$$

$$= 174946.35$$

$$= 175 \text{ Ton}$$

Pressing capacity = $F_N + 1.5$

Where

E – Young's modulus (N/mm²)

R – Radius of curvature (mm²)

σ_b – bending stress (N/mm²)

y – Neutral axis location (mm)

m – Moment (N.mm)

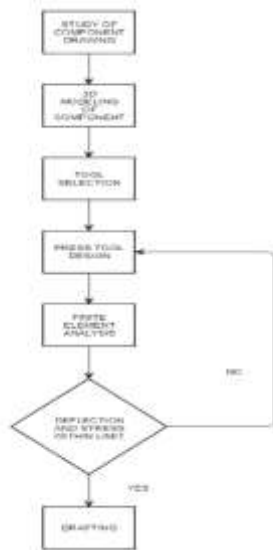
I -2nd moment of inertia (mm⁴)

Cost Estimation for Final Design:

Raw Material Cost

Material	Component	Raw Material size (mm)	Raw Material Volume (mm ³)	Material desity (kg/mm ³)	Raw Material Mass (kg)	Price/Kg (Rs.)	Quantity	Cost (Rs.)
T-90	Punch	500 x 350 x 206	36050000	7.73E-06	278.6665	90	1	25079.99
	die	650x 480 x 254	76440000		590.8812		1	53179.31
EN-36	Guide Bush	Ø90x 140	635850	7.85E-06	4.9914225	80	3	1197.941
	Guide Pillar	Ø60 x 430	1215180		9.539163		3	2289.399
C-45	Pusher	Ø40x 535	671960	7.85E-06	5.274886	70	2	738.484
	Stopper	Ø20 x 50	15700		0.123245		1	8.62715
	Locator	180x71 x20	255600		2.00646		1	140.4522
M.S	Top Plate	890x 690 x 60	36846000	7.85E-06	289.2411	60	1	17354.47
	Bottom Plate	890 x 690 x 70	42987000		337.44795		1	20246.88
TOTAL								120236

Design Methodology



4. Solid works

4.1 Introduction to Solid Works



Solid Works could be a solid modelling package (CAD) and computer-aided engineering(CAE) Trojan horse that runs on Microsoft Windows. Solid Works is printed by Dassault System.

Over three,246,750 product designers and engineers worldwide, representing 240,010 organizations, use SOLID WORKS to bring their styles to life—from the good gadgets to innovations that deliver a stronger tomorrow.

Dassault System SOLIDWORKS house offers complete 3D software system tools that permit you produce, simulate, publish, and manage your knowledge. SOLIDWORKS product square measure simple to find out and use and work along to assist you style product higher, faster, and a lot of cost-effectively. The SOLIDWORKS specialize in ease-of-use permits a lot of engineers, designers and alternative technology professionals than ever before to take advantage of 3D

in transportation their styles to life. It is headquartered at Waltham, Massachusetts, USA.

The latest version of Solid works was discharged on nineteenth Gregorian calendar month, 2016 as Solid works 2017.

4.10 Design of BG Components

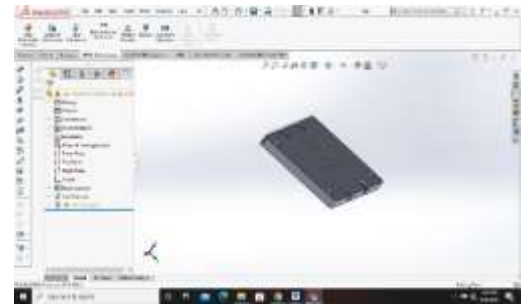


Fig 4.1 bottom pale

With the help of part we will do the bottom, with the help of sketch and futures options.

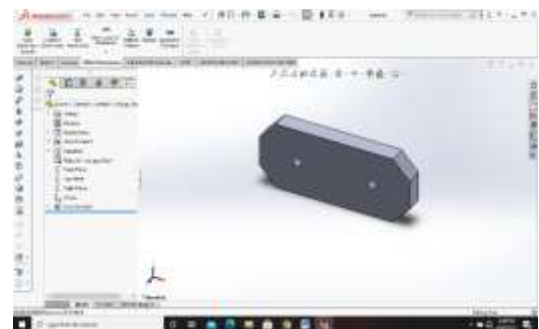


Fig.4.2 pusher

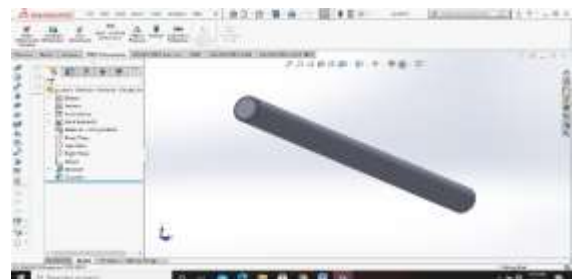


Fig. 4.3 pulley

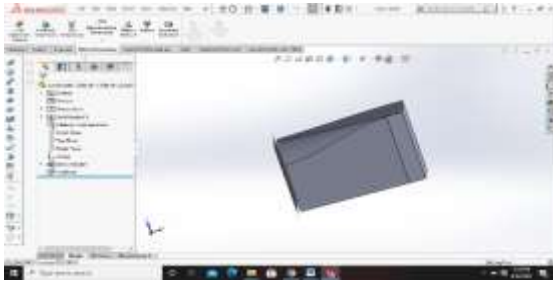


Fig. 4.4 bottom plate inside the body

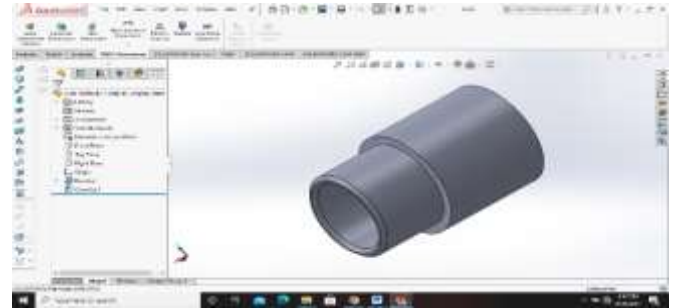


Fig 4.10 hollow bush

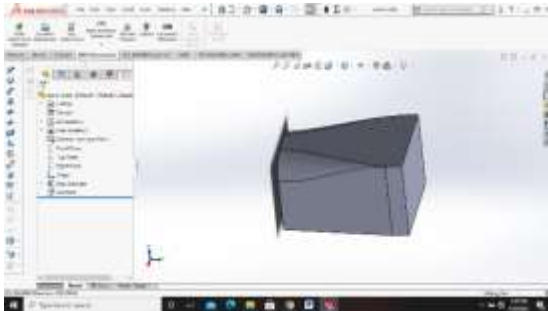


Fig.4.5 pusher block



Fig.4.11 bottom blaster

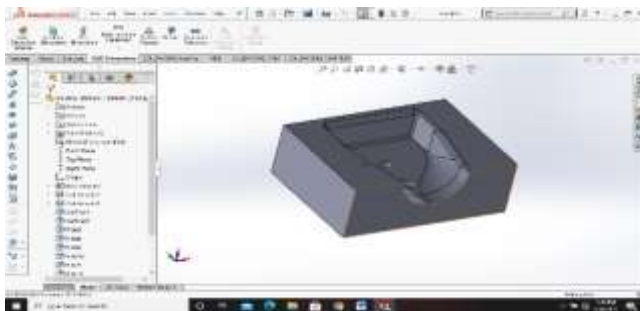


Fig 4.6 die plates



Fig 4.12 design of BG component

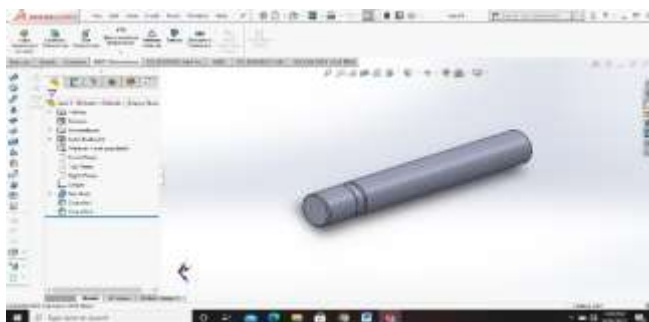


Fig.4.9 bush

5. Introduction to FEA

5.1 Introduction

Finite component Analysis (FEA) was initial developed in 1943 by R. Courant, WHO used the Ritz methodology of numerical analysis and decrease of variation calculus to get approximate solutions to vibration systems. Shortly thenceforth, a paper printed in 1956 by M. J. Turner, R. W. Clough, H. C. Martin, and L. J. Topp established a broader definition of numerical analysis. The paper targeted on the "stiffness and deflection of complicated structures".

By the first 70's, FEA was restricted to costly mainframe computers usually in hand by the astronautics, automotive, defence, and nuclear industries. Since the fast decline within the value of computers and also the fantastic increase in computing power, FEA has been developed to an implausible exactitude. Gift day supercomputers are currently ready to turn out correct results for every kind of parameters.

MATERIAL PROPERTIES

TITANIUM ALLOY



Titanium Alloy	
Density: 4.53e-06 kg/mm ³	
Structural	
Isotropic Elasticity	
Young's Modulus	103800 MPa
Poisson's Ratio	0.34
Shear Modulus	3.94e+04 MPa
Thermal Expansion Coefficient	8.4e-06 1/°C
Thermal Conductivity	7.0 W/mK
Specific Heat	4.8 J/kgK
Thermal	
Thermal Conductivity	
Specific Heat	4.8 J/kgK

Table 5.1 titanium alloy

CARBON FIBER:



Carbon Fiber (395 GPa)	
Density: 1.5e-06 kg/mm ³	
Structural	
Isotropic Elasticity	
Young's Modulus	395000 MPa
Poisson's Ratio	0.2
Shear Modulus	1.58e+05 MPa
Thermal Expansion Coefficient	1.2e-06 1/°C
Thermal Conductivity	1.0 W/mK
Specific Heat	0.8 J/kgK
Thermal	
Thermal Conductivity	
Specific Heat	0.8 J/kgK

Table 5.2 Carbon Fiber

NICKEL ALLOY:



nickel alloy	
Density: 8.9e-06 kg/mm ³	
Structural	
Isotropic Elasticity	
Young's Modulus	200000 MPa
Poisson's Ratio	0.3
Shear Modulus	76923 MPa
Thermal Expansion Coefficient	1.3e-05 1/°C
Thermal Conductivity	15 W/mK
Specific Heat	4.8 J/kgK
Thermal	
Thermal Conductivity	
Specific Heat	4.8 J/kgK

Table 5.3 nickel alloy

SILICON CARBIDE



silicon carbide	
Density: 3.1e-06 kg/mm ³	
Structural	
Isotropic Elasticity	
Young's Modulus	4.0e+05 MPa
Poisson's Ratio	0.18
Shear Modulus	3.24e+05 MPa
Thermal Expansion Coefficient	4e-06 1/°C
Thermal Conductivity	120 W/mK
Specific Heat	0.8 J/kgK
Thermal	
Thermal Conductivity	
Specific Heat	0.8 J/kgK

Table 5.4 silicon carbide

Static structural and steady state thermal analysis



FIG: -5.5 Structural and thermal analysis

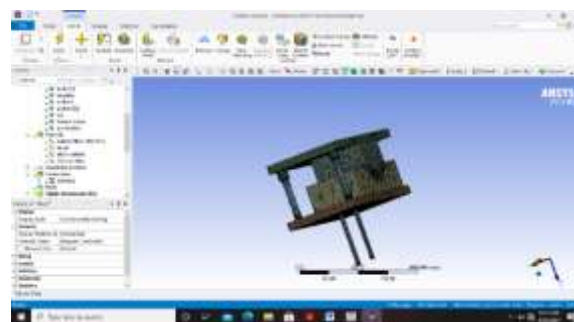


Fig:- 5.6 meshed file Fig5.7: - Fixed support, forces (boundary conditions)

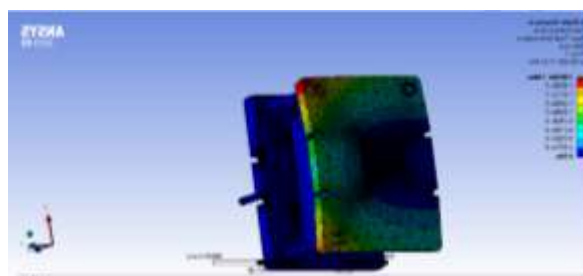


Fig5.8: -Total deformation for Titanium alloy

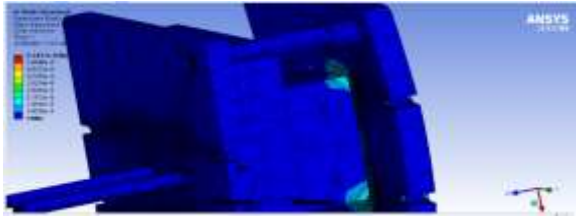


Fig 5.9 : -Equivalent Strain for Titanium Alloy

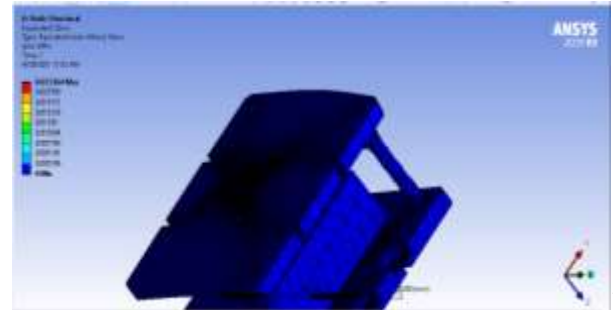


Fig 5.14 : - Equivalent (von-mises) Stress for Carbon fiber



Fig 5.11: - Equivalent(von-mises) stress

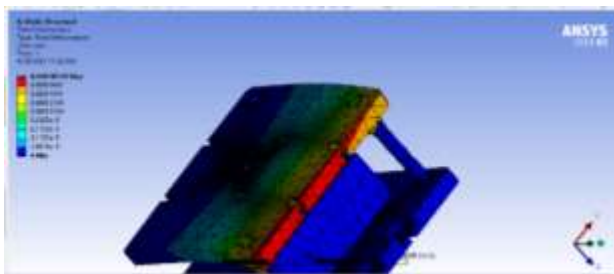


Fig 5.12: - Total deformation of carbon fiber

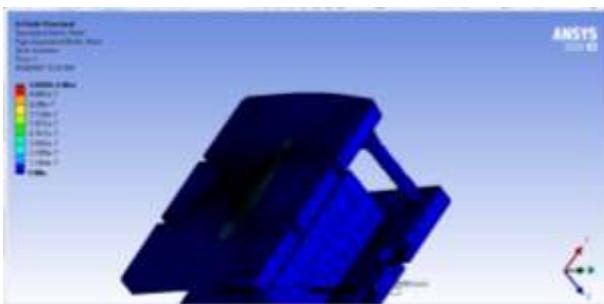


Fig 5.13 : - Equivalent strain for Carbon fiber

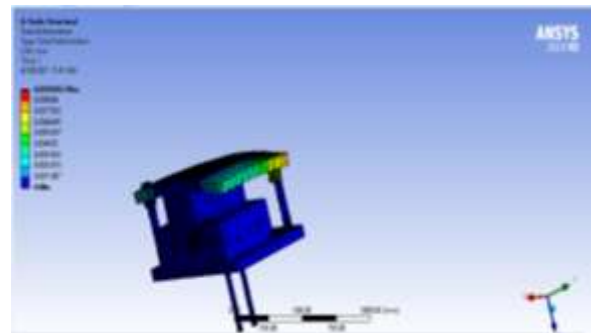


Fig5.15: -Total deformation of Nickel alloy

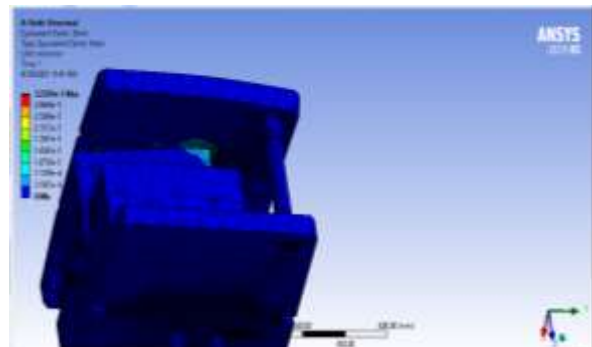


Fig 5.16: - Equivalent strain for Nickel alloy

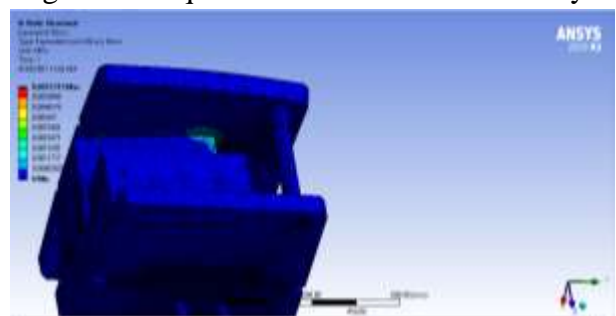


Fig 5.17: -Equivalent (von-mises) stress

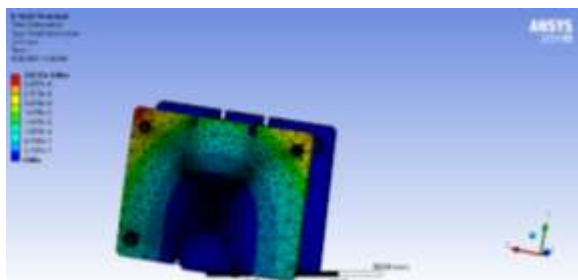


Fig 5.19: - Total deformation of Silicon carbide

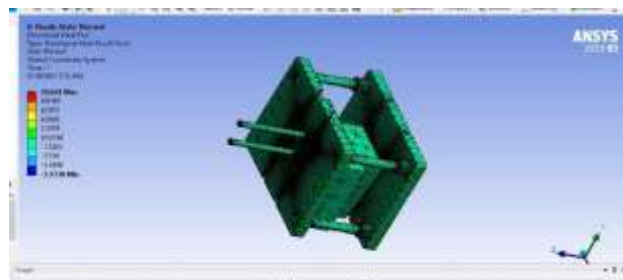


Fig 5.23: - Direction heat flux of silicon carbide

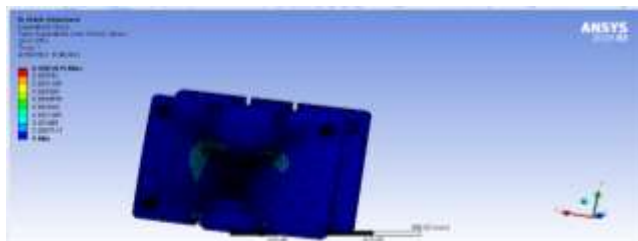


Fig 5.20:- Equivalent (von-mises) stress

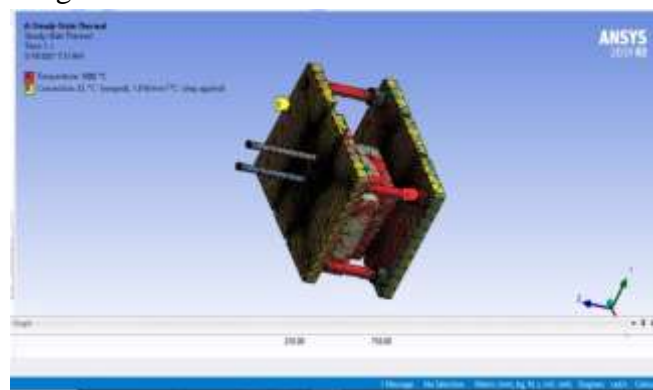


Fig 5. 24: - Heat flow by convection

THERMAL ANALYSIS :

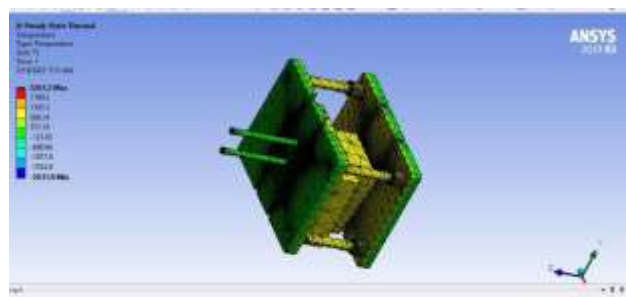


Fig 5.21 :-temperature

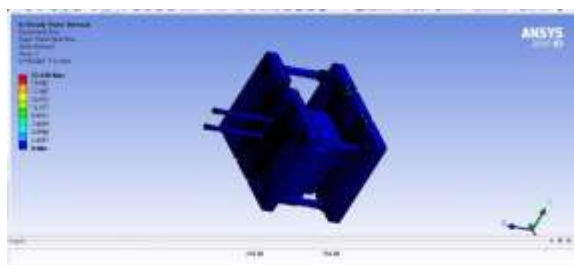


Fig 5.22: - Total heat flux of silicon carbide

6. Results

TABLES

6.1 STATIC STRUCTURAL ANALYSIS



Result Summary

Results	Minimum	Maximum	Units	Time (s)
Total Deformation	0.	1.8519e-004	mm	1.
Equivalent Elastic Strain	0.	1.0669e-006	mm/mm	1.
Equivalent Stress	0.	2.3364e-002	MPa	1.

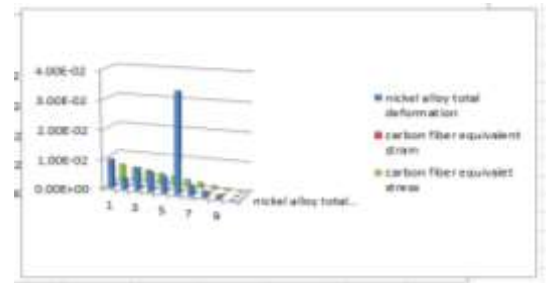
TABLE 6.1 SILICON CARBIDE Structural analysis

6.2 Steady state thermal analysis :

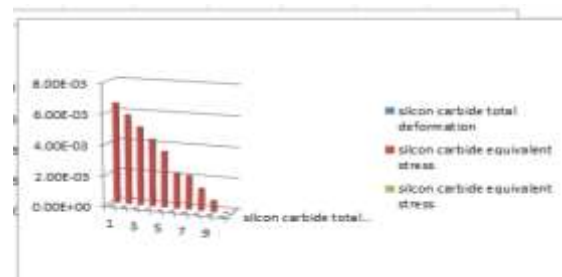


Result Summary

Results	Minimum	Maximum	Units	Time (s)
Temperature	-233.9	228.2	°C	1
Total Heat Flux	0	22.498	W/mm²	1
Directional Heat Flux	-7.1736	10.84	W/mm²	1



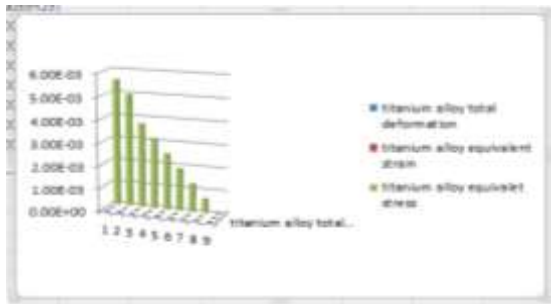
Graph 6.3 nickel alloy



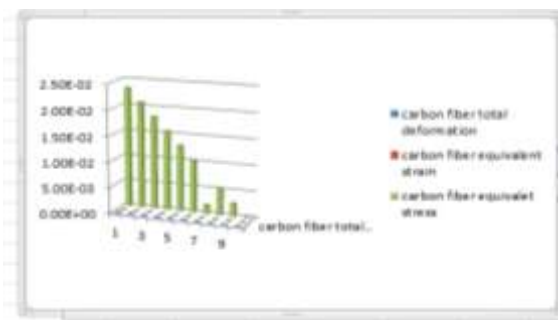
Graph6.4 silico carbide

TABLE 6.2 SILICON CARBIDE thermal analysis

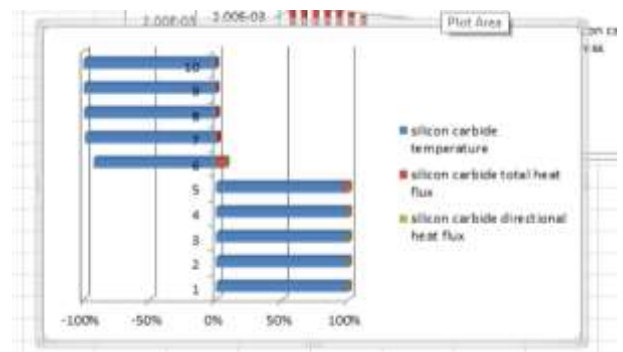
6.3 Graphs



Graph 6.1 titanium alloy



Graph 6.2 carbon fiber



Graph 6.5 silicon carbide temperature

CONCLUSION

- The design of BG component designed in solid works and static. Thermal analysis are done in ANSYS Workbench 2019 R3 version.
- When we compare the graphs this silicon carbide is the best material so thermal analysis done in silicon carbide.
- This thesis involves the design of bofors guns mazel brake; Forces required to operate the tool have been calculated using standard formulas

Future Scope

- Single compound tool which is able to perform each punching, Forming and non-cutting bend operation needed to supply the element.
- Automatic stock feed system.

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EXPERIMENTAL INVESTIGATION ON CI ENGINE WITH TERNARY BLENDS OF DIESEL AND BIODIESELS AS FUEL

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MALLAREDDY ENGINEERING COLLEGE (AUTONOMOUS), HYDERABAD

ABSTRACT

Bio-diesel is one of the most promising alternatives for diesel needs. The present work has focused on the performance of castor non-edible vegetable oil and Mustard oil edible vegetable oil and its blend with diesel on a double cylinder, 4 stroke, naturally aspirated, direct injection, water cooled, eddy current dynamometer Kirloskar Diesel Engine at 1500 rpm for variable loads. Initially, castor oil and their blends were chosen. The physical and chemical properties of Castor oil, Mustard oil and its blend were determined. In general, viscosity of neat vegetable oil is high, which can be reduced through blending with diesel and heating them. The performance and emission characteristics of engine are determined using Castor and Mustard oil and their blends with diesel. These results are compared to those of pure diesel. By analyzing the graphs, it was observed that the performance characteristics are reduced and emission characteristics are increased at the rated load compared to those of diesel. This is mainly due to lower calorific value, high viscosity and delayed combustion process. From the critical analysis of graphs, it can be observed that 10% of Castor oil and Mustard oil mixture mixed with 90% of diesel is the best suited blend for Diesel engine without engine modifications. It is concluded that castor and Mustard oil can be used as an alternate to diesel.

INTRODUCTION

India is one of the world's quickest developing countries, with supported financial turn of events, bringing about an enormous expansion sought after for petrol fills. As indicated by reports, India was the world's fourth greatest energy client in 2011, behind just the United States, China, and Russia. Because of a lack of petroleum derivative sources, the nation depends intensely on imported raw petroleum to fulfill its always expanding energy needs, which makes a critical financial difference. Thus, India should keep on investigating for choices to fulfill its future energy needs. Numerous scholars have researched different elective energizers for diesel motors during the most recent couple of many years. Numerous countries have a lot of horticultural region where biodiesel might be

produced at a moderate expense. Biodiesel is a fuel comprised of monoalkaline esters of long-chain unsaturated fats got from fatty oils like vegetable oil and creature fat.

A few investigations on the utilization of biodiesel in pressure start (CI) motors, both fixed and portable, have been distributed before.

