#### NADIMPALLI SATYANARAYANA RAJU INSTITUTE OF TECHNOLOGY (AUTONOMOUS)

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#### AQAR 2021-2022

Summary of 3.4.3 Details of research papers per teacher in CARE Journals notified on UGC

S.No	Nature of the Publication	Total Pulications 2021-2022
1	SCI	3
2	Scopus	5
3	Web of Science	1
4	UGC Care	6
5	IEEE Conference	1
6	Others	76
	TOTAL	92

PRINCIPAL N.S. RAJU INSTITUTE OF TECHNOLOGY (AUTONOMOUS) SONTYAM, ANANDAPURAM VISAKHAPATNAM-531173

#### 3.4.3 Details of research papers per teacher in CARE Journals notified on UGC website during the year

Name of the Author(s)	Department of the Author(s)	Title of the Paper	Name of the Journal	Month and Year of publication	ISSN	Link to the notification in UGC enlistment of the Journal
R.S.R. Krishnam Naidu , Mahesh Palavalasa, Shamik Chatterjee	EEE	Integration of hybrid controller for power quality improvement inphoto-voltaic/wind/battery sources	Journal of Cleaner Production	Nov-21	ISSN: 0959-6526	-
Mr.K.M.M.Tarakesh, Ch.S.L.Swarup , K.Divya , P. Govinda , M.Hari , S.Jeevan Kumar , S.Venkatesh , T.Rajesh	EEE	Cricket Bowling Machine	IJIRT	Jun-22	ISSN: 2349-6002	-
Mr.A.Bala Raja Ram, Dr.R.S.R.Krishnam Naidu , S.Jaya Krishna ,D.Pujitha Lakshmi, K.Pavan Kalyan, P.Venkat Teja, S.Jayashree, Ritik Ranjan, S.Jagadeesh	EEE	Air Quality Index Monitering Board	IJIRT	Jun-22	ISSN: 2349-6002	-
Bokam Divakar, DR. R. S. R. Krishnam Naidu, Kayala Avinash , Potunuru Anji , Sumanth Maharana , Kodigudla Dinesh , P. B. N. V. Sai Pavan, Salapu Sravanthi , Talari Chandini	EEE	Arduino Based Floor Cleaning Robot	IJIRT	Jun-22	ISSN: 2349-6002	-
K.Naveen , P. Geetha Rani , B.Sai Prathush , N.Chakradhar , P. Sagar , S. Devi, S.Gowtham Sai	EEE	Automatic Solar Street Light Using Arduino	IJIRT	Jun-22	ISSN: 2349-6002	-
K.S.Ramanjaneyulu ,R.Naresh , G.kartheek , A.Srinivasu , K.karthik , M.Prasanth , R.Lavanya latha	EEE	Automatic Bottle Filling Using Plc	IJIRT	Jun-22	ISSN: 2349-6002	-
Mahesh Palavalasa , R. S. R. Krishnam Naidu , Gayathri Garrepalli , Annapoorna Pinninti , Sai Ganesh Appalabathula , Sudheer Kumar Kalyana , Srinivas Molli, Uma Shankar Narem	EEE	Design and Modeling of E-Bike	IJRAMT	Jun-22	ISSN: 2582-7839	-
R.Srinu , Ch. Dileswarao , Ch. sirisha , K. Mounika , K.Trivikram , K.Eswarao , Md.Sameer	EEE	GO-Kart Using PVC Pipes	IJIRT	Jun-22	ISSN: 2349-6002	-
Mrs. S.Yamini , D.Gowtham , K.Uma maheswari , B.Karthik , K.Prudhvi yadav , P.Siva rama krishna , U.Sai krishna	EEE	Temperature and Face Mask Scan Entry System	IJIRT	Jun-22	ISSN: 2349-6002	-
V. Usha Rani , B. Indira , D. Manikanta , K. Venu, M. Jagadeesh, N. Divakar, S. Venkatesh, Sk. Tajuddin	EEE	Design and Development of Mobile Operated Wheel-Chair	IJARESM	Jun-22	ISSN: 2455-6211	-
T.Narayana Rao	МВА	Order statistics of additive uniform exponentional distribution	IJRASET	Oct-21	ISSN: 2321-9653	-
Mr. V.V.R. Murthy, Dumpa K V Tirumala Reddy, Darmisetti Vinay Prakash, Dammu Sateesh, Dupana ,Esaku,	MECHANICAL	Aerodynamic Analysis of Car Body with Aerodynamic Devices to Improve Performance	International Research Journal of Engineering and Technology	Jun-22	ISSN: 2395-0056, 2022	-
Mr. V.V.R. Murthy, G.L.Prasanna Kumar, B.Viswanadha Raju, P.Vamsi Krishna, N.Chandra Deep Varma	MECHANICAL	Modification of Bundle Former Piston by Failure Analysis to withstand the Fatigue	International Journal for Modern Trends in Science and Technology 2022	Jun-22	8(06), pp. 481-484. https://doi.org/10.46 501/IJMTST0806083	-
Mr. K.Abhinash,K.Yugandhar, B.Jignas, K.Siva Kumar, Y.Shiva Nandan Reddy	MECHANICAL	Publication: Fabrication of Water Heater/Cooler using Refrigeration system, International Journal for Modern Trends in Science and Technology	International Journal for Modern Trends in Science and Technology 2022	Jun-22	8(06), pp. 477-480. https://doi.org/10.46 501/IJMTST0806082	-

Mr. K. Abhinash,G. Raja, S. Vinay, U. Ganesh, V. Dilip Varma	MECHANICAL	Fabrication and performance of thermo-electric refrigerator	International Journal of All Research Education and Scientific methods (IJARESM)	Jun-22	ISSN: 2455-6211, Volume 10, Issue -2022	-
Mr. N. Suneel Kumar,G.Gayatri, N.Madhu, P.Venkata Sai Ram, P.Harshit Patrudu	MECHANICAL	Design And Fabrication Of Electro-magnetic Braking System	JETIR-Journal of Emerging Technologies and innovative Research	Jun-22	Volume 9, Issue 6, June 2022	-
Mr. N. Suneel Kumar, Dwarapudi Sai Balaji, Dwarapudi Ashok,Gondesi,Gopala Reddy, Gandi Upendra	MECHANICAL	Design and Thermal Analysis on Transformer Fin Using CFD	International Journal of Research in Engineering, Science and Management	Jun-22	Volume 5, Issue 6, June 2022	-
Mr. V.V.S.S.R.Krishna,Murthy.Ch,Yeswanth Ch, Pavan Sandeep D, Sampanth I, Pavan Kumar S	MECHANICAL	Enhancement of Design and Fabrication of a Composite Automobile Body Based on Integrated Structure and Analysis of Gases using Gas Analyser	International Journal of Modern Trends in Science and Technolology	Jun-22	Vol. 08, Issue 06, pp. 213-216, June 2022	-
Mr. Pittala Sai Radha,Krishna,D. Tulasi Ram, A. Teja,Shakar., M. Rajesh,P.Upendra Varma.	MECHANICAL	Experimental Analysis of Heat Transfer of a Fin by using Compressed Graphite Sheet	International Journal of Modern Trends in Science and Technolology	Jun-22	Vol. 08, Issue 06, pp. 431-435, June 2022	-
Mr. Kona Ram Prasad, Golagani Satish, Pasumarthi Hari Krishna, Pangi Sathish Kumar, Penuganti Lova Raju	MECHANICAL	Design and Fabrication of Multidirectional Rotational Trolley	International Journal for Modern Trends in Science and Technology	Jun-22	Volume 8, Issue 06, June 2022	-
Mr. Kona Ram Prasad, R.Raju, R.Balu, R.Prasad, S.Deva Krishna	MECHANICAL	Fabrication and Experimental Analysis of Heat Sink Fins	International Journal for Modern Trends in Science and Technology	Jun-22	Volume 8, Issue 06, June 2022	-
Mr. Kona Ram Prasad, G. Anvesh, G.Mani Ram, G.Prasanth Kumar,G.Prudhv	MECHANICAL	Experimental Analysis of Heat Transfer Rate by Applying Ceramic Coating on Metal Surface	International Journal for Modern Trends in Science and Technology	Jun-22	Volume 8, Issue 06, June 2022	-
Mrs. B.Usha Rani, A.Pravallika,B. Tirupathi Reddy, G. Vinay Varma,D. Vinay Kumar	MECHANICAL	Design and Fabrication of 3D Printer	International Journal Of Scientific Research In Engineering And Management	Jun-22	Volume 6, Issue 6 , pp. 02 -07 ,2022	-
Mrs. B.Usha Rani,K.Janaki Rao,Raj gopal Mahata,G.Krupa Raj,P.Kalyan Ram	MECHANICAL	Evaluation of Metal Foam In Battery Thermal Management System	International Journal of Research and Analytical Reviews (IJRAR)	Jun-22	Volume 9, Issue 2 , pp. 703 -709 ,2022	-
Mrs. B.Usha Rani,K. Hemanth, K. Ramchandrudu, K. Tharakeswaracharyulu ,P. Ram Prasad, Ch. Chenchu Ramya	MECHANICAL	Experimental Investigation of Phase Change Material on Battery Thermal Management System	International Journal of All Research Education and Scientific Methods	Jun-22	Volume 10, Issue 6, pp. 1274 -1280 ,2022	-
Dr. P.N.E. Naveen, Shankar Mukkala, Kumar,Raja Seela, Yerra.Arunkumar., Behara Teja,N.Mahesh, B.Sai Ganesh, G.Bhaskar Rao, M.Ganesh	MECHANICAL	Design and Fabrication of Power Generation Through Smart Speed Breakers	International Journal for Modern Trends in Science and Technology	Jun-22	8(06): 137-140, 2022	-
Dr. P.N.E. Naveen,Kommuri Govinda Sai,Korupolu Bharath,Kumar,Kothara Naveen,Pilla Pavan Sai Kumar	MECHANICAL	Design and Fabrication of 360 Degree Flexible Drilling Machine	International Journal for Modern Trends in Science and Technology	Jun-22	8(06): 230-233, 2022	-
Mr. T T V S R Krishna,Kumar,B.Jeevan Kumar, G.Shiva,K.Shyam Sekhar, K.Naveen Subash	MECHANICAL	Design of Water Heater Cum Water Cooler Using Refrigeration System	International journal of Advances in Engineering and Management (IJAEM)	Jun-22	Volume 4, Issue 6, pp: 1983-1993 June 2022	-

Mr. T T V S R Krishna,Kumar,V.Balaraju, V.Srinivas,V.Swamy, P.Sai Kiran	MECHANICAL	Design And Thermal Analysis Of thermoelectric Battery For energy production	IRJMETS/Certificate	Jun-22	Certificate/Volume 4/Issue06/40600066 778, June 2022	-
Dr. V. V. Ravi kumar,N. Sai Nishanth, Pawan Gopal, P. Devi, B. Nagaraju,S. Dileep Kumar, T. Mohan, B.Yogesh, G. Karthick Varun	MECHANICAL	Application Design of an Integrated Outdoor Air Quality Monitoring Device Based on Solar power	International Journal of Scientific Research in Engineering and Management (IJSREM)	Jul-22	ISSN: 2455-6211 Volume 10, Issue 7, July-2022	-
Dr. P. N. E. Naveen, Akala Swathi Kiran,Diyya,Hemanth Kumar,Kedari Vamsi,Sanjeev Sunil Singh	MECHANICAL	Design and Fabrication of Emergency Braking System	International Journal of All Research Education and Scientific Methods (IJARESM)	Jul-22	ISSN: 2455-6211 Volume 10, Issue 7, July-2022	-
Mr. K.Abhinash,Pendyala Veera Venkata Rajesh	MECHANICAL	Overall efficiency in the improvement of an industrial boiler using COAL ACTIVATOR	Specialusis Ugdymas / Special Education	July 2022	volume 1, Issue 43, Pg no. 5313 – 5327, 2022	-
Dr.Ravi Kumar, Mr.K.Ram ,Prasad,Siyyadri Adinarayana	MECHANICAL	AA7xxx alloy in order to reduce the grain size with addition of AA7xxx+0.5% SC alloy; Study their Microstructure, Mechanical properties, Thermal properties and SCC behavior,	Specialusis Ugdymas / Special Education	July 2022	volume 1, Issue 43, Pg no. 4769 – 5328, 2022	-
Dr.Naveen, Mrs.B.Usha Rani, BORRA TEJA	MECHANICAL	Evaluation of Thermal Properties of a Plastic Gears Composed of Sugar Bagasse Reinforced with Polyester/ Graphene Blends	Specialusis Ugdymas / Special Education	July 2022	Volume 1, Issue 43,Pg no. 4769 – 4777, 2022	-
Dr.Raghu Ram Reddy, M.Hema Kumar	MECHANICAL	Dry sliding wear behaviour of WC-Co coating on Ti6Al4V using Thermal Spray coating technique	Specialusis Ugdymas / Special Education	July 2022	Volume 1, Issue 43 ,Pg no. 5874 – 5883, 2022	-
Sujatha Sivarethinamohan a,Joga Rao Hanumanthub, Kalyani Gaddam c,Gokulan Ravindiran d, Avinash Alagumalai e	CIVIL	Towards sustainable biodiesel production by solar intensification of waste cooking oil and engine parameter assessment studies	Science of the Total Environment	Sep-21	1879-1026	-
Raja Murugadoss Jayaraju,Kalyani Gaddam ,Gokulan Ravindiran, Sivaprakasam Palani , Maheandera Prabu Paulraj , Aravindan Achuthan, Praveen Saravanan , Senthil Kumar Muniasamy	CIVIL	Biochar from waste biomass as a biocatalyst for biodiesel production: an overview	Applied Nanoscience	2-Jun-21	2190-5517	-
Sujatha Sivarethinamohan, Gokulan Ravindiran, Joga Rao Hanumanthu, Kalyani Gaddam, Praveen Saravanan & Senthil Kumar Muniasamy	CIVIL	Effective removal of remazol brillinat orange 3R using a biochar derived from Ulva reticulata	Energy Sources, Part A: Recovery, Utilization, and Environmental Effect	Jun-21	Taylor & Francis online	-
M. Senthil Kumar, G. Kalyani , S. Mahendran , H. Joga Rao, R. Gokulan , R. Someswaran, C. Jenifa Latha, M. Palpandian	CIVIL	Treatment of RO Rejects Wastewater by Integrated Coagulation Cum Adsorption Process	Pol. J. Environ. Stud. Vol. 30, No. 5 (2021), 4031-4038	July 2021	-	-
T. Dhilip , Ramesh Chandra Bagadi, M. Gopal Naik and Suresh Kumar N	CIVIL	Bi-Directional Causal Analysis using a Novel Coefficient of Causation	Asian Research Journal of Current Science 4(1): 217-223, 2022; Article no.ARJOCS.824	30-Mar-22	-	-
Dr. J. Raja Murugadoss	CIVIL	Optimization of River Sand with Spent Garnet Sand in Concrete Using RSM and R Programming Packages	Journal of Nanomaterials, Hindawi Publications	June, 2022	Volume 2022, Article ID 4620687, 8 pages, June, 2022	-

	Ch //I	Experimental Investigation on Reactive	Advances in Materials	4.44	Indexed in SCI, I.F:	
Dr. G. Kalyanı	CIVIL	Orange 16 Removal Using Waste Biomass of Ulva prolifera	Science and Engineering, Hindawi Publications	1-May-22	1.726, Q2), (ISSN No: 1687-8434)	-
		Removal of Reactive Red 120 in a Batch			1007 04347	
Dr. G. Kalvani		Technique Using Seaweed-Based	Journal of Nanomaterials,	1 May 22	Indexed in SCI, I.F:	
Dr. G. Kaiyani		Biochar: A Response Surface	Hindawi Publications	1-IVIAy-22	2.986	-
		Methodology Approach				
Mr. P. Haragonal	CIVII	Strength comparison between normal	USREM	1_1_1_21	2582-3930	_
	CIVIL	concrete and self healing concrete		1-301-21	2302-3330	_
Mr. G. Chanikya	CIVIL	Soil Stabilization Using Industrial Waste	IJSREM	1-Jul-21	2582-3930	-
Mrs. Lovaraju	CIVII	Experimental Investigations on design	USREM	1-101-21	2582-3930	-
	CIVIL	of flexible pavement		1-301-21	2302-3330	_
Dr. B. Siva Prasad B. Divya, K.Teja Satya Sashanka		Design and Analysis of Swasthik				
Varma, S.Sreeja, P. Harshath Varma, N. Naga Chandra	E.C.E	Antenna Array for Wireless	IJAEM	Jun-22	2395-5252	-
Mouli		Applications				
Dr. K. Ravi Kumar,Vyda Jayanth Kumar, Allada Kiran ,		Smart Security System Using RFID and				
Pakki Johna Sudeepa Patnaik and Gorivilli Naveen	E.C.E	Camera Module for Home and Office	IJSDR	Jun-22	2455-2631	-
Kumar		Automotio Tomo oraturo Data atian far				
Wirs. W. V. S Koja Ramani,A. Sai Lakshimi, R. Gopichano,	E.C.E	Safoty Entranço	IJRES	Jun-22	2320-9356	-
S. Heindiatria and D. Teja Mr. K. Bajasokhar E. Moghana, A. Satua Girish, M. Saj		Visitor System using Public				
Vinay and A Vandhana	E.C.E	Announcement	IJSMS	Jun-22	2581-5946	-
Mr. V. Sravana Kumar, S. Gavathri, Ch. Suresh		Various Full Adder Based 32-Bit				
P.Swarnamala and B.S.V.Satvanaravana	E.C.E	Wallace Tree Encoder	IJERT	Jun-22	2278-0181	-
Mr. P. Sahitya Kiran, K. Pushkala, S. Yaswanth Kumar, S.						
Lavanya Kumari and N.J. Srikar	E.C.E	IOT Based Industrial Automation	IJRES	Jun-22	2320-9364	-
Mr. Chaile Sultan, K. Singni, D. Naga Suprani, C.V.N. Mani,		Analysis Of Slotted Patch Fractal				
Krishna and A Chaitanya Sravani, G.V.N.Iviani	E.C.E	Antenna With DGS For Multiband	IJREAM	Jun-22	2454-9150	-
		Applications				
Dr. B. Siva Prasad V.Yaswant Sai Pawan, K.Madhu Sree,	ECE	Agricultural Rover Based on Solar	קראון	lun_22	2455-2621	_
A.Vinaya Sree and K.Sai Charan Raju	L.C.L	Power	1301	5011-22	2433-2031	_
Mr. K.Y.K.G.R. Srinivasu,V.Sai Preethi, V.R.V.S.Karthik,	F.C.F	Smart Cart with Automated Billing	LISDR	lun-22	2455-2631	-
R.Teja and P.Jyothi	L.C.L		13501	5411 22	2100 2001	
Mr. Ch. Shivaji, G.Harshapriya , G.V.V.Vamsi, K.Gayathri	E.C.E	Power and Delay Optimization of 8-Bit	IJRET	Jun-22	2278-0181	-
Devi and J.Roja Ramani	-	ALU using Various Techniques	-			
Mr. S. Jaya Raju,K.Leela Sai Koteswari , K.G.Deepika,	E.C.E	RFID Based Automatic Toll Collection	IJRES	Jun-22	2320-9356	-
N.Kavya and P.Sai Teja		System for Dynamic Charging Vehicles				
Dr. B. Siva Prasad, Y.Harika , A.Kartnik, G.Ramesh and	E.C.E	Smart Helmet for Accident Avoidance	IJRES	Jun-22	2320-9356	-
I.Vijaya Dilaskala valilia Mrs. V. Aswani, D. Anaasha, Aiith Danda, K. Ushasri		Emorgonov Alart System for Disabled		-		
Mirs. V. Aswani, D.Aneesna, Ajith Panda, K.Oshash,	E.C.E	People Using Hand Cesture and GSM	IJSDR	Jun-22	2455-2631	-
Dr. K. Pavi Kumar G. Java Sree, V. Manohar and G		Pailway Track Crack & Object Detection				
Venu Vardhan	E.C.E	Using GSM & GPS	IJRES	Jun-22	2320-9364	-
Mrs M V S Roja Ramani P R S S K Swetha P Sree		Design of Smart Bus Fare Collection				
Bama, V. A. Ram Kumar and S. Ramesh Naidu	E.C.E	System Using RFID	IJRES	Jun-22	2320-9364	-
Mr. K. Rajasekhar K. Harika Devi, A. Ruthik Kumar, E.	1	Design and Implementation of Decoder	 	1		
Ramya and M. Kiran.	E.C.E	and MUX using Mixed Logic	IJMIST	Jun-22	2455-3778	-

Mr. Y. Sravana Kumar ,D.Hima Varshini, D.Tilothama, D.Jagadeesh and I.Jithendra	E.C.E	IOT-Based Smart Notice Board	IJAEM	Jun-22	2395-5252	-
Mr. P. Sahitya Kiran K.Hari Krishna, K.Srikanth, B.Neeraj and Y.Akhil.	E.C.E	Implementation of High-Speed Low Power 32-Bit Dadda Multiplier Using CLA	IJERT	Jun-22	2278-0181	-
Mr. Shaik Sultan B. Kavya, CH. Pavan, D.Divya and S. Sirisha	E.C.E	Slotted patch Orthogonal MIMO antenna for UWB applications	IJRAR	Jun-22	2348-1269	-
Mr.M.Veeraiah,B.Nandini, P.Koteswara Rao, M.Jaswanth, and M.Jyotsna	E.C.E	Implementation of Vehicle Starting Using Fingerprint Sensor & Accident Detection with Accelerometer, GSM & GPS	IJRES	Jun-22	2320-9364	-
Mr. P. V. J. Raj Kumar, R.Sowjanya, K.Anandkumar, P.Sanjay and K.Sai Kiran	E.C.E	AI Based Robotic Arm	IJRES	Jun-22	2320-9364	-
Mr. Ch. Shivaji P. Yaswanth Kumar, Ch. Geetha Sri, S. Pavani and Ch. Sai Kishore	E.C.E	IoT Based Smart Stand For LPG Cylinder Monitoring and Safety Enhancement	IJRES	Jun-22	2320-9364	-
Mr. S. Jaya Raju, N. Sravani, V.Ramesh, A. Harika and B. Krishna	E.C.E	Electronic Protection For Exam Paper Leakage Using Arduino Uno	IJRES	Jun-22	2320-9364	-
Mr. K.Y.K.G.R. Srinivas K. Jyothi, K. Ramana, Ch. Ramakrishna and ,V. Praveen.	E.C.E	IOT Based Autonomous Robot For Safety Enhancement	IJRSET	Jun-22	2394-739X	-
Mr. P. V. J. Raj Kumar, V. D. K. M. Lakshmi, C. Suryanarayana, R. Pavan Kumar and , P. Sujith	E.C.E	Voice and MEMS Based Page Turning Assistor for Disabled People	IJRSET	Jun-22	2394-739X	-
Mrs. V. Aswani , G.Prudhvi Sai Kumar, A.Lavanya, J.Harish Kumar and , P.Vashika	E.C.E	Arduino Based Coal Mine Safety Monitoring and Alerting System for Workers	IJAEM	Jun-22	2395-5252	-
Mr. K. Rajasekhar	E.C.E	Damping Analysis to Improve the shunt capacitive RF MEMS switch	Electronics and energetics	Sep-21	2217-5997	-
Mr.Y.Sravan Kumar	E.C.E	A Novel Approach towards using Internet-of-Things in Smart Agriculture Monitoring System	AICT	Dec-21	978-1-6654-3641-0	-
Mr. B. Hema Sai Kumar, Ms. B.A.G. Avanthi, Ms. Juli Kumari, Ms. M. Tabu, Mr. V. Subhakara Rao, Mrs. Bhargavi	C.S.E	Patient Monitoring System Using IOT	The International journal of analytical and experimental modal analysis	Jun-22	0886-9367	-
Boddu Bhavana, Vasundhara Madaka, Balivada Reetika,Rama Jyothi Pampana, Madhuri Kuramarpu, Sreerama Murthy Velaga, D Aparna	C.S.E	Certifact	Journal of Interdisciplinary Cycle Research	Jun-22	0022-1945	-
Ms.P.Pravallika , Ms. B.Durga Bhavani,Ms. P.Pavitra, Mr.G,Dileep Varma, Mr. K.Shankar	C.S.E	Driver Drowsiness Detection Using Deep Learning	Journal of Interdisciplinary Cycle Research	Jun-22	0022-1945	-
Mr. D. Akash, Mr. G. Dillep, Ms. K. Swathi, B. Jhansi Rani, G. Srinivas Rao	C.S.E	Anti Theft Security alert system	The International journal of analytical and experimental modal analysis	Jun-22	0886-9367	-
Ch. Esther, S. Nayana Sai, S. Sushma, B. V. R. Gupta, Mr. G. Srinivasa Rao	C.S.E	Disease Prediction Based on Symptoms by Using Decision Tree And Random Forest In Machine Learning	International Journal of Scientific Research in Computer Science, Engineering and Information Technology	Jun-22	2456-3307	-

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			International Journal of			
K. Latha, S. Mounika, Ch. Rajesh, I. Raghunath, K.	C.S.E	Face Emotion Detection Using Deep	Research in Advanced	Jun-22	2454-4221	-
Dinesh and T. V. S. Shram		Learning	Computer Science			
D Auropas M Maurilla T Disha Kumari C Chaitanua			Engineering,			
D.Ayyappa, v.Wounika, T.Richa Kumari, G.Chaitanya,	C.S.E	Framework of Image Captioning	Science	Jun-22	0377-9254	-
A.Suraj Kurran		Dradiating different types of brain	Science			
P. Sanithi, V. Gayathri, V. Saraswathi, A. Sai Sarah, G.Y.	C.S.E	Predicting different types of brain	Journal of Information and	Jun-22		-
S. Harshitha		Stokes				
G.Sai Lakshmi Phani, V.Lalitha, D.Yasaswini, G.Rudra,	0.0.5	Virtual Screening and Evaluation	Adventer a lo Fracia e aria e	1	2205 5252	
Deepak, M.Sravan Kumar, Mr.K. Shankar	C.S.E	Application for Recruitment	Advances in Engineering	Jun-22	2395-5252	-
K. Commente Deile Deinkungsteil M. Churger Complex Ch.V.		Automotic Creanale Income	and Management (IJAEM)			
K. Sampath Raja Ragnupathi, M. Shyam Sundar, Ch.V.	C.S.E	Automatic Grayscale Image	Journal of Interdisciplinary	Jun-22	0022-1945	-
Anusha, G. Renuka, Dr. R. Priya Vaijayanthi		Colorization For Human Images				
IVIR. D.V.S. VISWANADH, IVIS. K.B.K. PRABHANJNA, IVIS.	0.0.5	COVID19 EXPLORATORY DATA ANALSYIS	The International Journal of		00000 0007	
K. SAI PRANAVI, MS. V. LAKSHMI LAHARI, Mr. S.	C.S.E	AND VISULATION USING MAP	analytical and experimental	Jun-22	0886-9367	-
			International Journal of			
B. Uday Kumar Reddy, P. Vijaya Lakshmi, G. Harsh		Traffic Signal Control For Emergency				
Vardhan Reddy, G. Pradeep Chandra, R.V.Harsha	C.S.E	Vehicles Using Web Enabled Smart	Computer Science,	Jun-22	2456-3307	-
Vardhan, Mr. K. Shankar		Devices/IOT	Engineering and			
K. Sai Kaivalava, R. Jum Sai, DVS Davika, Shaik Maarai						
Ali G. Hari Koorthana, "Collage information shartht	CSE	College information chartht System	Journal of Interdisciplinary	lup 22	0022 1045	
System	C.3.E	Conege information chartot system	Cycle Research	Jun-22	0022-1945	-
			The International journal of			
M. Vaheed Abbas, B. Thirumala,K. Jahnavi, K. Tulasi,	CSE	Phishing website detection using	analytical and experimental	lup_22	0886-0367	_
Dr. Rayyudu Srinivas	C.J.L	machine learning techniques	modal analysis	Juli-22	0880-9307	-
			The International journal of			
K. Harsha vardhan Srinivas, Deepak P, Debashish	CSE	Game Development	analytical and experimental	lun-22	0886-9367	_
Nandi, S. Mirza Duwal ali baig, Mrs. R. Priya vaijayanthi	C.J.L		modal analysis	5011-22	0000-5507	_
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B. Bhavya, M. Tejeswari, G. Bhavana, K. Sai Upendra,	CSE	Traffic Sign Detection and	analytical and experimental	lun-22	0886-9367	_
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# Integration of hybrid controller for power quality improvement in photo-voltaic/wind/battery sources



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#### ABSTRACT

Renewable Energy Sources (RES) are currently being used on a larger scale to support and satisfy the higher energy demands caused by industrialization and population growth. Therefore, the power generation has to be increased at a greater speed to meet the daily user needs for improvement in lifestyle. The electric utilities and system operators face a tough challenge due to the rise in the number of consumers of power systems and the unpredictable nature of the electric load. Therefore, an effective Energy Management System (EMS) is developed using a combination of Modified Flower Pollination Algorithm (MFPA) and Modified Perturb and Observe (MP&O) method. Three different systems namely: RES Photovoltaic (PV) module, wind turbine, and battery are used to create an effective EMS. MFPA extracts more power from the PV panel by providing less scaling factor. Then it is utilized to increase the initialized population of particles to enhance step size and reset the position of particles. Furthermore, MFPA is used to effectively control the switching between the wind turbine and battery storage system. Furthermore, the MP&O method is used to trigger the switch of the DC-DC converter to achieve stable power from the PV/wind/battery system. The MFPA-MP&O controller is compared with three standard controller combinations FPA-P&O, FPA-MP&O and MFPA-P&O and is also compared with existing RES designs that are: MPCP-MPVP, Fuzzy Logic Control - Proportional Integral (FLC-PI), and MPPVC. Total Harmonic Distortion (THD) of MFPA-MP&O controller is 0.40%, which is less when compared with the MPCP-MPVP, FLC-PI and MPPVC RES designs.

#### 1. Introduction

Nowadays, Renewable Energy Sources (RES) are being used on a larger scale to compensate for the increasing power demands of the modern world. The usage of non-renewable energy sources is gradually decreasing due to their vast negative impacts on the occurrence of global warming and due to the high amount of preference given for the usage of RES (Jain et al., 2020; Salisu et al., 2020). The RES is considered an important energy source to satisfy the electricity requirements in remote and isolated areas (Hamanah et al., 2020). In the current economic development, the RES provides a clean, affordable and proper energy supply to the desired system (Nyeche and Diemuodeke, 2020). Other advantages of the RES are that these sources are present in limitless amounts in nature and very eco-friendly (Naidu and Singh, 2015). The different types of RES are tidal power, solar, wind, biomass, hydroelectric and geothermal energy (Shezan et al., 2016). Those buildings that were integrated with Photovoltaic (PV) systems, were successful in effectively minimizing the energy consumption to a great extent (Li et al., 2015). Furthermore, the PV systems offer various benefits like lack of noise, absence of fuel cost, high dependability, and ease of allocation (Abushnaf and Rassau, 2018). A cost-effective solution is available in rural areas where the buildings were integrated with transmission systems, but it requires a high cost in urban areas (Altin and Eyimaya, 2018).

The major drawback of the RES is that the sources mainly depend on the topological condition of certain sites and the outputs from the RES are sporadic. Moreover, a single RES does not satisfy the entire energy demand of the load. Hence, a continuous supply of power can be delivered by integrating two or more RES into a single unit of power supply (Tudu et al., 2019). Therefore, a reliable, flexible, and cost-effective EMS was designed by integrating the PV power generation and storage devices, named hybrid systems (Jun et al., 2011; Roumila et al., 2017) to improve the power quality features. The advantages of the RES-based EMS are: wind and solar-based energy sources are

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### **Cricket Bowling Machine**

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Abstract— Science is basically passive observation of the universe as it exists to generate knowledge and Engineering .is making use of that. Engineers always look upon the problem from technical point of view. An engineering project is balanced cocktail of the practical aspect of the humanity and economics. New ideas and inventions are the part of engineer's life. Ball pitching devices have been used in sport practice from many years. The aim of this project is to design a cheapest ball pitching system ever to throw the automatically at different suitable adjustable speeds for the cricket practice. Typically, balls are thrown from a device using motors, discs and swing can also beset by the operator. The report shows all the design criteria (including mechanical and electrical aspects to develop a professional cricket-pitching machine.

#### 1.INTRODUCTION

The concept of the cricket-pitching machine provides accurate and consistent batting practice for cricketers of all standards. It is best cricket practice facilities available to all cricketers at an affordable price, which have recognized a very tangible and enjoy able way to improve batting performance. Since the successful launch of the first BOLA in 1985which was purchased by Surrey Country Cricket Club and shortly afterward the England Test Side, Stuart Williams. And this have encouraged other for continuous improvement and development of this dynamic instrument (thus to us also).

The main mechanism of the machine consists of two heavy wheels, between the concept of the

Cricket-pitching machine provides accurate and consistent batting practice for cricketers of all standards.

2. BLOCK DIAGRAM



Fig 2: Block diagram of bowling machine

#### 3. PARTS OF BOWLING MACHINE

In Bowling Machine there are several parts. They are

- 1 Motor
- 2 LCD Screen
- 3 Battery
- 4 Capacitor
- 5 Field Effect Transistor
- 3.1 PMDC MOTOR

In fig3.1, a PMDC motor, an armature rotates inside a magnetic field. The basic working Principle of a PMDC motor is based on the fact that Whenever a Current carrying conductor is placed inside a magnetic field, there will be mechanical force experienced by that conductor.





### Air Quality Index Monitoring Board

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Abstract— Air pollution is one of the governing factor for the public health and it is the concerning part for the environment. The main objective of this paper is to provide the details about our project which is based on monitoring the air quality index of area where we live. This will help us to know in what situation we are living and what are the environmental changes that need to be made to make our live more healthy. In this paper we will show how our project compares the actual data with the predefined data. The predefined data is based on the National Air Quality Index (NQAI). In this paper concentration of various pollutants along with various harmful gases for various cities of India are also analyzed based on NAQI data and it will be easy to compare the actual data with it. This paper includes the comparison data of many Indian cities with grown alarming due to severe unsafe web of particulate matter (PM) and harmful gases present in air.

*Index Terms:* Air Quality Monitoring, National Air Quality Index, Particulate Matter, Sensors, LED Board.

#### 1.INTRODUCTION

The Air Excellence Guide (AEG) may be a common indicator of air quality. The Air Quality Indicator (AQI) is calculated and supported on air pollutants like CO and NO2 compounds that consume opposing possessions happening the atmosphere and human health. The Air Quality Indicator may be a range that represents the very finest meditation of a specific air unused matter at a particular time. I propose an air quality as well as air pollution monitoring system that allows us to monitor and check live air quality as well as air pollution in an area through Internet of Things (IoT). It uses air sensors (Gas Sensor SENSOR NETWORK) to sense presence of harmful gases/compounds in the air and constantly transmit this data. In addition, system keeps measuring air level and reports it. The sensors interact with Arduino Uno (Microcontroller) which processes this data and

transmits it over the application. This allows authorities to monitor air pollution in different areas and act against it [1]. In addition, authorities can keep a watch on the air pollution near schools, and hospitals areas. Normally, little concentrations area unit measured exploitation ppb (parts per billion), that represents units of mass of a material per one billion units of total mass. Parts per million (ppm) may be similar and unremarkable used unit to measure concentrations of pollutants. It determines the requirements of a new system and analyze on product and resource requirement, which is required for the successful system. The product requirement contains input and output requirements it gives the wants in term of input to produce the required productivity. The resource requirements define in brief about the hardware that are needed to achieve the required functionality. In this project I am going to make an IoT based Air Pollution Detection Monitoring System in which I monitor the Air Quality over a web server using ESP8266 Wi-Fi device and a trigger alarm when the air quality goes down a certain level means when there is amount of harmful gases is present in the air like CO2. It shows the air quality in PPM (Parts per Million) on LED BOARD and webpage so that I monitor it very easily.

#### 2. LITERATURE SURVEY

2.1 A Comparative Study of Air Quality Index

Based on Factor Analysis and US-EPA Methods for an Urban Environment:

Bishoi et al posited the EPA method for the computation of AQI (EPAQI). This technique involved the calculation other index value for each pollutant (SO2, NO2, carbon monoxide, Ozone, Particulate Matter). The EPAQI was then evaluated by determining the maximum index value of the

### Arduino Based Floor Cleaning Robot

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Abstract— Smart Dust collector as its name represents it works smartly or we can say that it is an automatic Dust collector. It detects the dust objects and collects the dust. So, there is some sensor work to detect the object around the dustbin. Sometimes due to dust cleaning activities take a long time then there are other activities that are overlooked. For this reason, we are trying to develop a smart floor cleaning robot that can navigate & clean dust.

Indexed Terms-- Arduino, Dust Collecting Robot, Ultra-Sonic Sensor, DC Shunt Motor, Motor Driver

#### I. INTRODUCTION

Cleaning is important work approximate in every place. Sometimes this is easy and sometimes Cleaning is Important work approximate difficult. Sometimes we assigned people for purpose of cleaning and pay money and sometimes cleaning is required in areas where presence of living being dangerous so we cannot assigned living being in every place. In advancement of science a robot come in light but it operate by a personnel. To avoid this limitation of personnel we require more technologies.

Automation is a great solution of this problem. So we make an autonomous floor cleaning robot that operated by internet of things and Arduino Nano programming. Ultrasonic sensor is the most important component for autonomous floor cleaning robot because ultrasonic sensor works as eyes of robot. Ultrasonic sensor useful for turning of robot by sense the obstacle or wall. Sensing distance range of robot set by Arduino Nano programming. In this range robot sense the obstacle and turn back.

Cleaning is the essential need of the current generation. Basically, in household floors the floor has to be cleaned regularly.

SECTION - I

PARTS OF FLOOR CLEANING ROBOT: In Floor cleaning robot there are several parts. They are

Chassis, 2. Wheels, 3. DC shunt motor, 4. Batteries,
 Ultra - sonic sensor, 6. Motor driver, 7. Node MCU,
 Wiper motor and other components.

#### SYSTEMS USED IN FLOOR CLEANING ROBOT:

As like floor cleaning robot have various systematic or principle components as, below we described briefly about each component.

#### WORK HAS BEEN DIVIDED INTO FOLLOWING

- 1. Design
- 2. Fabrication
- 3. Motor
- Arduino Nano:

The Arduino Nano is a surface mount breadboard compatible version of the ever- popular Arduino micro controller. It's small with integrated on-board USB and is breadboard friendly. As the function It has almost all the analog and digital pins that the UNO or Demilune and the same function as Duemilanove or

### Automatic Solar Street Light Using Arduino

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*Abstract*— This paper suggests energy efficient of automatic street light by using Arduino. The main objective is to design energy efficient automatic streetlight for energy conversation in present streetlights of rural area, urban area and completely for smart cities. The system LED, solar panel, charge controller, Battery, Arduino. The system is set to automatically turn OFF during the hours of daylight and only operate during the night.

#### 1.INTRODUCTION

The solar street lights absorb the solar energy during daytime. The solar energy gets converted into electrical energy by the photovoltaic cells, which is stored in the battery. During night-time the lamp starts automatically and the electricity already stored in the battery gets consumed. The system is to design and provide an automatic control facility. Street light controllers are smarter versions of the mechanical or electronic timers previously used for street light on-off operation.

By using this system Energy consumption is also reduced because now-a-days the manually operated street lights are not switched off properly even the sunlight comes and also not switched on after sunset. 1.1 BLOCK DIAGRAM:



Fig.1.1 Block diagram



Solar panel is one of the most important parts of solar street lights, as solar panel will convert solar energy into electricity. There are 2 types of solar panel: monocrystalline and poly-crystalline. Conversion rate of monocrystalline solar panel is much higher than polycrystalline.



Fig2.1Solar panel

#### **3.ARDUINO**

Arduino is an open-source platform based on microcontroller board having the ATmega32 series controllers and Integrated Development Environment for writing and uploading codes to the microcontroller. It has input and output pins for interaction with the outside world such as with sensors, Switches, Motors and so on. To be precise it has 14 digital input/output pins, 6 analog inputs, a 16MHz quartz crystal, a USB connection, a power jack, an ISCP header and a reset button It contains everything needed to support the microcontroller. It can take supply through USB or we can power it with an AC-to-DC adaptor or a battery. It takes inputs from the LDR, process the data and gives the output

### Automatic Bottle Filling Using Plc

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*Abstract:* The objective of our project is to design, develop and monitor "Automatic bottle filling system using PLC". This work provides a lot of benefits like low power consumption, low operational cost, less maintenance, accuracy and many more. This project is based on Industrial automation and is a vast application used in many industries like milk industries, chemical, food, mineral water and many industrial manufacturers. A prototype has been developed to illustrate the project

Filling is the task that is carried out by a machine and this process is widely used in many industries. In this project, the filling of the bottle is controlled by using a controller known as PLC which is also the heart of the entire system. For the conveyor system, a dc motor has been selected for better performance and ease of operation. A sensor has been used to detect the position of the bottle. In our project we have used less number of systems hence the overall cost has been reduced to an extent. Ladder logic has been used for the programming of the PLC, which is the most widely used and accepted language for the programming of the PLC. The PLC used in this system is a MELSEC FX-1N which makes the system more flexible and easy to operate

#### I. INTRODUCTION

The project is based on industrial automation and PLC is the heart of automation. The hardware and the software are the two important areas in our project.

1) HARDWARE DESCRIPTION: In this project, MELSEC FX1N-24 is used for controlling the inputs and outputs. Input supply to the PLC is given through a SMPS. The rating of the SMPS is 24VDC 5 Amps. The PLC used here is a compact PLC which has a fixed number of inputs and outputs. In this kind of PLC model, the CPU contains 14 digital inputs and 10 digital outputs. One diffuse photoelectric sensor has been used for the positioning of the bottles. A geared DC motor has been used for running the conveyor system. The rating of the DC motor is 12V and 50 RPM speed with a high starting torque of 70 Kg-cm (at no load). Toggle switches are used to serve the purpose of some inputs to the PLC.

2) SOFTWARE DESCRIPTION: There are five important languages which are used for the programming of the PLC. The list of the methods are as follows: • Functional block diagram (FBD) • Structure text • Instruction list • Flow chart • Ladder diagram Out of these five languages, ladder is the most widely used language and is simple as compared to other languages. Ladder diagram has been used for the programming of this PLC is the most widely used language and is simple as compared to other languages. Ladder diagram has been used for the programming of this PLC is the most widely used language. Ladder diagram has been used for the programming of this PLC

#### **II.LITERATURE SURVEY**

1.An Automated Bottle Filling Project For Freshman Engineering Students –June 2005 In this paper the researchers Kala Meah, Timothy Garrison , York College of Pennsylvania at all.. The students work in small teams and have r toughly 12 weeks to design an automated electromechanical system that first transports three empty bottles, three tennis balls. The machine must fill each bottle of water, filled bottles to an area outside of the operational zone.

2. PLC Based Automatic Bottle Filling System With User Defined Volume Selection -8thAugust 2012.In This Research Paper the researchers T. Kalaiselvi, R.Praveena at have develop an automatic bottle, filling system with a mechanism using sensors. Automatic filling process for all the bottles simultaneously with a user defined selection for volume to be filled.

Different height Using Programmable Logical Controller –14<sup>th</sup> July 2013.In This Research Paper the researcher MALLARADHYA H M, K R PRAKASH have Design and Develop an automated liquid filling



# Design and Modeling of E-Bike

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Abstract: This project details about the Electric Bike which runs on the battery thereby providing voltage to the motor. This project compromises with design and fabrication of Electric Bike which makes use of Electric energy as the primary source and solar energy, if possible, by attaching solar panels. It also highlights on the design aspects of the bike. There is a provision for a charging the battery by ejecting it from the main system. The electrical power generated which is used to run the bike can give better fuel economy compared to conventional vehicle, better performance and also causes less pollution. The project is to design a feasible yet highly adaptable E-bike. As the number of motor vehicles on the roads throughout the world increases at staggering rate each year, the dependence on oil-based fuel grows almost unchecked. The increased use of non-renewable fossil fuels brings with it environmental problems such as: the "greenhouse effect", health problems for city delivers and concern over the stability of fuel supply. To move away from this dependence on oil, a vast amount of money is being spent on the development of electrical vehicles (EVs) that may be produced. This project presents a study of electrical motorcycle design. The aim of this study is to investigate how to design a simple, cost-effective model of electrical motorcycle with intelligent control system. This can be implemented by removing the internal combustion engine, the exhaust system and other unnecessary components from the motorcycle and replaced by an electrical motor, an intelligent controller.

*Keywords*: Electric bike, Power, Economical, Hub motor, Battery, Analysis, Chassis.

#### **1. Introduction**

An electric bike is, first and foremost, a bicycle. It uses the same designs, geometries, and components as any other bicycle, but also includes an added electric motor. This is fuelled by a rechargeable battery, which gives riders an extra boost of power and ultimately provides a smoother, more convenient, and less strenuous cycling experience. The idea of creating an electric bike has intrigued cyclists since the late 1800s, when several American inventors experimented with the possibility of combining the potential power of electric motors with the simple mechanics of the bicycle. It wasn't until the technological advancements of the 20th and 21st centuries, however, that this idea finally became a viable reality. With lightweight motors, high efficiency rechargeable batteries, smoothly shifting drive trains, and huge advances in bicycle components, today's electric bikes provide a way for cyclists of all ages, fitness levels, and physical needs to enjoy the benefits of cycling, whether it's a leisure ride, a workout, or part of a daily commute. For many, electric bikes are an attractive alternative to both conventional bicycles and traditional automobiles, providing an environmentally friendly, fun, efficient, and convenient way to travel.

The e-bike is an electric vehicle, an advanced version of the pedal bicycle, powered by a rechargeable battery. These bikes are an excellent alternative for people who want to switch from a car for their daily commute. The population of India is 1.35b billion, and nearly 253 million vehicles are there on the road [1]. In India, cities are experiencing excessive traffic and noise pollution, leading to inexorable air pollution from the last few years.

As the gasoline-driven two-wheeler sales figures increased during the late 20th and early 21st century, the number of exhaust emissions caused by them also increased. These exhaust emissions from the petrol-powered internal combustion engines gave out various harmful gases and particulate matter in the environment. With an increased fuel consumption trend, the toxic constituents are continuously being released in the surroundings every day [3]. The emissions led air around us to start degrading in quality, getting polluted, drawing extensive attention to the degree of the air pollution caused both locally and globally.

One of the primary sources of pollution in urban areas is the two-wheeler traffic. These exhaust emissions contain various toxic components, which are associated with severe adverse health effects, including premature death, respiratory symptoms, impaired lung function, and cardiovascular diseases.

#### 2. Methodology

An electric bike is a battery-operated vehicle that runs on the stored chemical energy inside the rechargeable battery packs. An electric bike is a pure E-bike if it exclusively uses its electrical power and not any other secondary power source. Electric motors and motor controllers propel these vehicles via various drive mechanisms, delivering the wheel's power.

#### A. Design Objective

The frame is inspired by the renowned two-wheeler

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## **GO-Kart Using PVC Pipes**

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*Abstract*— The first go-kart was simply a cart consisting of wheels and handles jointed together as children pushed from behind when learning to walk or a four-wheeler platform where children where children can sit on it while another push the kart around. Go-kart was invented in California by Art Ingles and Lou Borelli using 100cc mower engines and strong steel frames. Then, newly designed karts were beginning to gain popularity in Britain around the year 1959-1960"[1],[3].

Day to Day it must be effect on our daily travelling with minimum cost, so in order to travel without fuel we design go-kart using PVC pipes under Rs.30,000/- so we hope that our project will have recognized in this competitive world. This report explains how go-kart was made, its objectives and uses etc."[4],[6].

#### INTRODUCTION

Go-kart has long existed in our world whether it is used for recreation. According to Graham Smith (2002), Art Ingles who was a veteran hot rod and race car builder at Kurtis Kraft in California, America invented the first ever go-kart in 1956. Initially, karting is a leisure motorsport enjoyed by airmen during the post-war period. The sport is quickly caught on with Go Kart Manufacturing Co. Inc. Being the first company to manufacture and distribute go-karts after two years. In 1959, McCullough also jump in the bandwagon of the industry, by becoming the first company to manufacture go-kart engines. Although go-kart originated from United States, it has also gain interests from countries all over the worlds especially Europe"[2],[5].

By design Go-kart we can travel free of fuel because now day the price of petrol is varying day to day'[3],[4]. Go-kart is simply made by PVC (Polyvinyl chloride)

#### PARTS OF GO-KART:

- In Go-kart there are several parts. They are
- 1. Chassis, 2. Wheels ,3. Motor, 4. Dc motor,
- 5. Batteries ,6 Steering and other components.



#### SYSTEMS USED IN GO KART:

As like automobile Go-kart also have various systems like cooling system, lubrication system

#### WORK HAS BEEN DIVIDED INTO FOLLOWING

- Design
- Braking
- Steering
- Motor

#### DESIGN:

First of all chassis made by PVC pipes and ply wood sheet. Pipes are marking required size and cut by the axial blade, after cutting pipe in our required measurements we must connect the pipes with couplings and fittings .After that take plywood Sheet same length of the chassis make adjustments as we required bolted with PVC pipe chassis.

### Temperature and Face Mask Scan Entry System

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Abstract— COVID 19 pandemic is causing a global health epidemic. The most powerful safety tool is wearing a face mask in public places and everywhere else. The COVID 19 outbreak forced governments around the world to implement lockdowns to detect virus transmission. According to survey reports, wearing a face mask at public places reduces the risk of transmission significantly. A machine learning model for monitoring body temperature and face mask detection. The proposed model can be used for any shopping mall, hotel, apartment entrance, etc. As an outcome a cost-effective and reliable method of using AI and sensors to build a healthy environment. Evaluation of the proposed framework is done by the Face Mask Detection algorithm using the open-CV software library. Besides, the body temperature of the individual is monitored using a non-contact temperature sensor.