It very well might be used as a fuel in diesel motors without requiring any significant motor changes, and it has about similar eco-friendliness and diminished molecule discharges as standard diesel. When contrasted with a diesel-powered motor, a biodiesel-energized motor has substandard virus stream qualities, more noteworthy thickness, and higher nitrogen oxide discharges. Environmentally friendly power sources incorporate wood, biomass, wind, and daylight. It likewise comes as nonrenewable petroleum derivatives like oil and coal, whose use dirties land, ocean, and, above all, the air we relax. Exceptional industrialization, energized for the most part by petroleum derivatives, has changed the substance of the earth during the most recent two centuries.

Without vehicles and power, current civilization would die. The developing speed at which human lives are changing has huge ramifications for the climate and the world's conveying limit. The modern upheaval has brought about a critical ascent in abundance for one fourth of the populace as well as huge disparities. Contamination and rising energy use affect a huge number of individuals. Sustainable power sources incorporate wood, biomass, wind, and daylight. It additionally comes as nonrenewable petroleum derivatives like oil and coal, whose utilization contaminates land, ocean, and, in particular, the air we relax. Phenomenal industrialization, powered for the most part by petroleum derivatives, has changed the essence of the earth during the most recent two centuries. Without autos and power, the present society would die. The developing speed at which human lives are changing has critical ramifications for the climate and the world's conveying limit.

The modern transformation has brought about a huge ascent in abundance for one fourth of the populace as well as huge imbalances. The equilibrium of the world's expanses of land, oceans, and climate has previously been affected by contamination and expanding energy utilization. The deficiency of biodiversity is especially huge. Luckily, a portion of these repercussions have been all the more all-around perceived during the beyond 25 years. Around 800 million barrels of oil have been scorched since the beginning of the oil period. Consistently, around 71 barrels of oil are scorched all through the globe. Furthermore, this utilization rate keeps on increasing at a speed of 2% consistently. At regular intervals, the 2% pairs the sum. It is assessed that somewhere in the range of 1000 and 1600 billion barrels of petrol utilization are ready to go, taking into consideration monetary recuperation. By 2010, the globe would have utilized around half of the whole amount that could be extricated actually and financially. At present utilization rates, 1600 billion barrels would be gone in 60 years. It is previous chance to think about other energy.

LITERATURE REVIEW

The cost of biodiesel and the nature of the feedstock are the two most significant components affecting its financial aspects (**Piazza, 2007**). Soybean oil, cottonseed oil, renderings, and waste oil, for instance, each have a buying cost subject to feedstock sum and geographic accessibility, contention with other feedstock applications, and result quality (Capareda, 2007).

Motor Performance Alternative powers and fuel blends may possibly be respected practical other options assuming motor execution is kept up with while using them. Brake compelling power (BEP), brake-explicit fuel utilization (BSFC), and warm productivity are three elements to think **about while ascertaining motor execution**.

Cetinkaya and partners (2005) When contrasting waste oil biodiesel with petrol diesel in a 75 kW four-chamber normal rail motor, the force drop was only three to five percent. Lin et al., (2006)[23] found that in a 2.84 L normally suctioned motor, unadulterated palm oil biodiesel created simply 3.5 percent less power at full burden than oil diesel.

Altiparmak et al. (2007) announced a 6.1 percent improvement in greatest force while using a 70 percent tall oil biodiesel blend. While utilizing tobacco seed oil biodiesel mixes to fuel a circuitous infusion diesel motor, Usta (2005) track down gains in force and power.

DIESEL ENGINE

Any gas powered motor in which air is packed to a sufficiently high temperature to touch off diesel fuel took care of into the chamber, making ignition and extension impel a cylinder. It changes the substance energy in the fuel into mechanical energy that might be used to push cargo vehicles, tremendous farm trucks, trains, and ships. Few cars, as well as specific electric creating sets, are diesel-fueled.

Burning of diesel

The diesel motor is a cylinder chamber gadget with irregular burning. It has a two-stroke or four-stroke cycle (see graph); yet, not at all like a gas motor with flash start, the diesel motor just infuses air into the burning chamber on the admission stroke. Pressure proportions in diesel motors are ordinarily in the scope of 14:1 to 22:1. Motors with exhausts (chamber measurements) less than 600 mm might have both two-stroke and four-stroke plans (24 inches). Two-stroke cycles are essentially only utilized in motors with exhausts greater than 600 mm.

Diesel motor with four strokes

A four-stroke diesel motor's standard cycle occasions incorporate a solitary admission valve, fuel-infusion spout, and fumes valve, as portrayed previously. The association of infused fuel with packed hot air in the chamber touches off the motor, which is a more proficient technique than the flash start gas powered motor.

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The diesel motor produces power by copying gas infused or showered into the chamber's packed, hot air charge.

The air should be warmed to a temperature higher than the start temperature of the infused fuel. Fuel splashed into air at a temperature more noteworthy than the fuel's "auto-start" temperature immediately joins with oxygen in the air and consumes. The temperature of the air inside the not set in stone by both the motor's pressure proportion and its present working temperature; be that as it may, at motor turnover up, supplemental warming of the chambers is once in a while utilized, in light of the fact that the temperature of the air inside the not entirely settled by both the motor's pressure proportion and its present working temperature. Since burning is started via air warmed by pressure as opposed to an electric flash, diesel motors are frequently alluded to as pressure start motors.

Compression Ignition (CI) Engine, and how can it work

A pressure start motor, regularly known as a CI motor, is a gas powered motor that utilizes hot packed air to touch off the fuel. Whenever air is compacted, it becomes hot, and this hotness is used to touch off the fuel and consume it. The air in this motor is sucked during the attractions stroke and afterward packed during the pressure stroke. Fuel is taken care of into the chamber at the finish of the pressure stroke, when it is lighted by the fieriness of packed air, and the consuming system begins. For this motor's activity, diesel is used as a fuel. It works on the Diesel Cycle idea. This sort of motor's pressure proportion normally runs from 14:1 to 22:1. It is found in rock solid vehicles like transports, trucks, and ships.

Pressure Ignition Engine's Main Components

Coming up next are the vital parts of a pressure start (CI) motor:

1. **Injector:** This part infuses gas into the chamber during air pressure.
2. **Delta valve:** During the attractions stroke, the air inside the chamber is sucked through the gulf valve.
3. **Exhaust Valve:** The exhaust valve is the place where the entire consumed or exhaust from the chamber is tossed out.
4. **Ignition chamber:** An ignition chamber is a space where fuel is singed.
5. **Cylinder:** A cylinder is a responding part of a CI motor that moves to and fro inside the chamber. Its main role is to move pushed force created during the power stroke to the driving rod through the associating bar.
The cylinder is associated with the driving rod by means of the interfacing bar.
7. **Driving rod:** This part changes over the cylinder's responding activity into rotational movement.

MATERIAL METHODOLOGY C.I ENGINE IN C.I ENGINES, VEGETABLE OIL

Bio-diesel is a biodegradable option in contrast to diesel fuel made from sustainable biodegradable sources like vegetable oil and creature fats. It is biodegradable, non-harmful, and radiates negligible degrees of contamination. It is likewise earth useful. The National Soy Diesel Development Board (presently National Bio-diesel Board), which spearheaded the commercialization of bio-diesel in the United States, named it bio-diesel in 1992.

Bio-diesel is comprised of mono-alkyl-esters of long-chain unsaturated fats got from inexhaustible lipid sources. The expression "bio-diesel" alludes to various ester-based oxygenated fills got from supportable organic sources. It very well might be used with next to zero change in pressure start Rudolf Diesel attempted vegetable oil as a fuel for his motor interestingly a century prior. With the presentation of minimal expense petrol, appropriate raw petroleum parts were handled for use as fuel, and diesel powers and motors started to advance pair. During World War II during the 1940s, vegetable oils were by and by utilized as a wellspring of fuel in crisis conditions. In light of the ascent in unrefined petroleum costs, restricted non-renewable energy source supplies, and ecological worries, there has been a recharged accentuation on the assembling of bio-diesel fuel from vegetable oils and creature fats. Bio-diesel can possibly bring down contamination levels and alleviate a dangerous atmospheric devotion.

A portion of the advantages of using vegetable oil in an I.C. motor are as per the following:

i) Vegetable oil is created in the United States, lessening the requirement for costly oil imports; (ii) Development of the biodiesel area will improve the homegrown farming economy of agribusiness based countries like India, particularly in provincial regions.

(iii) It is non-poisonous and biodegradable.

(iv) It is an inexhaustible fuel that might be created from disposed of agrarian items and different feedstocks.

(v) When contrasted with diesel, it has a 80 percent warming worth; (vi) It has an unobtrusive sweet-smelling content;

(vii) It has a low cetane number thus has a lower penchant to thump; (viii) Low sulfur content, making it eco-accommodating;

(ix) Improved lubricity, which wipes out the requirement for broad motor changes; (x) Personal wellbeing is expanded (streak point is 100 degrees Celsius more prominent than diesel); (xi) It might be utilized in existing oil diesel foundation (with least or no motor adjustments).

Coming up next are the critical deterrents to involving vegetable oil as an I.C. motor fuel: i) Feed stock homogeneity, consistency, and unwavering quality are in uncertainty; (ii) Feed stock

homogeneity, consistency, and unwavering quality are being referred to; (ii) Feed stock homogeneity, consistency, and steadfastness are being referred to; (ii) Feed stock homogeneity, consistency, and dependability are in

(iii) Product still up in the air by the provider, feedstocks, and assembling methodology; (iv) Storage and taking care of are tricky (particularly long haul stockpiling security);

(v) In mixes, the blaze point is unsound;

(vi) Compatibility with I.C. motor material ought to be researched further; (vii) Engine activity in chilly climate is troublesome with vegetable oils; (viii) Engine maker acknowledgment is one more significant test; (ix) Continuous accessibility of vegetable oils ought to be guaranteed prior to focusing on their far and wide use in I.C. motors.

Coming up next are the significant mechanical perspectives (comparable to the utilization of vegetable oils as powers in gas powered motors) that need more consideration:

Advancement of minimal expense quality checks;

(ii) Research into the impacts of oxidized fuel on motor execution and sturdiness; (iii) Emission testing with an assortment of feedstocks; (iv) Research into creating explicit business sectors, for example, mining and civil water supplies, that can determine bio-diesel as the fuel of decision for ecologically delicate regions; (v) Co-item improvement, like the savvy recuperation of glycerol;

(vi) Responses to fuel framework execution, material similarity, oil added substance similarity, and unfortunate fuel steadiness during long haul stockpiling; (vii) In request to help client and maker trust, progressing motor execution, emanations, and solidness testing in a scope of motor kinds and sizes is required.

(viii) Vegetable oil's ecological benefits over diesel fuel ought to be broadly broadcasted; (ix) In request to adjust cost and accessibility, studies are expected to limit creation costs, produce minimal expense feed supplies, and track down suitable business sectors.

(x) Research into the impacts of glycerol on motor toughness, discharges, and material similarity; (xi) Additives for expanding cold stream qualities, material similarity, and capacity oxidation anticipation, in addition to other things.

CASTOR SEED OIL

Castor oil is a non-unpredictable greasy oil extricated from the plants' beans. Its shade fluctuates from vapid to greenish. Blown castor and hydrogenated oil are two of its results. Materials, paints, stains, plastics, beauty care products, strands, hair oils, and drying oils all use castor oil. It's additionally used for clinical and customary medicines. The attributes of castor oil and diesel are thought about in Table 1.

Property	Diesel oil	Castor oil
Density (g/ml) at 30°C	0.84	0.956
Calorific value (kj/kg)	42000	36000
Viscosity (cst) at 30°C	5.0	78
Flash point (°C)	57	320
Fire point (°C)	65	345

OIL FROM MUSTARD SEEDS

Monterey County transportation specialists are exploring different avenues regarding putting biofuel produced using privately developed mustard plants in transport gas tanks.

Monterey-Salinas Transit authorities intend to have refined mustard-seed oil - to be joined with standard diesel fuel - from around 3,000 pounds of seeds assembled in August from a 10-section of land field in the King City district by December.

"We'll use our oil recently," said Hunter Harvath, the transportation office's partner head supervisor.

At the point when the seed can be squashed and cleaned decides the time. He expressed that since the wine grape pulverize is going all out, presses are in scant inventory during this season.

The mustard seed try began in February on San Bernabe Vineyards' 20-section of land property outside King City. To find which sort of mustard will produce the most seed oil, Pacific gold and wild California mustards were planted.

The objective is to see whether mustard might be a manageable, local option in contrast to maize and soy, which are the most well-known biodiesel fuel sources. As per Harvath, transports on the Monterey-Salinas Transit course presently run on 20% biodiesel got from soy beans.

Just the Pacific gold assortment was assembled in light of the fact that turnips overran the other field, making it challenging to gather the wild California seed with a consolidate, as per Harvath. Around 750 to 800 liters of biodiesel will be delivered from a ton and a portion of seed. He added mustard oil, as other biodiesel, would make up 20% of the fuel blend that drives the transports.

Authorities at MST are now arranging the following period of biofuel preliminaries. More land might be established later this pre-winter to exploit normal water system from winter downpours. Mustard, alongside different plants, will doubtlessly be examined for biofuel potential.

PROPERTIES	MUSTARD OIL	DIESEL
SPECIFIC GRAVITY	0.672	0.83
CALORIFICVALUE(MJ/KG)	42.1	43.22

FLASH POINT(K)	518	47
VISCOSITY	33.8	5.8
SULPHUR CONTENT(MGS/100G)	170.5	10
ACID VALUE	1.5	0
FIRE POINT(C)	90	64
CETANE NO.	47	49
MOLECULAR WEIGHT(G)	99.15	233

PROPERTIES OF CASTOR AND MUSTARD SEED OIL MIXTURE AND DIESEL

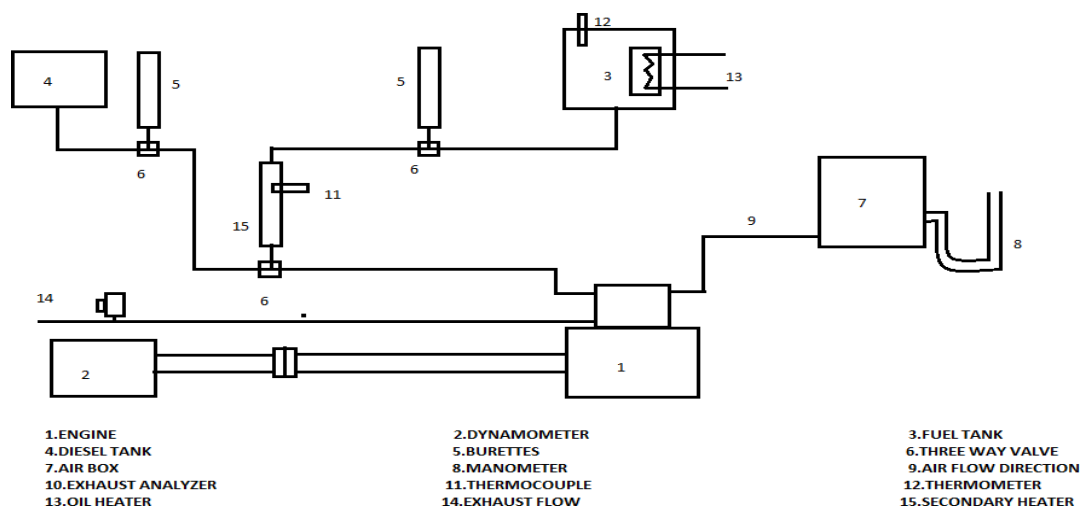
PROPERTIES	CASTOR OIL	MUSTARD OIL	MIXTURE	DIESEL
SPECIFIC GRAVITY	0.96	0.672	0.816	0.83
CALORIFIC VALUE(MJ/KG)	36.2	42.1	37.85	43.22
FLASH POINT(K)	317	518	417.5	47
VISCOSITY	226.82	33.8	130.31	5.8
SULPHUR CONTENT(MGS/100G)	20	170.5	95.25	10
ACID VALUE	1.642	1.5	1.57	0
FIRE POINT(C)	345	90	217.5	64
CETANE NO	40	47	43.5	49
MOLECULAR WEIGHT(GM)	932	99.15	515.575	233

EXPERIMENTAL SETUP AND PROCEDURE (CI) ENGINES

DIAGRAM OF (CI) ENGINES



Fig: 5.1 Diagram of (Ci) Engines



ENGINE SPECIFICATION

Engine	4s twin cylinder,water cooled,direct injecting,vertical,3.7 kw power
Make/model	Kirloskar tv 1
Bhp and rpm	10 bhp @1500 rpm
Bore*stroke	80mm*110mm
Compression ratio	17.5:1

PROCEDURE

To make the mix, join the castor oil with the mustard oil. The two oils are blended in extents of 50% and 50 percent. From that point onward, 10% of the combination is taken and 90% of diesel is taken to make the mix. This is the principal fuel that has been scrutinized. Then, at that point, to create the subsequent mixing, 20% of the blend is gathered and 80 percent diesel is joined. Additionally, a 30% blend is gathered and assessed. The mix oil is filled the gas tank, the motor is turned over, and the perusing for 0 burden is gotten, as well as the time it takes to utilize 20ml of oil. After then, the weight is dynamically raised to 0, 5, 10, 15, 20, and 25 kg.

Diesel

Load (Kgf)	Engine speed (rpm)	Time (sec.)	Ex. temp. (°c)	Fuel consumption (Kg/hr.)	Brake power (Kw)	Brake sp. Fuel consumption (Kg/Kw hr.)	thermal (%)
0	1500	74	260	0.81	0	0	0
5	1500	54	310	1.11	1.34	0.828	9.3
10	1500	45	340	1.33	2.7	0.492	15.7
15	1500	39	390	1.53	4.04	0.379	20.4
20	1500	33	420	1.81	5.39	0.336	23
25	1500	27	450	2.21	6.74	0.328	23.6

10% blending

	Engine speed (rpm)	Time (sec.)	Ex. temp. (°c)	Fuel consumption (Kg/hr.)	Brake power (Kw)	Brake sp. Fuel consumption (Kg/Kw hr.)	thermal (%)
0	1500	69.52	270	0.85	0	0	0
5	1500	52.9	315	1.12	1.347	0.8314	10.14
10	1500	42.71	360	1.39	2.695	0.519	16.32
15	1500	37.31	400	1.59	4.04	0.398	21.40
20	1500	31.46	450	1.89	5.39	0.35	24.05
25	1500	25.87	470	2.30	6.738	0.34	24.71

20% blending 30% blending

	Engine speed (rpm)	Time (sec.)	Ex. temp. (°c)	Fuel consumption (Kg/hr.)	Brake power (Kw)	Brake sp. Fuel consumption (Kg/Kw hr.)	η thermal (%)
0	1500	67.80	275	0.87	0	0	0
5	1500	48.4	320	1.23	1.347	0.91	9.26
10	1500	40.23	365	1.48	2.695	0.549	15.4
15	1500	34.23	410	1.74	4.04	0.43	19.64
20	1500	28.67	460	2.07	5.39	0.384	21.8
25	1500	23.53	475	2.53	6.738	0.375	22.51

Emission characteristics: Diesel

LOAD	HC	CO	NO _x
0	22	0.01	3
5	18	0.05	3
10	13	0.1	4
15	11	0.17	7
20	8	0.22	15
25	6	1.6	38

	Engine speed (rpm)	Time (sec.)	Ex. temp. (°c)	Fuel consumption (Kg/hr.)	Brake power (Kw)	Brake sp. Fuel consumption (Kg/Kw hr.)	η thermal (%)
0	1500	65.33	280	0.91	0	0	0
5	1500	46.6	330	1.287	1.347	0.95	8.92
10	1500	38.10	375	1.56	2.695	0.57	14.72

15	1500	32.05	420	1.83	4.04	0.45	18.82
20	1500	27.78	465	2.14	5.39	0.39	21.41
25	1500	22.69	490	2.62	6.738	0.38	21.91

10% blending 20% blending

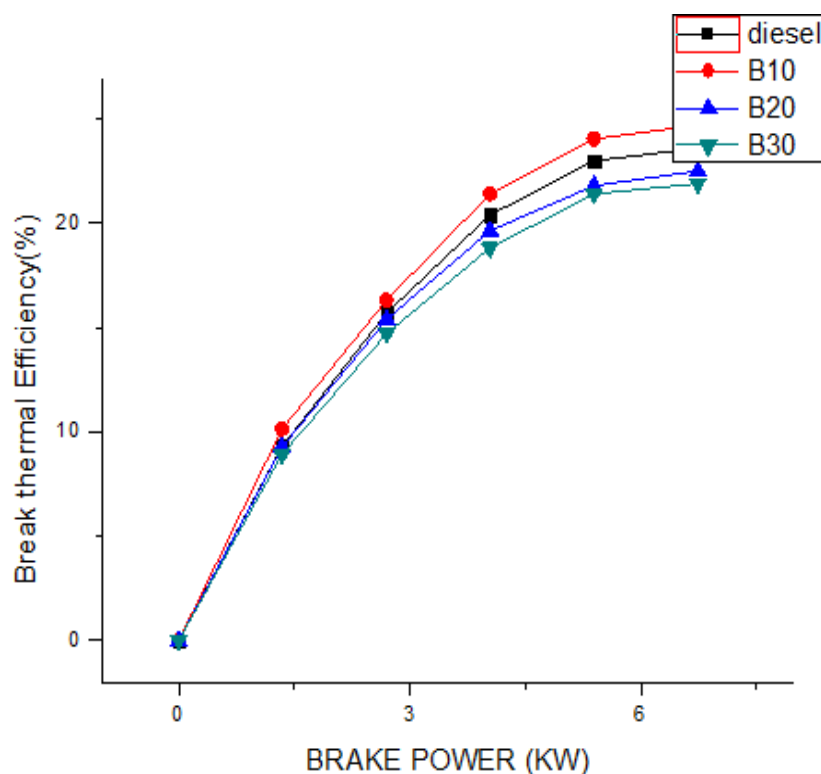
LOAD	HC	CO	NO _x

LOAD	HC	CO	NO _x
0	19	0.01	4
5	17	0.06	5
10	11	0.11	7
15	9	0.18	11
20	7	0.24	17
25	5	1.8	40
0	18	0.05	6

5	15	0.09	8
10	11	0.15	12
15	9	0.21	19
20	7	0.28	27
25	5	2.3	43

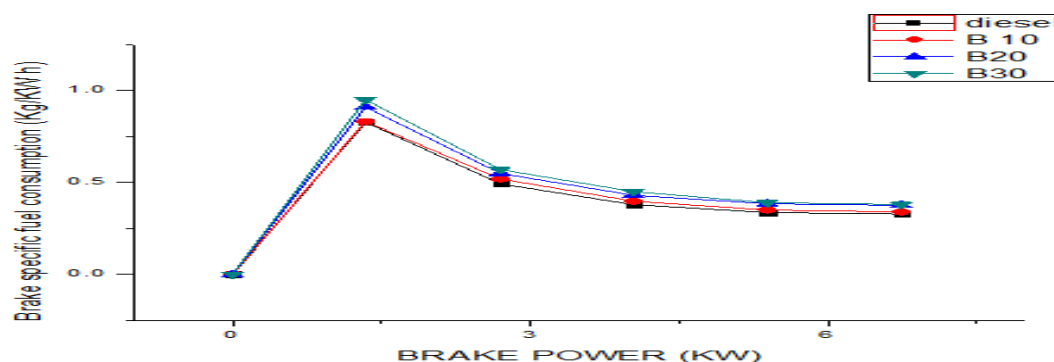
30% blending

LOAD	HC	CO	NO _x
0	16	0.07	9
5	14	0.12	11
10	7	0.18	16
15	5	0.23	20
20	4	0.31	32

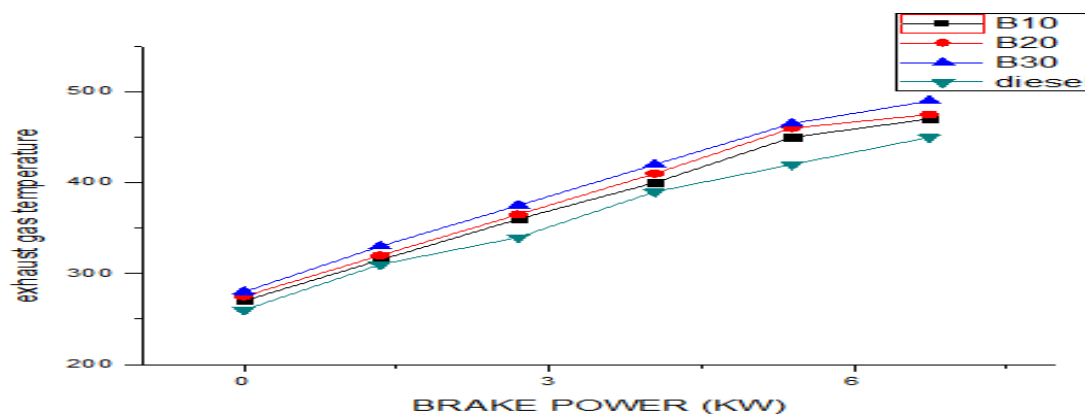
RESULT AND DISCUSSION*Performance characteristics***Break thermal efficiency v/s Brake power**

In contrasted with 20% mixing, 30% mixing, and unadulterated diesel, the break warm effectiveness of blending 10% is the best. At the point when we consolidate 10% of the time, we obtain the best outcomes

Brake specific Fuel Consumption V/S Brake Power



Explicit to brakes Pure diesel has the most reduced fuel utilization contrasted with 10%, 20%, and 30% blending.

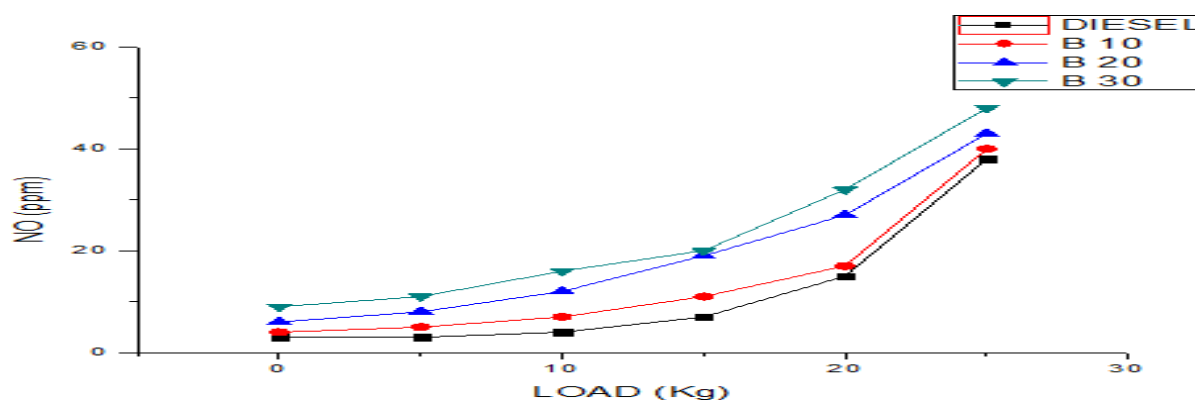


Exhaust Gas Temperature V/S Brake Power

In contrast with other blending, the temperature of the fumes gas on account of diesel is the least.

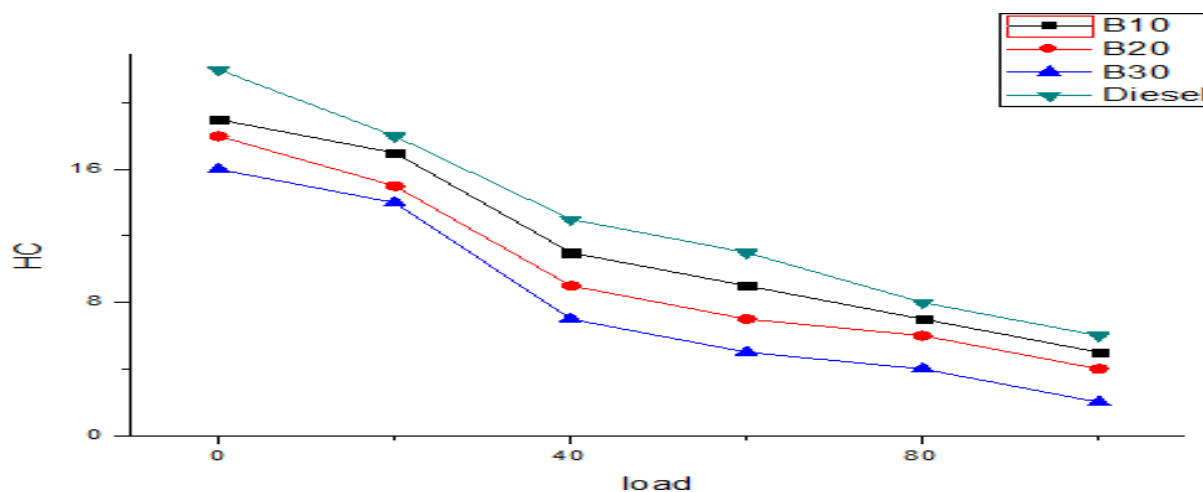
EMISSION TESTS

NO (ppm) V/S LOAD (%)



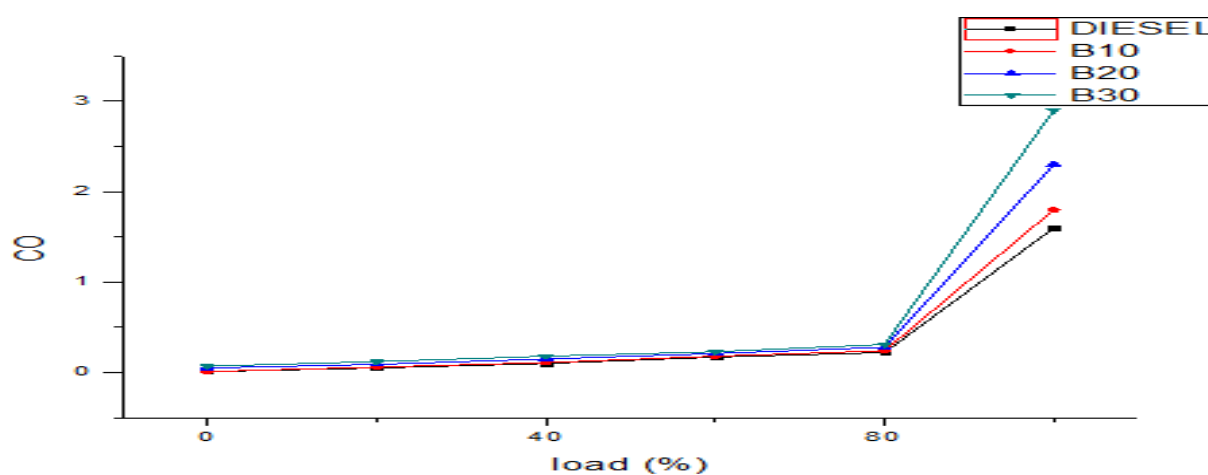
Since vegetable oils have a higher O₂ esteem than diesel, they consume more inside the chamber, bringing about a higher temperature inside the chamber, which is the essential wellspring of higher NO_x levels.

HC V/S LOAD (%)



The lower the HC rate, the higher the oxygen esteem. Since vegetable oils have a higher oxygen focus, they produce less hydrocarbons. As how much blend expands, the hydrocarbon content abatements.

CO V/S LOAD



Vegetable oil has a higher oxygen content than diesel, which functions as a chamber burning energizer. As a result, the burning is predominant than diesel. Therefore, CO, which is delivered because of deficient ignition, is lower in these oils than in others.

CONCLUSION

- As found in the charts above, 10% mixing gives the best exhibition and emanation attributes.
- Mixes have a lower Co, Unburned Hydrocarbon esteem than diesel. This is attributable to the way that fuel consumes more effectively inside the chamber than diesel.
- Because of the more prominent consistency and lower calorific worth of the fuel, the brake warm effectiveness and brake explicit fuel utilization of mixes are lower and higher (except if 10% mixing), separately, than diesel.
- Mixes have more noteworthy thickness, consistency, and glimmer point, and their calorific worth is practically 0.8 to 0.9 times that of diesel.

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STUDY ON COOLING TOWERS IMPROVEMENT OF EFFICIENCY AND EFFECTIVENESS INDUSTRIAL UTILISATION

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ABSTRACT:

In many industries, cooling towers are used to cool space to send heat out through cooling systems and condensers. Thus, the analysis and cooling system is primarily a vapor compression cooling system, which we call a chiller or chilling system.

The use of chemicals to improve plant efficiency through the scale and corrosion removal process, reduces the fouling factor. The quick process increases this temperature and pressure for the cooling product, but there are several advantages to doing so. The properties of the chemicals increase the efficiency of the increased cooling system and expand the optimum temperatures and relative humidity. Descaling means destroying the bio-dispersant and corrosive cells or particles; It is also anti-fouling. Cooling towers are based on a pump system that leads pumps to play an important role in this system and to continue working, chemical characterization measure to the potential of hydrogen (PH) and total dissolved solids (TDS). The whole article is made of heating ventilation and air conditioning (HVAC) systems and chemicals utilization. This is based on the water-cooled chiller and induced counter-flow Cooling Tower.

Keywords: Cooling tower, Refrigeration system, Chiller plant, Descaling chemicals, Effectiveness, Efficiency, Temperatures, Relative Humidity(RH), Spray nozzle.

NOMENCLATURE:

CT:	Cooling Tower
TDS:	Total Dissolved Solids
PH:	Potential of Hydrogen
WBT:	Wet Bulb Temperature
DBT:	Dry Bulb Temperature
HVAC:	Heating Ventilation and Air-conditioning
VCRS:	Vapour Compression Refrigeration System
Range:	Difference of CT inlet to CT outlet
Approach:	Difference between CT inlet to the wet bulb temperature of air

1. INTRODUCTION

1.1. History

Cooling Tower were introduced in 19th century where condenser worked on steam engines, condenser relatively cooling refrigerant by cooling water with cooling tower. In most of the cases removing vapour from the condensed water, by doing these temperatures were reducing [1]. The power plants boiler was used to generate energy likewise steam was worked in steam turbine for run the generator

[2]. Whereat exit of steam turbine converted liquid to travel through the condenser and rejects heat from it. The Cooling tower took liquid water then reduces temperature range (3°C - 5°C). Classification of Cooling towers below tree chart art.

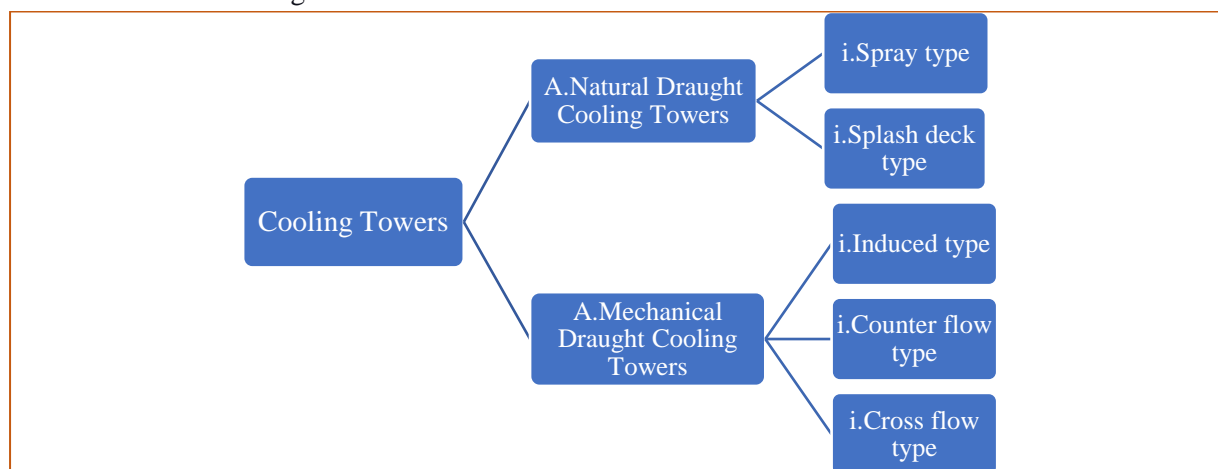


Figure 1. Illustration of Cooling towers

Cooling Towers which means that tower inside is cooling by contact of air, which is classified as Natural and Mechanical draught Cooling Towers. This is shown above the classification of cooling towers.

Natural draught which is based on fill fitting means that no external air use or atmospheric air use, made it tower-like structure, types which are Spray and Splash deck, Spray type which fills arrangement i.e., horizontal rectangular space of fill throughout of hot water and trapping of air. In Splash deck type is attached vertically faced towards the air.

Mechanical Draught Cooling Towers which are based on the external agent i.e., fan, cooling manner fan was revolving and suck air from air grills, types which are Induced, Counter and Cross flow. Induced suck air inward through crossing the fill, Counter flow which hot and cold fluid enter opposite with each other of flow and have fan, Cross flow which is the hot and cold fluid mixed to the flow with help of a fan.

1.2. Objectives of Cooling Tower

In recent scenario Cooling towers mostly and mainly used purpose of rejecting heat from the condensed liquid and so decided to compare the values of calculations.

1.3. Evaluation of Cooling Tower:

- Types of Chemicals & Chemical Composition
- Characteristics of Chemical
- Descaling Properties & Corrosion Resistance
- Measuring of PH And TDS
- Dry Bulb Temperature and Wet Bulb Temperatures of Air.
- Condenser Temperatures and Pressures Drop
- Temperature of Cold Water and Hot Water @ Cooling Tower

1.4. Methods & Materials

The water-cooled chillers respectively to the rejection of heat. Rejection of mainly thermal and hot gases sends the liquid into the atmosphere in the same way it sends through a pump to an evaporator. Most of the cooling systems were water evaporation which are been listed below.

- Chiller Plant
- Cooling Tower
- Antiscalates Chemicals
- Sling Hygrometer
- Refrigerant

2. LITERATURE SURVEY

The purpose of the study is to first determine the factors that contribute to the water quality of the cooling towers and secondly to determine the potential water quality of the high, medium, or low pollution. Questionnaires were sent to various locations with cooling towers to understand which factors contribute to possible water pollution in cooling towers [3].

The questionnaire covered geographical location, construction applications, maintenance practices, installation of cooling towers, and water treatment. In addition to completing the questionnaire, the site was also asked if it was ready to send water samples from the cooling tower [4].

After receiving the site sending water samples, the site received a sample collection kit. The kit included instructions for collecting samples, two bottles of water, bottle labels, and prepaid postal address tags for the night, two bottles were provided to the site to have enough water to conduct the necessary tests [5-7]. More than half of the bottles were received and refrigerated within 48 hours of the sample being taken.

This analysis and execution process make up water, temperature setpoints, pressure, and psychometrics properties such as specific and relative humidity, wet and dry bulbs temperature, and dew point temperature along with chemicals [8].

This is a circulating process with the above equipment and works water coolers. Cooling tower designs such as conical, spherical, and square shapes, as well as counter flow and cross-flow types [9-10].

2.1. Principal of Operation

A cooling tower is a structure for cooling water in circulating water systems. In industry, cooling towers are used for cooling of refrigeration equipment, machinery-molders, plastics, chemical refining, chemicals for the cooling equipment to protect it from rapid destruction under the influence of high temperatures (e.g., cylinders, compressors, industrial furnaces masonry), etc.

The scale was formed by the heating of water in metal tubes, which means that condenser inlet, cooling tower makeup water comes contact with tubes then transmitting while refrigerant heat absorbing in it, flow through outlet of the condenser to cooling tower inlet then the process goes on cyclically.

2.2. Chemical Characteristics

2.2.1 Characteristics

- Removing scale and destroy in it.
- Most economical and strongest acid reaction with dissolving scale.
- Efficient and safe need to maintain
- Its low odour biodegradable
- It will allow ph colour indicator.
- Improve service life
- Improve efficiency of whole system.

S.No.	PARAMETERS	COOLING TOWER ANALYSIS	
		Previous	Present
1	pH	8.1	7.7
2	Hardness as Ca (mg/ltr)	24	30
3	Total Hardness (as CaCO_3) (mg/ltr)	60	74
4	Total Dissolved Solids TDS (mg/ltr)	325	310
5	Conductivity ($\mu\text{m}/\text{cm}$)	500	550

Table 1. Chemical composition analysis with values

Above Table 1. Which values taken by specific application pH meter, TDS meter and Conductivity meter. The samples of data taken before adding of chemicals and after adding chemicals respectively.

3. EXPERIMENTAL METHODOLOGY

The below schematic diagram of Induced Cooling Tower is used for experimentation work.

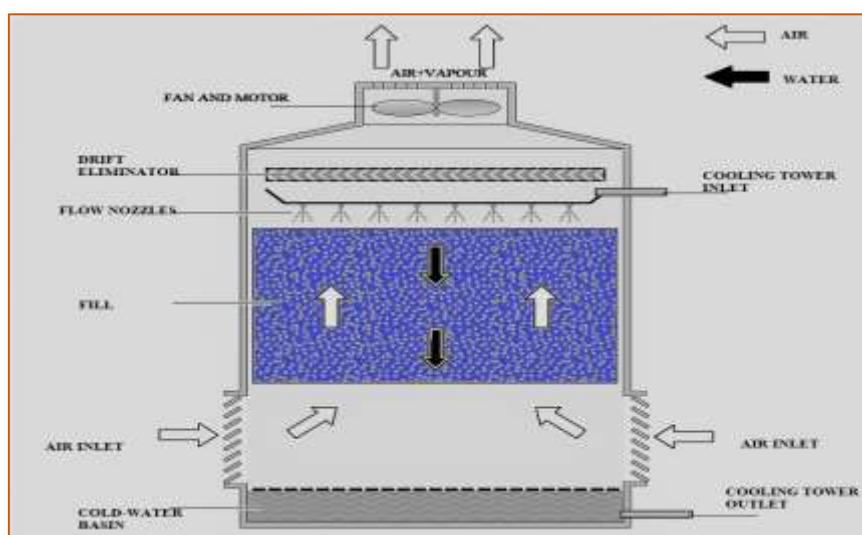


Figure 2. line diagram of Induced draught Cooling Tower

3.1. Cooling Tower Procedure:

Parameters	T ₁	T ₂	T ₃
Inlet Temperature (°C) (T _i)	27	28.1	30.1
Outlet or Discharge Temperature (°C) (T _o)	24.1	24.7	26
Dry bulb Temperature (°C)	28.2	28.6	30.1
Wet bulb Temperature (°C)	23.6	24.2	24.8
Depression (°C)	4.6	4.4	5.3
Ambient Temperature of air (°C)(T _a)	23.4	24.0	25.3
Saturation Temperature (°C)	27.3	28.5	30.7
Superheat Temperature (°C)	0.7	1.1	1.2

Parameters	A	B	C
Condenser Pressure (kPa)	610	636	685
Specific Enthalpy (kJ/kg) @ Hot Temp.	113.7603	118.3815	126.7838
Specific Enthalpy (kJ/kg) @ Cold Temp.	101.6377	104.1702	109.6497
Specific Enthalpy (kJ/kg) @ Wet Bulb temp.	99.0741	101.5836	104.0929

Table2. All Recorded Temperatures

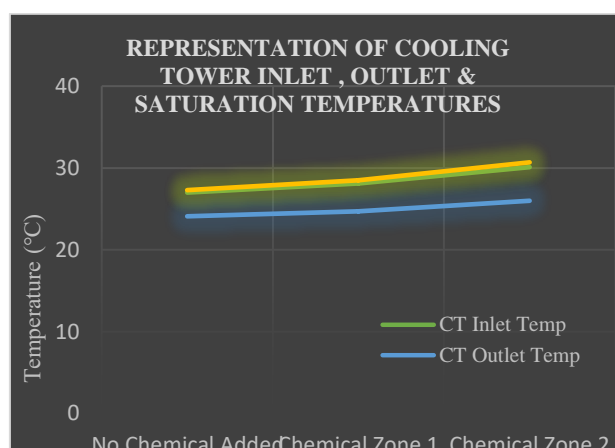


Fig.3. Graph of Temperatures of Cooling Tower with Chemical

3.2. Observation and Calculation

➤ Cooling Tower Effectiveness:

$$\text{Cooling tower Effectiveness } (\varepsilon) = \frac{\text{Range}}{\text{Range} + \text{Approach}} \times 100 (\%)$$

A. COOLING TOWER EFFECTIVENESS

$$\text{Cooling tower Effectiveness } (\varepsilon_A) = \frac{(27.0 - 24.1)}{(27.0 - 24.1) + (24.1 - 23.6)} \times 100 = 58.29 \%$$

B. COOLING TOWER EFFECTIVENESS

$$\text{Cooling tower Effectiveness } (\varepsilon_B) = \frac{(28.1 - 24.7)}{(28.1 - 24.7) + (24.7 - 24.2)} \times 100 = 87.17 \%$$

C. COOLING TOWER EFFECTIVENESS

$$\text{Cooling tower Effectiveness } (\varepsilon_C) = \frac{(30.1 - 26.0)}{(30.1 - 26.0) + (26.0 - 24.8)} \times 100 = 77.35 \%$$

➤ **Cooling Tower Efficiency**

$$\text{Cooling tower Efficiency } (\eta) = \frac{T_i - T_o}{T_i - T_a} \times 100 (\%)$$

A. COOLING TOWER EFFICIENCY

$$\text{Cooling tower Efficiency } (\eta_A) = \frac{27.0 - 24.1}{27.0 - 23.4} \times 100 = 80.55 \%$$

B. COOLING TOWER EFFICIENCY

$$\text{Cooling tower Efficiency } (\eta_B) = \frac{28.1 - 24.7}{28.1 - 24.0} \times 100 = 82.92 \%$$

C. COOLING TOWER EFFICIENCY

$$\text{Cooling tower Efficiency } (\eta_C) = \frac{30.1 - 26.0}{30.1 - 25.3} \times 100 = 85.41 \%$$

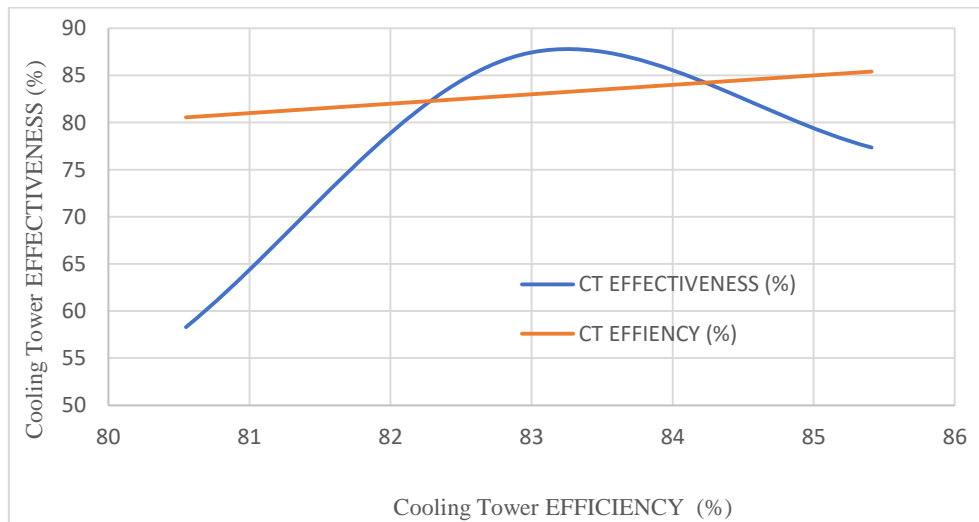


Fig.4. Cooling Tower Effectiveness vs Efficiency Graph Representation

➤ **L/G Ratio**

$$\frac{L}{G} \text{ Ratio} = \frac{h_2 - h_1}{T_1 - T_2}$$

A. L/G Ratio

$$\frac{L}{G} \text{Ratio (A)} = \frac{113.7603 - 101.6377}{27.0 - 24.1} = 4.1802$$

B. L/G Ratio

$$\frac{L}{G} \text{Ratio (B)} = \frac{118.3815 - 104.1702}{28.1 - 24.7} = 4.1797$$

C. L/G Ratio

$$\frac{L}{G} \text{Ratio (C)} = \frac{126.7839 - 109.6497}{30.1 - 26.0} = 4.1790$$

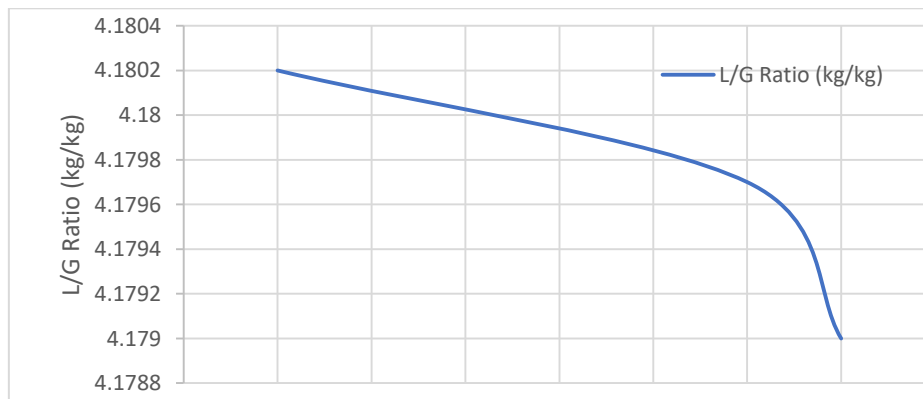


Fig.5. L/G Ratio (kg/kg) graph representation

➤ EVAPORATION LOSS

$$\text{Evaporation Loss} = 0.00085 \times 1.8 \times m \times (CT_{in} - CT_{out}) \text{m}^3/\text{hr}$$

A. EVAPORATION LOSS

$$\text{Evaporation loss} = 0.00085 \times 1.8 \times 1250 \times (2.9) = 5.54625 \text{m}^3/\text{hr}$$

B. EVAPORATION LOSS

$$\text{Evaporation loss} = 0.00085 \times 1.8 \times 1270 \times (3.4) = 6.60654 \text{m}^3/\text{hr}$$

C. EVAPORATION LOSS

$$\text{Evaporation loss} = 0.00085 \times 1.8 \times 1260 \times (4.1) = 7.90398 \text{m}^3/\text{hr}$$

➤ BLOW DOWN LOSS

$$\text{Blow Down Loss} = \frac{\text{Evaporation Loss}}{\text{Cycle of Concentration} - 1} (\text{m}^3/\text{hr})$$

1. Blow down = $1.196 \text{m}^3/\text{hr}$
2. Blow down = $1.205 \text{m}^3/\text{h}$

$$\text{Blow down} = 1.305 \text{ m}^3/\text{hr}$$

➤ MAKE UP WATER CONSUMPTION

$$\text{Make up water consumption} = \text{Evaporation loss} + \text{Blow down loss} + \text{Drift loss}$$

$$\text{Where drift loss} = 0.02\% \times \text{cooling water flow}$$

1. Make up water consumption = $5.54625 + 1.196 + 0.250 = 6.99225 \text{ m}^3/\text{hr}$
2. Make up water consumption = $6.60654 + 1.205 + 0.254 = 8.06554 \text{ m}^3/\text{hr}$
3. Make up water consumption = $7.90398 + 1.305 + 0.252 = 9.46098 \text{ m}^3/\text{hr}$

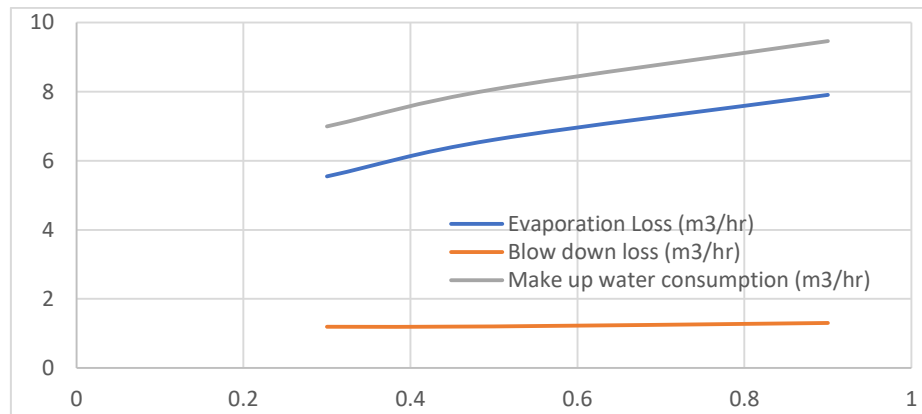


Fig.6. Evaporation loss, Blow-down and Make up water consumption variations

➤ COOLING CAPACITY OR HEAT REJECTED

$$\text{Cooling Capacity} = m_w \times \rho_w \times C_{pw} \times \Delta T \left(\frac{\text{kJ}}{\text{kg}} \right)$$

A. COOLING CAPACITY

$$\text{Heat rejected} = 1250 \times 1000 \times 4.18 \times 2.9 = 1,51,52,500 \text{ kJ/hr}$$

B. COOLING CAPACITY

$$\text{Heat rejected} = 1270 \times 1000 \times 4.18 \times 3.4 = 1,80,49,240 \text{ kJ/hr}$$

C. COOLING CAPACITY

$$\text{Heat rejected} = 1260 \times 1000 \times 4.18 \times 4.1 = 2,15,93,880 \text{ kJ/hr}$$

➤ TOTAL HEAT TRANSFER

$$Q = k \times s(h_w - h_a) \text{ (kJ)}$$

$$Q = 0.0117 \times (2.690) \times (126.7838 - 104.0929) = 415.4083 \text{ kJ}$$

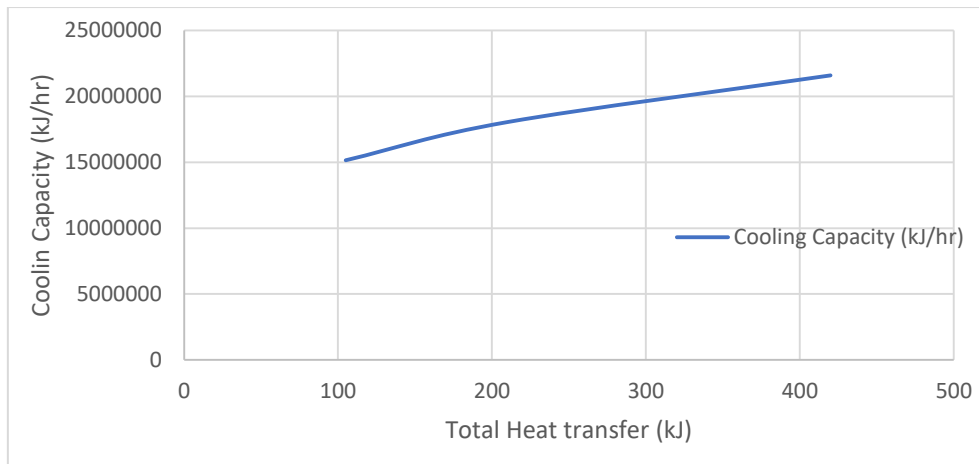


Fig.7. Cooling capacity (kJ/hr) and Total Heat transfer (kJ)

➤ COOLING LOAD

$$Q_1 = m_a \times (h_{a_2} - h_{a_1}) \text{ (kW)}$$

$$Q_1 \text{ (Avg)} = 296.8333 \times (104.0929 - 99.0741) = 1489.74697 \text{ kW}$$

➤ CONVECTIVE HEAT TRANSFER

$$Q = m_w \times C_{pw} \times (Tw_i - Tw_o) \text{ (kW)}$$

$$Q_{c1} = 256.7114 \times 4.18 \times (27.0 - 24.1) = 3111.855 \text{ kW}$$

$$Q_{c2} = 260.9017 \times 4.18 \times (28.1 - 24.7) = 3707.934 \text{ kW}$$

$$Q_{c3} = 258.7651 \times 4.18 \times (30.1 - 26.0) = 4434.716 \text{ kW}$$

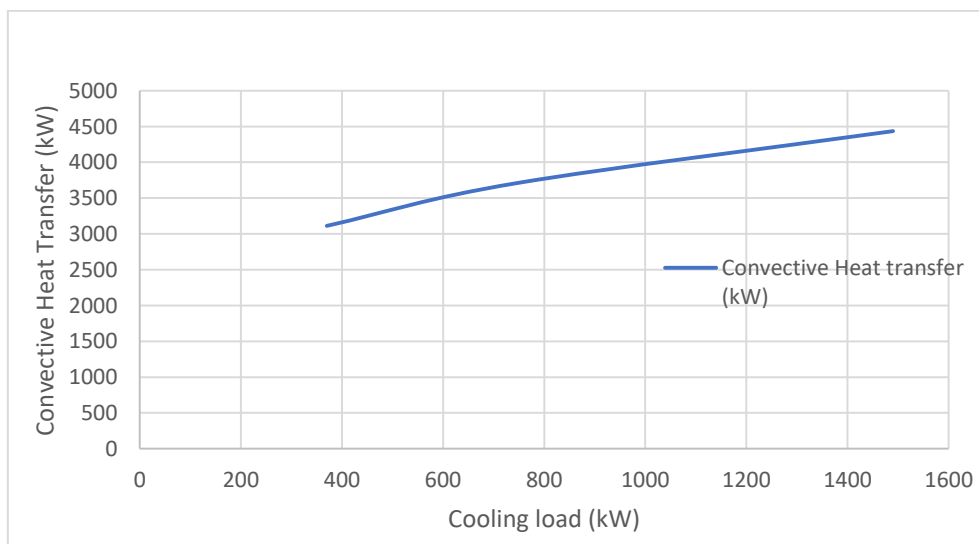


Fig.8. Cooling Load vs Convective Heat Transfer

3.3. Advantages and Disadvantages

3.3.1. Advantages

- Can be installed in any convenient location.
- Volumes of cold water
- Automation and efficiency.
- Mobility.
- High Corrosion resistance.
- Wide range of colours.
- Quick installation.
- Easy to maintain.