#### 1.INTRODUCTION

Since the last days of the previous year, the occurrence of novel infectious flu-a like respiratory disease COVID-19 caused by SARS-Cov-2 virus (also known as corona virus) has affected almost every aspect of people's lives globally. However, the crucial problem is the lack of approved vaccine and medication due to these facts, many protection and safety measures were taken by governments in order to reduce the disease spread, such as obligatory indoor mask wearing, Social distancing, quarantine, self-isolation etc..., We focus on most common indoor measures - people with high body temperature should stay at home, wearing mask is obligatory and distance between persons should be at least 1.5-2 meters.

The purpose of the project is to detect the person perfectly wearing mask or not and temperature detection of the person if the both are correct then the door allows the person in. The first step to detect COVID is by scanning for fever. Also, we need to monitor every person for a mask. We have temperature checking systems for every entrance for scanning but manual temperature scanning has a lot of disadvantages. To solve this problem, we here propose a fully automated temperature scanner and entry provider system. It is a multipurpose system that has a wide range of applications. The system makes use of a contactless temperature scanner and a mask monitor. The scanner is connected directly with a human barrier to bar entry if high temperature or no mask is detected. Any person will not be provided entry without temperature and mask scan. Only person having both conditions is instantly allowed inside. The system uses temperature sensor and camera connected with a raspberry pi system to control the entire operation.

#### BLOCK DIIAGRAM:



#### Fig 1.1 block diagram

#### EXPLANATION

The purpose of the project is to detect the person perfectly wearing mask or not and temperature detection of the person if the both are correct then the door allows the person in and there will be automatic sanitization these consists of temperature sensor, raspberry Pi model 3b also we are using a IOT based technology to store the data and some other

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# Order Statistics of Additive Uniform Exponential Distribution

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Abstract: In this paper we investigated the order statistics by using Additive Uniform Exponential Distribution (AUED) proposed by Venkata Subbarao Uppu (2010). The probability density functions of rth order Statistics, lth moment of the rth order Statistic, minimum, maximum order statistics, mean of the maximum and minimum order statistics, the joint density function of two order statistics were calculated and discussed in detailed. Applications and several aspects were discussed

Keywords: Additive Uniform Exponential Distribution, Moments, Minimum order statistic, Maximum order statistic, Joint density of the order Statistics, complete length of service.

#### I. INTRODUCTION

In several data sets arising pollutant concentration analysis, demography, risk analysis, actuarial Statistics, manpower modeling, etc, the variable under study is a sum of two or more variables. For example, in manpower modeling the complete length of service of an employee in the organization varies according to two types of factors namely, semi committed and committed states (temporary and permanent) respectively. Generally an employee during semi committed state may stay with the organization in the same pattern throughout the period of that state, and the frequency distribution associated with that part is a random variable and follows a uniform distribution. Once the employee is made permanent and confirmed in the organization the rate of leaving is constant and the frequency distribution associated with this part is like an exponential distribution. Therefore the total duration of stay of an employee which is known as complete length of service of an employee in the organization is the sum of two random variables, which are distributed as uniform and exponential. Very little work has been reported in literature regarding the Additive Uniform Exponential Distribution, which has a tremendous potential in analyzing many data sets arising at places like, manpower planning and other domains. Using the Jacobean transformation of random variables the probability density function of the distribution is obtained. This distribution includes uniform and exponential distributions as particular cases for limiting values of the parameters.

#### A. Additive Uniform Exponential Distribution

The probability density function of additive uniform exponential distribution (AUED) is

$$f_X(x) = \frac{1}{a} \left[ 1 - e^{-\theta x} \right]; 0 \le X \le a$$
$$= \frac{e^{-\theta x}}{a} \left[ e^{a\theta} - 1 \right]; a \le X < \infty$$
(1)

*a* and  $\theta$  are the parameters of the distribution, a > 0 and  $\theta > 0$ Its distribution function is

$$F_X(x) = \frac{x}{a} + \frac{\left(1 - e^{-\theta x}\right)}{a\theta}; \quad 0 \le x \le a$$
$$= 1 + \frac{\left(\frac{e^{a\theta} - 1\right)e^{-\theta x}}{a\theta}}{a\theta}; \quad a \le t < \infty$$
(2)

#### B. Order Statistics Of Additive Uniform Exponential Distribution

In this paper, we derive the distribution of extreme order statistics and the joint distribution of the order statistics and some properties. The distribution of extreme order statistics are very important for studying the inferences related to the maximum, minimum and median of the data sets. For example in manpower modeling the complete length of service of an employee is a random variable and studying its dynamics is very important for several operating policies regarding welfare and pensional benefits to find the probability distribution of the maximum duration of a state of an employee in an organization can be derived through order statistics.

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### Aerodynamic Analysis of Car body with Aerodynamic Devices to Improve Performance

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**Abstract** - This research is about analysis of the effects of different Aerodynamic add on devices on the vehicle to reduce drag and make the vehicle fuel efficient. The 3D model is developed in ANSYS Space claim. Computational fluid dynamics (CFD) is performed to understand the effects of these add on devices. CFD is performed in ANSYS Fluent module. Drag Coefficient, lift coefficient, drag force and lift force are calculated and compared. The results are analyzed and it was observed that optimized body has better drag coefficient and lift coefficient which helps improving the fuel economy and stability of the car.

*Keywords*: Aerodynamics, Drag Coefficient, Lift Coefficient, Computational fluid dynamics, Stream lined body.

#### **1. INTRODUCTION**

Aerodynamics plays crucial role in Automobile's performance. Initially, aerodynamics was used in racing to increase performance of the race cars to increase the race pace. But when fuel economy became a factor in road vehicles due to high prices of fuel, automobile manufacturers started to make changes to road cars by making them more streamlined and adding diffusers to reduce drag and improve fuel economy.

There will be different types of forces acting on a vehicle when it is moving. One of the forces that is acting against the flow of the vehicle is Drag Force. Reduction of this drag force helps in making a vehicle more fuel efficient and stable vehicle. The basic formula to calculate the overall drag is given by:

 $D = \frac{\rho}{2} C_d A V^2$ 

Where,

C<sub>d</sub> = Coefficient of Drag

A = Frontal area

V = Relative velocity of the object w.r.t. fluid medium

P = Density of air

So, our aim is to reduce the drag and lift forces acting on the car. We have analyzed 3 different models.

- Bluff model
- Streamlined model
- Streamlined model with diffuser.

And the results were noted and due to changes in the shape of the car body the drag reduction was observed which in return will increase the fuel efficiency of the car.

#### **Computational Fluid Dynamics**

CFD analysis consists of three main steps: Pre-Processing, Processing and Post-Processing. It is used to simulate fluid flow using computers with accurate results. We have used ANSYS Space Claim to design the Car models and ANSYS Fluent module to analyze the pressure contour, velocity contour, drag coefficient, lift coefficient, drag and lift forces of the models.

#### **Concept of Streamlining**

A body is stream lined when the air flow separation is low when compared to a bluff body whose air flow separation is high which causes a lot of pressure drag. A stream lined body has less pressure drag which in turn results in overall reduction in drag. A stream lined body is sleek and much easier to force such body through a fluid. So, we designed a car model with streamlined shape.

#### Diffuser

A diffuser, in an automobile, is a curved section of the car rear which improves the car's aerodynamic properties by improving the transition between the high-velocity airflow underneath the car and the much slower velocity in ambient atmosphere. The aft part of the car is where usually the diffuser is located. The diffuser helps in making the air flow at the exit is at the same pressure and same speed of the ambient. International Journal for Modern Trends in Science and Technology, 8(06): 481-484, 2022 Copyright © 2022 International Journal for Modern Trends in Science and Technology ISSN: 2455-3778 online DOI: https://doi.org/10.46501/IJMTST0806083

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# Modification of Bundle Former Piston by Failure Analysis to withstand the Fatigue

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#### ABSTRACT

The failure analysis of bundle former piston rod with a detailed study of various reasons regarding the failures. The different approaches of design parameters are considered and suitable regulation is specified. The present work compares the results of the theoretical design calculations against the experimental work. And an analysis will be done in ANSYS Software.

#### KEYWORDS:Solid works, Ansys

### 1. INTRODUCTION

#### 1. Description of Bundle Former Bar Separating Unit

The steel TMT bars from the rolling mill area would be transferred to bar separating mill by means of rollers. The bar separating unit will separate the bar into discretized units from where they are separated by means of bundles. The number of bars that are allotted to a bundle would be based from the operation characteristics like the size or the diameter of the individual bar unit.

#### **Bar Collecting Unit**

The steel bars from the separating area are transferred to a collecting unit called Bar Collecting Unit. In this unit the bars from the rolling chain are made to fall into a hook shaped collecting tray operated by means of hydraulic cylinder and piston Unit. The number of bars that are collected into the tray is calculated by means of a sensor mounted on the rolling chain unit at the beginning of the bar that is falling into the tray. The Function of this collecting unit is to collect the bars falling from the separating unit and transfer the same to the rollers where the bundle former presses the bulk of bars to make it a bundle and then a strapping machine puts straps to the bundle.



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# Fabrication of Water Heater/Cooler using Refrigeration system

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#### ABSTRACT

This water heater cum cooler makes the study of water-cooling system using a compressor in Refrigerator system. The main aim in developing this device is to develop a multifunctional unit which can provide both hot water and cold water using the regular refrigeration cycle. The refrigeration cycle is a thermodynamic heat pump cycle which is a conceptual and Mathematical model for heat pump, air conditioning refrigeration systems.

The refrigerant R-22 /F-22 (FLORON – 22) is used as medium which absorbs and removes heat from the water and subsequently rejects the air in the atmosphere. The Main difference between this water cooler & amp; Heater and Traditional water Heater & amp; Cooler used domestically is this comprises of a compressor functioning of this system. Whereas, that Traditional Heater, Cooler has condenses and has 2 switches to combine working & amp; it's a Non – Cyclic process. Their capacity is less. Circuit is different Power consumption is more. This is more effective and controllability is more. Constant refilling of water is necessary.

This is a cyclic process which uses both condenser and evaporator. Water storage space is more. Power consumption is less. Usage is easy usage.

KEYWORDS: Compressor, Refrigerant, Condenser, Evaporator, Accumulator, Water heater/Cooler.

#### 1. INTRODUCTION

Refrigeration involves the process of removing heat from a body and cooling it to a lower temperature than the actual. Refrigerators are used for the refrigeration process.

Heat and cold are two different entities associated with temperature. Body temperature is measured by a thermometer. We prefer to wear light coloured cotton clothes when it is hot. We prefer to wear light coloured cotton clothes when it is hot. We prefer to wear darkcoloured polyester clothes when it is cold as per the weather. Heating is the process of upkeeping the heat in the body. Refrigeration is the process of cooling space.

Any substance capable of absorbing heat from another required substance can be used as refrigerant i.e. ice, water, air or brine. A mechanical refrigerant is a refrigerant which will absorb the heat from the source and dissipate the same to the sink or in the form of latent heat. The physical properties will enable them to repeat continuously a liquid to gas and gas to liquid transformation. Air was used as a refrigerant in many



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# Fabrication and Performance of Thermo-Electric Refrigerator

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#### ABSTRACT

Advancement in technological field led to the most valuable invention i.e., refrigeration and air conditioning system but its prolonged and effects the environment. CFC'S, HFC's are released from the conventional refrigeration systems which is caused major environmental issues then it results the increase in global warming. These refrigerants also deplete the ozone layer that allows the ultraviolet rays directly coming to the earth's surface and their effect is for a longer period of time. Nearly thousands of O3 molecules can be destroyed by a single molecule of the HFC and the percentage of the HFC's discharge from the conventional refrigeration and air-conditioning systems is less compared to the discharging of CO2. So that's why we created this eco-friendly refrigerator to stable the environment.

The impact of ongoing progress in science and technology the refrigeration effect is created by using refrigerants but in this system, we are using thermo-electric modules to produce the refrigeration effect. A Thermoelectric module is used in the place of compressor so that it become less weight and portable, as it is based on the principles of Peltier effect. The use of Peltier effect is to create two junctions they are hot and cold junctions opposite to each other.

#### **1. INTRODUCTION**

When the temperature gradient is passed between the two dissimilar semi-conductors, the electric current would be flow. This is known as the Seebeck effect. Jean. C. Peltier, a French watchmaker and an amateur scientist discovered a reserve effect of Seebeck. He discovered that joined metals heat pump can be made. He found that, when the electric current is passed between the two dissimilar electric conductors, caused the heat to be either emitted or absorbed at the junctions of the materials. This is called as Peltier effect and it maintains the effectiveness on both heat and cold junctions.

#### THERMOELECTRIC REFRIGERATOR

Thermoelectric coolers are solid state heat pumps that operate on the Peltier effect. The thermos-electric module consists of a positive and negative terminal. The theory that the electric current passes through two dissimilar conductors then there is a heating or cooling effect produced. The temperature difference is created when the voltage applied to the free ends of two dissimilar materials. This temperature difference will cause the heat so this heat is moved from one side to another side. This thermo - electric module contains an arrangement of P - type and N- type semiconductors. These elements that act as the two dissimilar conductors. The arrangement of these elements is fastened between two ceramic plates, electrically in series but thermally in parallel. When DC current passes through one or more pairs of elements from N-type to P-type, there is a drop in temperature at a cold junction, resulting in the absorption of heat from the surroundings. The heat is transfer through the cooler and released on the hot side as the electrons move from a high to low energy state. The heat pumping capacity of a cooler is proportional to the current and the number of pairs of N-type and P- type elements.





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# JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

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# DESIGN AND FABRICATION OF ELECTROMAGNEIC BRAKING SYSTEM

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**ABSTRACT:** An electromagnetic brake is a new and revolutionary concept. These are totally friction less Electromagnetic brakes are the brakes working on the electric power & magnetic power. An Electromagnetic Braking system uses Magnetic force to engage the brake, but the power required for braking is transmitted manually. Electromagnetic braking system is a modern technology braking system used in light motor & heavy motor vehicles. This system is a combination of electro-mechanical concepts. The frequency of accidents is now-a-days increasing due to inefficient braking system. The concept helps in reducing or eliminating sources of heat generation, friction, noise, and wear of materials. There is no involvement of fluids as used in hydraulic braking systems. Electromagnetic brakes work on the principle of repulsion and attraction between two electromagnet field coils. The repulsion between the field coils opposes the motion of the wheel. This repulsion is initiated within the field coils by a switch or a lever that allows current to be supplied to the coils. Each coil is separately spaced evenly on both the outer and inner array of field coils. The disc is connected to a shaft and the electromagnet is mounted on the frame. When electricity is applied to the coil a magnetic field is developed across the armature because of the current flowing across the coil and causes armature to get attracted towards the coil. As a result, it develops a torque and eventually the vehicle comes to rest.

#### Introduction:

A brake is a device, where it restricts motion. It is commonly known that the brakes use friction to convert kinetic energy into heat. But the Electromagnetic brakes have been used as supplementary retardation equipment in addition to the regular friction brakes on heavy vehicles. They work on the principle of electromagnetism. The working principle of this system is that when the magnetic flux passes through and perpendicular to the rotating wheel the eddy current flows opposite to the rotating wheel/rotor direction.



# Design and Thermal Analysis on Transformer Fin Using CFD

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Abstract: The design problem considers minimization of the short circuits and explosions due low heat reduction through fins. The transformer design involves the optimum transfer of heat through fins to minimize the leakage field, short circuits and explosions. While designing the transformer, original dimensions of the transformer should be taken and not consider the before used materials of manufacturing the transformer. The design of transformer involves in considering the two different materials one is alumina 96% and another one is structural steel to get the temperature distribution and temperature changes within the transformer by giving the boundary conditions of transformer including atmospheric temperature. Then compare both the materials with present used material of the transformer using software analysis. Then choosing the best material for better heat reduction (to atmosphere) through the fins (extended surface) of transformer. Generally mild steel is better than the aluminum as it in a strength. The analysis has proved that mild steel has better strength than the aluminum materials. Comparing the mild steel with the aluminum on the transformer for better heat rejection by conducting the steady state thermal analysis, transient analysis. The results of comparing these two different materials on the transformer is that the mild steel has better strength and good temperature capacity for high capacity of transformers than the aluminum. Results based on equivalent stress, static deformation and natural frequencies shows that mild steel transformer performed better in that it has high strength and good temperature bearing capacity and will deflect far less that aluminum. The aluminum materials are assigned to the transformer body and fins will become melts and damaged because aluminum has low strength and low temperature bearing capacity than the mild steel material. So that aluminum is used only for low heat sink or rejection of the fins. Mild steel is better suited for the high temperature holding transformer because mild steel is more rigid. These structural analysis results are gained through experimental work. These structural analysis results are gained through experimental work. These structural analysis results are gained through experimental work.

Keywords: Transformer fin.

#### 1. Introduction

Transformer is a unit which helps in step up and step down the voltage. While doing the operation, transformer core gets heated up to a temperature ranging from 105 degree Celsius to 220 degrees Celsius. Transformer consists fins which helps in transmitting the heat generated inside core to outside atmosphere. If the temperature is increased beyond the mentioned temperature, even in 1 degree rise in temperature also reduces the efficiency by 50%. So, in order to minimize the loses caused to overheating, we are developed a project which can withstand a temperature ranging from 220 degree Celsius to 335 degrees Celsius. In order to get that output we redesigned the fins by changing the material as well as dimensions.

Heat transfer in transformer generally takes place in 3 modes.

- 1. Conduction
- 2. Convection
- 3. Radiation

*Conduction:* Conduction is a mode of heat transfer in which heat is transferred through direct physical contact between two or more solid bodies. In transformer this mode of heat transfer occurs in transformer core. Heat generated inside the transformer core get transferred to outside atmosphere by means of conduction.

*Convection:* Convection is also a mode of heat transfer in which heat is transferred within the fluid itself. In transformer this mode of heat transfer occurs within the coolant (mineral oil).

*Radiation:* Radiation is a special mode of heat transfer in which heat is transferred in form of electromagnetic waves. For this mode of heat transfer does not require any medium. In transformer this phase of heat transfer occurs at transformer fins and air. Heat from transformer fins is dissipated to atmosphere through radiation process.

By redesigning the transformer fins, the area of contact of fins to outside atmospheric air gets increases, due to increase in area of contact to outside atmosphere heat transfer rate increases.

In this design we make use of aluminium as transformer material, so that weight of the transformer gets reduced.

Aluminium has excellent corrosion resistant property and also has good thermal conductivity.

#### A. Problem Definition

Day by day number of research works are going on thermal stream to proper utilization of thermal energy.

1. Its time to proper utilization of thermal energy, cooling

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# Enhancement of Design and Fabrication of a Composite Automobile Body Based on Integrated Structure and Analysis of Gases using Gas Analyser

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#### ABSTRACT

In this project we have Designed and fabricated a Composite Automobile Body Based on Integrated Structure by ourselfinterest-based racing car model. The Design of the car was carried out using CATIA software and the analysis is done by using ANSYS Software. The car was fabricated in one of our laboratories at our Institute. The car has been tested for its performance.

#### KEYWORDS: Composites, CATIA, Ansys

#### **1. INTRODUCTION**

A car (or automobile) is a wheeled motor vehicle used for transportation. Most definitions of cars say that they run primarily on roads, seat one to eight people, have four wheels, and mainly transport people rather than goods. Cars came into global use during the 20th century, and developed economies depend on them. The year 1886 is regarded as the birth year of the car when German inventor Carl Benz patented his Benz PatentMotorwagen. Cars became widely available in the early 20th century. One of the first cars accessible to the masses was the 1908 Model T, an American car manufactured by the Ford Motor Company. Cars were rapidly adopted in the US, where they replaced animaldrawn carriages and carts. In Europe and other parts of the world, demand for automobiles did not increase until after World War II.

Cars have controls for driving, parking, passenger comfort, and a variety oflights. Over the decades, additional features and controls have been added tovehicles, making them progressively more complex. These include rearreversing cameras, air conditioning, navigation systems, and in-carentertainment. Most cars in use in the early 2020s are propelled by an internalcombustion engine, fuelled by the combustion of fossil fuels. Electric cars, which were invented early in the history of the car, became commercially available in the 2000s and are predicted to cost less to buy than gasoline carsbefore 2025.

#### 2. METHODOLOGY

According to the report of KPM Indian automobile industry is a developed industry that is having high opportunities when we compare among the others International Journal for Modern Trends in Science and Technology, 8(06): 431-435, 2022 Copyright © 2022 International Journal for Modern Trends in Science and Technology ISSN: 2455-3778 online DOI: https://doi.org/10.46501/IJMTST0806074

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# **Experimental Analysis of Heat Transfer of a Fin by** using Compressed Graphite Sheet

#### Pittala Sai Radha Krishna | D. Tulasi Ram | A. Teja Shakar | M. Rajesh | P.Upendra Varma

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#### ABSTRACT

An experimental investigation of heat transfer from a square fin using graphite sheets is addressed in the present work. The test has been performed on three different thickness of graphite sheet having 1mm,3mm and 6mm thickness placed in the slotted fin. The experimental setup comprises centrifugal blower, test section, heater and test panel. Results are obtained for local fin temperature distribution, rate of heat flux. The local fin temperatures of a fin with graphite sheet are higher than that of a plane square fin due to an increased rate of heat conduction. The rate of heat flux is also increased with the increase in the thickness of graphite sheet. The Effectiveness and Efficiencies of fin with Graphite sheet are also increased

KEYWORDS: Square fin, Graphite sheets, Thermal Conductivity, Effectiveness.

#### **1. INTRODUCTION**

Now a day's heat dissipation from electronic and mechanical components is the major problem. Electronic components like LED lights, CPU in computers, different electronic chips, transistors, and some mechanical devices produce heat while it is working. If this heat is not dissipating from the device properly it becomes over heated and system will have damaged and it didn't work properly. So many studies and experiments are done on this problem by using fins, heat sinks with different geometries. Typically, the fin material has a high thermal conductivity. The fin is exposed to a flowing fluid, which cools or heats it, with the high thermal conductivity allowing increased heat being conducted from the wall through the fin. Present work deals with the thermal performance of a square fin using compressed graphite sheets by using the graphite sheets the thermal conductivity of a fin can be increased which intern increases the heat conduction from the fin. Fins are the extended surfaces, which are directly or indirectly attached to the hot body to dissipate the heat by conduction, convection and radiation. Fins are used to increase the heat transfer rate from a surface to a fluid. The heat removed by conduction from body, which it is attached, then by convection and radiation from fin. The use of fins in very common and they are designed in different shapes. Circumferential fins around the cylinder of a motor cycle engine and fins attached to the condenser tubes of refrigerator are a few examples.

Heat sinks are devices that enhance heat dissipation from a hot surface, usually the case of a heat generation International Journal for Modern Trends in Science and Technology, 8(06): 426-430, 2022 Copyright © 2022 International Journal for Modern Trends in Science and Technology ISSN: 2455-3778 online DOI: https://doi.org/10.46501/IJMTST0806073 Avsileble.org/inc.gt/10.46501/IJMTST0806073

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# Design and Fabrication of Multidirectional Rotational Trolley

#### Kona Ramprasad | Golagani Satish | Pasumarthi Hari Krishna | Pangi Sathish Kumar | Penuganti Lova Raju

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#### ABSTRACT

Normal dumper vehicle unload materials only in one direction that too only at the backside of the tipper trolley by using various powerful hydraulically operated cylinders, which may cause the problems of blockage when the work area is limited. The Multidirectional dumper overcomes the problem of unloading the vehicle on side way by using Pneumatic cylinder used in our prototype but hydraulic cylinder would have to be used in a standard vehicle. By using cylinder and Geneva mechanism the material can be unloaded in as per requirement. However, the Multidirectional dumper is developed and tested for its rotation in all 360° possible angle to unload the materials in the tipper trolley and monitor the inclinations for its gradualism by using Geneva mechanism.

KEYWORDS: 360 degrees trolley, Prototype hydraulic cylinder and truck.

#### 1. INTRODUCTION

Material handling in construction and civil works is one of the basic necessities. The material supply to civil and construction is provided through trucks, dumper etc. The material should be properly loaded, managed, stacked, transported and unloaded. The dumper carries the material which is loaded from the site, where the material is initially stored. It is then loaded to the dumper and transported to the required site and then unloaded. The major issues raises over here, the incompatibility of the site with the fully loaded dumper causes a lot of settling time for the trolley to get the material properly arranged and transportation time to reach its location.

The dumper unloads the material in only one direction. But this incapability can be full new method mechanism as the Multidirectional dumper. Gothic mechanism is an approach to reduce the idle time to settle the dumper. The material is unloaded in any direction and hence can be boldly stated as "Multidirectional Dumper." The major outcomes of Multidirectional dumper has overcome space requirement which often result in road blocking. Hence, we have inversion in the existing mechanism providing the unloading in 3600 rotations. This mechanism prevents blocking of road, saves time and enhances productivity at lowest cost. The automotive sector is fast booming section in India. There are variable in automotive industry light and heavy motor vehicle.

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# **Fabrication and Experimental Analysis of Heat Sink Fins**

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#### ABSTRACT

In this project we had fabricated the different types of fins like circular and square. This fins made up of aluminium because it is low cost and high heat transfer rate. The experiment is carried out on fins test rig. We took the different temperatures of fins with help of this test rig and the results of this fins has been compared with efficiency and heat transfer rate. Finally, we want to conclude that which fin has high rate heat transfer and efficiency

#### 1. INTRODUCTION

Heat transfer is the study of the flow of heat. In chemical engineering, we have to know how to predict rates of heat transfer in a variety of process situations. For example, in mass transfer operations such as distillation, the overhead vapour has to be condensed to liquid product in a condenser, and the bottoms are boiled off into vapour in a reboiler. Often the feed stream is preheated using the bottoms product in a heat exchange.

Another example is the production and use of process steam, which is brought to various locations in a plant through steam pipes as a heating utility. Also, these steam pipes need to be insulated to minimize heat loss to the ambient air. Such insulation is also important when transporting hot fluids from one place to another.

A similar application is the transport of refrigerated liquids through piping – here we need to insulate to avoid transferring heat into the liquid from the ambient air. Chemical reactors can generate heat if the reaction is exothermic, and this heat must be removed to avoid a runaway reaction; likewise, endothermic reactions need a supply of heat to maintain the reaction. Heat transfer also is important in our daily lives.

For example, we heat our homes in the winter using hot water in baseboard heaters. We boil water routinely for cooking purposes. If you look inside a modern personal computer, you'll see a fan that is used to cool the electrical circuitry, which becomes warm because of the flow of electrical current through resistances. Sometimes when the circuits are dense, a refrigerant is used in a sealed tube that is boiled at one end where it is warm, to take away the heat, and condensed at the other end where it is cooler.

The three basic mechanisms of heat transfer.

They are conduction, convection, and radiation. Next, we discuss each of these mechanisms in some detail.

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# **Experimental Analysis of Heat Transfer Rate by Applying Ceramic Coating on Metal Surface**

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#### **Article Info**

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#### ABSTRACT

In this project we have study the heat transfer analysis of ceramic coating applied on stainless steel metal surface. The experiment is carried out emissivity test rig. The coating technique is used by Plasma Electrolysis Oxidation (PEO). The result has been compared to the pure stainless steel and ceramic coated stainless steel with reference of the black body.

KEYWORDS: stainless steel, ceramic coating, Plasma electrolysis oxidations, heat transfer rate, Emissivity.

#### **1. INTRODUCTION**

Energy is a core subject to education in Mechanical Engineering (ME). Among the various issues, technologies for energy recovery and conversion are at the forefront of any mechanical engineering curricula.

#### Heat

Heat is the amount of energy that flows spontaneously from a warmer object to a cooler one. More generally, heat arises from many microscopic-scale changes to the objects, and can be defined as the amount of transferred energy excluding both macroscopic work and transfer of part of the object itself. The process of heat, also called heating

#### Heat transfer

Heat transfer is a discipline of thermal engineering that concerns the generation, use conversion, and exchange of thermal energy (heat) between physical systems. Heat transfer is classified into various mechanisms, such as thermal conduction, thermal convection,

thermal radiation, and transfer of energy by phase changes. Engineers also consider the transfer of mass of differing chemical species, either cold or hot, to achieve heat transfer. While these mechanisms have distinct characteristics, they often occur simultaneously in the samesystem.Heat conduction, also called diffusion, is the direct microscopic exchange of kinetic energy of through the boundary between two particles systems. When an object is at a different temperature from another body or its surroundings, heats flows so that the body and the surroundings reach the same temperature, at which point they are thermal equilibrium. Such in spontaneousheattransferalwaysoccursfromaregionof hightemperaturetoanotherregionoflower temperature, as described by the second law ofthermodynamics.Heat convection occurs when bulk flow of a fluid (gas or liquid) carries heat along with the flow of matter in the fluid. The flow of fluid

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# Design and Fabrication of 3D Printer

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#### ABSTRACT

3D printing is called as desktop fabrication. It is a process of prototyping where by a structure is synthesized from a 3d model. The 3d model is stored in as a STL format and after that forwarded to a 3D printer. It can use a wide range of materials such as ABS, PLA, and composites as well.3D printing is a rapidly developing and cost optimized form of rapid prototyping. The 3D printer prints the CAD design layer by layer forming a real object. 3D printing process is derived from inkjet desktop printers in which multiple deposit jets and the printing material, layer by layer derived from the CAD 3D data.

3D printing significantly challenges mass production processes in the future. This type of printing is predicted to influence industries, like automotive, research and development team, medical, education, consumer products industries and various businesses.

KEYWORDS: 3D printing, Rapid Prototyping, ABS, PLA

#### INTRODUCTION

#### 3D-

printing or additive.manufacturing is.the construction of a three-dimensional object from a CAD model or a digital 3D model. It can be done in a variety of processes in which material is deposited, joined or solidified under computer control, with material being added together (such as plastics, liquids or powder grains being fused), typically layer by layer.

In the 1980s, 3D printing techniques were considered suitable only for the production of functional or aesthetic prototypes, and a more appropriate term for it at the time was rapid prototyping.<sup>[3]</sup> As of 2019, the precision, repeatability, and material range of 3D printing have increased to the point that some 3D printing processes are considered viable as an industrial-production technology, whereby the term additive manufacturing can be used synonymously with 3D printing. One of the key advantages of 3D printing is the ability to produce very complex shapes or geometries that would be otherwise impossible to construct by hand, including hollow parts or parts with internal truss structures to reduce weight. Fused deposition modeling (FDM), which uses a continuous filament of a thermoplastic material, is the most common 3D printing process



Fig : Process of 3D Printing

#### **EXPERIMENT AND METHODOLOGY:**

Our objective is to study, design and fabrication of a 3d printer. We studied the history, different printing methods and overview of the past research in the previous chapter. This chapter includes design and fabrication of the same mentioned earlier. First we ordered the whole tool-kit including all the parts and components those are used to manufacture a 3d printer. It took a while

I

# EVALUATION OF METAL FOAM IN BATTERY THERMAL MANAGEMENT SYSTEM

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#### ABSTRACT

Batteries, especially lithium-ion ones, are the main energy sources of electric vehicles. In order to remove the generated heat in these batteries, passive cooling systems such as those employing phase change materials (PCMs) can be used, without any energy consumption. The main drawback of conventional PCMs is their low thermal conductivity, which can be solved by adding conductive additives to pure PCM. In this study, nine passive battery thermal management systems (BTMSs) based on paraffin wax as pure PCM, and copper foam as conductive additive, but with nine different amounts (from 1 to 9 volume%), are numerically simulated to reveal the role of additive content. The results show that the addition of metal foam greatly influences the time evolution of PCM liquid fraction. It is turned out that the addition of 6 volume% copper foam can create the best cooling effect and preserves the cell in the desired temperature range. In fact, adding more than this value can significantly reduce the heat absorption capacity of BTMS and makes the BTMS unreliable.

**Keywords:** Conjugate heat transfer  $\cdot$  Porous media  $\cdot$  Battery thermal management system (BTMS)  $\cdot$  Li-ion battery  $\cdot$  Phase change materials (PCMs)

#### INTRODUCTION

#### **ELECTRIC VEHICLES (EV)**

Today,accordingtothereductioninfossilfuelresourcesandalsodanger ouscontaminantscomingoutofconventionalvehicles,human is forced to design and utilize different types of electric vehicles (EVs). Lithium-ion(Li-ion) batteries are the main sources of energy in thementioned vehicles due to their high power andenergy density, long lifecycle and lowrate of self-discharge. However, the Li- ion batteries suffer from high level of heat generation while they work at high discharge rates. The excess amount of generated heat should be removed from the battery cells, otherwise it may cause thermal runaways and safety concerns. In order to remove excess generated heat, researchers have looked for effective ways to develop battery thermal management systems (BTMSs) with higher performance.

An electric vehicle (EV) is one that operates on an electric motor, instead of an internal-combustion engine that generates power by burning a mix of fuel and gases. Therefore, such as vehicle is seen as a possible replacement for current-generation automobile, in order to address the issue of rising pollution, global warming, depleting natural resources, etc



Electric Vehicle (EV)

#### **BATTERYTHERMAL MANAGEMENT SYSTEM (BTMS)**

TheBatteryThermalManagementSystem(BTMS)isthedeviceresponsi bleformanaging/dissipatingtheheatgenerated duringtheelectrochemicalprocessesoccurringincells,allowingthebatte rytooperatesafelyandefficiently. TheBTMS's (BatteryThermalManagementSystem)objectiveistopreventaccelerate dbatterydeteriorationbymanaging theheatgenerated byitscomponentssothatitoperatescontinuouslyunderoptimumtempera tureconditions..TheBTMSisthebatterypackcomponentresponsibleforensuringthatthecellsoperateundertheop

timumtemperature conditionsspecifiedbythemanufacturer.

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# Experimental Investigation of Phase Change Material on Battery Thermal Management System

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#### ABSTRACT

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Electric vehicles (EV) develop fast and have become popular due to their zero emission and high tankto-wheels efficiency. However, some factors limit the development of the electric vehicle, especially performance, cost, lifetime and safety of the battery. Therefore, the management of batteries is necessary in order to reach the maximum performance while operating at various conditions. The battery thermal management system (BTMS) plays a vital role in the control of the battery thermal behavior. In this study, the paraffin (PCM) was prepared and characterized. And then the PCM have been applied in the LiCOo2 battery module for experimental research. Different discharge rate and pulse experiments were carried out at various working conditions, including room temperatures (25C) and high temperature (350c). Testing result indicated that PCM cooling system can control the peak temperature under40 I. The results exhibit that PCM cooling in battery thermal management ha promising advantages over traditional air cooling.

Keywords: Aluminum, Battery Thermal Management System, paraffin, PCM.

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#### **INTRODUCTION**

As is well known, the electric vehicle is a very important alternative transportation and gains more and more attention due to the shortage of conventional fossil energy. Because of its renewable property, zero pollution, zero emission and high energy utilization, electric vehicle has become a hot research topic in the automotive industry. For that reason, the United States, China, Japan and Europe have proposed their own development plans for renewable energy vehicles. In the United States, Obama firstly proposed a commitment to reach 1 million electric vehicles in 2015 in the state of the Union address in 2011. In 2012, China released the development plan of renewable energy automotive industry and clearly stated that by 2015 and 2020, the total sales volume of all-electric vehicles and plug-in hybrid vehicles should exceed 500,000 and 5,000,000 respectively. In 2010, the Japanese government announced the "new generation of automotive strategy", which planned to by 2020 develop electric vehicles and hybrid electric "new generation vehicle" to the level that total sales accounted for about 50% of its new vehicle sales.

European major automobile country Germany, in its "national electric vehicle development plan", proposed that the total number of electric vehicles in Germany would reach 1 million by 2020. The efforts made by all countries in the world for the development of electric vehicles have led to the continuous progress of electric vehicle technology. Electric cars include three types: plug-in hybrid vehicles, pure electric vehicles, and fuel cell cars. The electric vehicle contains three main technologies: battery and its management system, motor and its controller, vehicle control technology.

The main research of battery technology is concentrated on positive and negative materials, membrane materials, additives in electrolyte, and management system of battery pack. The battery management system also includes electrical management, thermal management and safety management.

To avoid the adverse impacts of high-temperature conditions, battery systems designed for vehicle applications typically employ convective thermal management in the form of air or liquid cooling. Thermal management system designs can vary widely in complexity and in cost.

On the low end of complexity, the management system might use a small fan to circulate ambient air from the environment through the battery chamber. This approach is fairly simple and inexpensive to implement, but it might not manage heat effectively enough to permit high-rate battery use in all conditions or to prevent a sizable temperature

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# Design and Fabrication of Power Generation Through Smart Speed Breakers

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#### ABSTRACT

It is very significant to design pollution free energy generation system. Speed breaker Power Generator (SBPG) is the most emerging technique which produces electrical power with minimum input.

An experimental study to generate the electricity by SBPG is described in this paper.

In this system, a Rack and pinion mechanism is used for the production of electricity.

The rotary motion is transferred to DC generator which generates DC power which is stored in batteries same as in solar technology.

The generated power can be used for the domestic purpose or commercially, which are present near the speed breaker.
Wecantaptheenergygeneratedandproducepowerbyusingthespeedbreakeraspowergeneratingunit.

It is observed that the generated voltage is directly proportional to the angular speed of the generator gear. Further, it is found that the total power generated from the rotational induction generators is 691 kW while that from the translational induction generators is 8.2922 kW per day on 12-hour basis.

One such example of producing power in order to provide energy for a smaller area / scale is from speed breakers cheapest and new source of energy is obtained by the conversion of one form of energy into other. The renewable sources of energy become more popular because of nonpolluting and easily available from the nature. The number of vehicles passing over the speed breaker on the road is increasing day by day. Such speed breakers are designed for heavy vehicles, thus increasing input torque and ultimately increasing the power as output. There are many suitable and compact mechanisms to enhance efficiency. The generated power can be used for the lamps near the speed breakers and this will be a great boon for the rural villages too. In this paper it is mainly focused on the working of the newly developed rack and ratchet (pinion) mechanism which is used to develop the power from speed breakers, its practical implementation.

It generates about 43 watts from one push of 65 kg weight. which can convert into electric energy by generator and later stores in batteries. In this particular study gear, rack and pinion were used for fabrication of the experimental setup. Contact stresses of rack and spur gear were analyzed under static loading and finite element analysis

KEYWORDS:Speed Breaker, Kinetic Energy, Rotational induction, Boost converter, renewable energy, Rack and pinion mechanism, Finite element analysis, Generator, Passenger Car.

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# Design and Fabrication of 360 Degree Flexible Drilling Machine

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#### ABSTRACT

Drilling is a cutting and material removal process in which holes are made with the help of a drill bit, often multi-point cutting tool. Drilling process involves, the drill bit to rotate at high rpm (revolutions per minute) against the surface of the workpiece. Thus, the unwanted partwill bedrilled, and the material will bedrawn from the hole in the form of chipsalong the shank. Therefore, Drilling machine is one of the machines which is very important is the heart of an industry. The purpose of our project is to make the drilling machine to rotate flexiblyin 360 degrees to make it more convenient. The machine is compact and by using this machine, total cycle time will be reduced and also, once the workpiece is clamped on the base plate, there is no need to move the workpiece to different locationsfor the purpose of drilling, itminimizesthenumber of machines required and human fatigue is alsominimized. With the contrast of this machine, we can drill in any direction at any angle with minimizedhuman effort. The machine is mounted on a flat surface which is supported by legs. In this drilling machine we haveused rack and pinion mechanism to move the drill in different angles, so the machine canwork in less space with efficiency. Multiple operations can be done by changing the tool in the tool holder. This machine can also be used in automation.

#### INTRODUCTION

360-degree flexible drilling machine is a type of drilling machine which can drill in 360-degree angle with accuracy and precision in circular cross-section. We have chosen this project as the drilling machine is the heart of any industry. It is very essential and plays a crucial role in an industry. Drilling is a cutting process in which it uses a drill bit usually multi point cutting tool to cut a hole of circular cross-section in solid materials. The drill bit cuts a hole with its sharp cutting edges and rotary motion and as the drill bit fed into the surface of the workpiece, hole will be cut. The drill bit head makes the drill bit to rotate at hundreds to thousands of rotations per minute (revolutions per minute) which makes cutting edges of the drill bit to remove the unwanted material from the workpiece along the shank.With these high-speed revolutions of the drill bit, it can cut almost any material with accuracy and precision except for rocks. In rock drilling even these high speeds and sharp cutting edges cannot make a hole just with the drill bit and the speed. Therefore, we use a hammer, the hole usually made in rock drilling by hammering thedrill bit into the hole by quick short movements and the hammering action can be



# Design of Water Heater cum Water Cooler Using Refrigeration System

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#### ABSTRACT

The purpose of this study is to use water cooler and water heater to improve the convenience of the user so that they can use the water cooler and mobile water heater properly and comfortably. This study focuses on how refrigeration and water heaters use thermoelectric pads as a cooling and heating medium. Peltier works when the voltage is flowing from the power bank. The temperature difference on the surface of the processor allows the heat to occur at a fast rate. Arduinouno is used as a voltage regulator and temperature sensor to improve product performance. concept designs are designed, created and evaluated. The final prototype will include some markers that will be used as temperature readings by cooling and heating. Based on the results shown, the prototype can achieve the desired result with optimized energy consumption. When the temperature supplier produces a good temperature, the amount of water temperature will rise and the heat in the water will reach thermal equilibrium until the cold and hot temperatures reach a better minimum. Therefore, the temperatures in the cold and hot areas are more efficient in achieving thermal equilibrium in rising water.

#### I. INTRODUCTION REFRIGERATION SYSTEM

The mechanism used for lowering or producing low temp. in a body or a space, whose temp is already below the temp. Of its surrounding, is called the refrigeration system. Here the heat is being generally pumped from low level to the higher one & is rejected at high temperature.

#### Refrigeration

The term refrigeration may be defined as the process of removing heat from a substance under controlled conditions. It also includes the process of reducing heat& maintaining the temp. of a body below the general temp. of its surroundings.In other words, the refrigeration means a continued extraction of heat from a body whose temp is already below the temp of its surroundings.

#### **Refrigerator & Refrigerant**

A refrigerator is a reversed heat engine or a heat pump which takes out heat from a cold body & delivers it to a hot body. The refrigerant is a heat carrying medium which during their cycle in a refrigeration system absorbs heat from a low temp. system& delivers it to a higher temp system.

#### **Refrigeration Cycle**

In refrigeration system the heat is being generally pumped from low level to higher one & rejected at that temp. This rejection of heat from low level to higher level of temp can only be performed with the help of external work according to second law of thermodynamics. The total amounts of heat being rejected to the outside body consist of two parts:

- The heat extracted from the body to be cooled.

- The heat equivalent to the mechanical work required for extracting it.

A refrigerator is a reverse heat engine run in the reverse direction by means of external aid.

Every type of refrigeration system used for producing cold must have the following four basic units:

• Low temp thermal sink to which the heat is rejected for cooling the space.

• Means of extracting the heat energy from the sink, raising its level of temp before delivering it to heat receiver.

• A receiver is a storage to which the heat is transferred from the high temp., high pressure refrigerant.

• Means of reducing the pressure & temp of the refrigerant before it returns to the sink.

The processes of the cycle are evaporation, compression, condensation & expansion.

By reversing the heat engine cycle completely & by changing the working agent, a refrigeration cycle is



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#### DESIGN AND THERMAL ANALYSIS OF THERMOELECTRIC BATTERY FOR ENERGY PRODUCTION

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#### ABSTRACT

Currently humans are facing delicate issues, similar as adding power costs, environmental pollution and global warming. In order to reduce their consequences, scientists are concentrating on perfecting power creators concentrated on energy harvesting. Creators ( TEGs) have demonstrated their capacity to transfigure thermal energy directly into electric power through the Seebeck effect. In this paper considered different types of shapes similar as blockish-leg, trapezoidalleg, Y- leg, I- leg and X-leg, for P- N- Module all grounded on their separate shape structures along different top and nethermost contact as magnesium alloy, copper alloy, aluminum alloy all grounded on their separate thermal parcels to Optimizing the module with respect to input parameters for maximum affair parameters like current viscosity, voltage flux, temperature distribution, and remaining affair parameters using Ansys- 21 software

**Keywords:** Different shaped legs, different top and bottom contact plate materials like magnesium, copper and aluminium alloy, Ansys-21.

#### INTRODUCTION

I.

The concept of thermo electricity can be classified into 2 parts. Thermo electric Coolers (TEC) and Thermo electric Generators (TEG). In order to run a TEC, a certain amount of current has to be input along with maintaining a temperature difference which gives a cooling power and the coefficient of performance of the device can then be measured. However, in a TEG, a load resistance is input along with maintaining a temperature difference and electricity is thus generated from these conditions.

#### THE SEEBECK EFFECT

when there is a temperature difference in a thermo electric material, an electric current is created due to movement of holes and electrons in the semiconductor materials the effect that causes this behavior is called the seebeck effect.



Figure 1.1. The movement of (a) holes (b) electrons in the Seebeck Effect

#### Mathematical relation

 $V = \alpha \Delta T$ 

1.1



# Application Design of an Integrated Outdoor Air Quality Monitoring Device Based on Solar Power

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#### Abstract

Pollution has rocked the world with skyrocketing pollution levels. Though the long-term solution to the pollution problem lies in finding and minimizing pollution sources, we need to bring the current pollution levels under control by the time. The best way of controlling pollution is by using air purifiers. But regular indoor air purifiers are small low power devices that don't posses enough purifying capability needed for outdoor spaces. Along with this there is also an issue of power supply in outdoor machines.

So here we design a heavy-duty outdoor air purifier that is made for outdoor purification along and powered by solar panels so it is energy independent. Our solar air purifier consists of a heavy-duty suction fan that pulls air from the bottom of the purifier through a layer of HEPA and Carbon filters for elimination of PM 10 PM 2.5 pollutants as well as gases.

Keywords: OUTDOOR SOLAR AIR PURIFIER, HEPA AIR FILTER, SOLAR PANEL.

#### 1. Introduction

As we know that air pollution level in cities is very high. Most of pollution comes as by-product from vehicle and construction of buildings; these are in form of particulate matter which are like methane, carbon dioxide, dust particulate etc. These create a lot of health problems like respiratory illness, decreased lung functions, development of diseases like asthma etc. Larger dust particles are major particulate among these and if its air quality value is down to minimum then air has very improved quality in which all type of living things can breathe easily. Although there are many types of air purifier that are available in market but none of them are sufficient enough to deliver its working efficiency in public places like bus stand, near hospitals, traffic signals etc. Many institutes are also not able to afford these because of high cost and installation cost. Government organizations have very low budget for air purifier like extra expenditure. So, it is advisable to develop such air purifier which can cost less and are highly efficient. So, we are making solar powered air purifier, which runs on solar energy without use of filters and also works for longer duration than others. It uses component like solar panel, fan, converter, pump, etc.


# -Design and Fabrication of Emergency Braking System

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#### ABSTRACT

The general public, policymakers and the automobile industry have developed a growing amount of interest in automotive safety. It is more than explained by the figures on road collisions, where around 1 a year. Thanks to road traffic collisions 2 million people die. This paper introduces a cost-effective crash warning system concept for low-budget cars. Rear-end crashes are typical crash situations, and driver fatigue is a major cause of such incidents and therefore does not respond on time. No security program is a substitution for the most critical safety device of any driver's car. Many vehiclesmanufacture now use revolutionary technology for a day to help warn drivers to stop crashes and reduce possible impact speed when a collision cannot be stopped. Another such feature is Collision Warning with Automatic Braking where the area in front of the car is constantly tracked with the aid of the long-range sensor and driver is alert in the case of a collision and with the brake assist for collisions with other cars, both driving and stationary. Additionally, if the driver fails to respond given the warning and the potential collision is considered inevitable; brakes are automatically applied to stop the vehicle. This helps to reduce the level of effect and therefore the chance of repercussions. Finally, it was discussed how, using traffic incident data, the utility of these programs can be measured from the real- life safety viewpoint.

Keywords: Crash, Arduino Ultrasonic System, Automatic Braking system

#### **INTRODUCTION**

The Automatic Braking Collision Warning system is a mix of many innovations. Over the years, vehicle safety has acquired a growing attention from the general public, governments and the automobile industry. Increasing demand from the general population, governments and the automotive market. An effective means of making ongoing progress in the development of safety is a working cycle focused on real-world scenarios and input on the production of this knowledge. This working approach was found to be very successful for the production of passive protection. This research extends this cycle of working towards the production of modern active protection systems. Strong safety programs require a broader field of research and success targets, thereby extending to incident of injuries next to injury defence and adversary vehicle next to host car. The aim of this paper is to address some of the latest innovations in active protection and put them in perspective. Using blinking LED and LCD monitor, the identification of collisions is achieved by using the Ultrasonic sensor and the Stop signal. Braking is achieved by means of a servo motor attached to a parking brake lever to ensure maximum braking power and minimum braking time. Electromechanical actuation by means of mechanical actuator which makes the action extremely fast, thus ensuring safety braking. Prime mover control is cutoff by means of a relay switch to reduce power wastage and split wear. All these devices are operated using Arduino Super 2560 which is a programmed microcontroller to perform the specified function.

# Overall efficiency in the improvement of an industrial boiler using COAL ACTIVATOR

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#### Abstract

The main objective of this project is to find out the boiler capacity and its development. The thermal industry is considered to be the major source of conventional energy in India. The chemical energy of coal is converted into electricity in a thermal power plant. It is now the most in demand industry due to high energy demand. The boiler is a very important part of the power plant. Running the plant with maximum result we need high boiler efficiency. Calculating boiler efficiency as one of the most important types of performance measurement in any power plant. For calculation of Boiler efficiency basically we use Direct and Indirect method. It is a measure of how effectively chemical energy in fuel is converted into heat energy in steam going to the turbine. We also improve boiler efficiency by using coal activator.