3.3.2. Disadvantages

- Scale destroying agent will use proper guidelines because it is a reaction agent.
- Proper handling is needed, when touching with hands it will smooth operation but allergies happening.
- Don't pour outside it will smashing space.
- Chemical kept the desired location and
- Observation will need when mixing and diluting chemical
- Don't allow to free atmosphere.

4. RESULTS

4.1. Improved Effectiveness and Efficiency of the Cooling Tower

Effectiveness which defined as the Range to Range and Approach of Cooling Tower Temperatures, where the Approach increases then effectiveness goes fall, as same as Approach decreases then lead to an increase the effectiveness. In such a way that Range increase then effectiveness increases were there directly proportional to each other. In this scenario A, B, and C's effectiveness were increased, decreased and something raised, cause of the wet-bulb temperature of the air, shown below graph fig.9. respectively.

Efficiency means the Range to the Inlet and wet bulb temperature of air (Approach), In this Efficiency, increases with decrease in Approach and increase in Range, In this A, B and C points efficiency consequently raised. So the wet-bulb temperature of the air is beyond the limits, shown below fig.9. respectively.

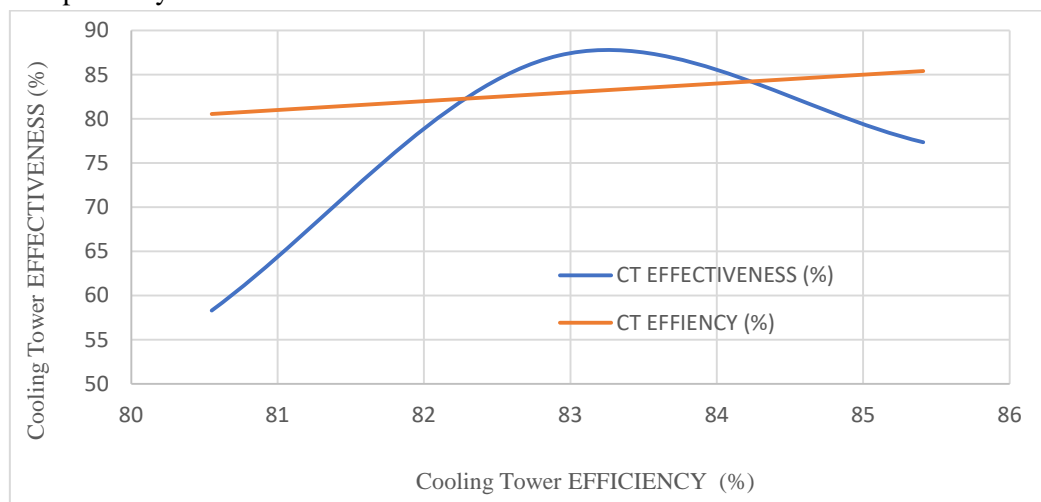


Fig.9. Cooling Tower Effectiveness vs Efficiency Graph Representation

4.2. Evaporation & Down Loss, Make up Water Consumption

Evaporation loss which includes the mass flow of water and temperature differences, give the mass flow of water raises steadily, In this scenario evaporation loss increased due to mass flow of water raised thoroughly and temperature difference comparatively low, So increased loss

Blow down loss which is increases in cycles of concentration decreases in a manner that why evaporation loss increases, the blow loss increased.

Makeup Water consumption raised very slightly increased, the chemicals which reaction in cooling water some amount of vaporization done.

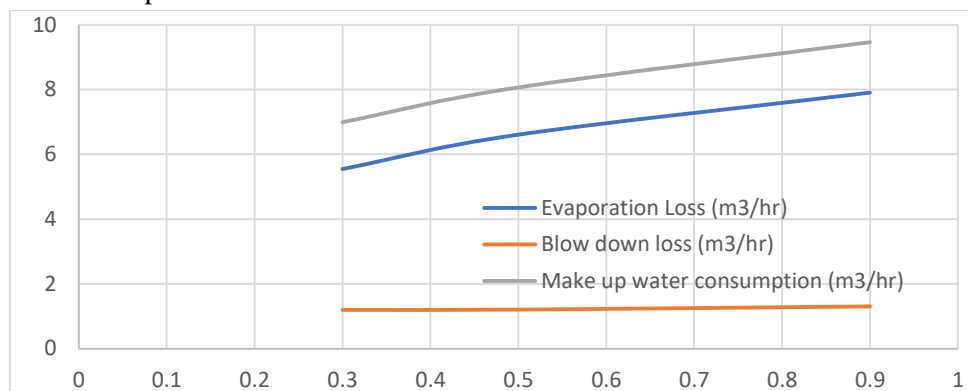


Fig.10. Evaporation loss, Blow-down and Make up water consumption variations

4.3. Liquid to Gas Ratio

Liquid to Gas ratio, which means that enthalpy and temperature differences, water to vapour this stage slightly decreased. Liquid consumption very low..

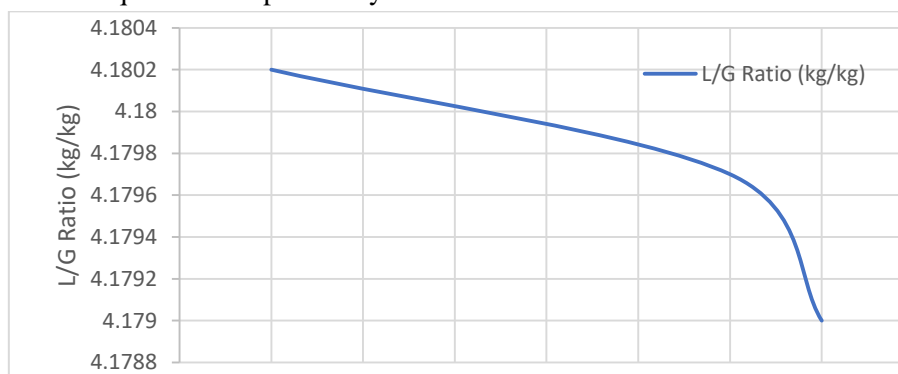


Fig.11. L/G Ratio (kg/kg) graph representation

4.4. Cooling Capacity and Total Heat Transfer

Cooling capacity and Total heat transfer, which describes that cooling was certain total heat transfer pass through it, both are directly proportional to each other, in the scenario, cooling capacity and total heat transfer increased thoroughly.

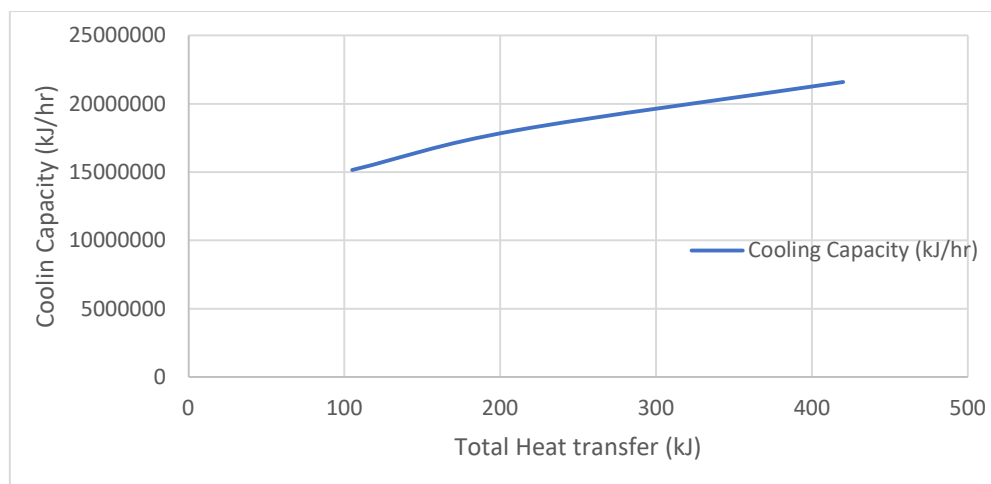


Fig.12. Cooling capacity (kJ/hr) and Total Heat transfer (kJ)

4.5. Cooling Load and Convective Heat Transfer

It describes that convective heat transfer raised cooling load, which means that Cooling Tower hot fluid cooled thoroughly by this scenario.

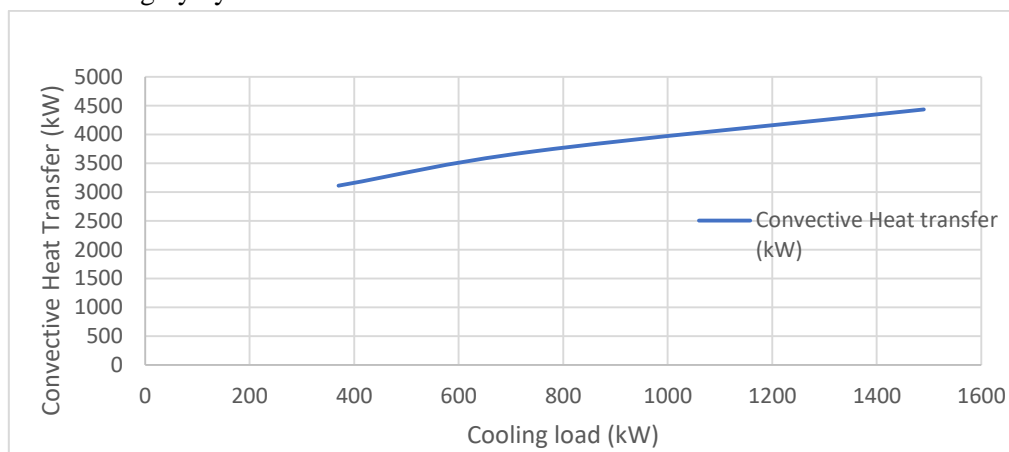


Fig.13. Cooling Load vs Convective Heat Transfer

5. CONCLUSIONS

- This Effectiveness and Efficiency improved by decreasing of scale and corrosion formation. Temperatures maintaining predominately by utilization of Chemicals of Anti-Scalants, Biocides and Conductivity of water.
- By this article studied various parameters of cooling tower, improved antiscalants, Total dissolved solids and reduce rust and biocides. Mainly PH and TDS are maintained beyond the limits of Cooling Tower.
- Evaporation loss, Blow-down loss and Make up water consumption. L/G ratio which thoroughly falling from 0.10 kg/kg
- Convective and total heat transfer was increased in desired capacity of cooling tower.

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SCAN ME

Review Paper

FLAVONOID CONSTITUENTS OF *Andrographis* SPECIES AND THEIR SPECTRAL DATA

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Abstract

The genus *Andrographis* which belongs to the family Acanthaceae consists of 40 species of which 26 species occur in India. Most of the members of this genus are annual herbs or small shrubs. A few plants belonging to this genus are extensively use in traditional medicine in the treatment of dyspepsia, influenza, dysentery, malaria and respiratory infections, and as astringent and antidote for poisonous stings of some insects. This review of literature including phytochemical investigations on naturally occurring compounds of flavonoids from *Andrographis* species and their spectral data of flavonoids reported.

Key words: *Andrographis*, Acanthaceae, Flavonoids and Spectral data (UV, IR, ^1H & ^{13}C NMR and Mass).

INTRODUCTION

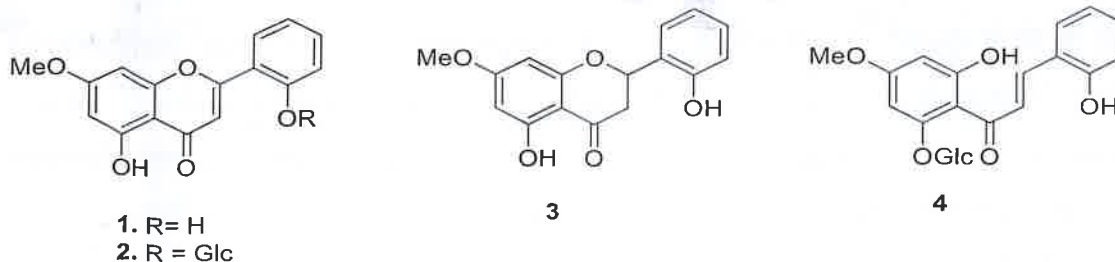
The genus *Andrographis* which belongs to the family Acanthaceae consists of 40 species of which 26 species (*Andrographis affinis*, *Andrographis alata*, *Andrographis atropurpurea*, *Andrographis beddomei*, *Andrographis chendurunii*, *Andrographis echioides*, *Andrographis elongata*, *Andrographis explicata*, *Andrographis glandulosa*, *Andrographis gracilis*, *Andrographis lawsonii*, *Andrographis lineata*, *Andrographis lobelioides*, *Andrographis longipedunculata*, *Andrographis macrobotrys*, *Andrographis megamalayana*, *Andrographis neesiana*, *Andrographis paniculata*, *Andrographis producta*, *Andrographis rothii*, *Andrographis rotundifolia*, *Andrographis serpyllifolia*, *Andrographis stellulata*, *Andrographis stenophylla*, *Andrographis subspathulata*, *Andrographis viscosula*) occur in India [1]. Most of the members of this genus are annual herbs or small shrubs. A few plants

belonging to this genus are extensively use in traditional medicine [2-3] in the treatment of dyspepsia, influenza, dysentery, malaria and respiratory infections, and as astringent and antidote for poisonous stings of some insects.

The systematic chemical examination of *Andrographis* species has so far been confirmed to only eleven species viz., *A. alata*, *A. echioides*, *A. elongata*, *A. lineata*, *A. paniculata*, *A. rothii*, *A. viscosa*, *A. wightiana*, *A. serpyllifolia*, *A. lobelioides* and *A. affinis*. The phytochemical studies on these eleven species of *Andrographis* have so far led to the isolation and characterization of several novel flavonoids with rare 5-O-glycosylation and unusual oxygenation pattern in ring-B. The present paper mainly focused on review of different flavonoid constituents reported from andrographis species and spectral data of flavonoid constituents isolated and characterized by extensive spectral data used from professor gunasekar research laboratory, s.v.university, Tirupathi, Andhra Pradesh, India.

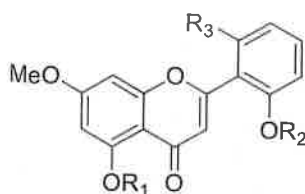
FLAVONOIDS REPORTED FROM ANDROGRAPHIS SPECIES

Echioidinin (**1**), isolated from the leaves of *A. echioides* by [4] and it is the first report of a 2'-oxygenated flavone from the genus *Andrographis*. Later reinvestigated the *A. echioides* [5] have isolated a new 2'-O-glucoside of echiodin (**2**). The isolation of echiodin constitutes the first report of a flavone carrying glycosylation at 2'-position. [6-7] have reported two new flavonoids viz., dihydroechioidinin (**3**) from *n*-hexane extract and adroechin (**4**) from ethyl acetate soluble portion of methanol extract of the whole plant of *A. echioides*. The occurrence of **3** and **4** constitute the first report of a 2'-oxygenated flavanone and a 2'-oxygenated chalcone glycoside, respectively from an *Andrographis* species.

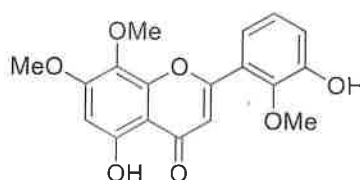


Two new flavone glycosides viz.,echioidinin 5-O-glucoside (**5**) and 5, 2', 6'-trimethoxyflavone 2'-O-glucoside (**6**) together with echiodinin (**1**) from the whole

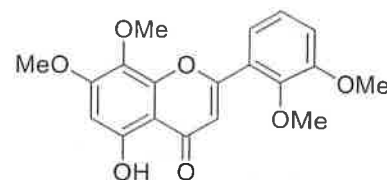
plant of *A.alata*. The occurrence of **6** constitutes the first report of a 2', 6'-dioxxygenated flavone glycoside from an *Andrographis* species. The occurrence of **5** was also reported from *A.echioides* [6].



5. $R_1 = \text{Glc}$, $R_2 = R_3 = \text{H}$
6. $R_1 = \text{H}$, $R_2 = \text{Glc}$, $R_3 = \text{OH}$

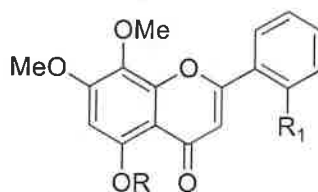


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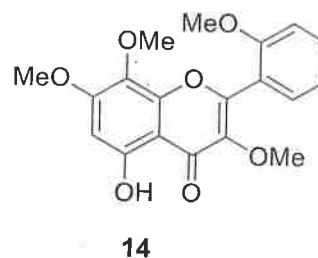
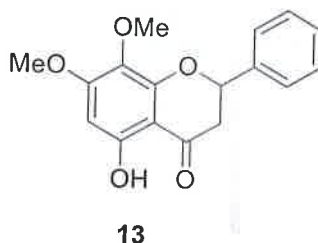
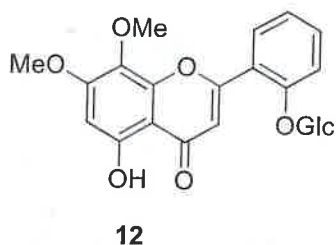
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A novel flavone, wightin besides echiodinin (**1**) from the stems and roots of *A. wightiana*. Wightin was identified as 5, 3'-dihydroxy-7, 8-2'-trimethoxyflavone (**7**) and is the first report of a naturally occurring flavone with an unique 2',3'-dioxxygenation pattern in ring-B. *A.paniculata* Nees widely known for its medicinal value in folklore medicine has been studied extensively for its flavonoid constituents [10]. A new flavone have reported from the roots of *A.paniculata* [11] with 2', 3'-dioxxygenation pattern and was characterized as 5-hydroxy-7, 8, 2', 3'-tetramethoxyflavone (**8**). Three new flavones isolated from the callus cultures of *A.paniculata* and were characterized as 5-hydroxy-7,8-dimethoxyflavone (7-*O*-methylwogonin) (**9**), 5, 2'-dihydroxy-7,8-dimethoxyflavone (skullcapflavone I) (**10**), skullcapflavone I 2'-methyl ether (**11**). The occurrence of 7-*O*-methylwogonin (**9**) constitutes the first report of a 2'-deoxyflavone from an *Andrographis* member [12]. The isolation of skullcapflavone I 2'-methyl ether (**11**) was also reported from *A. echioides* [6].

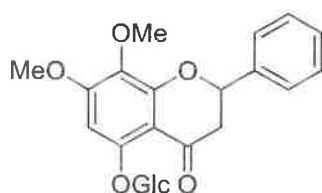


9. $R = R_1 = \text{H}$
10. $R = \text{H}$, $R_1 = \text{OH}$
11. $R = \text{H}$, $R_1 = \text{OMe}$

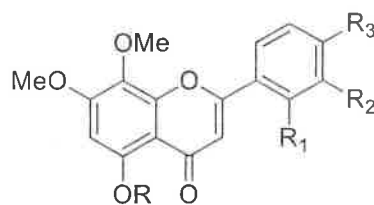
Three new flavonoids along with a known flavone, 7-*O*-methylwogonin (**9**) isolated from the roots of *A.paniculata* [13-14]. The new flavonoids were identified as skullcapflavone I 2'-*O*- β -D-glucoside (**12**), 7-*O*-methyldihydrowogonin (**13**) and 5-hydroxy-3, 7, 8, 2'-tetramethoxyflavone (**14**). The occurrence of **13** and **14** constitute the first report of the occurrence of a flavanone and a flavonol from an *Andrographis* species.



Kuroyanagi have carried out extensive studies on the roots of *A.paniculata* [15] and reported six new flavonoid glucosides named andrographilides A, B, C, D, E and F (**15-20**) along with two known flavones 5-hydroxy-7,8,2',3'- tetramethoxyflavone (**8**) and 5, 2'-dihydroxy-7,8-dimethoxyflavone (skullcapflavone I) (**10**). It is interesting to note that the flavanone, 7-*O*-methyldihydrowogonin (**13**) and its 5-*O*-glucoside i.e., andrographidine A (**15**), and a flavone 5-*O*-glucoside, andrographidine C (**17**) reported from *A.paniculata* [15] were all devoid of oxygenation in ring-B. Andrographidine B (**16**) isolated from *A.paniculata* is a new flavone with 2', 3'-dioxygenation. Andrographidine D (**18**) is a rare example of a flavone carrying a sugar residue at 5-position with an unusual 2', 3'-dioxygenation pattern. Andrographidine E (**19**) is another new flavone 5-*O*-glycoside with 2'-oxygenation in ring-B. Andrographidine F (**20**) constitutes the first report of a flavone 5-*O*-glycoside with 2', 3', 4'-trioxygenation in ring-B. Similar Andrographidine related compound was reported namely as Andrographidine G (**20a**) from *A.paniculata* [16].



15



16. R = R₃ = H, R₁ = OH, R₂ = O-Glc

17. R = Glc, R₁ = R₂ = R₃ = H

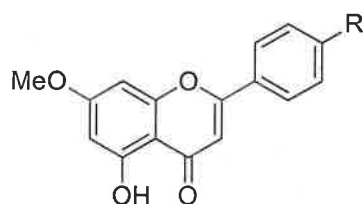
18. R = Glc, R₁ = R₂ = OMe, R₃ = H

19. R = Glc, R₁ = OMe, R₂ = R₃ = H

20. R = Glc, R₁ = R₂ = OMe, R₃ = OH

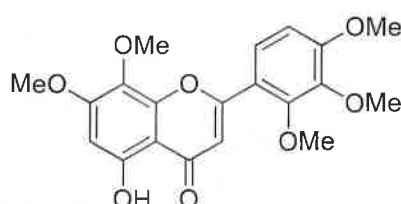
20a. R = Glc, R₂ = R₃ = H, R₁ = OH

Govindachari have investigated the leaves, stems and roots of *A.serpyllifolia* and reported a new flavone, serpyllin besides apigenin 7,4'-di-*O*-methyl ether (21) and tectochrysin (22). The structure of serpyllin was established as 5-hydroxy-7, 8, 2', 3', 4'-pentamethoxyflavone (23) on the basis of spectral and synthetic evidence. Serpyllin (23) is the first example of a naturally occurring flavone with 2', 3', 4'-trioxygenation pattern in ring-B [17]. Later Damu have reinvestigated the whole plant of *A.serpyllifolia* and reported two new acylated flavone glucosides viz., skullcapflavone I 2'-*O*-β-D-(2''-*E*-cinnamyl)-glucoside (24) and skullcapflavone I 2'-*O*-β-D-(3''-*E*-cinnamyl)-glucoside (25) in addition to two known flavones, 7-*O*-methylwogonin (9) and andrographidine C (17). The occurrence of 24 and 25 constituents the first report of acylated flavone glycosides in *Andrographis* genus [18].

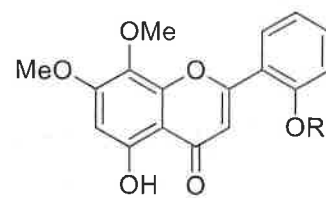


21. R = OMe

22. R = H



23



24. R = 2''-Cinnamyl-Glc

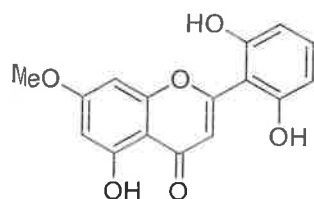
25. R = 3''-Cinnamyl-Glc

26. R = 4''-Cinnamyl-Glc

26a. R = 6''-Cinnamyl-Glc

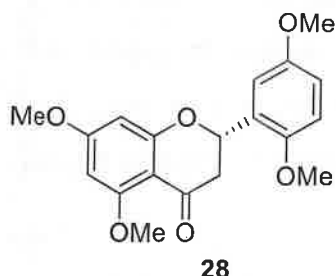
Jayakrishna have reported a new acylated glucoside viz., skullcapflavone I 2'-*O*-β-D-(4''-*E*-cinnamyl)-glucoside (26) and a new flavone aglycone, 5, 2', 6'-trihydroxy-7-methoxyflavone (27) besides three known flavones, 7-*O*-methylwogonin (9), skullcapflavone I (10) and skullcapflavone I 2'-*O*-β-D-glucoside (12) from the whole plant of *A.elongata* [19]. Later investigated on the whole plant of *A. nallamalayana* [20]

reported skullcapflavone I 2'-O- β -D-(6''-E-cinnamyl)-glucoside (26a).

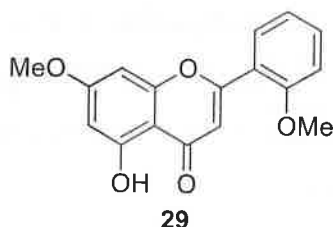


27

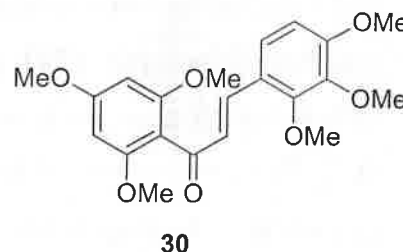
Kesava reddy have reported two new flavonoids viz., 5,7,2',5'-tetramethoxyflavonone (28) and 5-hydroxy-7,2'-dimethoxyflavone (29) together with echiodin (2) and skullcapflavone I (10) from the whole plant of *A. rothii*. The occurrence of 28 constitutes the first report of a 2',5'-dioxygenated flavanone from an *Andrographis* species [21]. Later investigated another another new *Andrographis* species, namely *A. neesiana* reported two new flavonoids viz., 2', 4', 6', 2, 3, 4-hexamethoxy chalcone (30) and 5-hydroxy-7,2',5'-trimethoxyflavone (31) together with a known flavone glycoside, echiodin-O- β -D-glucopyranoside (5) [22].