The art of converting plastics into useful fuels was scaled up a few decades ago, but this side is far less likely. Plastic contains most of the organic polymers made up of carbon and other elements. Various processes such as gasification and pyrolysis are used to convert plastics into smaller hydrocarbon units such as naphtha. This is named as a "COAL ACTIVATOR". This paper aims to provide the best options that will help reduce fuel (Coal) prices in the future.

Keywords: Boiler, Boiler Efficiency, Boiler Losses, Performance, Coal Activator, Direct Method and Indirect Method.

### Introduction

Saving energy may the one of most interested themes and then one of the most important subjects for boiler. According to bureau of energy efficiency "thermal efficiency of boiler is defined as the percentage of heat input that is effectively utilized to generate steam." It is also defined as "Boiler efficiency is a ratio between the energy supplied to the boiler capacity and the energy received from the boiler." It is expressed in percentage. And the boiler fuel (coal) is mixed with coal activator to improve the efficiency.

Companies around the world and people started producing fuel from waste plastic. Only 8% of waste plastic is recycled in the U.S., in 15% Western Europe, and very few in developing countries, this recycling of plastic keeps it vast the amount of plastic from landfills and from the oceans. Over 500 billion pounds of new plastic made every year and almost 33% of it is single use and thrown. Since less plastic is recycled, we need it reframe plastic waste versus landfill as a less used resource destination. According to the United Nations Environment Program, global plastic consumption has gone up from 5.5 Million tons in the 1950s and 110 million tons in 2009. Due to technical limitations or inconvenience of recycling, only a portion of that material will reappear in the new plastic products. This leads to extra-normal amounts dumped in landfills for thousands of years. Pacific ocean is the largest landfall in the world: The Great Pacific Garbage Patch.

Department of Plastics The American Chemical Council asked the Earth Institute Earth Engineering Center to explore recovery paths the energy inherent in non-recycled plastics. As a

# AA7xxx alloy in order to reduce the grain size of with addition of AA7xxx+0.5% SC; Study their Microstructure, Mechanical properties,Thermal properties and Stress Corrosion cracking behaviour

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#### Abstract

**Purpose-** In order to reduce the grain size with addition AA-7xxx+Sc alloy, study their mechanical properties, microstructure and corrosion behaviour of AA-7xxx with AA-7xxx + wt% (0.5Sc) alloys. Precipitation hardening of above conditions was investigated.

**Design/methodology/approach-** Precipitates at different age-hardening conditions were measured of nano scale precipitates MgZn2, Al2Cu and Al3Sc. The precipitation hardening behaviour of AA-7xxx+0.5 wt.% Sc alloys are studied on the basis of optical microscopy, electron microscopy (SEM & TEM), XRD observations, mechanical properties and electrochemical analysis.

**Findings-** AA 7xxx and AA-7xxx+0.5 wt.% Sc alloys were developed casting method and comparing mechanical properties, microstructure and stress corrosion cracking behaviour of using 3% NaCl solution medium to understand the corrosion behaviour of alloy such as AA 7xxx and AA-7xxx+0.5 wt.% Sc ally , AA-7xxx+0.5 wt.% Sc precipitation hardened (T6) alloy.

**Originality/value**- Hardness, mechanical properties and Stress corrosion cracking behaviour of AA-7xxx with AA-7xxx + wt% (0.5Sc) alloys and understand the corrosion behaviour of alloy such as AA 7xxx and AA-7xxx+0.5 wt.% Sc ally, AA-7xxx+0.5 wt.% Sc precipitation hardened (T6) alloy and potentio-dynamic polarization (PDP) curves.

*Keywords:* AA7xxx alloys, Stress corrosion cracking, Precipitation hardening, Transmission electron microscopy (TEM), AA-7XXX+0.5%Sc.

### Introduction

Aluminium alloys are prominent materials like aerospace, marine, naval and auto mobile applications. Ultra-fine grained (UFG) materials possess superior mechanical properties which have attracted the scientific community in the past few decades. These structured materials offer a significant improvement in strength without compromising ductility and toughness. In specific, AA7xxx series alloys are most recommended light weight aluminium alloy for aerospace applications due to their high specific strength, resistance to various corrosive media, etc. Proper selection of alloying additions and thermo- mechanical processing will be considered as key strengthening factors which facilitate the formation of the desirable compounds and refining

# Evaluation of Thermal Properties of a Plastic Gears Composed of Sugar Bagasse Reinforced with Polyester/ Graphene Blends

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#### Abstract

Currently, bagasse sugarcane, a waste product of the sugar industry, is mainly burned as fuel in sugar mill boilers. The low cost, low density and acceptable mechanical properties of bagasse fibre make it an ideal candidate to be considered for value-added applications such as reinforcement in plastic composites. In this by varying the composition of bagasse sugarcane with graphene as the filler material five specimens are prepared. The Structural deformation, bending stress and strain of gears with different materials are analyzed through ANSYS software. The heat flow rate on the surface of the gear tooth is analyzed with the help of CFD software under dry and wet run condition. The performance of the gears under various speeds and torques are observed in this work.

Keywords: Sugarcane bagasse, Graphene, Ansys, CFD, Heat flow rate, tooths Surface.

### **1.Introduction**

Now-a-days natural fibers such as banana, pineapple, and flax fiber composite materials are replacing the glass and carbon fibers owing to their easy availability and cost. Natural fibers may play an important role in developing biodegradable composites to resolve the current ecological and environmental problems. Natural fibers are lighter and cheaper, but they have low mechanical properties than glass fibers. By use of hybrid fibers may solve this issue. Most of the studies on natural fibers are concerned with single reinforcement. The addition of natural fibers to the glass fiber can make the composite hybrid which is comparatively cheaper and easy to use. Natural fibers are chosen as reinforcement because they can reduce the tool wear when processing, Respiratory irritation and serves as alternatives for artificial fiber composites in the increasing global energy crisis and ecological risks. A fiber reinforced polymer is a composite material consisting of a polymer matrix embedded with high strength fibers, such as glass, aramid and carbon. The major advantages of composite materials are that they have a high ratio of stiffness to weight and strength to weight. A principal advantage of composite materials lies in the ability of the designer to tailor the material properties to the application.

### 2. Literature Review

Barnasree, Kumar, and Bhowmik et. al. [1] were studied wood dust particle reinforced in epoxy based composite for analysis of mechanical behavior. The sundy wood dust particle used as reinforcement and LY 556 epoxy for resin. The six different percentage of filler particle used in study. Tensile and flexural test were carried out using UTM and sample size based on ASTM Standard. The different design parameters like as filler content and speed for loading with tensile and flexural strength using GRA were optimized. Optimization by GRA has the advantage of selecting best and worst options. GRG shows that test run number 13 is the best suited and test run number 3 is the least important. Epoxy composite with 10 filler contents (wt%) at corresponding speed of 1 mm/min shows best performance and on the other hand with 0 filler content (wt%) at the speed of 3 mm/min shows the worst performance.

# Dry sliding wear behaviour of WC-Co coating on Ti6Al4V using Thermal Spray coating technique

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#### Abstract

The titanium alloys are extensively using in defence, aerospace, automobile, chemical plants and biomedical applications due to their very high strength and lightweight properties. The most commonly used titanium alloy is the two phase Ti6Al4V. But, it has poor wear and corrosion resistance when exposed to different environment conditions. In this work, surface coatings were applied on Ti6Al4V substrate using high velocity oxy fuel (HVOF) to improve wear characteristics. The ceramic coating (WC–Co) were deposited on Ti6Al4V substrate with different thicknesses 300µm, 400µm and 500µm.

In the present investigation, hardness of both coated specimens and substrate were found by conducting Vickers hardness test. The cross sectional and surface morphology of substrate and coated system with varying thickness were made using SEM.

Pin-on-disc tests are performed for evaluating sliding wear behaviour of substrate and coated system where the counter disc was made of chrome steel. Wear test was carried out at different sliding distances of 1000m, 2000m, 3000m and 4000m at a constant load of 50N and the disc speed was recorded as 600rpm. The mass loss of substrate material and coated system was measured for all the test conditions to demonstrate the wear behaviour. SEM analysis showed the wear behaviour of coated and uncoated samples. The mass loss of the above test conditions expressed that the coating system found to be better improvement in wear resistance of substrate. However, the thicker coat samples (500µm) shows maximum hardness and highest wear resistance.

Keywords: Ti6Al4V, HVOF, WC-Co, wear, hardness.

### **1.Introduction**

Thermal sprayed coatings are used in a wide range of other applications such as the gas turbine, petroleum, chemical, paper/pulp, automotive and manufacturing industries. Metals, carbides and cermets are the most widely used coating materials. The most familiar thermal spray techniques such as high velocity oxy fuel (HVOF) process and detonation spray (DS) or detonation gun (D-gun) spraying system. Selection of coating material, coating technique and the process parameters is an important factor, which influence the tribological performance.

### 2. Literature Review

Tungsten Carbide with different compositions of Cobalt such as WC–12%Co, WC–20%Co and WC–6%Co coatings were deposited on steel MoCN315M by Y. Wang [1] using D-gun spray and plasma-spray.

Surface coating technology can efficiently and economically improve the properties of metals such as wear resistance, corrosion resistance and high temperature oxidation resistance, etc. [2,3]

M. Magnani et al. [4] fabricated WC–Co coatings on an AA 7050 aluminium alloy using HVOF technology to improve wear resistance. H. Zhang et al. [5] deposited WC–24% Cr3C2–6%Ni coatings by HVOF. They reported that the thermal spray cermet coatings improved wear resistance compared to the substrate material.

#### **REVIEW ARTICLE**



# Biochar from waste biomass as a biocatalyst for biodiesel production: an overview

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#### Abstract

Depletion of fossil fuels resulted in the search for alternative energy sources that are eco-friendly and renewable. Biodiesel had become one of the promising alternative energy sources in the past decade. The conventional biodiesel production cost is very expensive on an industrial scale and becomes the main challenge. To reduce the production cost, the catalyst is considered a promising tool for speeding the biodiesel production rate. In this aspect, many types of research have been conducted by utilizing catalysts produced from various feedstocks for biodiesel production and purification. Recently, biochar was used as a catalyst for biodiesel production. Henceforth, the present review comprises an overview of biochar feedstock, production of biochar via pyrolysis, activation of biochar and process conditions for biochar. Apart from the production of biochar, the main focus of this review is on the biochar-based catalyst for biodiesel production. This biochar-based catalyst will act as a sustainable source of energy by reducing the economy of biodiesel production.

Keywords Activation · Biodiesel · Biochar · Catalyst · Feedstocks

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#### Introduction

Rapid industrialization and an increase in population will result in a rapid increase in energy consumption to 28% from 2015 to 2040. The major source of energy are crude oil, coal and natural gases and these sources are non-renewable sources that are depleting continuously. So, the need for alternative renewable sources of energy is the need of the research in the current scenario. It is expected that the renewable energy source will increase from 24% in the year 2016 to 30% in the year 2022. Among different renewable sources of energy, biodiesel is considered one of the promising alternative sources of energy. Compared to petrodiesel, a conventional source of energy, biodiesel is considered to have many advantages like environmentally friendly, renewable energy, biodegradable and non-toxic (Knothe et al. 2010).

As estimated by Organization for Economic Co-operation and Development (OECD), Food and Nations, 36 billion liters of biodiesel is produced in the year 2017. 37.5% of the total biodiesel was produced by European Union and 19.1% was produced by the United States (US) and these countries are the leading producers of biodiesel in the year 2017. Biodiesel production varies from region to region



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# Effective removal of remazol brillinat orange 3R using a biochar derived from *Ulva reticulata*

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#### ABSTRACT

Marine seaweed is considered as one of the efficient tools for the mitigation of carbon dioxide and it is naturally overgrown in India. Biochar produced from seaweeds will remediate the toxic pollutants present in the soil and wastewater. The current investigation examined the potential of biochar synthesized from Ulva reticulata for the decolorization of Remazol Brilliant Orange 3 R (RBO3R). An up-flow-packed bed column is designed to check the feasibility of the effluent treatment in a real wastewater system. The partition coefficient was calculated to elucidate the optimal initial RBO3R concentration that has the highest affinity toward the biochar and the column operating parameters namely sorbent bed depth, flowrate and the initial RBO3R concentration were also studied. To validate the experimental data mathematical models namely the modified dose-response model (MDR) and Yoon Nelson model (YN) were developed. The results concluded that the removal efficiency of 69.08% and sorption capacity of 0.1046 mmol/g was obtained. The biochar potential has been assessed by conducting three sorptions and an elution cycle continuously using 0.01 M sodium hydroxide as the elutant.

#### **ARTICLE HISTORY**

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#### **KEYWORDS**

Biochar; remazol brilliant orange 3R; packed bed column; modeling; partition coefficient

#### Introduction

Rapid industrialization and increase in population have created many types of contaminants that affect the environment and health of the human. These pollutants created many types of pollution and water pollution is considered as one of the major pollutions that have adverse effects. Water is considered as one of the essential components for the survival of human beings and all industries required water for manufacturing and processing. So, the utilization of water increased and the release of the pollutants to the water also increased. These have become a major concern in recent years and many researchers are focusing on water and wastewater treatment methods (Abdolali et al. 2014). Of all the types of pollutants, dyes are considered as the major pollutant that affects water in huge quantity. Generally, dyes are toxic, carcinogenic and mutagenic agents that are stable and due to their water-soluble properties, their application in industries becoming increasing in recent years. These dyes are commonly used in many industries and the major industries that are utilizing these dyes in huge quantities are textile, tannery, paper, and pulp and paint industries. Of all these industries, textile industries are considered as one of the major industries that were utilizing dyes in huge quantities. The dyes that are used for the coloring in the fabric are not utilized completely and 10% of the total applied

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Original Research

# Treatment of RO Rejects Wastewater by Integrated Coagulation Cum Adsorption Process

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#### Abstract

This research proposed to treat the RO rejected wastewater in a household plant by the integrated treatment system. The possibility of wellhead water treatment by the combined treatment system of coagulation and adsorption for salinity reduction via flexible high recovery RO system was evaluated through analysis of treatment options on a laboratory scale. The naturally available gooseberry seed used as a coagulant in phase-1. It reduced 99.3% of TDS and hardness. It also increases the DO level of RO reject water, at the same time it increases turbidity and color. Turbidity and color removed by surface-modified zeolite in the phase-2. The zeolite material was taken in temperature 400°C as adsorbent of 6 cm column achieved 8NTU in 150 mmin. The 12 cm column was achieved 7.5NTU in 150 mins. Thomas and Thomson modelling well fitted with an experimental study. The regression correlation reached up to 0.942, 0.9810 and 0.984. It is apparent from the recorded SEM patterns study. This study concludes that the coagulation by Goosperry seed produced the highest removal of TDS and hardness and in the adsorption process, with 400°C enhances the surface morphology and porous structure indicates that heating with higher-level temperature enhances the adsorption capacity of the adsorbent material. The highest efficiency is observed in hydrothermal hotness.

Keywords: RO reject, coagulation, adsorption, zeolite, SEM analysis, column regeneration

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# Bi-Directional Causal Analysis using a Novel Coefficient of Causation

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#### Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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**Original Research Article** 

### ABSTRACT

The understanding and computation of both correlation and causation are of prime importance to infer relationships between the variables under consideration. Often made conclusions related to causation are subjective and are likely to vary across space and time. The current research investigation aims to develop a model for computing the causal impact of one variable upon another using a Novel Coefficient of Causation. The proposed coefficient involves computing the inner product of two specially transformed variables between which the coefficient of causation is computed. The variable sets considered for the analysis are the Anscombe's Quartet datasets. It is found that the coefficient well explains the causal behavior between two variables and the same is illustrated through analysis carried out on the standard functions. The proposed model can effectively help in drawing the causal inference objectively. Further, the model also helps in understanding the strength and direction of the causation.

Keywords: Coefficient of causation; bi-directional causal analysis; anscombe's quartet; MATLAB.

### **1. INTRODUCTION**

The saying "correlation is not causation" reminds analysts that even if two variables are correlated, It should not affirm that changes in one variable cause changes in the other. As the relationship could well be coincidental, or a third factor could be causing both variables to change [1]. For example, Lung cancer is considered to be caused by smoking. However, not everyone who smokes will acquire lung cancer as smoking alone is not enough to cause lung cancer. One

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## Towards sustainable biodiesel production by solar intensification of waste cooking oil and engine parameter assessment studies



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#### HIGHLIGHTS

#### GRAPHICAL ABSTRACT

- The viability of trapping solar energy for biodiesel production from waste resource explored
- Solar reactors have high potential for sustainable biodiesel production
- Biodiesel blends exhibit promising engine performance than crude biodiesel
- Increasing biodiesel proportion decreased the delay period
- Smoke opacity of B20 blend significantly reduced in comparison with mineral diesel



#### ARTICLE INFO

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#### ABSTRACT

Renewable energy sources for harnessing biofuels are the viable solution to substitute fossil fuels and reduce production cost. In this study, waste cooking oil was converted into biodiesel via a customized solar reactor. The solar reactor was customized using copper tubes and black surface to trap solar energy for conversion of waste cooking oil into biodiesel. The main experimental parameters studied are temperature (30 to 50 °C), stirring speed (100 to 500 rpm), catalyst loading (0.25 to 1.25 wt%), flow rate (3 to 15 LPH), and methanol to oil ratio (3:1 to 15:1), respectively. The uppermost conversion of 82% was achieved at catalyst load of 0.75 wt%, stirring speed of 300 rpm, flow rate of 3 LPH and methanol/oil ratio of 12:1. Performance of biodiesel blend (D80 + BD20) in CI engine showed a decrease in ignition delay (10.5 deg. CA) and brake thermal efficiency (32.7%) at maximum load (100%). Smoke emission was also decreased with an increase in biodiesel blend at lower brake power, but an increase in brake power increased the smoke emission.

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#### 1. Introduction

With the increasing population and modernization of the transport sector, the demand for fuel is widening. Petroleum-based fuel supplies

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## Research Article

# **Optimization of River Sand with Spent Garnet Sand in Concrete Using RSM and R Programming Packages**

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The main ingredients of concrete are derived from natural resources such as cement, sand, and coarse aggregate. Rapid urbanization leads to the high demand for concrete causing depletion of natural deposits of sand. In this study, the optimized quantities of sand with spent garnet sand are compared in Design Expert's Response Surface Method and R Programming's RStudio packages in terms of predicted and actual compressive and flexural strength at 28 days of curing. Optimization of sand with spent garnet sand at various percentages such as 20, 40, 60, and 80 is proposed. The findings revealed that the correlation coefficient ( $R^2$ ) of 28 days compressive strength is 0.976 and 28 days flexural strength is 0.969 in both software. It indicates that both software can effectively predict and optimize.

#### 1. Introduction

Concrete is used as a main source of material in the construction field. It consists of cement, fine aggregate, coarse aggregate, water, and admixtures if required. In general, concrete consists of 60-75% of all in aggregates [1, 2]. Fine aggregate is a natural deposit depleting at faster rates than its reclamation. There is a huge demand for its suitable alternative meeting the requirements of fine aggregate as per Indian Standards [3–5]. On the other hand, some of the promising fine aggregates used in the research community are marble dust, crushed coconut shell, used foundry sand, spent garnet sand, etc. [6–8]. The use of by-products of marble, garnet, and foundry industries in any form of concrete production reduces erosion, landslides, and other environmental hazards. Garnet is mostly acquired by digging tiny shallow pits, except in a few locations in Tamil Nadu where it is retrieved from the seashore. Mining is done by hand using pick axes and spades. Drilling and blasting are not required since garnet is extracted from soft worn rocks. Fine abrasive garnet is collected during the processing of beach sands. Dredging, both dry and wet, is used to mine beach sand. Individual minerals, including garnet, are separated in heavy upgradation plants and mineral separation plants. At TGI plan, sands containing 26% garnet are advanced to 80%-88% garnet rich concentrate, which is further upgraded

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### Research Article

## **Experimental Investigation on Reactive Orange 16 Removal Using** Waste Biomass of *Ulva prolifera*

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*Ulva prolifera* marine seaweed was tested for its capacity to eliminate reactive orange 16 (RO16) from aqueous solutions. Algae has recently been regarded as one of the most environmental friendly wastewater treatment methods and resources. The batch study used variations in solution pH, sorbent dosage, initial dye concentration, and temperature. The biochar was characterized using Fourier transform infrared (FT-IR) spectroscopy, an elemental analyser, proximate analysis, and a BET analyser. The adsorption mechanism was further investigated using adsorption isotherm and kinetic models. The thermodynamic analysis was performed by varying temperatures at different dye concentrations and calculating thermodynamic parameters such as Gibbs free energy, enthalpy, and entropy. The study was performed to evaluate the sorbent's performance in real-time wastewater treatment, a variety of chemicals, solid-liquid ratios, and regeneration cycles that were used to determine desorption efficiency.

#### 1. Introduction

Dyes are a type of harmful contaminant that has been widely used for a variety of purposes. Paint, paper and pulp, textiles, and plastic sectors all used dyes. Natural and synthetic dyes are the two types of dyes [1]. Natural dyes have a low environmental impact; however, due to the dye availability and demand, synthetic dyes have become more popular. Water stability, binding nature, water fastness, and the development of strong chemical connections between fabric and dye molecules are all properties of synthetic dyes [2]. There are various benefits, including low cost, a variety of hues, and improved qualities of dyed materials. Acid dyes, basic dyes, reactive dyes, direct dyes, disperse dyes, and sulphur dyes are all types of synthetic dyes. Dyes are carcinogenic and nonbiodegradable in general [3]. Dye molecules penetrate the human ecosystem's food chain, causing a variety of health problems. Cancer, kidney failure, lung problems, liver damage, and skin disease are just a few of the devastating conditions that can arise. Due to their improved properties, reactive dyes are the most commonly used dyes.

Reactive dyes are used to print cellulose materials and come in a wide range of hues [4]. According to estimates, around 30% of the dyes used in the printing industry are reactive dyes. Reactive dyes form strong chemical links (covalent bonds) between the fabric and the dye, making it difficult to remove. The presence of aromatic ring structures inside reactive dyes causes this. Furthermore, wastewater from reactive dyeing industries is extremely alkaline, with a pH of more than 10 to 11 [5]. Reactive dyes require sodium carbonate or soda ash for dyeing, and this wastewater is used to wash nearly 10% to 20% of the colours. In the dyeing process, sodium alginate is utilised as a thickener. These alkaline solvents pollute wastewater more and have negative environmental consequences [6].

Membrane filtration, ion exchange, sedimentation, electrocoagulation, reverse osmosis, and phytoremediation are some of the most often utilised treatment methods [7].



## Research Article

# Removal of Reactive Red 120 in a Batch Technique Using Seaweed-Based Biochar: A Response Surface Methodology Approach

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The elimination of Reactive Red 120 (RR120) from synthetic solution using biochar generated from *Ulva prolifera* was investigated. The process parameters sorbent dose (A), pH (B), initial dye concentration (C), and temperatures (D) were optimized using response surface methodology (RSM). To estimate the removal effectiveness of dye with the best 27 trails, the Box-Behnken method (blocked) was utilised. Analysis of variance (ANOVA), main effect plot, interaction plot, and surface plot were used to establish the significance of the model, and the confidence level of the model was set at 95%. To maximise the objective, the RSM optimizer was utilised with a desirability of 1. Furthermore, the batch investigation was supplemented by isotherm models, kinetic models, and thermodynamic analyses to understand the adsorption mechanism.

#### 1. Introduction

Water is the primary source of survival for humans and aquatic life, and it has recently become a big concern. Many chemicals are introduced into water bodies as a result of home and industrial activities, resulting in water pollution [1]. Dyes cause significant water contamination. There are currently about 10,000 different types of dyes available in the industry [2]. Over the last three decades, the use of dyes in the textile, paint, paper and pulp, and leather sectors has steadily increased. Dyes are classified into two types: natural dyes and synthetic dyes. Natural dyes have various drawbacks, including limited availability, dyeing processing time, and expense. Synthetic dyes are created by colouring naturally occurring dyes. Dyes are further subdivided into reactive dyes, acid dyes, and cationic dyes [3]. Reactive dyes have various distinct properties. Reactive dyes will strongly bond to the cloth through the production of covalent bonds, resulting in good colouring over the fabric.

Ion exchange, membrane filtration, sedimentation, electrocoagulation, and chemical precipitation are some of the various treatment methods for separating contaminants from the effluent [4]. These traditional processes are timeconsuming, and the colour treatment costs a lot of money. The adsorption technique is used to eliminate several hazardous contaminants. The key advantage of the adsorption method is that it takes less time and has a lower treatment cost, and regeneration of the sorbent will result in a lower overall treatment cost [5]. Activated carbon is one of the most common sorbents used in industry. Because of the heterogeneous nature of the activated carbon, a wide range of contaminants was absorbed [6]. Many researchers advocated the biosorption approach to solve the shortcomings of activated carbon. Biosorption is a method that uses either live or dead biomass to remove contaminants [7]. Many sorbents derived from waste leaf compost, neem seeds, tamarind seeds, industrial sludge, date seeds, orange peels, powdered nut shell, and rice husk have proven to be effective.



# STRENGTH COMPARISON BETWEEN NORMAL CONCRETE AND SELF HEALING CONCRETE

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### ABSTRACT-

The strength can be defined as the ability to resist force. With-regard to concrete for structural purpose it can be defined as the unit force required to cause rupture concrete is very good material to resist the compressive load to a limit but if the load applied on the concrete is more than their limit of resisting load, it causes the strength reduction of concrete by producing the cracks in the concrete and the treatment of the cracks in very expensive.

*Key Words*: Concrete, Microstructure, Mineral, Polymer, Autonomic Self Healing

### **1. INTRODUCTION-**

Normal cement concrete has clearly emerged as the material of choice for the construction in the world today. This is mainly due to low cost of materials and construction for concrete structure as well as low cost of maintenance. Therefore, much advancement of concrete technology has occurred depending on the speed of construction, the strength of concrete, the durability of concrete and the environmental friendliness of industrial material like, fly ash, blast furnace slag, silica fume etc.

### 2. OBJECTIVES-

To develop and observe the strength comparison of self healing concrete with normal concrete

- To Develop efficient self-healing techniques for bending cracks in concrete
- To heal cracks by bacterial precipitation.
- To investigate the effect of bacillus species bacteria in gaining strength.
- Enhancing the durability and compressive strength of concrete.

### 3. METHODOLOGY-

### **3.1 MATERIALS & METHODS**

Self-healing concrete is one of the modern smart concretes, which can heal the cracks formed in it by itself

- 1. Chemical encapsulation.
- 2. Bacterial encapsulation.
- 3. Mineral admixtures.
- 4. Chemical in glass tubing

5. Self healing with self controlled tight crack width

3.2 MECHANICAL AND PHYSICAL PROPERTIES OF SELF HEALING CONCRETE



## SOIL STABILIZATION USING INDUSTRIAL WASTE

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#### **ABSTRACT:**

Due to rapid increase in urbanization, the lands are required essentially. The role of land in developments is very important. For the development of any country or nations sufficient land should be available, but the land resources are limited. Some of them are suitable for structures or buildings, but there are some land resources which are not suitable for structures for example soft soil. Soft soils have low bearing capacity. Due to this reason, it is not suitable for structures. The bearing capacity of soft soil can be maximize are increased with the help of some industrial wastes and by using some methods. Soils are made stronger and more durable by mixing additive materials. In particular, the use of waste provides environmental and economic advantages for this case. Wastes form in large quantities, however, which create storage problems. The main objectives of the soil stabilization is to increase the bearing capacity of the clay soil, it's resistance to weathering process and soil permeability.IS: 10500-2012..

**Key words:** Black cotton, soil stabilization, bagasse ash unconfined compressive strenth test, standard proctor testr.

#### **1. INTRODUCTION:**

Improvement of physical, hydraulic, mechanical and chemical properties of poor soil is called soil stabilization. India produces an enormous amount of different types of waste materials as byproducts from different sectors like industrial, agricultural, etc. These waste materials if not deposited safely it may be hazardous. The amount and type of waste generated increases with increase in population. These wastes remain in the environment for longer duration since it is unused. Waste materials such as industrial waste sand, rice husk, wheat husk offer a cheaper method for stabilizing marginal soils. As an added benefit, utilizing waste materials in soil stabilization applications keeps these materials from being dumped into Landfills, thereby saving already depleting landfill space. In many set of circumstances, road service layers, foundation layers and construction material cannot utilize the soil directly. The rising cost of the land and huge demand for high rise buildings makes the improvement of soil at a site unavoidable. Therefore, it is required to revamp the quality of the soil. The expansive soil used in this research also known as black cotton soil.

**OBJECTIVES**: The main objectives of conducting this study include:

- The main objective of the study is to enhance the quality of the soil using the rice husk ash and sugarcane straw waste.
- Addition of such material will enhance both physicals well as chemical properties of the soil. This research undertakes the use of agricultural waste in stabilizing black cotton soil, various attempts have been made to improve the strength of soil using different chemical



### **Experimental Investigation On Design Of Flexible Pavement**

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#### ABSTRACT-

Pavements are required for the smooth, safe and systematic passage of traffic. Pavements are generally classified as flexible and rigid pavements. Flexible pavements are those which have low flexural strength and are flexible in their structural action under loads. Rigid pavements are those which possess note worthy flexural strength and flexural rigidity.

The profound development in automobile technology has resulted in heavy moving loads on the existing highways for optimization of the transport cost. In the project report, an attempt is made to design a road near Sontyam, based on the principles of pavement design. On the existing alignment of the road, soil samples are collected for determination of soil characteristics like the consistency limits, sieve analysis, C.B.R. values etc.., Based on this the thickness of the pavement (flexible) is designed. The alignment of the road is also designed and fixed by surveying and leveling. The total road length being 497 meters of which, one section is 247m, other is 200m and the third section is 50m.

*Key Words*: Flexible Pavement, Bitumen, Base course, Wearing course, Highway

#### **1. INTRODUCTION-**

For economic and efficient construction of highways, correct design of the thickness of pavements for different conditions of traffic and sub-grades is essential. The science of pavement design is relatively new. In India, previously road crust was designed on some rational data but more on the experience of the road engineer.

Some arbitrary thicknesses of the pavements were used which lead to costly failures and wastage as in some cases, the thickness of pavements was insufficient and in the other cases expensive. As there are no proper design criteria, the construction of roads was more or less uneconomical in almost all cases. Hence judicious method of designing and calculating the crust thickness on the basis of estimation of traffic loads and bearing capacity of etc... will lead sub-grade to economical construction of roads.

#### 2. OBJECTIVES-

• The surface of a pavement should be stable and non-yielding, to allow the heavy wheel loads of the



# Design and Analysis of Swasthik Antenna Array for Wireless Applications

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#### **ABSTRACT:**

In this paper a Rectangular Microstrip patch antenna is designed for multiband operations using low-cost substrate material  $FR_4$ . The proposed antenna is simulated using ANSYS HFSS (High frequency structure simulator). The proposed antenna consists of Swasthik shaped EBG cells on the on the ground plane of rectangular MPA.The antenna operates at frequency range 11 to 18GHz with two notch bands and enhanced gain of 7.21db. The swasthik EBG cells modified to get improvement in results than the rectangular MPA.This antenna finds applications in WLAN,Ku Band,K Band, and other wireless communication applications.

**KEYWORDS:** Rectangular Microstrip patch antenna, HFSS (High frequency structure simulator), EBG (Electromagnetic Band Gap), WLAN

#### I. INRODUCTION:

Antenna is very important component of communication system. An antenna is transducer which converts the electric signal into electromagnetic wave and vice versa. A Microstrip patch antenna consists of a radiating patch on one side of a dielectric substrate and a ground plane on the other side. So, the design of the patch and substrate directly affects the antenna results. Recently, several techniques have been proposed for overcoming the problem of surface waves. One of the effective methods which suits for the millimeter structures is to use photonic band gap structures.

Using photonic band gap structures has become attractive for engineers and researchers working on antennas, electromagnetic and microwaves. These substrates contain so called Photonic Crystals. Also known as electromagnetic bandgap (EBG) structures and electromagnetic band-gap materials (EBMs) are a class of periodic metallic, dielectric, or composite structures that exhibit a forbidden band, or band gap, of frequencies in which wave's incident at various directions destructively interfere and thus are unable to propagate. On the other hand, the EBG structures also reflect a part of the energy that circulate along the substrate of the antenna, thus acting as reflecting walls across the antenna and thereby the cavity effect. With elite rows of EBG structures, minus energy is reflected, and the parasitic effect becomes prevailing.

This contributes to the significant enhancement in the bandwidths. The 2-D EBG surfaces, have the advantages of low profile, light weight, and low fabrication cost, and are widely considered in antenna engineering. Two popular kind of 2-D EBG are mushroom-like EBG surface and uniplanar EBG surface. An important feature in the uniplanar EBG design is the removal of vertical vias. Thus, it simplifies the fabrication process and is compatible with microwave and millimeter wave circuits. There are several configurations of EBG structures according to their application in antenna. In this paper, an Electromagnetic Band Gap periodic structure is used which swasthik is shape in the ground plane of the microstrip patch antenna. From the experimental results characteristics such as the bandwidth, gain of the antenna are improved by adding the Electromagnetic Band Gap structure on the ground plane.

#### ANTENNA GEOMETRY

The geometry and the design steps of Microstrip patch antenna are described below a substrate is created with dimensions of 40 mm X

# Smart Security System Using RFID and Camera Module for Home and Office

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*Abstract*: In this modern world, everyone wants their belongings to be safe and secure. People want to monitor their homes even when they are away from the place where they are. They want to monitor the home environment being miles away. So this system is proposed for all these purposes. There are many systems in the past that provide each of these features individually. In this paper, the proposed system can monitor the home and can provide immediate updates on whatever is happening. It perfectly distinguishes authorized and unauthorized persons and provides alerts not only by buzzer but also provides captured images of that person too. In addition to this, it alerts in case of fire and gas and also reduces the consumption of power by controlling lights.

It distinguishes the authorized using RFID module and if any unauthorized entry is spotted. It sends an alert to the owner with attached pictures. So, the probability of false alarms will be reduced. If anyone manages to enter the home by breaking the windows or doors and if such events are spotted by using vibration sensors, the owner will be intimated with the captured images using a camera (ESP32) and GSM module. It alerts in case of fire or gas which will be detected by fire (Flame sensor) and MQ6 gas sensor. It ensures enhanced protection by integrating all these features into a single project.

Keywords: RFID, Vibration sensors, Camera Module (ESP32), GSM Module, Flame sensor, MQ6 gas sensor.

### I. INTRODUCTION

There is a high demand for security and safety devices nowadays. They are required to ensure safety and security in our homes and office. Security and safety are provided to ensure that the homes and offices do not become easy targets for burglars and intruders [1]. Doors and windows that are not locked and that are inadequately secured can provide easy access to our homes. Most intruders enter through unlocked doors. In this busy world, people have no time to secure their belongings. Hence, smart devices are needed to secure their homes. In recent years, most fire accidents occur due to gas leakage where a gas leakage problem turns into a huge fire accident [2,3].

The need for securing homes exists since ancient days. Techniques for protecting the households are door locks, barred windows. etc. Nowadays, security systems are all automated which can detect undesired situations occurring at home while the owners are being away. Advancements in

Technology made these security systems precise and more effective. The invention of electronic components like sensors, Arduino. etc. paved the way for the new era of security systems.

"Intelligent Alarm System to Protect Small, Valuable Items" an intelligent alarm system was proposed [4] to protect small and valuable items; like jewellery and other expensive, small size properties. The system utilizes machine learning techniques to intelligently detect threats, based on the environment data collected by different sensors and Arduino microcontroller, and then notify the owner by email message on a real-time basis. When received on the mobile phone, the email activates a unique notification alarm, so the user knows immediately about the threat.

In [5] proposed "RFID Smart card door lock". They designed a security system that provides access to the authorized individuals to enter. They installed a security system that included a door locking system that used passive RFID to activate, verify, and authorize the user and at the same time open the door for secure access.

Smart digital door lock for the Home Automation" was proposed in [8] A smart digital door lock system for home automation. A digital door lock system is equipment that uses digital information such as a secret code, semi-conductors, smart cards, and fingerprints as the method for authentication instead of the legacy key system. In this proposed system, a ZigBee module is embedded in a digital door lock and the door lock acts as a central main controller of the overall home automation system. Technically, the proposed system is a network of sensor nodes with a digital door lock as a base station.

In [10] a system was proposed which is controlled by an Arduino Uno microcontroller centrally. The microcontroller detects the output of Radio Frequency Identification (RFID), keypad 4x4, limit switch, Light Dependent Resistance (LDR) and Passive Infra-Red (PIR) for security of the door. The microcontroller will give a response when it detects the output from the sensors.

A response given by the microcontroller will control the Solenoid, Buzzer, Liquid Crystal Display (LCD) display, and lamp. The door will open if the data/password of RFID and Keypad 4x4 are appropriate. The buzzer will turn on when the limit switch detects an open door without using RFID and Keypad. The lamp will turn on automatically if conditions are dark and there is human movement in the room. The measurement uses a PIR sensor to detect the motion and LDR to measure the light condition.

In this paper section II shows the operation and drawbacks of the existing system. Section III explains the implementation of the proposed security system. The results of the proposed security system are discussed in Section IV followed by the conclusion and future scope.

## **Automatic Temperature Detectionfor Safety Entrance**

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**Abstract**—Covid-19 has made a huge impact on the society. The new restriction has been imposed regarding entrances of multiple people in various places include schools, colleges, hospitals, offices, shopping malls etc., To stop the spreading of infection, social distancing and thermal screening are being adapted everywhere. The thermal screening is currently being done manually and there is a huge chance of errors in human temperature detection. Moreover, thermal screening requires human intervention. Taking these into considerations this project is developed for safety entrance based on human temperature detection. In this entrance system the temperature of a person is checked at the entrance without human intervention, hence everything can be done automatically.

Keywords: ESP32, IR Sensor, OLED Display, Buzzer, MLX90614 (Contactless Temperature Sensor), Servo motor

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#### I. INTRODUCTION

Since, Covid -19 pandemic is considered as the most critical worldwide well being disaster of the century and the best test that the man kind has gone through after second world war. The side effect of disease are fever and body pains.

Since December 2019 we have gone through many changes in our lives. The quantity of patients for most part was expanding step by step enormously. So, by watching this condition and by remembering all the rules we made some set ups like contact less sanitization and bodytemperature detector. It was programmed by non-contact waterless 70% alcohol based sanitized container showing that so by watching this extremely momentum condition and by remembering all these rules we made some investigated deal with contactless sanitization & body temperature detector identify gadget. The disease can spread even from the air infected with the virus. The disease was found in Wuhan, China with some confirmed cases and several deaths and later they are found in various places of China. This gives the clear idea the disease can easily spread from one place to another easily.

#### **II. OBECTIVE**

The main aim of this entrance system is to avoid the human involved intervention for checking the temperature of people at various places. The main theme of our project refers to embedded system technology that includes IOT in this entrance system by using contactless temperature sensor (MLX90614) the temperature of human is measured. This measured value is checked with the fixed threshold value, if the measured value is less than the threshold value is allowed inside. Otherwise that person is restricted by closing the door and pointing person with a buzzer indication. Here everything is done automatically by using internet by the user. In addition to this the count of predefined persons can only be allowed.

#### III. LITERATURE SURVEY

1. Here we have taken the some of the existing systems for measuring the temperature of a person without any contact they include "RFID based Contactless body temperature screening using Arduino MLX90614 IR temperature sensor"[1]. Here the process include when a person scans his RFID card and EM18 RFID Reader sends the data to the microcontroller Arduino Uno is using UART communication. Now the temperature of the person is measured using a non-contact infrared thermometer using the MLX90614 sensor. The temperature is measured one only when the person is less than 25 cm from the thermometer &ultrasonic sensor is used for this purpose. This temperature is noted against the name is read through RFID reader directly to an excel sheet. This is also an attendance system which stores the temperature of each and every person. As

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# **Visitor System using Public Announcement**

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Abstract-This proposed system completely describes the voice announcement system and parent verification for the safety of the students. In this model each and every student must store their roll number with their parents or guardian's mobile number. This proposed system takes Roll Number of student from the user and the system access the parent's authorized phone number automatically from the data base, the entire system is placed in the office room or the reception. When the parents enter student roll number the system gets the corresponding phone number and sends an OTP through App and requests parent to enter OTP. If the entered OTP is correct then the system will send a notification to authority and based on the response from authority it will send a voice notification to the students. In the proposed system two level securities with OTP matching from parent along with authority permission are provided.

Keywords-One Time Password (OTP), Light Emitting Diodes (LEDs), Liquid Crystal Display (LCD).

#### I. INTRODUCTION

It is very Important strand in maintaining discipline among Employee/Student in an organization and imparting quality education in schools, colleges and if someone drifts from required standards proper action can be taken. Thus, introducing an important step in taking proper precautions from hostile visitors. A Conventional way of visitor meeting a student or professor in schools/colleges is by calling his/her respective name via office clerk with the help of messenger handing over a receipt of the student's REGD number, and the student meet their visitor. Same process is with professors or an office employee in other organizations.

Under certain circumstances we see that we seem to put the student, professor or an employee in the harm's way, since no authentic biometric data is recorded and the details provided might not be real. Keeping in mind, with respect to above problems we shall now introduce a simple yet reliable method of visitor meeting their guest in school/college/office ensuring there is no discrepancy in the meet.

#### **II. LITERATURE SURVEY**

#### A. Previous System and Its Demerits

The Primitive way of conducting visitor meet was via receptionist calling a clerk to writing over a piece of paper of the student to be called and in that way the clerk goes over the classroom and calls the student.

The Demerits due to the above is as follows:

- Extensive Paper work like maintaining registers and consuming huge space for the registers.
- High human efforts like walking around the campus just to pass a message.
- No proper data is stored permanently and the data is not relied.
- The visitor might also be hostile.

#### **B.Proposed Method**

- Covering the Demerits, the project will not only remove the above demerits but also increases the ease of work flow making fewer human efforts and complexity.
- Introducing VISITORSYSTEM USINGPUBLIC ANNOUNCEMENT. In this the visitor biometric is saved as well as the data is stored, where the storage complexity is not present.
- In this regard we use Hardware and software sections.
- Therefore Extensive paper work is reduced as we are using web servers to store data. Human effort is reduced and also data is stored.
- The student is then called via speakers. Then the respective student goes to thereception.



# Various Full Adder based 32-Bit Wallace Tree Encoder

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*Abstract*: Now a days in Analog to Digital conversion using, an analog to digital converter (ADC), converts any analog signal into quantifiable data, which makes it easier to process and store, as well as more accurate and reliable by minimizing errors. Wallace tree encoder plays a crucial role and it based on converting thermometer code into binary code in ADC. In this project we design 32-bit Wallace tree encoders with Various Full Adder Techniques like CMOS, Pass Transistor Logic (PTL), Hybrid technique, Gate Diffusion Input (GDI) and Proposed Modified Gate Diffusion Input (M-GDI) Technique. The proposed MGDI technique provide Less Delay, Less Power Consumption, Better Power Delay Product and a smaller number of transistors compared to existing techniques. The proposed designs are designed and simulated using Mentor Graphics Tool with 90nm CMOS technology.

#### Keywords: ADC, Wallace tree encoder, CMOS, PTL, GDI, MGDI, Hybrid

#### I. INTRODUCTION

Speed, power dissipation and area are very important parameters of any VLSI based systems. Data conversion circuit plays an important role in high-rate data communications. Analog to Digital Converter (ADC) is an electronic integrated circuit used to convert the analog signals such as voltages to digital or binary form consisting of 1s and 0s. Most of the ADCs take a voltage input as 0 to 10V, -5V to +5V, etc., and correspondingly produces digital output as some sort of a binary number.

In analog to digital conversion process, Wallace tree encoder is utilized in the process of converting the thermometer code to binary. This can be termed to be a high-speed application and a flash type of flash ADC, which is a resistor ladder, encoder and comparator circuit. In electronics, an analog-to-digital converter (ADC, A/D, or A-to-D) is a system that converts an analog signal, such as a sound picked up by a microphone or light entering a digital camera, into a digital signal.

#### II. LITERATURE SURVEY

Yamini Shanmugam, Gopika Sundari P B, Rithika S and Sanjeev V (2021) proposed an "Comparative Analysis of Low Power Wallace Tree Encoder with Modified Full Adders". They designed a 16-bit low power Wallace tree encoder with modified full adders. Wallace tree encoder consumes more power so, by constructing low power, high performance Wallace tree encoder using PTL resistor ladder logic with modified full adders, the power can be conserved. To design this Wallace tree encoder, they used different types of full adders. The proposed design will be designed and simulated using Tanner EDA V16 tool. The proposed system aims in reducing the number of transistors to get better power efficiency and delay comparator. It has the advantage of correcting bubble error without the need of an extra bubble error correcting block. The proposed Wallace tree encoders are compared with other encoders using full adder. The results show that power consumption, delay and the power transistor count delay will be calculated. Finally, they are selected 16-bit low power Wallace tree encoder with modified full adders to improve high performance [1].

J.M. Mathana, R. Dhanagopal, R. Menaka (2020) proposed an "VLSI Architecture for High Performance Wallace Tree encoder". In the research, the VLSI architecture design for Wallace tree encoder with modified full adder is proposed. In the proposed work, a low power Wallace tree encoder is designed using only pass transistor logic (PTL) full adder. The circuit is designed using CADENCE 5.1.0 EDA equipped and simulated with the application of spectre virtuoso [2].

Rajkumar Sarma and Veerati Raju (2012) proposed as "Design and Performance Analysis of Hybrid Adders for High-Speed Arithmetic Circuit". In this research, a hybrid full adder is designed and analysis the performance for high-speed arithmetic circuit. In this paper, they proposed Gate diffusion technique (GDI) & PTL-GDI technique. Only 10 transistors are used to implement the SUM & CARRY function for both the designs. The SUM and CARRY cell are implemented in a cascaded way. By comparing both the techniques of adders the power delay product and power consumption will be observed. The significance of these designs is substantiated by the simulation results obtained from Cadence Virtuoso 180nm environment [3].

# **IOT Based Industrial Automation**

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Abstract- Internet of things (IOT) has made great impact in industries. IOT is a technology that helps us to control the physical devices through internet which is used to reduce the human effort. As India is developing country there are many manufacturing companies. But the major issue in the industries was industrial accidents. But the major issue due to industries was industrial accidents which causes the human and profit loss. To reduce this problem this project is introduced which helps to control and monitor all the industrial parameters, for this purpose we are using different sensors such as fire, gas, mems, humidity and temperature sensors. Along with this alerting system for workers and surrounding peoples there is a voice module and buzzer and light indication which gives them voice and sound alerts that something wrong happening in the industry. And addition of this software was using for live monitoring termed as blynk software which is familiar to the mobile and web dashboard

Keywords- IOT, fire sensor, gas sensor, temperature and humidity sensor, mems sensor

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#### I. INTRODUCTION

Now a days, the industries require more manual power to monitor and control the parameters in industries like temperature, fire, gas, etc. with the help of single microcontroller and LCD displays. To sense the various parameters the different sensors are aroused in the industry. Here there is no sensing devices in the industry at the time of emergency, it leads to a harmful situation, so, in this project different sensors and alert systems is used under the concept of automation control which is reduce the high manpower necessity, so in this automation method all parameters are sensed by the microcontroller. The issue is displayed on the LCD and immediately the voice alert is comes from the speakers for the inside workers alerting purpose. The light Indication is for surrounding people alerting.

#### **II. OBECTIVE**

The main aim of this project is to reduce the industrial deaths and avoid the human effort. The main theme of the project using domain of embedded systems technology that includes IOT in the industries by using different sensors like gas, fire, mems, temperature and humidity sensors to monitor the various parameters. Here relay acts as a kill switch which is activated when things go out of hands. Here voice module, light indication is for the workers and surrounding people alerting and take precautions accordingly along with this we are using Blynk software for live monitoring purpose.

#### III. LITERATURE SURVEY

By the case study of LG polymers gas leakage taking, it as an example we implemented this concept as a project of "IOT based industrial automation" Here we have taken the some of the IEEE existing base papers for Here we are have taken the some existing systems for monitoring industrial parameters they include "Internet of Things in Industries: A Survey". In this paper they summarize the current state-of-art of IOT in industries systematically. They tracking and identifies the key enabling technologies involved in IOT include RFID systems, barcode, and intelligent sensors. A simple RFID system is composed of an RFID reader and an RFID tag. Because of its ability to identify, trace, and track devices and physical objects, the RFID system is increasingly being used in industries such as logistics, supply chain management, and healthcare service monitoring [1].

Another paper was "integration of wireless sensor network services into other home and industrial networks" in this they discussed about the need and how to integrate wireless sensor networks into other existing IP-based networks. Using the 6LoWPAN it is possible to connect a wireless sensor network with the



# Analysis of Slotted Patch Fractal Antenna with DGS for Multiband Applications

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Abstract In this paper the model of Slotted Patch Antenna for Multi Band is developed and analyzed using Defected Ground Structure. This is proposed after designing and simulating using ANSYS High frequency structure simulator (HFSS) software packages based on Finite Element Method (FEM). The proposed antenna consisting of four fractal 'H'-shaped cells applied at the top of the circular patch and the cross section of ground in the structure is reduced with the insertion of circular split ring resonator (CSRR) slots. The performance of the antenna is evaluated using HFSS simulator. The substrate used for the design is ROGER R04003. Therefore, these parametric studies and optimization focus on the enhancement of Gain, Directivity.