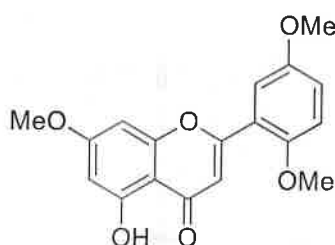
28



29

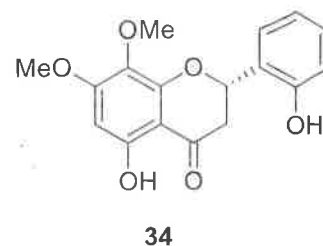
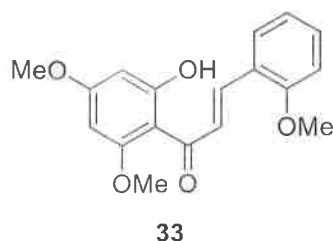
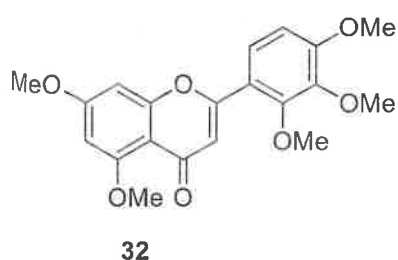


30

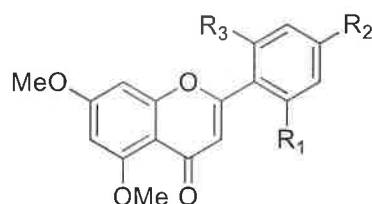


31

Harikishore have investigated the whole plant of *A. lineata* [23] three new flavonoids viz., 5,7,2',3',4'-pentamethoxyflavone (32), 2'-2,4',6'-trimethoxychalcone (33) and dihydroxyskullcapflavone I (34) besides six known flavonoids namely echiodinin (1), echiodin (2), dihydroechiodinin (3), skullcapflavone I (10), 7-O-methyldihydrowogonin (13) and serpyllin (23).



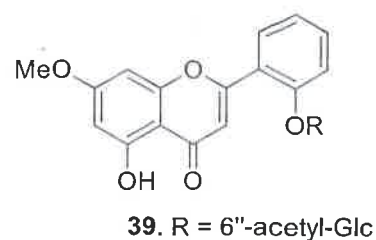
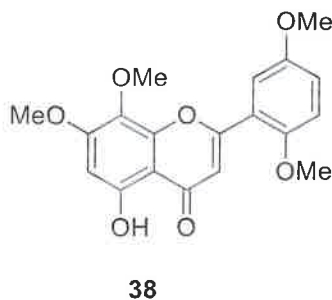
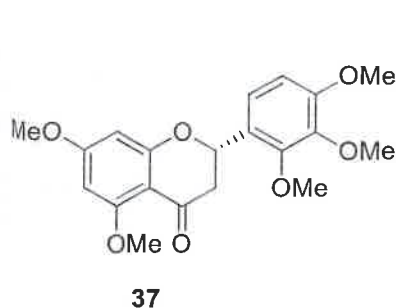
Koteswara Rao have reported two new flavones viz., 5, 7, 2'-trimethoxyflavone (**35**) and 5, 7, 2', 4', 6'-pentamethoxyflavone (**36**) together with echiodinin (**1**), echiodin (**2**) and 5, 2', 6'-trihydroxy-7-methoxyflavone (**27**) from the whole plant of *A.viscosula*. The occurrence of **36** constitutes the first report of a 2', 4', 6'-trioxygenated flavone in nature [24].



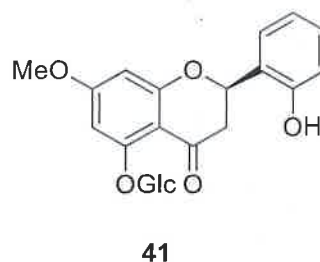
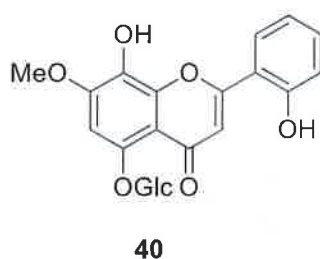
35. $R_1 = \text{OMe}, R_2 = R_3 = \text{H}$

36. $R_1 = R_2 = R_3 = \text{OMe}$

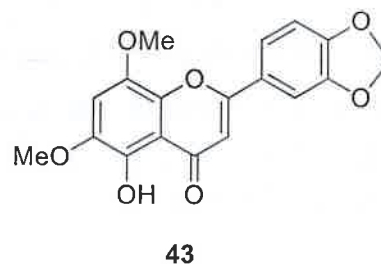
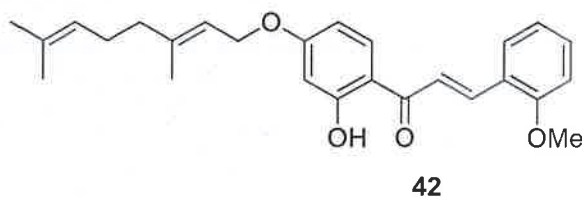
Vijaya Bhaskar Reddy has reported three new flavonoids namely as 5,7, 2', 3', 4'-pentamethoxyflavanone (**37**), 5-hydroxy7, 8, 2', 5'-tetramethoxyflavone (**38**) and echiodinin 2'-O- β -D-(6''-O-acetyl)-glucopyranoside (**39**) from the aerial parts of *A.affinis* [25]. In addition to these Vijaya Bhaskar Reddy reported extensive review on Chemistry, Biological Activity and Biosynthesis of Naturally Occurring Compounds of Cadalene Type Sesquiterpenoids from Malvaceae, 3-arylidenechroman-4-ones and their inhibitory effects on platelet aggregation activity and Inhibitory effects of Bichalcone derivatives on Superoxide anion generation ($\text{O}_2^{\bullet -}$) and elastase release by activated human neutrophils in response to FMLP/CB [26-28].



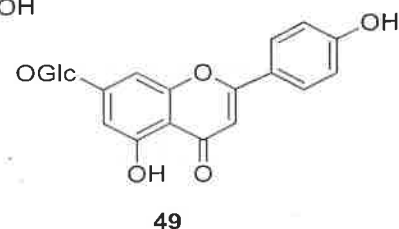
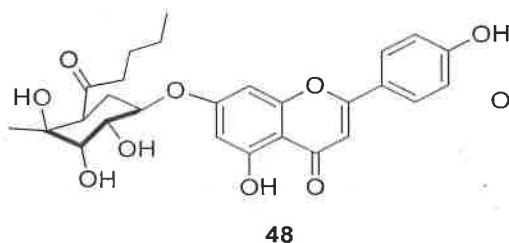
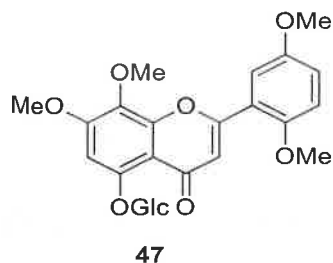
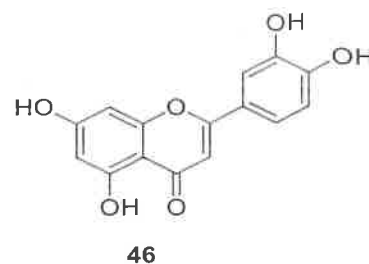
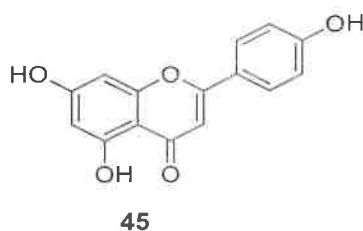
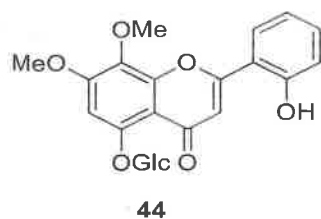
Yang sheng have reported two new flavonoid from *A.echoides* [29] namely as 5,8,2'-trihydroxy-7-methoxyflavone-5-O-β-D-glucopyranoside (**40**) and (2R)-5,2'-dihydroxy-7-methoxyflavanone-5-O-β-D-glucopyranoside and trivially named as androgechside B (**41**).



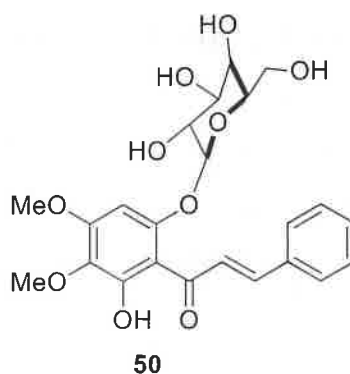
A new *O*-geranylated chalcone namely as 2'-hydroxy-2-methoxy-4'-*O*-[*E*-3,7-dimethyl-2,6-octadienyl] chalcone (**42**), together with three known flavones, 5-hydroxy 7, 2'-dimethoxyflavone, skullcapflavone I and echiodin, were isolated from the leaves of isolated from the leaves of *A. lobelioides* [30]. A new flavanone with methylenedioxy group is in ring-B has been reported namely as 5-hydroxy-6,8-dimethoxy-3,4-methylenedioxy flavone (**43**) from the leaves of *A.paniculata* [31].



Chen reported 7,8-dimethoxy-2'-hydroxy-5-O-β-D-glucopyranosyloxyflavone (**44**), Apigenin (**45**), Luteolin (**46**), 7,8,2',5'-tetramethoxy-5-O-β-D-glucopyranosyloxyflavone (**47**), 5,4'-dihydroxy-7-O-β-D-pyranglycuronate butyl ester (**48**) and 5,4'-dihydroxy-7-O-β-D-glucopyranosyloxyflavone (**49**) from the aerial parts of *A.paniculata* [32].



Chemical investigation of the aerial parts of *Andrographis paniculata* [33] resulted in isolation and structure elucidation of, a new chalcone glucoside, namely as pashanone glucoside (**50**).



SPECTRAL DATA OF FLAVONOID COMPOUNDS ISOLATED FROM VARIOUS *ANDROGRAPHIS* SPECIES

Spectral data of flavonoid compounds isolated from various *andrographis* species are reported in gunasekar research laboratory, Tirupathi, Andhra Pradesh, India.

Echiodinin (1)

Green yellow needles (MeOH); mp 264-2658°C; UV λ_{\max} (MeOH) nm (log ϵ): 265 (4.40), 335 (4.19); +NaOMe: 265, 390; +NaOAc: 265, 335; +AlCl₃: 250, 274, 285 sh, 315 sh, 355; +AlCl₃/HCl: 235, 265, 315, 355; IR (KBr) ν_{\max} cm⁻¹: 3400 (OH), 2980, 1654 (>C=O),

1615, 1520, 1456, 1360; ^1H NMR ($\text{DMSO}-d_6$): δ 12.87 (OH-5), 10.86 (OH-2'), 7.90 (1H, dd, $J = 2.8$ Hz, H-6'), 7.40 (1H, dt, $J = 2.8$ Hz, H-4'), 7.11 (1H, s, H-3), 6.99-7.06 (2H, m, H-3', 5'), 6.73 (1H, d, $J = 2.5$ Hz, H-8). 6.35 (1H, d, $J = 2.5$ Hz, H-6), 3.90 (3H, s, OMe-7); ^{13}C NMR ($\text{DMSO}-d_6$): δ 161.4 (C-2), 109.1 (C-3), 182.0 (C-4), 161.0 (C-5), 97.8 (C-6), 165.1 (C-7), 92.4 (C-8), 157.3 (C-8a), 104.6 (C-4a), 117.0 (C-1'), 156.7 (C-2'), 116.9 (C-3'), 132.8 (C-4'), 119.3 (C-5'), 128.4 (C-6'), 55.9 (OMe-7); ELMS m/z (rel. int): 284 $[\text{M}]^+$ (100), 267 $[\text{M}-\text{OH}]^+$ (1) 255 $[\text{M}-\text{CHO}]^+$ (5), 254 $[\text{M}-\text{CO}]^+$ (2), 166 $[\text{A}_1]^+$ (4), 118 $[\text{B}_1]^+$ (1).

Echiodin (2)

Yellow solid (MeOH) mp 276-278°C, UV λ_{max} (MeOH) nm (log ϵ): 268 (4.12), 320 (3.90); +NaOMe: 275, 375; +NaOAc+ H_3BO_3 : 368, 320; + AlCl_3 : 280, 291, 342; + AlCl_3/HCl : 280, 291, 342, 375; IR (KBr) ν_{max} cm^{-1} : 3415 (OH), 2942 (OMe), 1660 ($=\text{O}$), 1610, 1554, 1430, 1353, 1230, 1129, 1100, 1054, 800, 723; ^1H NMR ($\text{DMSO}-d_6$): δ 12.87 (OH-7), 7.92 (1H, dd, $J = 7.5, 2.0$ Hz, (H-6')), 7.55 (1H, ddd, $J = 7.5, 7.5, 2.0$ Hz, H-4'), 7.35 (1H, dd, $J = 7.5, 2.0$ Hz, (H-3')), 7.18 (1H, ddd, $J = 7.5, 7.5, 2.0$ Hz, H-5'), 7.08 (1H, s, H-3), 6.75 (1H, d, $J = 2.0$ Hz, H-8), 6.39 (1H, d, $J = 2.0$ Hz, H-6), 5.31 (1H, d, $J = 7.0$ Hz, H-1''), 3.86 (3H, s, OMe-7), 3.80 (1H, m, H-6''b), 3.40 (1H, m, H-6''a), 3.31 (3H, m, H-2'', 3'', 5''), 3.18 (1H, m, H-4''); ^{13}C NMR ($\text{DMSO}-d_6$): δ 182.1 (C-4), 165.2 (C-7), 161.1 (C-5), 161.0 (C-2), 157.5 (C-8a), 155.5 (C-2'), 133.0 (C-4'), 139.9 (C-6'), 120.0 (C-1'), 115.5 (C-3'), 110.4 (C-3), 104.7 (C-4a), 100.2 (C-1''), 97.9 (C-6), 92.6 (C-8), 77.1 (C-5''), 76.7 (C-3''), 73.3 (C-2''), 69.5 (C-4''), 60.5 (C-6''), 56.0 (OMe-7); FABMS (positive mode) m/z (rel. int): 447 $[\text{M}+\text{H}]^+$ (50), 285 $[\text{M}+\text{H}-\text{glycosyl}]^+$ (100).

Dihydroechioidinin (3)

Colorless needles (CHCl_3), mp 200-201°C, $[\alpha]_{\text{D}}^{25} -19.7^\circ$ (MeOH; c 0.13); UV λ_{max} (MeOH) nm (log ϵ): 285 (4.17), 332 sh (3.29); +NaOAc: 285, 332 sh; + AlCl_3 : 308, 367; + AlCl_3/HCl : 308, 367; IR (KBr) ν_{max} cm^{-1} : 3421 (-OH), 3239, 2829, 1645 ($>\text{C}=\text{O}$), 1601, 1507, 1456, 1345. ^1H NMR (300 MHz, $\text{Me}_2\text{CO}-d_6$): δ 12.14 (OH-5), 8.79 (OH-2'), 7.53 (1H, dd, $J = 7.5, 2.0$ Hz, H-6'), 7.21 (1H, ddd, $J = 7.5, 7.5, 2.0$ Hz, H-4'), 6.95 (1H, dd, $J = 7.5, 2.0$ Hz, H-3'), 6.93 (1H, ddd, $J = 7.5, 7.5, 2.0$ Hz, H-5'), 6.09 (1H, d, $J = 2.3$ Hz, H-8), 6.04 (1H, d, $J = 2.3$ Hz, H-6), 5.81 (1H, dd, $J = 13.0, 3.0$ Hz, H-2), 3.85 (3H, s, OMe-7), 3.12 (1H, dd, $J = 17.2, 13.0$ Hz, H-3_{ax}), 2.85 (1H, dd, $J = 17.2, 3.0$ Hz, H-3_{eq}). ^{13}C NMR (75 MHz, $\text{Me}_2\text{CO}-d_6$): δ 197.7 (C-4), 168.8 (C-7), 165.0 (C-5), 164.4 (C-8a), 154.8 (C-2'), 130.2 (C-4'), 127.2 (C-

6'), 126.2 (C-1'), 120.7 (C-5'), 116.3 (C-3'), 103.7 (C-4a), 95.5 (C-6), 94.5 (C-8), 75.5 (C-2), 56.2 (OMe-7), 42.5 (C-3). EIMS m/z (rel.int.): 286 [M]⁺ (55), 268 (100), 193 (16), 167 (82), 138 (21), 120 (17).

Androechin (4)

Yellow needles from (MeOH), mp 128-130°C, $[\alpha]_D^{25}$ -22.5 (c 1.0 MeOH); UV λ_{\max} (MeOH) nm (log ϵ): 252 sh (3.83), 310 sh (3.99), 365 (4.15); +NaOAc: 252 sh, 309 sh, 365; +AlCl₃: 270, 408; +AlCl₃/HCl: 270, 408; IR (KBr) ν_{\max} cm⁻¹: 3341 (OH), 1616 (>C=O), 1535, 1384, 1338, 1293, 1202, 1160, 1077, 1051; ¹H NMR (400 MHz, DMSO-*d*₆): δ 13.55 (1H, s, OH-6'), 10.17 (1H, s, OH-2), 8.07 (1H, d, J = 16.0 Hz, H- α), 8.0 (1H, d, J = 16.0 Hz, H- β), 7.79 (1H, dd, J = 8.0, 1.5 Hz, H-6), 7.25 (1H, ddd, J = 8.0, 8.0, 1.5 Hz, H-4), 6.91 (1H, dd, J = 8.0, 1.5 Hz, H-3), 6.84 (1H, ddd, J = 8.0, 8.0, 1.5 Hz, H-5), 6.33 (1H, d, J = 2.3 Hz, H-3'), 6.17 (1H, d, J = 2.3 Hz, H-5'), 5.13 (1H, d, J = 7.0 Hz, H-1''), 3.82 (3H, s, OMe-4'), 3.10-3.80 (6H, m, sugar protons); ¹³C NMR (75 MHz, DMSO-*d*₆): δ 192.8 (C-4), 165.3 (C-6'), 165.2 (C-4'), 159.7 (C-2'), 157.0 (C-2), 137.8 (C- β), 131.4 (C-4), 127.9 (C-6), 126.0 (C- α), 121.7 (C-1), 119.7 (C-5), 116.2 (C-3), 106.9 (C-1'), 100.5 (C-1''), 95.2 (C-5'), 93.8 (C-3'), 77.5 (C-3''), 76.8 (C-5''), 73.6 (C-2''), 69.7 (C-4''), 60.7 (C-6''), 55.6 (OMe-4'); HRFABMS m/z (rel.int.): 471.1266 [M+Na]⁺ C₂₂H₂₄O₁₀Na requires 471.1267; FABMS m/z (rel.int.): 471 [M+Na]⁺, 449 [M+H]⁺, 287 [M+H-162]⁺.

Echioidinin 5-O- β -D-glucopyranoside (5)

Pale yellow needles (MeOH); mp 245-246°C; UV λ_{\max} (MeOH) nm (log ϵ): 257 (4.38), 305 (4.33) and 330 (4.25); +NaOMe: 257 sh, 300 sh, 400; + NaOAc: 257, 305, 342 sh; +AlCl₃: 257, 315, 348 sh; +AlCl₃/HCl: 257, 288 sh, 335; IR (KBr) ν_{\max} cm⁻¹: 3200 (OH), 2950, 1652 (>C=O), 1618, 1560; ¹H NMR (DMSO-*d*₆): δ 10.70 (OH-2'), 7.94 (1H, dd, J = 2, 8 Hz, H-6'), 7.38 (1H, dt, J = 2, 8 Hz, H-4'), 7.02-7.04 (2H, m, H-3', 5'), 7.06 (1H, s, H-3), 6.98 (1H, d, J = 2.5 Hz, H-8), 6.92 (1H, d, J = 2.5 Hz, H-6), 4.78 (1H, d, J = 7 Hz, H-1''), 3.91 (3H, s, OMe-7), 3.35-3.85 (5H, m, sugar protons); ¹³C NMR (DMSO-*d*₆): δ 158.5 (C-2), 112.0 (C-3), 177.1 (C-4), 158.0 (C-5), 103.3 (C-6), 163.5 (C-7), 96.4 (C-8), 158.7 (C-8a), 109.1 (C-4a), 117.0 (C-1'), 156.6 (C-2'), 116.9 (C-3'), 132.4 (C-4'), 119.2 (C-5'), 128.2 (C-6'), 104.1 (C-1''), 73.5 (C-2''), 77.5 (C-3''), 69.8 (C-4''), 75.6 (C-5''), 60.8 (C-6''), 55.9 (OMe-7); FAB- MS (positive mode) m/z (rel. int): 447 [M + H]⁺ (5), 285 [M + H-glucosyl]⁺ (23).

5, 2', 6'-Trihydroxy-7methoxyflavone-2'-O- β -D-glucopyranoside (6)

Pale yellow needles (MeOH); mp 138-139°C; $[\alpha]_D^{25}$ -10.4 (c 0.1, MeOH); UV λ_{\max} (MeOH) nm (log ϵ): 258 (4.61), 300 (4.46); +NaOMe: 270, 290, 364; + NaOAc: 259, 299; + NaOAc+H₃BO₃: 259, 299; +AlCl₃: 269, 315, 368; +AlCl₃/HCl: 269, 315, 368; IR (KBr) ν_{\max} cm⁻¹: 3400 (OH), 2907, 1661 (C=O), 1604 (C=C); ¹H-NMR (Me₂CO-*d*₆): δ 12.93 (1H, s, OH-5), 10.17 (1H, s, OH-6'), 7.29 (1H, t, *J* = 8.3 Hz, H-4'), 6.75 (1H, d, *J* = 8.3 Hz, H-3'), 6.66 (1H, d, *J* = 8.3 Hz, H-5'), 6.62 (1H, d, *J* = 1.9 Hz, H-8), 6.40 (1H, d, *J* = 1.9 Hz, H-6), 6.34 (1H, s, H-3), 4.92 (1H, d, *J* = 7.8 Hz, H-1''), 3.89 (3H, s, OMe-7), 3.70 (1H, br d, *J* = 12 Hz, H-6''a), 3.40 (1H, br d, *J* = 12 Hz, H-6''b), 3.27 (1H, ddd, *J* = 9.0, 9.0, 9.0 Hz, H-4''), 3.19 (1H, dd, *J* = 9.0, 9.0 Hz, H-3''), 3.08 (1H, dd, *J* = 9.0, 9.0 Hz, H-5''), 3.06 (1H, dd, *J* = 7.8, 9.0 Hz, H-2''); ¹³C NMR (DMSO-*d*₆): δ 165.0 (C-7), 161.6 (C-2), 161.1 (C-5), 158.2 (C-9), 156.3 (C-2'), 156.1 (C-6'), 132.1 (C-4'), 112.4 (C-3), 110.0 (C-1'), 109.4 (C-5'), 76.6 (C-3''), 73.1 (C-2''), 69.5 (C-4''), 60.6 (C-6''), 55.9 (OMe-7); FABMS (positive mode) *m/z* (rel. int): 463 [M + H]⁺ (29), 301 [M + H-162]⁺ (100).

7-O-Methylwogonin (9)

Yellow needles, mp 181-182°C (hexane); UV λ_{\max} (MeOH) nm (log ϵ): 272 (4.52), 345 sh (3.78); (NaOAc): 272, 345 sh; (AlCl₃): 290, 330, 413; (AlCl₃+HCl): 290, 330, 413; IR (KBr) ν_{\max} cm⁻¹: 3432 (OH), 2938, 1713 (>C=O), 1610, 1511, 1449; ¹H-NMR (Me₂CO-*d*₆): δ 12.65 (1H, s, OH-5), 8.10 (2H, m, H-2', 6'), 7.61 (3H, m, H-3', 4', 5'), 6.80 (1H, s, H-3), 6.51 (1H, s, H-6), 3.98 (3H, s, OMe-7), 3.90 (3H, s, OMe-8); ¹³C-NMR (Me₂CO-*d*₆) δ : 183.5 (C-4), 164.7 (C-2), 160.0 (C-7), 158.4 (C-5), 150.3 (C-8a), 132.8 (C-4'), 132.3 (C-8), 130.0 (C-1'), 130.1 (C-3', 5'), 127.2 (C-2', 6'), 105.8 (C-3), 105.4 (C-4a), 96.7 (C-6), 61.6 (OMe-8), 56.8 (OMe-7); EI-MS *m/z* (%) 298, (M⁺, 46), 283 (100), 255 (8), 181 (12), 153 (32), 105 (4), 102(6).

Skullcapflavone I (10)

Pale yellow needles, mp 254-255 °C (MeOH); UV λ_{\max} (MeOH) nm (log ϵ): 270 (4.03), 340 sh (3.76); (NaOMe): 275, 398; (NaOAc): 270, 340; (AlCl₃) 280, 290, 350, 362 sh; (AlCl₃+HCl): 275, 293, 315, 355; IR (KBr) ν_{\max} cm⁻¹: 3434 (OH), 2937, 1651 (>C=O), 1611, 1575, 1508, 1453; ¹H-NMR (DMSO-*d*₆): δ 12.75 (1H, s, OH-5), 9.70 (1H, s, OH-2'), 8.01 (1H, dd, *J* = 8.0, 1.7 Hz, H-6'), 7.43 (1H, ddd, *J* = 8.0, 7.3, 1.7 Hz, H-4'), 7.14 (1H, s, H-

3), 7.11 (2H, m, H-3', 5'), 6.49 (1H, s, H-6), 3.97 (3H, s, OMe-7), 3.88 (3H, s, OMe-8); ^{13}C -NMR (DMSO- d_6): δ 182.2 (C-4), 161.7 (C-2), 158.4 (C-7), 157.5 (C-2'), 156.6 (C-5), 149.5 (C-8a), 133.0 (C-4'), 128.3 (C-8), 128.2 (C-6'), 119.2 (C-5'), 117.3 (C-3'), 117.2 (C-1'), 108.6 (C-3), 103.5 (C-4a), 95.8 (C-6), 61.1 (OMe-8), 56.7 (OMe-7); EI-MS m/z (%) 314 (M^+ , 44), 299 (100), 284 (1), 271 (8), 257 (2), 196 (2), 181 (19), 168 (3), 153 (45), 121 (4), 118 (9).

Skullcapflavone I 2'-methyl ether (11)

Yellow needles, mp 190-191 °C (CHCl_3); UV λ_{max} (MeOH) nm (log ϵ): 270 (4.33), 330 (3.81); (NaOMe): 272, 340; (NaOAc+ H_3BO_3): 270, 330; (AlCl_3): 292, 352, 408; (AlCl_3 +HCl): 292, 352, 408; IR (KBr) ν_{max} cm^{-1} : 3442 (OH), 2944 (OMe), 2843, 1654 ($>\text{C}=\text{O}$), 1608, 1582, 1441, 1375, 1342, 1278, 1209, 1125, 1022, 1007, 968, 932, 757; ^1H -NMR (CDCl_3): δ 12.70 (1H, s, 5-OH), 8.00 (1H, dd, $J = 8.0, 2.0$ Hz, H-6'), 7.52 (1H, dt, $J = 8.0, 2.0$ Hz, H-4'), 7.00-7.20 (2H, m, H-3', 5'), 7.03 (1H, s, H-6), 3.97 (3H, s, OMe-7), 3.90 (6H, s, OMe-8, 2'); ^{13}C -NMR (CDCl_3): δ 182.8 (C-4), 161.8 (C-2), 158.3 (C-7), 157.9 (C-5), 156.7 (C-2'), 149.2 (C-8a), 132.6 (C-4'), 128.7 (C-6'), 126.0 (C-8), 120.5 ((C-5'), 119.8 (C-1'), 111.4 (C-3'), 109.5 (C-3'), 109.5 (C-3), 104.0 (C-4a), 95.1 (C-6), 61.0 (OMe-8), 55.7 (OMe-7), 55.1 (OMe-2'); ESITOFMS (positive ion mode) m/z (rel. int. %): 657.1637 [$2\text{M}+\text{H}$] $^+$ (16), 351.0687 [$\text{M}+\text{Na}$] $^+$ (5), 329.0707 [$\text{M}+\text{H}$] $^+$ (100), ($\text{C}_{18}\text{H}_{16}\text{O}_6+\text{H}$ requires 329.1025); ESIMS/MS (positive ion mode) m/z 329.1 [$\text{M}+\text{H}$] $^+$ (66), 314.0 [$\text{M}+\text{H}-\text{CH}_3$] $^+$ (48), 313.1 [$\text{M}+\text{H}-\text{CH}_3-\text{H}$] $^+$ (86), [$\text{M}+\text{H}-\text{H}_2\text{O}$] $^+$ (5), 299.0 [$\text{M}+\text{H}-2\text{CH}_3$] $^+$ (100), 285.0 [$\text{M}+\text{H}-\text{CH}_3-\text{CO}-\text{H}$] $^+$ (62), 283.1 [$\text{M}+\text{H}-\text{H}_2\text{O}-\text{CO}$] $^+$ (19), 271.1 [$\text{M}+\text{H}-2\text{CH}_3-\text{CO}$] $^+$ (30), 196.0 ($^{13}\text{A}^+$) (3), 181.0 ($^{13}\text{A}^+-\text{CH}_3$) (43), 165.0 ($^{13}\text{A}^+-\text{CH}_3\text{OH}$) (43), 132 ($^{13}\text{B}^+$) (3), 91.0 ($^{13}\text{B}^+-\text{C}_2\text{H}_2-\text{CH}_3$) (24).

Skullcapflavone I 2'-O- β -D-Glucopyranoside (12)

Yellow needles, mp 260-262 °C (MeOH); $[\alpha]_{\text{D}}^{25} -24.6^\circ$ ($c=0.3$, MeOH); UV λ_{max} (MeOH) nm (log ϵ): 270 (4.05), 315 sh (3.42); (NaOAc): 270, 315; (AlCl_3): 280, 330, 380 sh; (AlCl_3 +HCl): 278, 320, 370 sh; IR (KBr) ν_{max} cm^{-1} : 3431 (OH), 3305, 2923, 1658 ($>\text{C}=\text{O}$), 1610, 1574, 1508, 1450, 1372; ^1H -NMR (DMSO- d_6): δ 12.70 (1H, s, OH-5), 7.89 (1H, dd, $J = 7.8, 1.5$ Hz, H-6'), 7.58 (1H, dt, $J = 7.3, 1.5$ Hz, H-4'), 7.37 (1H, d, $J = 7.3$ Hz, H-3') 7.25 (1H, dt, $J = 7.8, 1.5$ Hz, H-5'), 7.08 (1H, s, H-3), 6.61 (1H, s, H-6), 5.33 (1H, d, $J =$

7.0 Hz, H-1''), 3.71 (1H, m, H-6''a), 3.49 (1H, m, H-6''b), 3.42 (1H, ddd, $J = 9.0, 8.0, 2.0$ Hz, H-5''), 3.32 (1H, dd, $J = 9.0, 7.0$ Hz, H-2''), 3.30 (1H, dd, $J = 9.0, 9.0$ Hz, H-3''), 3.20 (1H, dd, $J = 9.0, 9.0$ Hz, H-4''), 3.91 (3H, s, OMe-7), 3.81 (3H, s, OMe-8); ^{13}C -NMR (DMSO- d_6): δ 160.7 (C-2), 110.0 (C-3), 182.1 (C-4), 103.9 (C-4a), 156.4 (C-5), 95.6 (C-6), 158.3 (C-7), 128.2 (C-8), 149.0 (C-8a), 120.2 (C-1'), 155.3 (C-2'), 115.4 (C-3'), 132.8 (C-4'), 122.1 (C-5'), 128.8 (C-6'), 56.2 (OMe-7), 61.0 (OMe-8), 99.8 (C-1''), 73.2 (C-2''), 76.5 (C-3''), 69.4 (C-4''), 77.0 (C-5''), 60.3 (C-6''); FAB-MS (positive ion mode) m/z 477 $[\text{M}+\text{H}]^+$, 315 $[\text{M}+\text{H-glucosyl}]^+$.

7-O-Methyldihydrowogonin (13)

Color less needles (CHCl_3); mp 98-100°C; $[\alpha]_D^{25} -38.7^\circ$ ($c=0.2$, MeOH); UV λ_{max} (MeOH) nm (log ϵ): 287 (4.27), 343 (sh) (3.83); (NaOAc): 288, 343; (NaOAc+ H_3BO_3): 288, 343; (AlCl_3): 322, 345; (AlCl_3+HCl): 322, 345; IR (KBr) ν_{max} cm^{-1} : 3442 (OH), 2932, 1636 ($>\text{C}=\text{O}$), 1498, 1457, 1438, 1339, 1312, 1265, 1109, 780, 705; ^1H NMR (CDCl_3): δ 11.90 (1H, s, OH-5), 7.45 (5H, m, (H-2', 3', 4', 5', 6')), 6.09 (1H, s, H-6), 5.45 (1H, dd, $J = 12.2, 3.2$ Hz, H-2), 3.87 (3H, s, OMe-7), 3.76 (3H, s, OMe-8), 3.06 (1H, dd, $J = 17.2, 12.2$ Hz, H-3_{ax}), 2.87 (1H, dd, $J = 17.2, 3.2$ Hz, H-3_{eq}); ^{13}C NMR (CDCl_3): δ 196.0 (C-4), 161.5 (C-7), 159.8 (C-5), 126.0 (C-2', 6'), 153.5 (C-8a), 128.8 (C-4'), 130.0 (C-8), 138.4 (C-1'), 128.7 (C-3', 5'), 103.0 (C-4a), 93.0 (C-6), 79.1 (C-2), 61.2 (OMe-8), 56.2 (OMe-7), 43.3 (C-3); ESITOFMS (positive ion mode) m/z 323.0713 $[\text{M}+\text{Na}]^+$ (7), 301.0898 $[\text{M}+\text{H}]^+$ (100), ($\text{C}_{17}\text{H}_{16}\text{O}_5+\text{H}$ requires 301.1076); ESIMS/MS (positive ion mode) m/z 301.0 $[\text{M}+\text{H}]^+$ (3), 197.0 ($^{13}\text{A}^+$) (100), 182.0 ($^{13}\text{A}^+-\text{CH}_3-\text{H}_2\text{O}$) (27), 154.0 ($^{13}\text{A}^+-\text{CH}_3-\text{CO}$) (12), 139.0 ($^{13}\text{A}^+-\text{CH}_3-2\text{CO}$) (20), 136.0 ($^{13}\text{A}^+-\text{CH}_3-\text{CO}-\text{H}_2\text{O}$) (58), 111.0 ($^{13}\text{A}^+-2\text{CH}_3-2\text{CO}$) (11), 108.0 ($^{13}\text{A}^+-\text{CH}_3-2\text{CO}-\text{H}_2\text{O}$) (39), 104.0 ($^{13}\text{B}^+$) (3).

Andrographidine G (20a)

White solid; mp 145-147 °C; $[\alpha]_D^{25} -51.7$ (c 0.15, MeOH); UV λ_{max} (MeOH) nm (log ϵ): 330 (2.60), 255 (10.00); IR (KBr) ν_{max} cm^{-1} : 3673 (OH), 1660 ($>\text{C}=\text{O}$) cm^{-1} ; ^1H NMR (pyridine- d_5): δ 8.04 (s, H-3), 7.82 (s, H-6), 7.56 (d, $J = 7.8$ Hz, H-3'), 7.66 (t, $J = 7.8$ Hz, H-4'), 7.34 (t, $J = 7.8$ Hz, H-5'), 8.48 (d, 7.8 Hz, H-6'), 4.20 (s, 7-OMe), 4.26 (s, 8-OMe), 5.63 (d, $J = 7.2$ Hz, H-1''), 4.71 (t, $J = 7.9$ Hz, H-2''), 4.66 (t, $J = 7.9$, H-3''), 4.47, 4.47 (overlapped, H-4'', H-5''), 4.95 (br d, $J = 12.0$ Hz, H-6a''), 4.59, (br d, $J = 12.0$ Hz, H-6b''); ^{13}C NMR (pyridine- d_5): δ 160.3 (C-2), 113.1 (C-3), 179.2 (C-4), 154.7 (C-5), 101.8 (C-6),

157.1 (C-7), 133.5 (C-8), 151.6 (C-9), 110.6 (C-10), 118.9 (C-1'), 158.5, (C-2'), 117.8 (C-3'), 133.0 (C-4'), 119.9 (C-5), 129.1 (C-6'), 56.5 (7-OMe), 61.5 (8-OMe), 106.4, (C1''), 75.2 (C-2''), 77.9 (C-3''), 71.7 (C-4''), 79.5 (C-5''), 62.8 (C-6''); HR-ESI-TOF-MS (+ve ion mode): m/z $[M + H]^+$ calcd for $C_{23}H_{25}O_{11}$: 477.1397; found: 477.1391.

Skullcapflavone I 2'-O- β -D-(2''-E-cinnamoyl) glucopyranoside (24)

Yellow amorphous powder (MeOH); mp 196-197°C; $[\alpha]_{D_{25}}^{25}$ 0.158 (MeOH, c 4.0); UV λ_{max} (MeOH) nm (log ϵ): 268 (4.45), 300 sh (3.94), 348 sh (3.51); (NaOMe): 278, 380; (NaOAc): 268, 300 sh, 348; (NaOAc+H₃BO₃): 268, 300 sh, 348; (AlCl₃): 275, 325 sh, 362; (AlCl₃+HCl): 265, 270, 305, 360; IR (KBr) ν_{max} cm⁻¹: 3457 (OH), 1710 (C=O ester), 1609 (C=O), 1586, 1511, 1448; ¹H NMR (DMSO-*d*₆): δ 12.68 (1H, s, OH-5), 7.66 (1H, dd, J = 7.5, 1.8 Hz, H-6'), 7.57 (1H, ddd, J = 8.5, 7.5, 1.8 Hz, H-4'), 7.41 (1H, dd, J = 8.5, 0.9 Hz, H-3'), 7.38 (2H, m, H-2''', 6'''), 7.35 (1H, m, H-4'''), 7.31 (2H, m, H-3''', 5'''), 7.23 (1H, ddd, J = 7.5, 7.5, 0.9 Hz, H-5'), 7.21 (1H, d, J = 16.0 Hz, H-7'''), 6.41 (2H, s, H-3, 6), 6.32 (1H, d, J = 16.0 Hz, H-8'''), 5.21 (1H, d, J = 8.1 Hz, H-1''), 4.94 (1H, dd, J = 9.5, 8.1 Hz, H-2''), 3.80 (3H, s, OMe-7), 3.77 (1H, m, H-6''a), 3.57 (3H, s, OMe-8), 3.53 (3H, m, H-3'', 5'', 6''b), 3.31 (1H, m, H-4''); ¹³C NMR (DMSO-*d*₆): δ 16.8 (C-2), 110.4 (C-3), 181.7 (C-4), 103.8 (C-4a), 156.5 (C-5), 95.7 (C-6), 158.1 (C-7), 128.2 (C-8), 149.0 (C-8a), 121.5 (C-1'), 155.1 (C-2'), 116.3 (C-3'), 132.9 (C-4'), 122.8 (C-5'), 129.1 (C-6'), 56.1 (OMe-7), 60.6 (OMe-8), 99.5 (C-1''), 73.2 (C-2''), 73.6 (C-3''), 69.8 (C-4''), 77.5 (C-5''), 60.5 (C-6''), 133.4 (C-1'''), 128.0 (C-2''', C-6'''), 128.5 (C-3''', C-5'''), 130.2 (C-4'''), 144.5 (C-7'''), 117.0 (C-8'''), 164.8 (C-9'''). HRFABMS (positive mode) m/z : 607.1807 ($[M+H]^+$; C₃₂H₃₀O₁₂+H requires, 607.1815); FABMS (positive mode) m/z (rel. int): 607 $[M+H]^+$ (100), 477 (1), 315 (44).

Skullcapflavone I 2'-O- β -D-(3''-E-cinnamoyl) glucopyranoside (25)

Yellow amorphous powder (MeOH); mp 236-237°C; $[\alpha]_{D_{25}}^{25}$ 0.09° (MeOH, c 5.0); UV λ_{max} (MeOH) nm (log ϵ): 273 (4.84), 321 sh (4.52), 352 sh (4.36); (NaOMe) 275, 385; (NaOAc) 272, 320 sh, 352 sh; (NaOAc+H₃BO₃) 272, 320 sh, 352 sh; (AlCl₃) 280, 335, 392 sh; (AlCl₃+HCl) 273, 330 sh, 360; IR (KBr) ν_{max} cm⁻¹: 3393 (OH), 1678 (C=O), 1616 (C=O), 1570, 1520; ¹H NMR (DMSO-*d*₆): δ 12.68 (1H, s, OH-5), 7.87 (1H, dd, J = 7.9, 1.7 Hz, H-6') 7.73 (2H, m, H- 2''', 6'''), 7.68 (1H, d, J = 16.0 Hz, H-7'''), 7.56 (1H, ddd, J = 8.5, 8.0, 1.7 Hz, H-4'), 7.42 (4H, m, H-3', 3''', 4''', 5'''), 7.26 (1H, ddd, J = 8.0; 7.9, 0.9 Hz, H-5') 7.01 (1H, s, H-3), 6.67 (1H, d, J = 16.0 Hz, H-8''') 6.59 (1H, s, H-6), 5.35 (1H, d, J = 7.9 Hz,

H-1''), 5.08 (1H, dd, $J = 9.2, 9.2$ Hz, H-3''), 3.91 (3H, s, OMe-7), 3.80 (3H, s, OMe-8), 3.71 (1H, m, H-6''a), 3.55 (4H, m, H-20, 40, 50, 6''b); ^{13}C NMR (DMSO- d_6): δ 161.0 (C-2), 110.2 (C-3), 182.3 (C-4), 103.9 (C-4a), 156.6 (C-5), 95.9 (C-6), 158.5 (C-7), 128.5 (C-8), 149.1 (C-8a), 120.4 (C-1'), 155.2 (C-2'), 115.6 (C-3'), 133.1 (C-4'), 122.3 (C-5'), 129.0 (C-6'), 56.5 (OMe-7), 61.1 (OMe-8), 99.6 (C-1''), 71.4 (C-2''), 77.9 (C-3''), 67.4 (C-4''), 76.8 (C-5''), 60.2 (C-6''), 134.2 (C-1'''), 128.3 (C-2''', C-6'''), 129.0 (C-3''', C-5'''), 130.3 (C-4'''), 144.2 (C-7'''), 118.7 (C-8'''), 165.7 (C-9'''). HRFABMS (positive mode) m/z : 607.1810 $[[\text{M}+\text{H}]^+; \text{C}_{32}\text{H}_{30}\text{O}_{12}+\text{H}$ requires 607.1815); FABMS (positive mode) m/z (rel. int): 607 $[\text{M}+\text{H}]^+$ (32), 477 $[\text{M}+\text{H}-\text{cinnamoyl}]^+$ (2), 315 $[\text{M}+\text{H}-\text{cinnamoyl glucosyl}]^+$ (53).

Skullcapflavone I 2'-O- β -D-(4''-E-cinnamoyl) glucopyranoside (26)

Yellow amorphous powder, mp 247-249 °C (MeOH); $[\alpha]_{\text{D}_{25}} -0.12^\circ$ (c 4.0, MeOH); UV λ_{max} (MeOH) nm (log ϵ): 272 (4.80), 320 sh (4.46), 350 sh (4.29); (NaOMe) 273, 380; (NaOAc) 271, 318 sh, 351 sh; (NaOAc+ H_3BO_3) 271, 318 sh, 351 sh; (AlCl_3) 278, 332, 390 sh; (AlCl_3+HCl) 278, 332, 390 sh; IR (KBr) ν_{max} cm^{-1} : 3391 (OH), 1676 ($>\text{C}=\text{O}$ ester), 1615 ($>\text{C}=\text{O}$), 1565, 1518; ^1H -NMR (DMSO- d_6): δ 12.69 (1H, s, OH-5), 7.89 (1H, dd, $J = 7.9, 1.5$ Hz, H-6'), 7.74 (2H, m, H-2''', 6'''), 7.68 (1H, d, $J = 16.0$ Hz, H-7'''), 7.60 (1H, ddd, $J = 8.4, 8.0, 1.5$ Hz, H-4'), 7.43 (4H, m, H-3', 3''', 4''', 5'''), 7.27 (1H, ddd, $J = 8.0, 7.9, 0.9$ Hz, H-5'), 7.02 (1H, s, H-3), 6.68 (1H, d, $J = 16.0$ Hz, H-8'''), 6.60 (1H, s, H-6), 5.36 (1H, d, $J = 7.9$ Hz, H-1''), 5.10 (1H, dd, $J = 9.1, 9.1$ Hz, H-4''), 3.92 (3H, s, OMe-7), 3.81 (3H, s, OMe-8), 3.73 (1H, m, H-6''a), 3.53 (4H, m, H-2'', 3'', 5'', 6''b); ^{13}C -NMR (DMSO- d_6): δ 160.9 (C-2), 110.1 (C-3), 182.3 (C-4), 104.0 (C-4a), 156.5 (C-5), 95.8 (C-6), 158.4 (C-7), 128.4 (C-8), 149.0 (C-8a), 120.3 (C-1'), 155.2 (C-2'), 115.5 (C-3'), 133.0 (C-4'), 122.3 (C-5'), 128.9 (C-6'), 56.4 (OMe-7), 61.1 (OMe-8), 99.5 (C-1''), 71.3 (C-2''), 74.5 (C-3''), 70.6 (C-4''), 75.5 (C-5''), 60.1 (C-6''), 134.1 (C-1'''), 128.2 (C-2''', C-6'''), 128.9 (C-3''', C-5'''), 130.3 (C-4'''), 144.1 (C-7'''), 118.6 (C-8'''), 165.6 (C-9'''). FAB-MS (positive ion mode) m/z : 607 $[\text{M}+\text{H}]^+$, 477 $[\text{M}+\text{H}-\text{cinnamoyl}]^+$, 315 $[\text{M}+\text{H}-\text{cinnamoyl glucosyl}]^+$. HR-FABMS (positive ion mode) m/z : 607.1807 $[\text{M}+\text{H}]^+$ (Calcd for $\text{C}_{32}\text{H}_{31}\text{O}_{12}$: 607.1815).

Skullcapflavone I 2'-O- β -D-(6''-E-cinnamoyl) glucopyranoside (26a)

Yellow amorphous powder (MeOH), mp: 198-200°C; $[\alpha]_{\text{D}_{25}} -0.18^\circ$ (c 4.00, MeOH); IR (KBr) ν_{max} cm^{-1} : 3458 (OH), 1709 ($>\text{C}=\text{O}$ of conjugated ester), 1609 ($>\text{C}=\text{O}$), 1510, 1447 cm^{-1} ; UV λ_{max} (MeOH) nm (log ϵ): 272 (4.40), 341 (sh) (3.50); (NaOAc) 272, 341

(sh); (NaOAc + H₃BO₃) 270, 342 (sh); (AlCl₃) 278, 370 (sh); (AlCl₃ + HCl) 272, 360 (sh) nm; ¹H NMR (300 MHz, DMSO-*d*₆): δ 12.69 (1H, s, OH-5), 7.67 (1H, dd, *J* = 7.5, 1.7 Hz, H-6'), 7.58 (1H, ddd, *J* = 8.5, 7.5, 1.7 Hz, H-4'), 7.41 (1H, dd, *J* = 8.5, 0.8 Hz, H-3'), 7.39 (2H, m, H-2'', 6''), 7.36 (1H, m, H-4''), 7.32 (2H, m, H-3'', 5''), 7.22 (1H, ddd, *J* = 7.5, 7.5, 0.8 Hz, H-5'), 7.21 (1H, d, *J* = 16.0 Hz, H-7''), 7.00 (1H, s, H-3), 6.42 (1H, s, H-6), 6.32 (1H, d, *J* = 16.0 Hz, H-8''), 5.22 (1H, d, *J* = 8.0 Hz, H-1''), 4.45 (1H, dd, *J* = 11.9, 6.4 Hz, H-6''a), 4.16 (1H, dd, *J* = 11.9, 1.7 Hz, H-6''b), 3.81 (3H, s, OMe-7), 3.58 (3H, s, OMe-8), 3.54 (3H, m, H-2'', 3'', 5''), 3.31 (1H, m, H-4''); ¹³C NMR (75 MHz, DMSO-*d*₆): δ 181.7 (C-4), 164.8 (C-9''), 160.8 (C-2), 158.1 (C-7), 156.5 (C-5), 155.1 (C-2'), 149.0 (C-8a), 144.5 (CH-7''), 133.5 (C-1''), 132.9 (CH-4'), 130.2 (CH-4''), 129.1 (CH-6'), 128.6 (CH-3'', 5''), 128.5 (C-8), 128.0 (CH-2'', 6''), 122.7 (CH-5'), 121.5 (C-1'), 117.0 (CH-8''), 116.3 (CH-3'), 110.4 (CH-3), 103.8 (C-4a), 99.5 (CH-1''), 95.8 (CH-6), 76.7 (CH-3''), 73.7 (CH-5''), 73.2 (CH-2''), 69.9 (CH-4''), 63.3 (CH₂-6''), 60.5 (OCH₃-8), 56.1 (OCH₃-7); ESITOFMS *m/z*: 607.1902 [M + H]⁺ calcd for C₃₂H₃₁O₁₂: 607.1952; ESI-MS/MS (positive mode): *m/z* (%) 607.1 [M + H]⁺ (100), 315.0 [M + H - cinnamoyl glucosyl]⁺ (75).

5, 2', 6'-Trihydroxy-7-methoxyflavone (27)

Yellow needles, mp 210-211 °C (MeOH); UV λ_{max} (MeOH) nm (log ε): 258 (4.55), 303 (4.20); (NaOMe) 257 sh, 290 sh, 357; (NaOAc) 258, 305; (NaOAc+H₃BO₃) 258, 305; (AlCl₃) 267, 286 sh, 318, 365; (AlCl₃+HCl) 267, 286 sh, 318, 365; IR (KBr) ν_{max} cm⁻¹: 3376 (OH), 3072, 2924, and 1647 (>C=O), 1618, 1562, 1456; ¹H-NMR (DMSO-*d*₆): δ 12.88 (1H, s, 5-OH), 9.88 (2H, s, 7-OH & 2'-OH), 6.26 (1H, s, H-3), 6.61 (1H, d, *J* = 2.2 Hz, H-8), 6.38 (1H, d, *J* = 2.2 Hz, H-6), 7.10 (1H, t, *J* = 8.2 Hz, H-4'), 6.40 (2H, d, *J* = 8.2 Hz, H-3', 5'); ¹³C-NMR (DMSO-*d*₆): δ 181.9 (C-4), 165.1 (C-7), 162.8 (C-2), 161.2 (C-5), 158.2 (C-8a), 156.6 (C-2', 6'), 131.9 (C-4'), 112.1 (C-3), 108.1 (C-1'), 106.4 (C-3', 5'), 104.8 (C-4a), 97.9 (C-6), 92.4 (C-8), 56.0 (OMe-7); EI-MS *m/z* (%) 300 (M⁺, 100), 283 (5), 272 (11), 167 (60), 166 (12), 137 (16), 134 (7). HR-Cl-MS *m/z* 301.0714 [M+H]⁺ (Calcd for C₁₆H₁₃O₆: 301.0711).

5, 7, 2', 5'-Tetramethoxyflavanone (28)

Colorless solid (MeOH), mp 198-200 °C [α]_D²⁵ -18.6° (c 0.14, MeOH). UV λ_{max} (MeOH) nm (log ε): 283 (4.13), 324 (sh) (3.86). IR (KBr) ν_{max} cm⁻¹: 2923 (OMe), 1685 (>C=O), 1601, 1560, 1492, 1446, 1369, 1276, 1215, 1159. CD (c 0.14, MeOH): [θ]₃₂₄ +0.21, [θ]₂₈₃

+0.68. $^1\text{H-NMR}$ (CDCl_3): δ 7.14 (1H, d, $J = 1.4$ Hz, H-6'), 6.82 (2H, m, H-3', 4'), 6.15 (1H, d, $J = 2.2$ Hz, H-8), 6.07 (1H, d, $J = 2.2$ Hz, H-6), 5.72 (1H, dd, $J = 12.3, 4.1$ Hz, H-2), 3.87 (3H, s, OMe-5), 3.81 (3H, s, OMe-7), 3.79 (3H, s, OMe-5'), 3.76 (3H, s, OMe-2'), 2.85 (1H, dd, $J = 16.6, 12.3$ Hz, H-3_{ax}), 2.79 (1H, dd, $J = 16.6, 4.1$ Hz, H-3_{eq}). $^{13}\text{C-NMR}$ (CDCl_3) δ : 189.8 (C-4), 165.9 (C-8a), 165.8 (C-7), 162.3 (C-5), 153.8 (C-5'), 149.5 (C-2'), 128.5 (C-1'), 113.5 (C-3'), 112.0 (C-6'), 111.5 (C-4'), 106.1 (C-4a), 93.5 (C-8), 93.1 (C-6), 74.2 (C-2), 56.1 (OMe-5), 55.8 (OMe-2',5'), 55.6 (OMe-7), 44.7 (C-3). ESI-MS/MS (positive mode) m/z (%): 345.1 $[\text{M}+\text{H}]^+$ (3), 191.1 ($^0\text{B}^+$) (44), 181.1 ($^{1,3}\text{A}^+$) (100), 176.1 ($^0\text{B}^+-\text{CH}_3$) (18), 166.1 ($^{1,3}\text{A}^+-\text{CH}_3$) (3), 163.1 ($^0\text{B}^+-\text{CO}$) (3). ESI-TOFMS m/z : 345.1153 $[\text{M}+\text{H}]^+$ (Calcd for $\text{C}_{19}\text{H}_{21}\text{O}_6$: 345.1332).