Keywords — Slotted Patch Antenna, Fractal Cell, CSRR Slots, Defected Ground Structure, HFSS,

### I. INTRODUCTION

There are number of techniques which have been reported for enhancing the parameters of conventional microstrip antennas, that is, using stacking, different feeding techniques, Frequency Selective Surfaces (FSS), Electromagnetic Band Gap (EBG), Photonic Band Gap Metamaterial<sup>[2]</sup>, and so forth. (PBG), Microwave component with Defected Ground Structure (DGS) has been gained popularity among all the techniques reported for enhancing the parameters due to its simple structural design. Etched slots or defects on the ground plane of microstrip circuits are referred to as Defected Ground Structure. Single or multiple defects on the ground plane may be considered as DGS. Initially DGS was reported for filters underneath the microstrip line. DGS has been used underneath the microstrip line to achieve band-stop characteristics and to suppress higher mode harmonics and mutual coupling. After successful implementation of DGS in the field of filters, now a days DGS<sup>[1]</sup> is in demand extensively for various applications. This paper presents the evolution and development of DGS. The basic concepts, working principles, and equivalent models of different shapes of DGS are presented<sup>[4]</sup>. DGS has been used in the field of microstrip antennas for enhancing the bandwidth and gain of microstrip antenna and to suppress the higher mode harmonics, mutual coupling between adjacent element, and cross-polarization for improving the radiation characteristics of the microstrip antenna. Applications of DGS in microwave technology are

summarized in this paper and the applications of DGS in the field of antennas are discussed. Low cost, high performance, compact size, wide band, and low-profile antennas often meet the stringent requirements of modern wireless communication systems. Modern communication demands the availability of efficient, compact, and portable devices that can be operated at high data-rates and at low signal power.

In this paper the performance of slotted patch antenna analyzed to investigate in terms of bandwidth, gain, radiation pattern and antenna structure was built on ROGERS R04003 substrate. The relative permittivity of 3.55 and thickness of 0.81mm. The dimensions of the proposed antenna is made of four fractal cells at the top and the ground plane with four CSRR slots.

### **II.** ANTENNA GEOMETRY

For this antenna design the substrate used is ROGER R04003 with a relative permittivity 3.55. The dimension of the substrate are 24mm x 37.5mm x 0.81mm shown in fig.

PARAMETER	DMENSON(mm)
Π,	я
W:	+
R,	5
L	375
L.	N
L,	1
L	12

# AGRICULTURAL ROVER BASED ON SOLAR POWER

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*Abstract*: In the field of agriculture various problems are faced by farmers in the operations like seed sowing, pesticide spraying, weeding. It takes a lot of time to perform all these tasks and also need different devices to perform these tasks. Thus "Agricultural Rover Based On SolarPower" is designed to execute the various functions simultaneously. The main aim of this paper is increasing the productivity and reducing the man power involved in Agriculture, the agricultural rover starts its function by ploughing the field, then sows the seeds in the ploughed area, waters the area where the seeds were sown and also cuts the weed. The functioning of the rover can be operated through Bluetooth.

#### Keywords: Arduino UNO, Solar Panel, Bluetooth Module, Relay Module, Motor Driver Circuit, Battery.

#### **INTRODUCTION**

Our whole economy is based on agriculture. So, it is necessary to make some advancement in this field. Today's agricultural field demands to find new ways of agricultural operation to improve performance efficiency. In the field of agriculture various problems are faced by the farmers in the operations like ploughing, seed sowing, and pesticide spraying, watering, and weeding. Also the equipment used to perform these operations are very heavy.

Nowadays robots are used in various sectors. We can make the use of available technologies and the robotics technology in the farming system to reduce the efforts of farmersand also to reduce time, energy and required cost. Hence, there is a greater need for multiplecropping in the farms and time saving machines. This project helps in different types of seed sowing machines. Watering, ploughing and also cutting the unwanted weed will be done by this project which will be helpful for the agriculture industry to move towards mechanization.

#### **OBJECTIVE**

By observing all the above point into considerations, thus agricultural rover machineis designed which can do complete agriculture work automatically without manpower requirement and which is tractor independent. Since the aim of the project is to create an ecofriendly machine. This implements simple mechanism which is operated by the microcontroller. Since there is no requirement of tractor so cost of production is also reduces. Since the machine cannot use any fuel, it cannot cause any pollution thus ecofriendly. This machine can revolutionize the present dayagriculture. Further many more modifications which completely automate the whole agriculture work and the machine simply work like a rover.

#### LITERATURE REVIEW

The main objective of autonomous agribot is efficient utilization of resources and to reduce labor work. It can perform various tasks like soil testing, sowing of seeds, spraying of fertilizers and harvesting of fruits. It can measure the NPK content of soil using color testing of chemical solution using fiber optic and dispense the required amount of fertilizers which is necessary or less in soil. It can dig a hole in soil by drilling mechanisms and plants seed and cover hole by soil again. It can spray the pesticides using spraying mechanisms. All above operations are performed by usingArduino controller which is master and others are lily pad which are slaves performs specific operation. By using image processing and robotic arm the agribot will detect fruits on treeand cut the fruit and dump it on basket. [1]

Agribot is a robot designed for agricultural purposes. It is designed to minimize the labor of farmers in addition to increasing the speed and accuracy of the work. It performs the elementary functions involved in farming i.e. ploughing the field, sowing of seeds and covering the seeds with soil. It uses controller, LM293D IC is a typical Motor Driver IC which allows the DC motor to drive on any direction, DC motor for digging. The robot is autonomous and provides the facility for optional switching of the ploughing system when required. PSoC (Programmable System on Chip) controller from Cypress Semiconductor, USA is used to control the robot. [2]

Mango cultivation methods being adopted currently are ineffective and low productive despite consuming huge man power. Advancements in robust unmanned aerial vehicles (UAV's), high sp d image processing algorithms and machine vision techniques, reinforce the possibility of transforming agricultural scenario to modernity within prevailing time and energy constraints. Present paper introduces Agricultural Aid for Mango cutting (AAM), a Agribot that could be employed for precision mango farming. It is a quadcopter empowered withvision and cutter systems complemented with necessary ancillaries. It could have

# SMART CART WITH AUTOMATED BILLING

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*Abstract*: Now a days shopping is one of the most fascinating and alluring things. At the very same time, it involves getting tired due to standing in a long queue for the bill and payment process. At billing counter, they get confused while comparing the total price of all the products with the budget in the pocket before billing. To overcome these problems, we have designed a Smart Cart using an Arduino. Each shopping cart is implemented with a Product Identification Device (PID) that contains a microcontroller, an LCD, LDR Module, RFID reader, Bluetooth module and Push buttons. Here each item consists of a RFID tag and each item is scanned with the help of RFID reader before dropping into the cart. There is a chance to revert the product depending on our need and budget. This can be done by using a push button. If the item is not scanned and is dropped into the cart, an alert is given through the buzzer. This is done with the help of LDR module and Laser diode. The total bill and the number of items will be displayed on the LCD once we are done with shopping and the total bill will be sent to the android device with the help of the Bluetooth module.

Keywords: Arduino Uno, Rfid reader, Rfid tags, Bluetooth module, LCD, Laser, Buzzer, pushbutton.

1.

#### INTRODUCTION

In this era of multiplexes and malls, we face huge rush and crowd while we go for shopping. The purpose of this innovation is to improve upon the conventional method of shopping by making it simple and fast. People generally spend most of their time in shopping. So, we need to make this process of shopping simpler and more efficient.

The purpose of supermarket is to provide availability of all products and save the time of the customers who are getting frustrated while waiting in the queue at the billing counter and sometimes they get confused while comparing the total prices of all the products with the budget in the pockets before billing. Sometimes, even the products in the cart or trolley gets misplaced while scanning, the products might get scanned several times at the billing counter. While shopping, cart plays an important role to carry all the items. After selecting all the items, we go to the billing counter and have to wait in long queue for our turn. So, to overcome this problem we designed this product.

This product is based on Embedded System Design. It uses an RFID-RC522 Module to read the products in the supermarket. The module is interfaced with Arduino-UNO. The LCD displays the total amount and total number of products. The receipt of the total bill is directly sent to the Android device through the Bluetooth module HC-05. II.

#### **II. LITERATURE SURVEY**

Developing a 'Multitasking Shopping Trolley Based on RFID Technology RFID (radiofrequency identification) International Journal of Soft Computing and Engineering, Vol.3, No.6, pp.179-183.2014[1] technology offers the ability to provide many new services and conveniences in the retail environment. RFID tags, or simply "tags", are small transponders that respond to queries from a reader by wirelessly transmitting a serial number or similar identifier. RFID is the special type wireless card which has inbuilt the embedded chip along with loop antenna. The inbuilt embedded chip represents the 12-digit card number. RFID reader is the circuit which generates 125KHZ magnetic signal. This magnetic signal is transmitted by the loop antenna connected along with this circuit which is used to read the RFID card number. RFID reader is interfaced with microcontroller. Here the microcontroller is the flash type reprogrammable microcontroller in which we already programmed with card number. The microcontroller is interfaced with keypad.

S.Sojitral and RG Patel, "A Review of Smart Shopping Systems", International Research Journal of Engineering and Technology,(Vol. 3, No.5, pp. 2561-2563, 2016) [2] The idea is to decode the QR codes, thereby launching a URL in the web browser. This is because in today's retail environment, products come with label tags for unique identification and theft protection. This in turn gives rise to in-store marketing and access to information. The impact of IoT comes in the case of mobile payment where by enabling NFC, one may get access to systems and virtual wallets. Components like microcontroller, an RFID reader, EEPROM, LCD and ZigBee module, is designed with a Product Identification Device (PID). RFID reader enables reading product information associated with the product being purchased. Meanwhile, EEPROM stores the product information attached to it and the data is sent to Central System for billing via ZigBee module. Central system gets access to information like the cart and EEPROM data, thereby allowing easy calculation of payment amount. trolley equipped with NFC reader display is suggested to maintain running total. In addition to this, use of IoT to connect all trolleys with the central server and providing provision of online payment would add more positivity to shopping experience suggested.

Smart trolley billing system using Arduino by Sridhar Mahad International Research Journal of Engineering and Technology, (Vol. 2, No.5, pp. 1562-2583, 2016) [3] the concept is designed into a smaller version of the automated self-checkout system on a shopping trolley with a user interface screen which allows customers to make payment for items scanned and placed

# Power and Delay Optimization of 8-Bit ALU using Various Techniques

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*Abstract:* The Arithmetic Logic Unit (ALU) is used in many applications such as Digital image processing, microprocessors and Digital Signal Processing. In this paper we designed the 8bit ALU by using various Techniques like CMOS, TG (Transmission Gate), GDI (Gate Diffusion Input), M-GDI (Modified Gate Diffusion Input), FS- GDI (Full Swing Gate Diffusion Input) Techniques and compare the power, delay and power delay product of 8-bit ALU by using the mentor graphics tool with 90nm CMOS technology with the minimum supply voltage of 1.2V and frequency of 125Mhz.

# Keywords: CMOS, Transmission gates (TG), Gate Diffusion Input (GDI), Modified Gate Diffusion Input (M-GDI), Full Swing Gate Diffusion Input (FS-GDI).

#### I. INTRODUCTION

An Arithmetic Logic Unit (ALU) is brain of the Central Processing Unit (CPU), which accomplish Arithmetic functions like addition, subtraction, multiplication, division and logical functions like AND, OR, XOR etc. To design an ALU full adder plays an important role which performs arithmetic operations. If there is any change in full adder then there is automatic improvement in the ALU. Power consumption and Delay are the major issues in electronics industry which triggered research efforts to reduce the Power consumption and Delay of the VLSI circuits, there is only a limited amount of power available for portable electronic devices widely used on daily basis, these electronic devices are high speed low power VLSI circuits works simultaneously. Gate Diffusion Input Techniques (GDI, M-GDI, and FS-GDI) was introduced a promising alternative to static CMOS logic and Transmission Gate logic. GDI Techniques reduces transistors count, Power and Delay issues of VLSI circuits.

#### **II. LITERATURE SURVEY**

A large body of investigation has been performed to expand and advance conventional Complementary Metal Oxide Semiconductor (CMOS) techniques for the fabrication of ULTRA low power integrated circuits (ICs). The purpose of this study is to expand a faster, lower power, and reduced area substitute to standard CMOS logic circuits. M-GDI technique is one such new technique for minimization of powerconsumption in the digital circuit design field.

Power dissipation becomes most important restriction in high performance applications. Optimizations for basic logic gates are fundamental constraint in order to get better the performance of a variety of low power and high-performance devices. Morgenshtein et al. investigated a high-speed and multipurpose logic style for low power electronics design, known as Gate Diffusion Input (GDI), with reduced area and power necessities, and proficient of implementing a broad variety of logic functions.

The arithmetic logic unit (ALU) is the core of a CPU in a computer. The adder cell is the elementary unit of an ALU. The constraints the adder has to satisfy are area, power and speed requirements. Some of the conventional types of adders are ripple- carry adder, carry-look ahead adder, carry-skip adder and Manchester carry chain adder.

#### **III. EXISTING TECHNIQUES**

#### 1.1 CMOS Logic

CMOS or Complementary Metal Oxide Semiconductor is a combination of NMOS and PMOS transistors that operates under the applied electrical field. The structure of CMOS was initially developed for high density and low power logic gates. The NMOS and PMOS are the types of Metal Oxide Semiconductor Field Effect Transistors (MOSFET). The CMOS transistors are used in various applications, such as amplifiers, switching circuits, logic circuits, Integrated circuit chips, microprocessors, etc. The importance of CMOS in semiconductor technology is its low power dissipation and low operating currents. Its manufacturing requires fewer steps as compared to the Bipolar Junction transistors.

# RFID Based Automatic Toll Collection Systemfor Dynamic Charging Vehicles

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#### ABSTRACT

In order to find a solution to stop and wait charge for electric vehicles and also to maintain transparency in toll gate system, we are providing automatic toll collection for electric vehicles which are using wireless power generating track. Thus by providing continuous charging path that allows the vehicle to charge continuously while it is in motion and it maintaining transparency in tollgate system by scanning RFID tags under RFID sensor, hence

the name RFID based automatic toll collection system for dynamic charging vehicles is introduced. This project focuses on automatic toll collection system which uses radio frequency identification (RFID) technology to identify a vehicle specifically for collecting toll. The proposed RFID system uses tags which are using the tag numbers as vehicle plate numbers of electric vehicles through which information embedded in the tags are read by RFID readers. It is possible to reduce the need for manual toll collection, also saves the time at toll gates and also helps the electric vehicles to get charge when they are in motion. For providing dynamic wireless electric vehicle charging we are using copper coils beneath the track, the track will generate wireless power to the electrical vehicles so that the vehicle uses wireless power for charging purpose while it is in motion. The track gets charging by an external battery and this external battery gets charged using solar energy.so that we can reduce the usage of petrol, diesel and other fossil fuels and we can also save the environment by reducing the usage of greenhousegases and also reduce global warming effect.

Keywords: Arduino UNO, LCD, Push Button, Relay, RFID Sensor, LC Tank circuit, RFIDtags, servo motor.

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#### I. INTRODUCTION

In the present scenario as the technology become advanced the usage of vehicles for transportation also involved to change i.e., they are shifting to the usage of electric vehicles. As these electric vehicles need charging stations for charging purpose it will take some time to stop and charge. For establishing these charging stations to power up the electric vehicles we require charging stations and it takes time to Charge the vehicle. The problem with electrically charged vehicles is, they can be charged only when they are in stationary mode and they are charged only for short distance and range. They don't have sufficient volume of battery storage also. So, we are going with dynamic vehicle charging which charges the vehicle when it is in motion. So, providing dynamic charging to the electric vehicle through transmitting coils which are mounted underneath the track is a better solution to avoid bulky battery structures, shorter range problem, and limited power transfer issue. In this proposed system RFID reader will read the RFID tags by taking the tag number as vehicle plate number and then it will either give access or it won't allow any electric vehicle to use that wireless power generation track. This process will entirely depend on database of the tag. As there is no need for vehicles to stop and toll authorities to manually collect the tolls, the system eliminates the traffic jam and possible human errors that normally happen in a toll system making it a more efficient process. The wireless power generating track will also be helpful and useful in reducing the usage of fossil fuels and also reduces the emission of greenhouse gases. This wireless power generating track will receive power from natural source of energy i.e., solar energy which is environmentally friendly without causing any pollution.

#### II. LITERATURE SURVEY

In this system the ideology can drain the prevalent botheration of bouncing the audit action at the check-posts and also decrease the pausing time, fuel burning of all vehicle in thetoll-plaza, due to self-regulated checking and automatic detection of tax amount. The crime vehicle can be discovered when a grievance had

# **Smart Helmet for Accident Avoidance**

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Abstract— From over the past decades the road accidents are increasing day by day in the country. Due to the fact, that the riders are not wearing the helmet and also the consumption of alcohol while riding the bike is another major cause which leads to the road accidents. This results in loss of human lives. In order to overcome these problems, this project work proposes a device called "SMART HELMET". The switch or touch sensor checks whether the person is wearing the helmet or not. The alcohol sensor which recognizes the alcoholic content in the riders breathe. If the person is not wearing the helmet is used then only the bike will start. Here when the rider met with an accident, the sensor recognizes the condition of motorbike and reports the accident. Then the G.P.S in the bike unit will send the location of the accident place to the registered number or to the nearby hospitals. It will provide a safer travel for bikers and help them in case of emergency.

Keywords—Arduino Uno, NEO 6-M G.P.S, MPU 6050, RF Modules, Relay Module, DC Motor, G.S.M SIM 900A, Alcohol Sensor, MQ-3 Gas Sensor, Micro Switch

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#### I. Introduction

In a highly populated and developing nations like India, which has a huge number of road accidents every year. The most effective means of road transport is through bike because of low cost and simplicity. But these Bikes are one of the most unsafe means of road transportation. The major road accidents that we come across is because of two-wheeler road accidents. The accidents mainly occur due to many reasons like drunk and driving, driving rashly, over speeding, leaving hands while driving for fun, etc.

Now-a-days wearing helmet is compulsory for bike riders, but the inconvenience which causes due to wearing of helmet make the rider to stop (or) avoid the usage of helmet and which finally leads to death of rider. In Many accidents the riders get injured mainly on the head. So, a helmet plays a very important role in saving the life of a rider. A design is proposed that synchronizes with the module present on helmet. if a rider is not wearing the helmet and wants to start a bike, it won't start. The rider must and should wear the helmet in order to start the bike. The MQ-3 alcohol sensor detects the alcohol content in the rider's breath. So, even though the rider consumes alcohol and wears the helmet, the bike won't start. So, the rider must wear the helmet and should not consume alcohol then only the bike will start.

Even though the police are continuously working day in and day out still two wheelers accidents are continuously increasing. This project aims on reducing accidents by making the rider drive carefully and safely. In case of an accident happens, the G.P.S and the G.S.M module sends messages with the location of rider to emergency contacts Ease of Use

#### **II.** Literature Survey

Several researchers have worked on this problem using various methods

Nataraja proposed a system that checks whether a helmet is worn or not by using an IR sensor. The project contains a helmet module and vehicle module which communicate via RF communication. The system is also capable of accident detection, signboard detection, and alcohol detection.

Shikha Gupta developed a smart helmet that was IOT enabled and was capable of performing alcohol detection and accident detection. The system is GSM and GPS enabled which sends messages in case of accidents. Features like live location tracking and a camera for recording in case of accidents are also present. The whole system is mounted on top of the helmet.

Vimal Jyothi Engineering College, Kannur, India, have shown the collision detection using an Arduino Uno; and the message is delivered using a Router and GSM modem. They mention "It consist of a GPS receiver, GSM modem, Arduino using ATMEGA 328 IC, vibration sensors, buzzer and a power supply system. The heart

# EMERGENCY ALERT SYSTEM FOR DISABLED PEOPLE USING HAND GESTURES AND GSM

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Abstract: Now a days we are facing many problems to communicate with disabled people because normal peoples are not trained with hand gestures. There are almost 30% of disabled people in the world. So it's very difficult to communicate with normal people. So to overcome these problems speaking systems were implemented but they are having some drawbacks. They were implemented a hand glove with inbuilt flex sensor and the movement of hand gesture will be captured and it will be compared with previously stored information. But by using this there is a problem i.e., because of using a flex sensor multiple times the density of the flex will be decreases. Hence we will be getting some errors and the output may not be accurate. So we are implementing a new model using MEMS sensor the output of the people will be given to the MEMS and the content will be compared with voice module which is previously recorded and the output will be displayed in LCD and also in the speaker. And GSM module is interfaced for emergency purpose by using push button. If we operate the push button then the message will be sent to the previous recorded numbers saying that they are in some need. So the alert will be given to that particular person and buzzer will be on.

Keywords: Arduino mega, 8channel voice playback module, speaker, LCD, relay, bulb, GSM module, pushbutton.

#### 1. INTRODUCTION:

Having difficulties like being visually impaired, hard of hearing, disabled are a greater amount of concern. As indicated by the World Health Organization, around 285 million individuals on the planet are visually impaired, 300 million are hard of hearing and 1 million are mute and 9.1 billion peoples are disabled. In everyday life communication is a serious issue for the disabled people. It's very difficult for the disabled people to convey their message to regular people. Since regular people are not trained on hand sign language, the communication becomes very difficult. In emergency or other times when a disabled people among new people communication with nearby people or conveying a message becomes very difficult.

The gestures created by the disabled person are difficult to understand. Sign language is a language which is used for communication between the normal people and disabled people. Sign language relies on sign patterns, i.e., body language, orientation and movements of the arm to facilitate understanding between people. In their day to day life they faced lot of problems on their communication. This paper is described to reduce the communication gap between the normal people and disabled people. The sign language is based on the hand gestures. Gesture is defined as an expressive movement of body parts. The collection of data can be stored on the controller. The data processing unit is used to perform the controlling and transferring function.

Two MEMS sensors are used in this paper, it generate eight outputs. By operating one MEMS sensor will get a basic needs i.e. food, medicine, water, etc. as output through speaker. The other MEMS sensor is used to operate light and fan and the output will be displayed in LCD. For the emergency purpose we are using push button and GSM module. If in case of any emergency situation by operating a pushbutton buzzer and GSM will be activated. By using GSM, SMS will be send to the particular person.

#### **II. LITERATURE SURVEY**

In this research of designing a system that will help disabled people to communicate in our surroundings. This research proposal is based on a very simple concept whereby we need to have a means for capturing the sign languages available in order to utilize International Journal of Engineering Research And Advanced Technology, Vol.5, Issue 8, August-2019 www.ijerat.com Page 27 DOI: 10.31695/IJERAT.2019.3491 them to solve the presented problem above, meaning using to translate them into speech so that voice impaired people can communicate. As a precursor to this research there have been many research involving simply of communication to disabled people. For example, in the research of Sign language, a language through which communication is possible without the means of acoustic sounds. Also is an effective tool that allows disabled people to communicate with their non-mute counterpart. However, hand gestures are still not the most natural mode of communication and unmute people still find it difficult to adapt to audio-less communication [1].

As well as in the research of electronic voice to disabled people using flex sensor, a system facilitates individuals by means of a glove based mostly disabled communication interpreter system. The glove is internally equipped with four flex sensors. For every specific gesture, the flex detector produces a proportional amendment in resistance and measures the orientation of hand. The process of those hand gestures is finished in controller. The glove includes 2 modes of operation- coaching mode to learn of each user associate degree an operational mode. The concatenation of letters to create words is additionally drained controller.

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# Railway Track Crack & ObjectDetection Using GSM & GPS

## Dr. K. RAVI KUMAR<sup>1</sup>, G. JAYA SREE<sup>2</sup>, V. MANOHAR<sup>3</sup>, G. VENU VARDHAN<sup>4</sup>

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**Abstract** - The main cause of the accidents happened in railways are railway track crossing and unrevealed crack in railway tracks. Nowadays in Indian railways they use manual system for tracking the cracks in the railways but this process will leads to take more time for detecting the cracks. Therefore, there is a need to have new technology which will be robust, efficient and stable for both crack detection as well as object detection. This paper discusses a Railway track crack & object detection using sensors, it is a dynamic approach which combines the use of GPS tracking system to send alert messages and the geographical coordinate of location.

Keywords — GSM, GPS Module, Arduino Microcontroller, IR sensor, Ultrasonic sensor.