5-Hydroxy 7, 2'-dimethoxyflavone (29)

Pale yellow amorphous solid (MeOH), mp 222-224 °C; UV λ_{max} (MeOH) nm (log ϵ): 266 (4.17), 329 (3.95); $[\text{AlCl}_3]$ 277, 342; $[\text{AlCl}_3+\text{HCl}]$ 277, 342. IR (KBr) ν_{max} cm^{-1} : 3413 (OH), 2934 (OMe), 1656 ($>\text{C}=\text{O}$), 1609, 1497, 1454, 1329, 1238, 1159. $^1\text{H-NMR}$ (CDCl_3) δ : 12.81 (1H, s, OH-5), 7.85 (1H, dd, $J = 7.5, 1.7$ Hz, H-6'), 7.46 (1H, ddd, $J = 8.3, 8.3, 1.7$ Hz, H-4'), 7.09 (1H, ddd, $J = 8.3, 7.5, 1.7$ Hz, H-5'), 7.04 (1H, dd, $J = 8.3, 1.7$ Hz, H-3'), 7.00 (1H, s, H-3), 6.44 (1H, d, $J = 2.2$ Hz, H-8), 6.35 (1H, d, $J = 2.2$ Hz, H-6), 3.92 (3H, s, OMe-2'), 3.85 (3H, s, OMe-7). $^{13}\text{C-NMR}$ (CDCl_3) δ : 182.8 (C-4), 165.4 (C-7), 162.1 (C-5), 161.3 (C-2), 158.0 (C-2'), 156.9 (C-8a), 132.6 (C-4'), 129.2 (C-6'), 120.7 (C-1'), 120.3 (C-5'), 111.7 (C-3'), 110.9 (C-3), 105.6 (C-4a), 97.9 (C-6), 92.4 (C-8), 55.8 (OMe-7), 55.7 (OMe-2'). ESI-MS/MS (positive mode) m/z (%): 299.1 $[\text{M}+\text{H}]^+$ (14), 284.1 $[\text{M}+\text{H}-\text{CH}_3]^+$ (50), 269.1 $[\text{M}+\text{H}-2\text{CH}_3]^+$ (5), 256.0 $[\text{M}+\text{H}-\text{CH}_3-\text{CO}]^+$ (85), 166.0 ($^{1,3}\text{A}^+$) (45), 138.0 ($^{1,3}\text{A}^+-\text{CO}$) (100), 133.0 ($^{1,3}\text{B}^+$) (1), 118.0 ($^{1,3}\text{B}^+-\text{CH}_3$) (51). ESITOF- MS m/z : 299.0859 $[\text{M}+\text{H}]^+$ (Calcd for $\text{C}_{17}\text{H}_{15}\text{O}_5$: 299.0915).

2', 4', 6', 2, 3, 4-Hexamethoxychalcone (30)

Pale orange-yellow solid (CHCl_3), mp 174-176 °C; UV λ_{max} (MeOH) nm (log ϵ): 252 (sh) (3.89), 308 (4.09), 330 (4.16); (MeOH+NaOAc): 252 (sh), 308, 331; (MeOH+ AlCl_3): 253 (sh), 309, 330; IR (KBr) ν_{max} cm^{-1} : 2904 ($-\text{OMe}$), 1653 ($>\text{C}=\text{O}$), 1612, 1504, 1348, 1296, 1219, 851, 772; $^1\text{H-NMR}$ (CDCl_3) δ : 7.55 (1H, d, $J = 16.2$ Hz, H- β), 7.29 (1H, d, $J = 8.8$ Hz, H-6), 6.90 (1H, d, $J = 16.2$ Hz, H- α), 6.66 (1H, d, $J = 8.8$ Hz, H-5), 6.13 (2H, s, H-3', 5'), 3.86 (3H, s, OMe-4), 3.83 (3H, s, OMe-4'), 3.82 (3H, s, OMe-3), 3.80 (3H, s, OMe-2), 3.74

(6H, s, OMe-2', 6'); ^{13}C -NMR (CDCl_3) δ : 194.8 ($>\text{C}=\text{O}$), 162.2 (C-4'), 158.7 (C-2', 6'), 155.4 (C-4), 152.9 (C-2), 142.5 (C-3), 139.6 (C- β), 128.2 (C- α), 123.2 (C-6), 122.1 (C-1'), 111.9 (C-1), 102.6 (C-5), 90.7 (C-3', 5'), 61.4 (OMe-2), 60.9 (OMe-3), 56.0 (OMe-4), 55.9 (OMe-2', 6'), 55.4 (OMe-4'); ESI-MS/MS (positive mode) m/z (%): 389.1 $[\text{M}+\text{H}]^+$ (2), 195.0 (59), 194.0 (3), 180.0 (53), 165.0 (8), 163.0 (27), 152.0 (100), 151.0 (38), 137.0 (70); ESI-TOF-MS m/z : 411.1234 $[\text{M}+\text{Na}]^+$ (22) 389.1340 $[\text{M}+\text{H}]^+$ (100) (Calcd for $\text{C}_{21}\text{H}_{24}\text{O}_7+\text{H}$: 389.1600).

5-Hydroxy-7, 2', 5'-trimethoxyflavone (31)

Pale yellow solid (MeOH), mp 196-198 °C; UV λ_{max} (MeOH) nm (log ϵ): 277 (3.99), 322 (3.54); (MeOH+NaOAc): 277, 322; (MeOH+ AlCl_3): 277, 353; (MeOH+ AlCl_3/HCl): 277, 353. IR (KBr) ν_{max} cm^{-1} : 3414 ($-\text{OH}$); 2944 ($-\text{OMe}$), 2842, 1647 ($>\text{C}=\text{O}$), 1589, 1492, 1464, 1414, 1339, 1298, 1262, 1229, 1208, 1160, 1127, 1029, 943, 804. ^1H -NMR (CDCl_3) δ : 12.78 (1H, br s, OH-5), 7.38 (1H, d, J = 3.0 Hz, H-6'), 7.02 (1H, s, H-3), 6.99 (1H, dd, J = 9.0, 3.0 Hz, H-4'), 6.94 (1H, d, J = 9.0 Hz, H-3'), 6.45 (1H, d, J = 2.2 Hz, H-8), 6.37 (1H, d, J = 2.2 Hz, H-6), 3.86 (3H, s, OMe-5'), 3.84 (3H, s, OMe-7), 3.81 (3H, s, OMe-2'). ^{13}C -NMR (CDCl_3) δ : 182.7 (C-4), 165.3 (C-7), 160.7 (C-2), 157.8 (C-8a), 152.3 (C-2'), 161.9 (C-5), 153.3 (C-5'), 120.5 (C-1'), 117.4 (C-4'), 114.4 (C-6'), 112.8 (C-3), 105.5 (C-4a), 110.9 (C-3'), 97.9 (C-6), 92.2 (C-8), 56.0 (OMe-7), 55.8 (OMe-2'), 55.7 (OMe-5'). ESIMS/MS (positive mode) m/z (%): 329.1 $[\text{M}+\text{H}]^+$ (24), 314.0 $[\text{M}+\text{H}-\text{CH}_3]^+$ (25), 299.0 $[\text{M}+\text{H}-2\text{CH}_3]^+$ (100), 271.0 $[\text{M}+\text{H}-2\text{CH}_3-\text{CO}]^+$ (89), 256.0 $[\text{M}+\text{H}-3\text{CH}_3-\text{CO}]^+$ (33), 167.0 ($^{13}\text{A}^+$) (34), 163.0 ($^{13}\text{B}^+$) (4), 148.0 ($^{13}\text{B}^+-\text{CH}_3$) (71), 139.0 ($^{13}\text{A}^+-\text{CO}$) (6), 133.0 ($^{13}\text{B}^+-2\text{CH}_3$) (34). ESI-TOF-MS m/z : 329.0790 $[\text{M}+\text{H}]^+$ (100) (Calcd for $\text{C}_{18}\text{H}_{16}\text{O}_6+\text{H}$: 329.1025).

5, 7, 2', 3', 4'-Pentamethoxyflavone (32)

Colorless needles (CHCl_3). mp 166-167 °C; UV λ_{max} (MeOH) nm (log ϵ): 271 (3.94), 329 (3.61); (MeOH+NaOAc): 270, 330; (MeOH + AlCl_3): 272, 330; (MeOH+ AlCl_3 + HCl): 272, 330; IR (KBr) ν_{max} cm^{-1} : 2943 ($-\text{OMe}$), 1632 ($>\text{C}=\text{O}$), 1590, 1491, 1459, 1414, 1342. ^1H NMR (400 MHz, CDCl_3): δ 7.45 (1H, d, J = 8.8 Hz, H-6'), 6.80 (1H, s, H-3), 6.73 (1H, d, J = 8.8 Hz, H-5'), 6.46 (1H, d, J = 2.1 Hz, H-8), 6.32 (1H, d, J = 2.1 Hz, H-6), 3.91 (3H, s, OMe-5), 3.89 (3H, s, OMe-2'), 3.88 (3H, s, OMe-4'), 3.86 (3H, s, OMe-3'), 3.85 (3H, s, OMe-7); ^{13}C NMR (75 MHz, CDCl_3): δ 177.8 (C-4), 163.7 (C-7), 160.8 (C-5), 159.9 (C-8a), 158.5 (C-2), 155.8 (C-4'), 152.8 (C-2'), 142.6 (C-3'), 123.7 (C-6'), 118.6 (C-1'), 112.4 (C-3), 109.1

(C-4a), 107.2 (C-5'), 95.8 (C-6), 92.6 (C-8), 60.9 (OMe-2'), 60.8 (OMe-3'), 56.3 (OMe-5), 56.0 (OMe-4'), 55.6 (OMe-7); ESI-MS/MS (positive mode) m/z (rel. int.): 373.1 [M+H]⁺ (1), 358.0 [M+H-CH₃]⁺ (3), 330.0 [M+H-CH₃-CO]⁺ (4), 302.0 [M+H-CH₃-2CO]⁺ (10), 237.0 (^{0,4}B⁺) (6), 195.0 (^{0,2}B⁺) (4), 193.0 (^{1,3}B⁺) (3), 181.1 (^{1,3}A⁺) (100); HRESIMS (positive mode) m/z : 373.0953 [M+H]⁺ (C₂₀H₂₁O₇ requires 373.1287).

2'-Hydroxy-2, 4', 6'-trimethoxychalcone (33)

Yellow needles (CHCl₃). mp 171–173 °C; UV λ_{\max} (MeOH) nm (log ϵ): 251 sh (4.13), 306 sh (3.87), 363 (4.36); (MeOH+NaOAc): 251 sh, 306 sh, 363; (MeOH+AlCl₃): 270, 406; (MeOH+AlCl₃+HCl): 270, 406; IR (KBr) ν_{\max} cm⁻¹: 3416 (-OH), 2885 (-OMe), 1612 (>C=O), 1511, 1458, 1259, 1155; ¹H NMR (400 MHz, CDCl₃): δ 14.39 (1H, s, OH-2'), 8.12 (1H, d, J = 15.7 Hz, H- β), 7.94 (1H, d, J = 15.7 Hz, H- α), 7.57 (1H, dd, J = 8.7, 1.7 Hz, H-6), 7.34 (1H, dt, J = 7.8, 1.7 Hz, H-4), 6.96 (1H, dt, J = 7.6, 1.8 Hz, H-5), 6.91 (1H, dd, J = 8.3, 1.9 Hz, H-3), 6.08 (1H, d, J = 2.3 Hz, H-3'), 5.93 (1H, d, J = 2.3 Hz, H-5'), 3.88 (6H, s, OMe-2, OMe-6'), 3.80 (3H, s, OMe-4'); ¹³C NMR (75 MHz, CDCl₃): δ 193.0 (>C=O), 168.3 (C-2'), 166.0 (C-4'), 162.5 (C-6'), 158.6 (C-2), 137.8 (C- β), 131.3 (C-4), 128.7 (C-6), 127.8 (C- α), 124.5 (C-1), 120.6 (C-5), 111.1 (C-3), 106.4 (C-1'), 93.7 (C-3'), 91.1 (C-5'), 55.7 (OMe-2), 55.5 (OMe-4'), 55.4 (OMe-6'); ESI-MS/MS (positive mode) m/z (rel. int.): 315.1 [M+H]⁺ (1), 181.0 (^{1,3}A⁺) (71), 166.0 (^{1,3}A⁺-CH₃) (48), 138.0 (^{1,3}A⁺-CH₃-CO) (100); HRESIMS (positive mode) m/z : 315.1052 [M+H]⁺ (C₁₈H₁₉O₅ requires 315.1232).

Dihydroskullcapflavone I (34)

Colorless needles (CHCl₃). mp 151–153 °C; [α]_D²⁸ -21.7° (MeOH, c 0.15); UV λ_{\max} (MeOH) nm (log ϵ): 287 (4.13), 329 sh (3.86); (MeOH+NaOAc): 287, 329 sh; (MeOH+AlCl₃): 310, 358; (MeOH+AlCl₃+HCl): 310, 358; CD: $\Delta\epsilon_{287}$ -0.86, $\Delta\epsilon_{329}$ +0.20 (MeOH, c 0.15); IR (KBr) ν_{\max} cm⁻¹: 3200 (-OH), 1637 (>C=O), 1605, 1498, 1458, 1352; ¹H NMR (400 MHz, CDCl₃): δ 11.90 (1H, s, OH-5), 7.33 (1H, dd, J = 7.7, 1.7 Hz, H-6'), 7.22 (1H, ddd, J = 7.7, 7.7, 1.7 Hz, H-4'), 6.94 (1H, ddd, J = 7.7, 7.7, 1.1 Hz, H-5'), 6.86 (1H, dd, J = 8.1, 1.1 Hz, H-3'), 6.85 (1H, s, OH-2') 6.11 (1H, s, H-6), 5.73 (1H, dd, J = 13.5, 3.1 Hz, H-2), 3.88 (3H, s, OMe-7), 3.78 (3H, s, OMe-8), 3.12 (1H, dd, J = 17.3, 13.5 Hz, H-3_{ax}), 3.07 (1H, dd, J = 17.3, 3.1 Hz, H-3_{eq}); ¹³C NMR (75 MHz, CDCl₃): δ 196.5 (C-4), 161.6 (C-7), 160.0 (C-5), 153.9 (C-2'), 153.0 (C-8a), 129.9 (C-4'), 129.8 (C-8), 126.4 (C-6'), 124.1 (C-1'), 120.7 (C-5'), 116.7 (C-3'), 102.9 (C-4a), 93.5 (C-6), 76.6 (C-2), 61.5 (OMe-8), 56.3

(OMe-7), 41.3 (C-3); ESI-MS/MS (positive mode) m/z (rel. int.): 317.1 $[M+H]^+$ (9), 197.0 ($^{13}A^+$)(100), 182.0 ($^{13}A^+-CH_3$)(38), 164.0 ($^{13}A^+-CH_3-H_2O$)(18), 154.0 ($^{13}A^+-CH_3-CO$)(50); HRESIMS (positive mode) m/z : 317.1021 $[M+H]^+$ ($C_{17}H_{17}O_6$ requires 317.1024).

5, 7, 2'-Trimethoxyflavone (35)

Colorless needles ($CHCl_3$), mp 177–178°C; UV λ_{max} (MeOH) nm (log ϵ): 261 (4.32), 322 (4.14); +NaOAc: 261, 322; +AlCl₃: 261, 322; +AlCl₃/HCl: 261, 290 sh, 323; IR (KBr) ν_{max} cm⁻¹: 1699 ($>C=O$), 1602 (C=C), 1491, 1458, 1427, 1341. ¹H NMR (300 MHz, DMSO-d₆): δ 7.89 (1H, dd, J = 8.1, 1.7 Hz, H-6'), 7.53 (1H, dt, J = 8.1, 1.7 Hz, H-4'), 7.22 (1H, dd, J = 8.1, 0.9 Hz, H-3'), 7.13 (1H, dt, J = 7.8, 0.9 Hz, H-5'), 6.69 (1H, s, H-3), 6.78 (1H, d, J = 2.3 Hz, H-8), 6.48 (1H, d, J = 2.3 Hz, H-6), 3.90 (3H, s, OMe-2'), 3.87 (3H, s, OMe-7), 3.81 (3H, s, OMe-5); ¹³C NMR (75 MHz, DMSO-d₆): δ 157.4 (C-2), 112.4 (C-3), 175.8 (C4), 108.0 (C-4a), 160.2 (C-5), 96.1 (C-6), 163.7 (C-7), 93.2 (C-8), 159.3 (C-8a), 119.4 (C-1'), 157.5 (C-2'), 113.0 (C-3'), 132.5 (C-4'), 120.7 (C-5'), 128.7 (C-6'), 56.1 (OMe-5), 55.9 (OMe-7), 55.9 (OMe-2'). HR-CIMS (Positive ion mode) m/z : 313.1077 $[M+H]^+$ (Calc. for $C_{18}H_{17}O_5$, 313.1075); EI-MS m/z (rel. int.): 312 $[M]^+$ (100), 311 (55), 283 (35), 266 (40), 180 (10), 151 (44), 131 (40).

5, 7, 2', 4', 6'-Pentamethoxyflavone (36)

Pale yellow solid, mp 192–194°C; UV λ_{max} (MeOH) nm (log ϵ): 252 (4.30), 300 (4.09); +NaOAc: 252, 300; +NaOMe: 252, 300; +AlCl₃: 252, 301; +AlCl₃/HCl: 252, 301; IR (KBr) ν_{max} cm⁻¹: 1660 ($>C=O$), 1610 (C=C), 1590, 1440, 1428, 1340, 1240. ¹H NMR (400 MHz, CDCl₃): δ 6.43 (1H, d, J = 2.2 Hz, H-8), 6.32 (1H, d, J = 2.2 Hz, H-6), 6.23 (1H, s, H-3), 6.13 (2H, s, H-3', 5'), 3.91 (3H, s, OMe 5), 3.83 (3H, s, OMe-4'), 3.82 (3H, s, OMe-7), 3.74 (6H, s, OMe-2',6'); ¹³C NMR (75 MHz, CDCl₃): ¹³C NMR (75 MHz, DMSO-d₆): δ 157.8 (C-2), 116.4 (C-3), 177.8 (C4), 109.3 (C-4a), 160.8 (C-5), 95.8 (C-6), 163.6 (C-7), 92.8 (C-8), 160.8 (C-8a), 104.3 (C-1'), 159.5 (C-2'), 90.6 (C-3'), 163.1 (C-4'), 90.6 (C-5'), 159.5 (C-6'), 56.3 (OMe-5), 55.6 (OMe-7), 55.9 (OMe-2'), 55.4 (OMe-4'), 55.9 (OMe-6'). ESIMS (Positive ion mode) m/z (rel. int.): 395.0994 $[M+Na]^+$ (10), 373.0698 $[M+H]^+$ (100); 329.1014 (5), 192.0876 (15), 181.0568 (100), 177.0625 (65), 167.0400 (65), 166.0323 (50).

5, 7, 2', 3', 4'-Pentamethoxyflavanone (37)

Colorless needles (CHCl_3); mp 166-168 °C; $[\alpha]_{\text{D}}^{25} -21.0^\circ$ (c 0.1, MeOH); UV λ_{max} (MeOH) nm (log ϵ): 282 (4.39), 320 (sh) (4.05), (MeOH + NaOAc) 283, 320 (sh) (MeOH + AlCl_3) 281, 320 (sh) nm; CD (MeOH) λ nm ($\Delta\epsilon$) 287 (-0.23), 320 (+0.07); IR (KBr) ν_{max} cm^{-1} : 1672 (C=O), 1609, 1576, 1499, 1461, 1359 cm^{-1} ; ^1H NMR (CDCl_3 , 400 MHz) δ 7.18 (1H, d, J = 8.7 Hz, H-6'), 6.71 (1H, d, J = 8.7 Hz, H-5'), 6.10 (1H, d, J = 2.3 Hz, H-8), 6.06 (1H, d, J = 2.3 Hz, H-6), 5.64 (1H, dd, J = 13.3, 2.8 Hz, H-2), 3.88 (3H, s, 2'-OMe), 3.87 (3H, s, 5-OMe), 3.85 (3H, s, 4'-OMe), 3.84 (3H, s, 3'-OMe), 3.78 (3H, s, 7-OMe) 3.03 (1H, dd, J = 16.6, 13.3 Hz, H-3_{ax}), 2.71 (1H, dd, J = 16.6, 2.8 Hz, H-3_{eq}); ^{13}C NMR (CDCl_3 , 75 MHz) δ 189.8 (C-4), 165.5 (C-7), 165.3 (C-8a), 162.3 (C-5), 154.0 (C-4'), 151.3 (C-2'), 142.0 (C-3'), 124.7 (C-1'), 121.3 (C-6'), 107.3 (C-5'), 106.0 (C-4a), 93.4 (C-8), 93.0 (C-6), 74.2 (C-2), 61.3 (2'-OMe), 60.7 (3'-OMe), 56.1 (5-OMe), 56.0 (4'-OMe), 55.5 (7-OMe), 44.8 (C-3); ESIMS/MS (positive mode) m/z 375.1 $[\text{M} + \text{H}]^+$ (13), 221.0 ($^{0.4}\text{B}^+ - \text{H}_2\text{O}$) (18), 206.1 ($^{0.4}\text{B}^+ - \text{H}_2\text{O} - \text{Me}$) (10), 191.0 ($^{0.4}\text{B}^+ - \text{H}_2\text{O} - 2\text{Me}$) (18), 181.1 ($^{1.3}\text{A}^+$) (100), 166.0 ($^{1.3}\text{A}^+ - \text{Me}$) (24), 138.0 ($^{1.3}\text{A}^+ - \text{Me} - \text{CO}$) (35); HRESIMS m/z 375.1521 $[\text{M} + \text{H}]^+$ (calcd for $\text{C}_{20}\text{H}_{22}\text{O}_7 + \text{H}$, 375.1443).

5-Hydroxy-7, 8, 2', 5'-tetramethoxyflavone (38)

Yellow solid (CHCl_3); mp 195-197 °C; UV λ_{max} (MeOH) nm (log ϵ): 272 (3.65), 358 (3.25), (MeOH + NaOAc) 272, 358, (MeOH + AlCl_3/HCl) 280, 383 nm; IR (KBr) ν_{max} cm^{-1} : 3380 (OH), 2900 (OMe), 1650 (C=O), 1580, 1500, 1460, 1240, 1210 cm^{-1} ; ^1H NMR (CDCl_3 , 400 MHz) δ 12.62 (5-OH), 7.51 (1H, d, J = 3.08 Hz, H-6'), 7.06 (1H, s, H-3), 7.01 (1H, dd, J = 9.0, 3.0 Hz, H-4') 6.96 (1H, d, J = 9.0 Hz, H-3'), 6.40 (1H, s, H-6), 3.92 (3H, s, 7-OMe), 3.90 (3H, s, 8-OMe), 3.88 (3H, s, 2'-OMe), 3.83 (3H, s, 5'-OMe); ^{13}C NMR (CDCl_3 , 75 MHz) δ 183.1 (C-4), 161.0 (C-2), 158.5 (C-7), 157.5 (C-5), 153.5 (C-5'), 152.5 (C-2'), 149.5 (C-8a), 129.0 (C-8), 120.7 (C-1'), 118.3 (C-4'), 113.9 (C-6'), 113.0 (C-3'), 110.5 (C-3), 104.8 (C-4a), 95.4 (C-6), 61.5 (8-OMe), 56.3 (7-OMe), 56.1 (2'-OMe), 55.7 (5'-OMe); ESIMS/MS (positive mode) m/z 359.1 $[\text{M} + \text{H}]^+$ (2), 344.0 $[\text{M} + \text{H} - \text{Me}]^+$ (5), 331.0 $[\text{M} + \text{H} - \text{CO}]^+$ (5), 329.0 $[\text{M} + \text{H} - 2\text{Me}]^+$ (100), 314.0 $[\text{M} + \text{H} - 3\text{Me}]^+$ (18), 300.0 $[\text{M} + \text{H} - 4\text{Me}]^+$ (13), 286.0 $[\text{M} + \text{H} - 3\text{Me} - \text{CO}]^+$ (65), 197.0 ($^{1.3}\text{A}^+$) (2), 163.0 ($^{1.3}\text{B}^+$) (2); HRESIMS m/z 359.1050 $[\text{M} + \text{H}]^+$ (calcd for $\text{C}_{19}\text{H}_{18}\text{O}_7 + \text{H}$, 359.1130).

Echioidinin 2'-O- β -D-(6''-O-acetyl) glucopyranoside (39)

Greenish-yellow crystalline solid (MeOH); mp 278-280 °C; $[\alpha]_{D_{25}}^{25} -64.0^\circ$ (c 0.1, MeOH); UV λ_{\max} (MeOH) nm (log ϵ): 265 (3.90), 320 (3.66), (MeOH + NaOAc) 268, 320, (MeOH + AlCl₃/HCl), 272, 365 nm; IR (KBr) ν_{\max} cm⁻¹: 3300 (OH), 2850 (OMe) 1725 (ester C=O), 1650 (C=O), 1610, 1600, 1450, 1100 cm⁻¹; ¹H NMR (DMSO-*d*₆, 400 MHz) δ 12.87 (5-OH), 7.91 (1H, dd, *J* = 7.8, 1.6 Hz, H-6'), 7.56 (1H, ddd, *J* = 7.8, 7.8 1.6 Hz, H-4'), 7.32 (1H, dd, *J* = 7.8, 1.6 Hz, H-3'), 7.21 (1H, ddd, *J* = 7.8, 7.8 1.6 Hz, H-5'), 7.04 (1H, s, H-3), 6.74 (1H, d, *J* = 2.2, Hz, H-8), 6.38 (1H, d, *J* = 2.2, Hz, H-6), 5.15 (1H, d, *J* = 7.3 Hz, H-1''), 4.05 (1H, dd, *J* = 11.9, 6.6 Hz, H-6''a) 4.27 (1H, dd, *J* = 11.9, 1.8 Hz, H-6''b), 3.85 (3H, s, 7-OMe), 3.60 (1H, ddd, *J* = 9.5, 6.6, 1.9 Hz, H-5''), 3.21-3.32 (3H, m, H-2'', 3'', 4''), 1.98 (3H, s, OAc-6''); ¹³C NMR (DMSO-*d*₆, 75 MHz) δ 182.0 (C-4), 170.1 (6''-OCOCH₃), 165.2 (C-7), 161.1 (C-5), 161.0 (C-2), 157.5 (C-8a), 155.2 (C-2'), 132.9 (C-4'), 129.1 (C-6'), 122.1 (C-5'), 120.3 (C-1'), 115.7 (C-3'), 110.4 (C-3), 104.7 (C-4a), 100.1 (C-1''), 97.9 (C-6), 92.6 (C-8), 76.7 (C-3''), 73.7 (C-5''), 73.1 (C-2''), 69.6 (C-4''), 63.2 (C-6''), 56.0 (7-OMe), 20.5 (6''-OCOCH₃); ESIMS/MS (positive mode) *m/z* 489.2 [M + H]⁺ (2), 285.0 [M + H - acetyl glucosyl]⁺ (100), 167.0 (¹³A⁺) (5), 119.0 (¹³B⁺) (3); HRESIMS *m/z* 489.1317 [M + H]⁺ (calcd for C₂₄H₂₄O₁₁ + H, 489.1396).

2'-Hydroxy-2-methoxy-4'-O-[(E)-3,7-dimethyl-2,6-octadienyl] chalcone (42)

Colorless solid (MeOH); mp: 59-60°C; IR (KBr) ν_{\max} cm⁻¹: 3450 (-OH), 2964, 2922 (OMe), 2857, 1637 (>C=O), 1573 (C=C), 1502, 1492, 1462, 1419, 1362, 1314, 1274, 1247, 1216, 1135, 1051, 1026, 1001, 973, 855, 831, 801, 751, 676, 641 cm⁻¹; UV λ_{\max} (MeOH) nm (log ϵ): 251 (3.98), 306 (4.22) 365 (4.94); ¹H NMR (600 MHz, CDCl₃): δ 13.54 (1H, s, OH-2'), 8.17 (1H, d, *J* = 15.6 Hz, H- β), 7.80 (1H, d, *J* = 8.8 Hz, H-6'), 7.68 (1H, d, *J* = 15.6 Hz, H- α), 7.61 (1H, dd, *J* = 7.5, 1.5 Hz, H-6), 7.37 (1H, ddd, *J* = 8.3, 7.5, 1.5 Hz, H-4), 6.98 (1H, ddd, *J* = 7.5, 7.5, 1.0 Hz, H-5), 6.93 (1H, dd, *J* = 8.3, 1.0 Hz, H-3), 6.47 (1H, dd, *J* = 8.8, 2.5 Hz, H-5'), 6.46 (1H, d, *J* = 2.5 Hz, H-3'), 5.46 (1H, m, H-2''), 5.08 (1H, m, H-6''), 4.57 (2H, d, *J* = 6.6 Hz, CH₂-1''), 3.92 (3H, s, OMe-2), 2.11 (2H, m, CH₂-5''), 2.08 (2H, m, CH₂-4''), 1.74 (3H, d, *J* = 1.0 Hz, Me-10''), 1.66 (3H, d, *J* = 1.1 Hz, Me-8''), 1.59 (3H, d, *J* = 0.5 Hz, Me -9''); ¹³C NMR (150 MHz, CDCl₃): δ 192.4 (>C=O), 166.6 (C-2'), 165.4 (C-4'), 158.9 (C-2), 142.2 (C-3''), 139.9 (C- β), 131.9 (C-7''), 131.7 (C-4), 131.4 (C-6'), 129.6 (C-6), 123.8 (C-1), 123.6 (C-6''), 121.0 (C- α), 120.7 (C-5), 118.5 (C-2''), 114.1 (C-1'), 111.1 (C-3), 108.3 (C-5'), 101.7 (C-3'), 65.2 (C-1''), 55.6 (OMe-2), 39.5 (C-4''), 25.8 (C-5''), 25.6

(Me-8"), 17.7 (Me-9"), 16.7 (Me-10"); ESITOFMS (positive mode) m/z (rel.int.): 407.2191 [M+H]⁺ (100) (calcd for C₂₆H₃₀O₄+H, 407.2245).

CONCLUSION

This review of literature including phytochemical investigations on naturally occurring compounds of flavonoids from *andrographis* species. This review will help researchers and scientists in locating the detailed information and address the continuous development in the phytochemistry and their detailed complete spectral data for further reference purpose.

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Production of Activated Carbon from Rice Husk and Rice Straw for Adsorption Studies

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Abstract:- The study proposes a process for converting rice residue (straw, husk) into activated carbon (AC). The raw material has been thermolyzed at 500°C, and the carbonizate was activated at 800°C. Appropriate techniques were used to study the characteristics of the AC produced. SEM has been used to examine the porous structure of activated carbon. Activated charcoal made from rice husk belongs to the wood activated carbon (WAC) product, while activated carbon derived from rice straw compares to the BAU-A grade, according to the results of the experiments. This study presents a sensible strategy for obtaining viable secondary adsorbent materials for adsorption in liquid media from agricultural by-products.

Keywords:- Rice straw and husk, activated carbon, carbonization, activation of carbonizate, sorbent.

I. INTRODUCTION

India and China account for the major rice production, rice straw forms a major component of agro-residues, and thus, could be a potential source of feedstock for biofuels production [1]. Scientists were trying to think about how to make activated carbon with high adsorption performance from inexpensive raw materials, as the use of activated carbon has increased day by day around the world. Researchers in the United States and elsewhere are increasingly interested in the activated carbon found in rice straw and husks. Rice has been one of the world's most important agro-food crops. Today, rice output across the globe is expected to be around 485 million tonnes per year. As per Kazagro trading JSC, Kyzylorda, Almaty, and Turkestan are the paddy areas of Kazakhstan. Kyzylorda is the country's major grain region, producing over 85% of the country's rice. After collecting and industrializing rice production, considerable amounts of wastage in the form of straw (approximately to 50% of weight) and husk (approximately to 20% of weight) are produced. The use of husk and straw, basically, stays a significant issue for farmers. The bulk of rice husk and straw is heated, resulting in a worsening of the ecosystems. The use of rice straw and husk, but also the manufacturing of desired carbonaceous materials, would be a collaborative solution to the environmental and technology difficulties. The thermal procedure of rice husk and the generation of phenolic-compounds from it have been studied by many authors [1, 2]. The use of rice straw and husk to make broadly appropriate adsorbent activated carbon is recommended in this study. AC has been typically made from different types of carbon-containing organic materials, including charcoal (DAK, BAU, etc.) [3,4], coal coke (AC brand AR, AG,

etc.), and others. [5-13] Petroleum coke, agricultural trash, coconut shells, fruit shells, pulp manufacturing debris, refuse, used rubber tyres, industrial wastewater, synthetic polymer effluents, and other materials. Using agricultural waste to make activated carbon is pollution-free since it eliminates the utilization of wood as an unrefined substance, reducing deforestation and encouraging more sensible use of agricultural waste. Another process for manufacturing activated carbon from barley waste was identified [14]. It also includes hot air heating and maintaining the first carbonization temperature between 290 and 320 °C. The time duration is 7 to 15 minutes in a cylindrical reactor. Another technique of creating activated carbon from barley waste exists: carbonization of oilseed straw at 450–500 °C in an inert nitrogen environment, followed by activation by steam at 820–850 °C [15]. Some studies have been conducted on the production of high porosity activated carbon prepared from rice husk, which does have selective sorption ability for Pb²⁺ ions [16–17]. Some other studies have found that combining rice husks and polytetrafluoroethylene produces a porous structural material [18].

II. EXPERIMENTAL

The tubular furnace is equipped with stainless steel, has a length of 250 mm and an interior diameter of 25 mm, and has been used to heat 10 g of raw material. Carbonization was carried out after the tube was covered. The carbonization temperature has been increasing at a rate of 10 °C/min until it reaches 500 °C and has been maintained for 100 min. Carbonization yields from husk and straw were 44% and 37%, correspondingly. Thereafter, a vessel has been coupled to the bottom of the muffle furnace to deliver steam to the apparatus, maintaining a water-to-carbonizate mass ratio of 2:1. The activation has been done at 800 °C, and the amount of AC produced ranged from 27 to 29 percent, based on the weight of the husk and straw employed. The resultant AC surface can be examined using a JEOL JSM6510 LV SEM (scanning electron microscope - Japan).

The characteristics of the resultant activated carbon have been evaluated using standard protocols [3, 19–21], including iodine adsorption activity, moisture mass fraction, water total pore volume, and bulk density.

III. RESULTS AND DISCUSSION

Figures 1 and 2 illustrate microphotographs of activated carbon at 500 times magnification, exhibiting the high porosity of the sorbent materials.

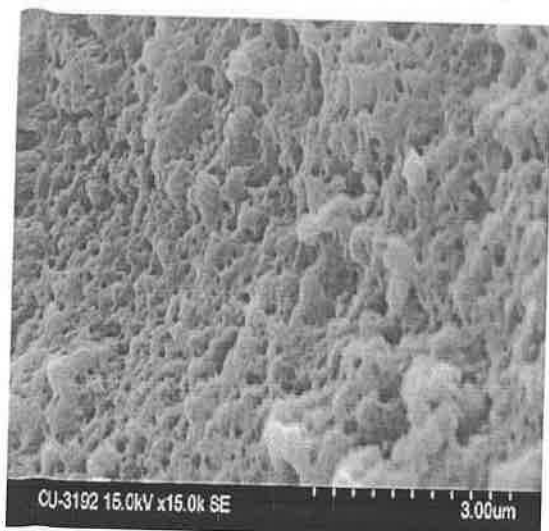
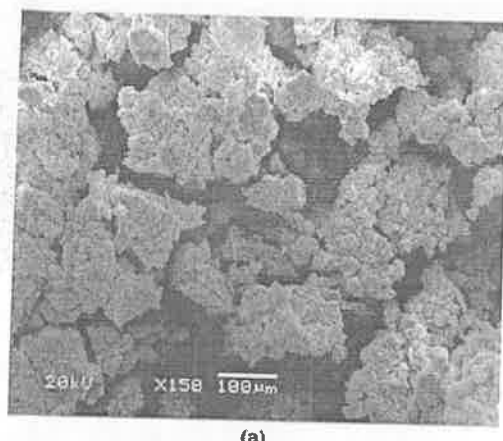
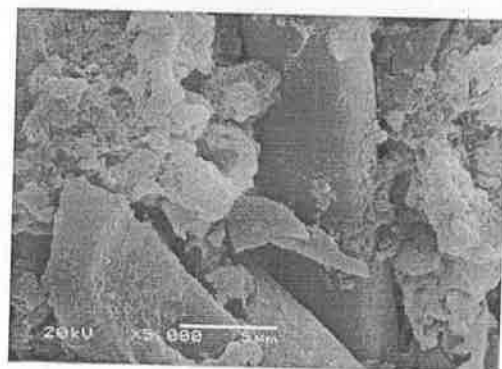


Fig. 1: Scanning Electron Microscope (SEM) image of Rice husk-derived activated carbon



(a)



(b)

Fig 2: Scanning Electron Microscope (SEM) image Rice straw-derived activated carbon

Scanning Electron Microscope (SEM) for activated carbon (AC) derived from rice straw with (a) Amplification factor 150, (b) Amplification factor 5,000.

S. No	Activated Carbon(AC)	Iodine absorption activity, %	Water fraction of moisture	Total pore volume of water	Bulk density g/dm ³
1	Activated carbon derived from rice husk	55	3.8	1.53	238.1
2	Activated carbon derived from rice straw	69	3.8	1.65	183.3
3	BAU-brand	> 62	< 10.0	1.62	< 240.0
4	WAC-grade	>32	< 10.0	1.42	220.0-250.0

Table 1: Characteristics of activated carbons derived from rice husk and straw

Iodine adsorption activity might have been calculated using a titrimetric process; mass fraction of moisture was determined by drying the sample to a constant weight; water total pore volume was calculated by filling pores with water and suctioning excess water from the surface of the sample; and bulk density was determined using a weighing method, Table 1 shows the information. According to the findings, rice husk activated charcoal is equivalent to WAC activated charcoal, but rice straw activated charcoal is equivalent to BAU-A grade, which seems to be employed for adsorption in aqueous media [3].

IV. CONCLUSIONS

Rice straw and husks were used to make activated carbon. The qualities of the resulting products have been investigated. The produced sorbents potentially substitute wood activated charcoal due to specific features allowing for more efficient agricultural waste disposal, minimized deforestation, and the making of value-added products.

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Composite Membrane for Hydrogen Production as a Clean Fuel Using Pem Water Electrolyser

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Abstract: Composite membrane of TiO_2 is synthesized by casting method using Nafion 5wt% solution. RuO_2 is used as anode and 10 wt% Pd on activated carbon is used as cathode in the water electrolyser cell. The performance of this Composite membrane is studied by varying voltage range 1.8 to 2.6V with respect to hydrogen yield and at current density 0.1, 0.2, 0.3, 0.4, and 0.5 (A cm^{-2}). This Composite membrane has been tested using in-house fabricated single cell PEM water electrolysis cell with 10cm^2 active area at temperature 27, 45 and 65°C and at 1 atmosphere pressure.

Keywords: TiO_2 , Nafion, Pd on activated carbon, Composite membrane, PEM water electrolyser, Hydrogen

1. Introduction

Hydrogen is considered as a clean and efficient energy source for the future [1-2]. Hydrogen as an energy carrier is an attractive option, because of its flexible, ecofriendly, affordable, used in all sectors of the economy. Today hydrogen is commonly used in industrial applications to manufacture petrochemicals and fertilizers. The current hydrogen industry does not produce hydrogen as an energy carrier or as a fuel for energy generation, except for pilot scale R&D projects.

Therefore, the electrolysis of water using proton exchange membrane (PEM) can be a novel approach for developing a technology for hydrogen production [3]. In water electrolysis the main components are PEM and electrocatalysts, the most commonly used PEM is Nafion and Composite membrane like Nafion/ TiO_2 , Nafion/ ZnO_2 etc.

Perfluorosulfonate ionomer membranes such as Nafion are specifically used in several industrial applications that require an ion-conducting polymer membrane with good thermal and chemical stability [4-5]. The conventional proton conducting polymer electrolyte membrane is mechanically unstable at temperatures above 100°C [6]. Nafion-like have a few drawbacks such as high cost, water dragging during operation. The effort to develop these higher temperature membranes includes modification of the conventional host polymers, via incorporation of various hygroscopic inorganic particles or by developing alternate new polymer system [7-10]. One of the inorganic membranes is Nafion/ TiO_2 [11-13]. The membrane having good electrochemical stability satisfactory mechanical strength and high proton conductivity [14-16]. Hence, research and development is needed to improve the performance and lower costs of hydrogen production. So, far less amount of work has been reported on inorganic

membrane to produce hydrogen. Hence in the present study an attempt has been made to evaluate the performance of composite membrane in water electrolysis process for the production of hydrogen. The characterization studies of the Composite membrane are done by ion exchange capacity (IEC) and FT-IR.

2. Materials and Methods

Materials

TiO_2 , NaCl, NaOH, and 10 wt% Pd on Activated carbon, RuO_2 , N, N- Dimethylacetamide are purchased from SRL Chemicals India and Nafion 115 membrane, 5 wt% Nafion solution is procured from M/s.Ion power Inc, USA.

Membrane preparation

For the preparation of the TiO_2 Composite membrane, 3gm of TiO_2 is dissolved in DMAC solution and added to 5wt% Nafion solution by stirring vigorously After Obtaining a clear solution at temperature, the mixture was then cast on a Petri dish and the solvent was evaporated at 100°C without vacuum once the solvents was completely evaporated, then Composite membrane was annealed at 120°C for 1 hour [17]. For Obtaining a transparent Composite membrane, the Composite membrane (Nafion/ TiO_2) and Nafion membrane 115 is pretreated with a standard treatment procedure described below [18-19].

- Boiling in 3% hydrogen peroxide (H_2O_2) for 1h to oxidize organic impurities.
- Rinsing with boiling water for 2h.
- Boiling in H_2SO_4 for 1h to remove ionic impurities.
- And finally the composite membrane is washed with deionized water to remove any excess acid and then dried.

Preparation of Membrane Electrode Assemblies (MEAs)

10 wt% Pd on Activated carbon is mixed with 5 wt % Nafion solution and coated on a composite membrane on one side as hydrogen electrode (Cathode) and RuO₂ is mixed with 5 wt% Nafion solution is coated on another side as oxygen electrode (Anode).

(Figure 1). Similarly the same procedure has been used to Nafion 115 membrane. The prepared MEAs are tested in-house single cell PEM water electrolyser.

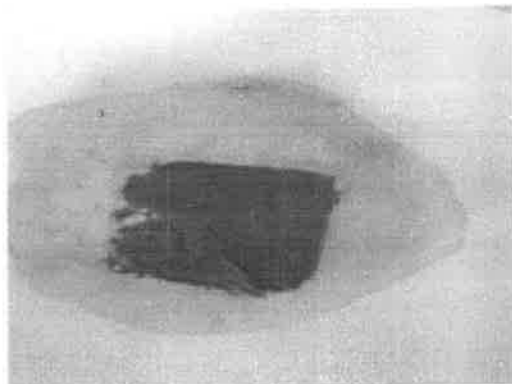


Figure 1: Composite membrane (Nafion/TiO₂)

Description of single cell PEM water electrolyser

The PEM water electrolyser is fabricated with SS316 material of 10 cm² single cell. Current collectors used are perforated titanium sheets. The thickness of each end plate is 20 mm, with a provision for inlet/outlet for water/gases for the respective electrodes. Each end plate has horizontal and vertical flow fields so as to hold water and for the free flow of produced gases during electrolysis operation [20]. The testing of the prepared MEA (fixed in single cell) is operated in electrolysis mode at 1 atm pressure and temperatures 27°C, 45°C, 65°C. The water used for this experiment is purified by reverse osmosis (Millipore Milli Q equipment). Thus, obtained pure water is supplied from water reservoir atop and supplied on the both sides of the single cell. The produced hydrogen and oxygen gases are evolved from top of the cell at respective electrodes. Thus, evolved water, gases are lifted by circulating water on both sides of the single cell and collected in vessels atop of the electrolyser.

Performance of the Membrane electrode assembly (MEA)

The performance of prepared MEA is evaluated using in-house fabricated single cell assembly. A DC voltage of 1.8 to 2.6V is applied during water electrolysis operation. The cell is kept under experimental condition for 2 hrs. The

performances are evaluated by current and voltage (I-V) characteristics curves generated during water electrolysis operation [2, 21].

Hydrogen Production

The hydrogen produced during the electrolysis operation is collected in vessels provided at the top of the single cell electrolyser. The theoretical yield of hydrogen is calculated using Faraday laws equation (Eq:2) as given below [22]

$$W_{H_2} = \frac{ItM}{FN} \dots\dots\dots (2)$$

Where w is the weight of the hydrogen produced at the cathode, I the applied current intensity (A), t the time (s), M the molecular weight of hydrogen (g mol⁻¹), F the faraday's constant (96485 C mol⁻¹) and N_e the number of electrons involved in the reaction. The experimental yield of the hydrogen with composite membrane and 10 wt% of Pd on activated carbon is calculated. Both the experiments (composite membrane and Nafion 115 membrane) are run for 10min at current densities 0.1, 0.2, 0.3, 0.4, 0.5 A/cm² at temperature 27°C, 45°C, 65°C and the produced hydrogen and oxygen gases are collected in respective vessels. The yield of hydrogen is calculated by taking the volume of the vessel and length of the vessel and length of the hydrogen gas occupied in the vessel at 1 atm pressure.

3. Results and Discussion**FT-IR**

The FT-IR spectrum of Composite membrane is exhibited in (Figure 2). The strong and wide peak at 3414.19 cm⁻¹ and peak at 1628 cm⁻¹ are due to the hydroxyl groups of Ti-OH with which physisorbed water molecule are bound by weak hydrogen bonds. The strong absorption centered at 710.55 cm⁻¹ is the typical Ti-O-Ti vibration [23, 24, 25]. The characteristic peak of -SO₃- group of Nafion of 1240 and 1132 cm⁻¹. Moreover the adsorption band of Nafion at 1240cm⁻¹, attributed to -SO₃- asymmetric stretch, shifted to 1235.54 cm⁻¹ and that at 1135cm⁻¹ attributed to -SO₃-symmetric stretch shifted to 1152.98cm⁻¹. The peak at 1100cm⁻¹ and 1200cm⁻¹ represent symmetric and asymmetric stretching of the CF₂ bonds. The peak at 1628.15 cm⁻¹ is due to the formation of CF=CF bonds in the polymer. Other common peaks that can be identified in this spectrum are symmetric S-O stretching at 1058.19 cm⁻¹.

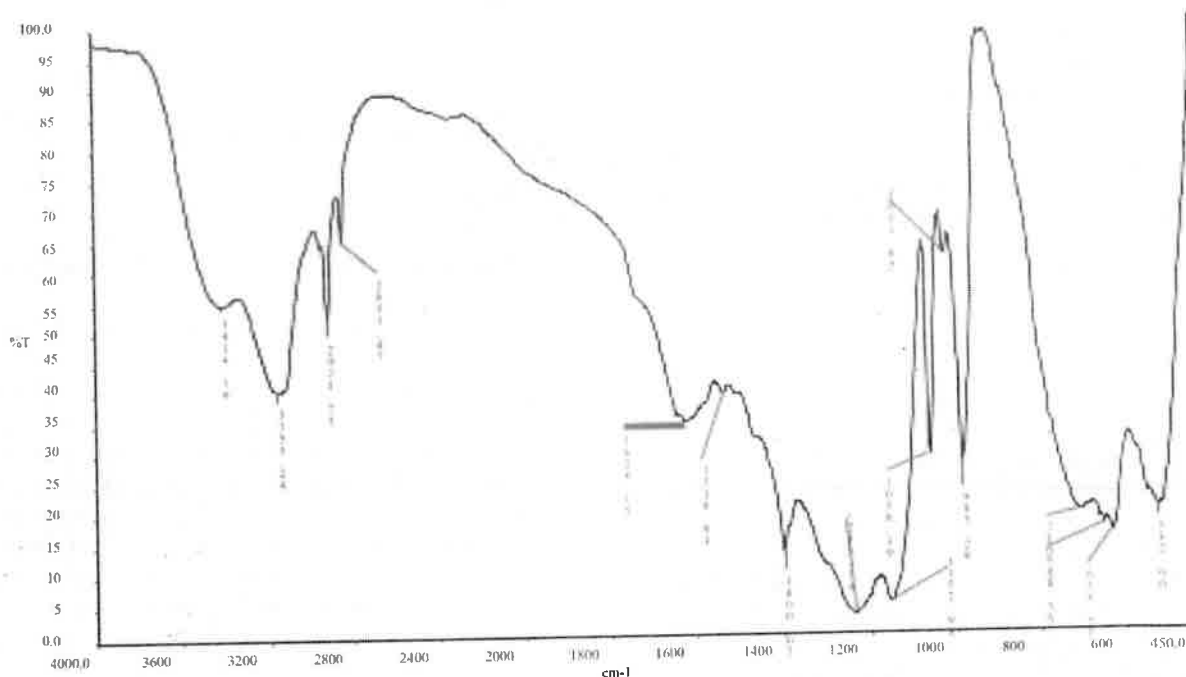


Figure 2: FT-IR spectra for composite membrane (Nafion/TiO₂)

Performance of Single cell with respect to hydrogen yield

The current-voltage (I-V) characteristics curves for the prepared TiO₂ composite membrane (Figure 1) and Nafion 115 is studied in single cell water electrolysis system using 10 wt% palladium on activated carbon as cathode and ruthenium oxide (RuO₂) as anode electrode. Hydrogen yield is calculated by using Faradays law, the experimental yields of hydrogen with respect to current densities at different voltages at room temperature are studied (Figure 3& 4) and Table 1, shows that The performance of Nafion membrane 115 (Figure 3) shows the decrease in voltage from 2.8 to 2.0 V when temperatures increased from 27 to 65°C at current density 0.4 Acm⁻². (Figure 5&6) and Table 2, Similarly the performance of composite membrane (Figure 5) is better than the former as it shows the decrease in voltage from 2.2 to 1.8 V at current density of 0.4 Acm⁻², the decrease in overvoltage are because of the decrease in temperatures from 27 to 65°C respectively during single cell. The prepared MEA with Pd on carbon support demonstrates better performance during the electrolysis operation.

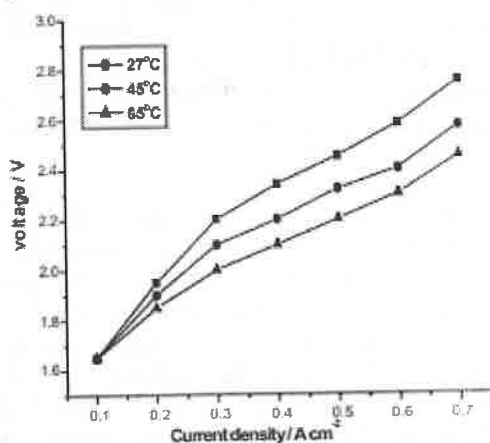


Figure 3: Polarization curves for 10 wt% Pd on activated carbon at 27°C, 45°C, 65°C for Nafion Membrane 115

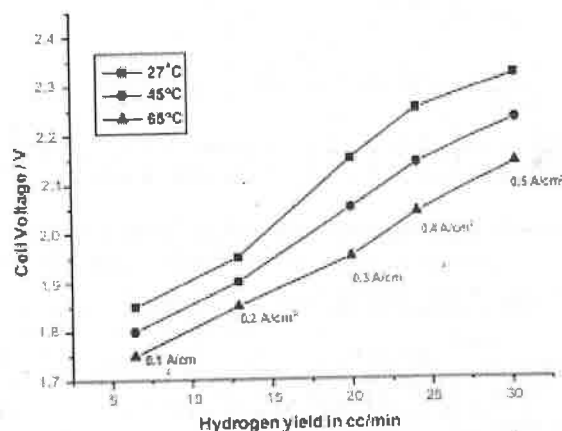


Figure 4: Hydrogen yield with respect to cell voltages at different temperatures and current densities for Nafion membrane 115

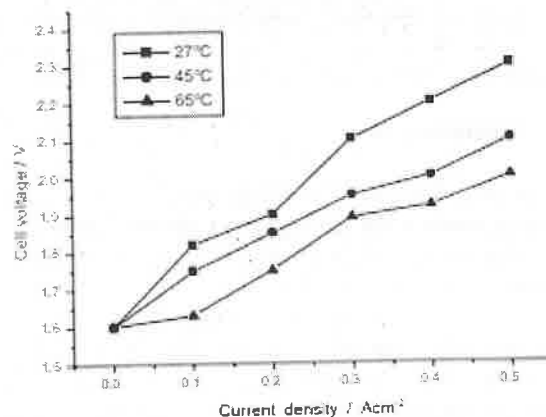


Figure 5: Polarization curves for 10 wt% Pd on activated carbon at 27°C, 45°C, 65°C for composite membrane

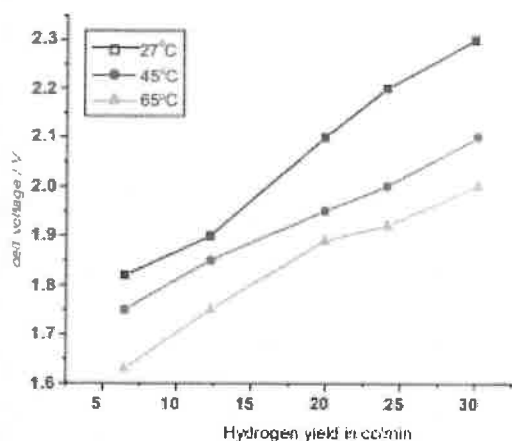


Figure 6: Hydrogen yield with respect to cell voltages at different temperatures and current densities for composite membrane

Table 1: Experiments carried out for 10 wt% Pd on activated carbon for Nafion Membrane 115

Cathode: Pd on activated carbon; Anode: RuO₂:

Experimental Hydrogen yield (cc/min)	Current density (A/cm ²)	Time (min)	Voltage during electrolysis process (V)			Theoretical Hydrogen yield (cc/min at STP)
			27°C	45°C	65°C	
6.45	0.1	10	1.85	1.80	1.75	6.9
12.29	0.2	10	1.95	1.90	1.85	13.8
19.92	0.3	10	2.15	2.05	1.95	20.7
24.10	0.4	10	2.25	2.14	2.04	27.7
30.20	0.5	10	2.32	2.23	2.14	34.2

Table 2: Experiments carried out for 10 wt% Pd on activated carbon for Composite Membrane (Nafion/TiO₂):

Cathode: Pd on activated carbon; Anode: RuO₂:

Experimental Hydrogen yield (cc/min)	Current density (A/cm ²)	Time (min)	Voltage during electrolysis process (V)			Theoretical Hydrogen yield (cc/min at STP)
			27°C	45°C	65°C	
6.45	0.1	10	1.82	1.75	1.63	6.9
12.29	0.2	10	1.9	1.85	1.75	13.8
19.92	0.3	10	2.1	1.95	1.89	20.7
24.10	0.4	10	2.2	2.0	1.92	27.7
30.20	0.5	10	2.3	2.1	2.0	34.2

4. Conclusions

A novel modified Composite membrane is prepared by casting method is having good proton conductivity. The experiments reveal that the composite membrane is slightly performed better than Nafion membrane 115 and it is also observed that during the electrolysis operation the over voltages are reduced with increase in temperatures, the hydrogen yield are 6.45, 12.29, 19.92, 24.10, 30.20 cc/min respectively at current densities 0.1, 0.2, 0.3, 0.4, 0.5 A/cm² at temperatures 27°C, 45°C, 65°C. The lower over potential saves the energy (current) consumption in electrolysis process which is important for industrial application. This results in an improvement in cell performance as well as hydrogen yield. That the composite membrane shows a good electrical conductivity and also shows sustainability hydrogen yields with respect to cell voltage and current density.

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