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#### I. INTRODUCTION

To test the cracks in railway tracks, communication, and identification using GPS module, GSM modem and IR sensor and PIR sensor. The GPS module and GSM modem were utilized to identify and transmit railway geometric parameters related to crack detection to a nearby railway station. The PIR sensor is used to detect moving objects crossing railroad tracks. This device may work both at night and during the day [1]. The proposed broken rail detection system automatically detects the faulty rail track without any human intervention. This paper proposes a cost effective solution to the problem of railway track crack detection utilizing LED-LDR assembly which tracks the exact location of faulty track which then mended immediately so that many lives will be saved [2]. This system is proposed for detecting railway track cracks using image processing, this method is used for both crack detection in railway tracks and object detection, a new method that is robust, efficient, and steady has been developed. This study presents a system for detecting defective train tracks and objects. It's a dynamic strategy that combines the usage of a GPS tracking system and a WIFI module to transmit alert messages and the location's geographical coordinates. To control and coordinate the operations of various devices, a Raspberry Pi 3 is employed [3]. This system is designed to find the cracks Using an op amp and a microcontroller, the suggested system provides a simple approach for detecting railway track cracks. The SMS is also sent to the main branch via GSM. The operation of his system includes when we apply reference voltage it gives predefined voltage when there is no crack detected or if any crack detected then the voltage levels will regulate and the op-amp output will be given to microcontroller, and the information will be sent through GSM module using software which is designed in vb6.0. at the end of the software can find out the location of the crack. Along with this there is an led used for indication purpose it will change its color from green to red when crack is detected [4]. In this paper they use IR sensors for detection of the crack in railway tracks. Whenever the crack is detected based on its latitude and longitude values the message will send to mobile phone. Then IR sensor is used for the detection purpose. This system is designed using Arduino Uno (ATmega328), IR sensors and Bluetooth to perform railway safety monitoring system. Here an IP based camera is also used for monitoring visual videos captured and photos captured from the railway tracks [5].

In this paper discusses a Railway track crack detection and object detection using IR sensors & Ultrasonic sensors. Whenever any crack or object detected and on the track buzzer sound will be generated and the sensor will send the information to the controller, then controller processes the whole information and it gets the location of crack or object using GPS and sends the detection SMS to the authority mobile numbers using GSM. For driving the robot on the railway track we here we are using DC motors and L293D Motor driver. So by using this robot we can reduce the accidents to a great extent and can prevent not only the loss of precious lives and can save the property as well.

## **Design of Smart Bus Fare Collection System Using RFID**

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**ABSTRACT:** Now-a-days in public transportation we are facing too many problems with ticket fare collection. There are almost 65% of the public using the public transportation for their daily works. So, to overcome these issues a smart fare collection system is to be implemented. In this paper we have implemented the smart bus fare collection system using RFID module. The passenger's details and the amount is stored in the RFID tags allocated to each user. The GSM modem is used to send the information to the user's registered mobile. All the inputs and details are displayed on the LCD display for the user's verification at that instant. **KEYWORDS:** Arduino UNO, RFID tags, RFID module, GSM modem, keypads and LCD display.

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#### I.INTRODUCTION

The journey in the public transports is very difficult, noisy and are corrupted. Around 65% of the public transports are bus transportation and almost complete population use these transportations for their works. The paper-based ticketing system which is used is not reusable and also is time consuming. So, the public transportation system needs to be smart. To avoid this paper-based ticketing, the time consumed and also the corruption the designing of smart bus fare collection system is needed to be implemented. A database is created in this project which is used to hold unique RFID Card number issued to a passenger. The passenger's count is read by the driver through his RFID. After calculating distance, the amount is deducted from passenger's account. RFID cards and reader is used to read card number which is send to database and fair amount is deducted from person's account.

#### **II. LITERATURE SURVEY**

Literature review was carried out throughout whole project to gain knowledge and skills needed to make this project. In paper [1] the authors explained the advantages of RFID cards about its low cost, it also explains how a RFID Reader will be there in the bus which is connected to main server which is used for automatic fare collection. In paper [2] the fare is automatically deducted according to distance travelled using GPS in the system. A database is created which is used to hold unique RFID Card number issued to a passenger. In paper [3] passengers count is done with the help of IR sensors and distance is calculated using motor and u slot sensor. After calculating distance, the amount is deducted from passenger's account. It is also accompanied with the system that if any accident is occurred then nearest hospital get automatically notified to it using GSM and GPS. In paper [4] RFID cards and reader is used to read card number which is send to database using WIFI and a fair amount is deducted from person's account. Other sources are books, online tutorials which are being used to gain knowledge throughout the project

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# Design and Implementation of Decoder and MUX using Mixed Logic

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#### ABSTRACT

Mixed logic designs take prioritized place in logic design approaches which will give a simplified mechanism for the analysis of digital circuits. Also, a mixed logic implementation gives clear idea with regards to the activity of a circuit. Here in this, introduced mixed logic designs like pass transistor dual value logic (DVL), transmission gate logic (TGL), static CMOS. By using CMOS technology, it requires 20 transistors to design 2:4-line decoder but by using mixed logic we can design the same 2:4-line decoder with the use of 14transistors (14T) only. Introducing mixed logic approach a 4:1 MUX was designed by using 2:4-line decoder of mixed logic design. This new approach gives the better operating speed, low power consumption compared to conventional logic design by reducing the transistors activity and simulations are carried out using tanner EDA tools.

KEYWORDS: Mixed logic, Low power MUX, Line decoder, Transmission gate logic (TGL), Dual value logic (DVL) & Static CMOS

#### 1. INTRODUCTION

In most of the integrated circuits, we generally prefer Static CMOS because of complementary nMOS and pMOS networks which results in good performance as well as resistance to noise and device variation. But by using CMOS technology, it requires 20 transistors to design 2:4-line decoder but by using mixed logic we can design the same 2:4-line decoder with the use of 14transistors (14T) only. Pass transistor logic (PTL) was developed as an alternative to CMOS logic. The main difference between the CMOS logic and PTL design is how the inputs are applied. In the PTL inputs are applied on the gates as well as source/drain terminals. PTL can be designed using either of nMOS and pMOS. The DVL has advantages over the PTL such as full swing operation while also maintaining reduced transistor count. A pair of nMOS and pMOS connected in parallel are called TGL.

**2–4 Line Decoder:** 2-bit input line decoder has 4-bit output. In conventional static CMOS line decoder uses 2 NOT gates and 4 AND gates. Instead of using AND gates we can use NAND gates as they are universal gates. So, for this design it uses 20 transistors for 2–4-line decoder.



# **Iot Based Smart Notice Board**

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ABSTRACT: This project gives the best solution to replace the present paper-based notice board system with advanced electronic notice board. Wireless electronic notice boards have been designed, which completely eliminates paperwork and reduces the manual work and time. Building a IoT based projects gives the fast transformation of data and the user can access the data from anywhere in the world. In this project, we have developed a IoT based smart notice board. The main objective of this project is developing an automatic, self-enabled and highly reliable electronic notice board. A display connected with the cloud will continuously waiting for the message from the user, if the user uploads the data through the server, it will automatically upload to the LED. By using Wi-Fi moduleESP8266, the user can upload the message to the LED by accessing through the website connected to server. The user can write the data from anywhere in the world to the LED. This will reduce the time to update the data as well as it will efficiently transfers the data to the end user.

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**Keywords:** Arduino Uno, LED, Wi-Fi module, AT89S52 Microcontroller, SMPS for LED board

#### **I.INTRODUCTION**

The main purpose is to design this electronic notice board system is to interface it with user's mobile phones for displaying the latest information. In other words, the user sends the information from remote areas and this information is received through Wi-Fi module on the Arduino board at receiving end. This system is designed withAT89S52Microcontroller, which is interfaced with Arduino Uno and level shifter through serial cable. LED matrix is also used this system for displaying the information or data. The Wi-Fi module is wireless component that will maintain connection with server. We are using server and it has URL link that can be used by the authorized person and that person can write or re-write the information which want to display. This system is designed with AT89S52 microcontroller, which is interfaced with Wi-Fi module and level shifter through serial cable. LED Matrix is also used in this system for displaying the information or data.

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The heart of this system is micro controller, this will receive data from Wi-fi modem using UART (universal transmitter and receiver), update this message on LED board through same UART only. This system also alerts the buzzer when new message is received. In this we are using Atmel AT89S52 controller, it is 8bit controller which has inbuilt 8k 8 bytes flash memory,256 bytes RAM and 32 I/O pins and UART. The advantages of this controller are low cost, availability of tools and resources are more.

Wi-Fi technology is a long-range wireless communications technology. It has beendeveloped rapidly in recent years. In this we are using Wi-Fi module and its operating voltageis 12v and 1 amp, data format is UART with 9600 baud rate. The advantages of Wi-Fi aremore secured and can sendmessagesfrom anywhere.Electronic noticeboards are userfriendly and echo friendly, they are replacing present paper usage notice useeitherLCD boards. We can orLED boards.LEDboardsare moreattractive.

#### **II.LITERATURE SURVEY**

Yash Tekkamaki [1] described "Large Screen Wireless Notice Display System" with an aim to increase the usability of electronic notice board, deals with wireless reception and display of message using Raspberry Pi. Practically, all output resolution is supported. This paper presents a way to incorporate messages in HTML script. It offers

# Implementation of High-Speed Low Power32-Bit Dadda Multiplier using CLA

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*Abstract*: Multipliers and Adders are the basic hardware units in arithmetic operations. This project is implemented a 32-Bit Dadda multiplier using Carry Lookahead Adder (CLA) to reduce the delay, power consumption and increase speed while adding partial products in multipliers to get final sum quickly / Fastly. This project can be implemented/evaluated using Verilog HDL on Xilinx Vivado tool.

Keywords: Dadda Multiplier, Carry LookAhead Adder, Verilog HDL.

I.

#### INTRODUCTION

Multiplication is the second most used arithmetic operation after addition, which has resulted in a large research interest in developing ways to improve the performance of multipliers. Multipliers have complex designs as a result of the large number of partial products that are formed during a multiplication; however, the general process can be broken down into three steps. The first step is to generate the partial product matrix. Each partial product is generated with an AND gate. As a result,  $N^2$  AND gates are required in an N-by-N multiplier. The second step (referred to as the "reduction" step) is to reduce the N rows of partial products to 2 rows that have an equivalent value. This step has the most delay in a multiplier and is where most of the research effort, this report included, focuses on improving. The third step is to use a carry LookAhead adder (CLA) to add the 2 rows and obtain their sum which is the product of the two input operands.

There is a widely used approach, Dadda which are currently used in high-speed multipliers to perform the reduction step. This multiplier is constructed with half adders and full adders. By using these arithmetic K. Srikanth U.G. Scholar, Department of ECE, N S RAJU Institute of Technology, Visakhapatnam, A.P, India.

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components in parallel, a result can be obtained quickly. Moreover, by using carry lookahead adder the delay of the second step (the reduction) can be improved by up to 30%. The drawback is that the complexity of the design increases by up to 25%. The approach offers different benefits with regards to complexity and performance. This report analyzes the differences between the two adders RCA, CSLA with CLA.

#### II. LITERATURE SURVEY

Madhav Venkata, Srinivas Nandan, Sudhakar Alluri (2020) proposed an "HIGH PERFORMANCE 32-BIT

DADDA MULTIPLIER USING EDA". They design a 32bit Dadda multiplier using SQRT CLSA with CBL which consumes less power but it comes with low speed & delay is high. In Dadda multiplier delay can be occurred, due to number of partial products during multiplication. The proposed project will be implemented with Dadda multiplier using CLA and simulated in Verilog language through Xilinx ISE tool. The proposed project aims in reducing the numbers of reducing partial products to get better power efficiency less delay and high speed [1].

s. manju, v. sornagopal, "An efficient of SQRT architecture of Carry Select Adder design by common Boolean logic" Carry Select adder (CSLA) is known to be the fastest adder among the Conventional adder structures. This work uses an efficient Carry select adder by sharing the Common Boolean logic (CLB) term. In this the logic simplification, we only need one OR gate and one inverter gate for carry and summation operation. Through the multiplexer, we can select the

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# SLOTTED PATCH ORTHOGONAL MIMO ANTENNA FOR UWB APPLICATIONS

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Abstract : A new ultra-wideband (UWB) antenna is presented in this paper. A slotted patch orthogonal MIMO antenna consists of radiating patch on one side of dielectric substrate and has the ground plane on other side. A compact design and construction of microstrip Ultra-Wide Band (UWB) antenna is proposed. The 65 x 35 x 1.6 mm3 antenna is mounted ondielectricsubstrateFR-4 with thickness h=1.6mm, relative permittivity  $\alpha$ =4.4 and loss tangent of 0.025. The proposed antenna has the capability of operating in the frequency range of (3GHz to 13.5GHz) which is covering radio location, mobile and satellite applications. This antenna is designed using microstrip line feed model and simulated using HFSS software. In order to reconfigure the proposed UWB antenna to reject two bands, the final antenna design is based on inspired split ring resonator (SRR) and rectangular slots, positioned in the middle of the radiating patch. Most of the wireless communication systems need antennas which resonates at more than one frequency while sustaining a small size. Compared with conventional antennas, microstrip patch antennas have more advantages and better prospects. They are lighter in weight, low volume, low cost, low profile, smaller in dimension and ease of fabrication and conformity. The antennas are analyzed using the different antenna parameters like radiation pattern, Gain, Return loss, VSWR.

#### Index Terms - Ultra-wide band, patch antenna, slots, Split ring resonator, HFSS.

#### I. INTRODUCTION

Ultra-wideband (UWB) is a radio-based communication technology for short-range use and fast and stable transmission of data. It has acquired a lot of popularity in wireless manufacturing since Federal Communication commission (FCC) permitted it's frequency band of 3.1 to 10.6 GHz. The main advantage which is attractive in this UWB technology is its high - capacity short range wireless communication using low cost , low energy transceivers .Due to short band of frequency range there will be an interferences with some other narrow band services which are already fulfilled by UWB bands .So By using the several methods and structures on the radiating patch of the antenna , these bands are filtered and rejected. One of the structure to overcome this problem is implementing the Split Ring Resonator with concentric circles (slot), moon shaped slot and a rectangular slot which helps to avoid the collision in the existing communication systems by improving the frequency band of the system. The slot radius of the inner split ring -used in our structure in figure 2- is varied to study the effect of changes of the rejected band. The first parameter r2 of The SRR slot is assumed to be constant(5mm) and then r1 is changed from 0.5mm to 2.5mm. As it shown in Fig.1, when the distance between two centres are too far in a way that the disk completely is eliminated from the geometry of the antenna has a wideband frequency notch that change. To investigate the effect of the second slot on the behaviour of the antenna by HFSS software, the length of the rectangular slot Lr is assumed to be constant(0.5mm) and the width Wr is changed from 12 to 14 mm.

In this design to investigate the performance of slotted patch antenna analyzed in terms of bandwidth, gain, radiation pattern and antenna structure was built on FR-4 substrate. The relative permittivity of 4.4 and thickness of 1.6mm.

#### **II.** ANTENNA DESIGN

Fig. 1 shows the geometrical configuration of the proposed antenna. The proposed design is made of FR-4 dielectric substrate with thickness h=1.6mm, relative permittivity er=4.4 and loss tangent of 0.025. The overall size of the antenna is 65mm x 35mm x 1.6 mm3. The antenna consists of a rectangular patch with steps and two slots (single ring resonator and rectangular). Inspiring from different antenna designs, we chose those offering small size, low cost, low complexity, light weight, and high-speed data rate, as this also makes them attractive for use in UWB applications.

# Implementation of Vehicle Starting Using Fingerprint Sensor & Accident Detection with Accelerometer, GSM & GPS

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Abstract -This project is implemented for protecting the vehicle from the theft. Now-a-day's vehicle theft is increasing rapidly, So people have started to use the theft control system which is installed in their vehicles. The commercially available anti-theft vehicular systems are very expensive & this project is developed as low cost vehicle theft protection system using a ARDUINO UNO. By using fingerprint sensor we will start our vehicle only by the authorized users, which provides more security to the vehicles[2]. In this project we also used keypad system, which it gives access to new persons to start the vehicle in the absence of the original person. In this project RF transmitter and RF receiver are used to get notification if any theft action occurs this will be happen when vehicle got theft the RF receiver which is held by vehicle owner gives an indication of vehicle theft by switching of the LED so that vehicle owner can recognized that theft action get occurred. For driving the vehicle DC motor is used. In this project GPS is used for location of the vehicle and GSM is also used, which it will send an emergency alert message to police, family and ambulance along with exact location[4]. LCD is used for monitoring respectively.

keywords: Arduino Microcontroller, Accelerometer sensor, Fingerprint Module, GPS Module, GSM Module, LCD, RF transmitter & RF receiver.

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#### I. INTRODUCTION

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The Vehicle theft is increasing widely, simultaneously the theft ratio is also increased. Because of increasing number of theft cases of the vehicle there is a need to enhance the security level of the vehicles. Traditional and commonly used key locks available in the vehicles are easily unlocked by the professional thieves. With the help of master key, it becomes very easy to unlock the lock of the vehicles by the thieves. This project explores how to avoid this kind of stealing & provide more security to the vehicles. The implemented system contain single board embedded system which is equipped with Global system for mobile communication (GSM) and global Positioning System (GPS) along with a microcontroller installed in the vehicle. The use of GSM & GPS technologies allows the system to track the vehicle & provide the most up-to-date information about ongoing trips. Moreover, fingerprint sensor is done in the implemented system to ensure the driving of correct person. The implemented system is very simple with greater security for vehicle anti-theft protection & low cost technique compared to other. If the vehicle is met with an accident, an immediate alarm is sent to the family, ambulance & police with the current location of the vehicle.

#### **II. LITERATURE SURVEY**

In this research of this system it helps the people from the vehicle thief and accident detection of the vehicle. This research proposal is based on the very simple concept that where we can capture the finger by using the finger print module by authorized persons and vehicle gets started[1]. This project is placed in two wheeler vehicle security system so that it provides security to this vehicle[2]. The microcontroller which is inbuilt in the Arduino, the Arduino will perform all the operations in this system, if the Arduino is failed the project is also failed. By using this microcontroller in the Anti-Theft security system using GSM networks it sends message to the authorized person[3].By using the GPS module we can find the exact location of the vehicle of the vehicle theft and if any accident occurs we can also find the location easily by using GPS, multi-tracking system can also be done by the GSM & GPS[4].The road accidents is also increased rapidly, if any
## AI BASED ROBOTIC ARM

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**ABSTRACT:** In this project for the control of an intelligent hand which can mimic the natural movement of the human hand. Implementing such intellectual hand finds its application in humanoid as well as personal robots. In this project vision-based interaction techniques are used to track the motion of the fingers and to extract the motion of the hand gesture accurately and promptly. Accuracy and effectiveness plays the key role for real time motion based applications. The robotic arm is one of the most widely used automation devices in the field of robotics science and technology. At present, the traditional manipulator control methods are mostly completed by preprogramming processing or command input from external devices. Such control methods are usually complicated and cumbersome are required operators to familiarize themselves with specific programming methods or according to different types of manipulators control instruction. The AI arm is controlled by the hand gestures of human hand and AI hand, while the human will gestures their hand in front of camera the open cv tracks the motions and sends to the AI arm without any delay due to the less delay in processing we can use the python open cv extract the motion from human hand and import into the AI hand.

Keywords: Arduino uno, servo motors, buck converter, robotic hand, batteries.

Date of Submission: 07-06-2022	Date of acceptance: 22-06-2022

## I. INTRODUCTION

Having The robotic arm is one of the most widely used automation devices in the field of robotics science and technology. At present, the traditional manipulator control methods are mostly completed by preprogramming processing or command input from external devices. Such control methods are usually complicated and cumbersome are required operators to familiarize themselves with specific programming methods or according to different types of manipulators control instruction. With the advent of accelerometers, a brand-new contactless somatosensory technology has been rapidly developed, showing a broad application prospect in the field of intelligent robots. The design of the robotic arm system better recognizes and senses changes in the human body, so as to achieve contactless control.

## **II. LITERATURE SURVEY**

[1] M. Georgi, C. Amma and T. Schultz, "Recognizing hand and finger gestures with IMU based motion and EMG based muscle activity sensing", Proceedings of the International Conference on Bio inspired Systems and Signal Processing, pp. 99-108, 2015.Session- and person-independent recognition of hand and finger gestures is of utmost importance for the practicality of gesture based interfaces. In this paper we evaluate the performance of a wearable gesture recognition system that captures arm, hand, and finger motions by measuring movements of, and muscle activity at the forearm

[2] P. Jung, G. Lim, S. Kim and K. Kong, "A wearable gesture recognition device for detecting muscular activities based on air-pressure sensors", IEEE Transactions on Industrial Informatics, vol. 11, no. 2, pp. 485-494, 2015.Recognition of human gestures plays an important role in a number of human-interactive applications, such as mobile phones, health monitoring systems, and human-assistive robots. Electromyography (EMG) is one of the most common and intuitive methods used for detecting gestures based on muscle activities. The EMG, however, is in general, too sensitive to environmental disturbances, such as electrical noise, electromagnetic signals, humidity, and so on.

[3] R. Sekhar, R. Musalay, Y. Krishnamurthy and B. Shreenivas, "Inertial sensor based wireless control of a robotic arm", IEEE International Conference on Emerging Signal Processing Applications, pp. 87-90,

## IOT Based Smart Stand for LPG Cylinder Monitoring and Safety Enhancement

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**ABSTRACT** -- It is an IoT-based Smart Stand for LPG Cylinder Monitoring and Safety Enhancement. LPG cylinders are currently used in every Indian home to cook. In order to make human life easier and safe an automated system is necessary. This system has a variety of monitoring tools that are both safe and automatic. It uses load cells to measure the quantity of gasoline left in the cylinder and it will be informed to the user through an LCD and a mobile/blynk interface. It also warns the user if the gasoline has depleted beyond the predefined limit. It detects gasoline leaks and performs a variety of accident-prevention tasks such as warning the user about gas leaks through a mobile interface called Blynk app and turns ON the exhaust fan and buzzer as well as turns off the gas regulator without the need for human intervention. Remote control of the regulator is also available, allowing you to extinguish the flame by turning off your regulator from anywhere using a mobile interface.

KEYWORDS: IoT, LPG cylinders, Load cell, Blynk, ESP 8266 NodeMCU, MQ-9 gas sensor

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#### I. INTRODUCTION

Almost everything nowadays is safe and automated, excluding the LPG cylinder systems. In this paper, an automated safety system is presented that simplifies the human lifestyle in handling LPG cylinders while also reducing the risk of cylinder explosion incidents to some amount. Almost everyone estimates the quantity of gasoline in the cylinders by lifting it or igniting the fuel with a burner. Both are unreliable and imprecise methods of determining the amount of gasoline in cylinders. By utilizing a load sensor as a key component, this system communicates the quantity of gasoline existing in the cylinder to the outside world via an LCD.

The primary purpose of identifying the amount of gasoline is to book a cylinder when the gasoline in the cylinder runs out. This technique has the benefit of not requiring the user to constantly monitor the amount of fuel. Every user will be able to set their limit. When the gasoline reaches the limit, it sends a warning to the user, informing them that their fuel is about to run out and that they should book a new cylinder.

The majority of LPG mishaps are caused by gas leaks, which can cause explosions if not detected. This system employs an MQ9 sensor, which detects gas leakage and instructs the controller to activate the exhaust fan, allowing gasoline to escape from the premises and into the air, reducing the risk of an accident. It also notifies the mobile unit and sounds a buzzer to alert the user about the leakage.

When you are far away from the kitchen and remembered that you left food on the burner with the gas turned on, in this kind of scenario, you can't turn off the gas immediately. This system provides a mobile/blynk interface, using which you can stop the flame by switching off your regulator from any place you are at.

### **II. LITERATURE SURVEY**

V. Tamizharasan, T. Ravichandran, M. Sowndariya, R. Sandeep, and K. Saravanavel paper [1] on *"Gas Level Detection and Automatic Booking Using IoT"* demonstrated monitoring the gas level in the cylinder and sending a notification to the user via a mobile network if the gas level falls below a specific threshold.

K. M. Sudar et al. paper [2] on "*Gas Level Detection and Automatic Booking Notification Using IoT*" demonstrated that notifying the user when there is a gas leak will not be enough to eliminate the risk of gas leak accidents, so they introduced a way to let the gas out from the premises by using an exhaust fan, with the result that if the user fails to identify the leak, the impact will be minimal.

M. H. B. M. Yaya, R. K. Patchmuthu, and A. T. Wan paper [3] on "LPG Gas Usage and Leakage Detection Using IoT in Brunei" Introduced an automatic regulator switching, which automatically turns off the

## Electronic Protection for Exam Paper Leakage Using Arduino Uno

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Abstract- The project describes electronic protection for exam paper leakage which is a high-security system. The examination is the important aspect for the educational system to test the skills of student through online, orally on papers. Question paper comes to the college from university in electronic sealed box which is an embedded system designed with ARM processor. An RFID card will be given to the college authorities and password will send to college before 10minutes of exam. By swiping the RFID card with appropriate password, lock of electronic sealed box is open. If anyone tries to open the electronic sealed box before and after RFID swipe duration message will be send to university board through GSM which indicates exam paper is leaked. In existing system, there is a controller along with RFID module which requires RFID tags to access which is disadvantage, as the card can be used by any one and there is no tracking of person who is actually accessing it. In the proposed system we are overcoming disadvantage with biometric scanner. GPS module to access a system and to keep a track for the person accessing.

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### I. INTRODUCTION

Education is basically the motivating force of the society. An examination is the assessment planned to measure the skill, knowledge, physical fitness or aptitude and also classification in so many subjects. An exam may be on paper, on the computer, orally, in exam centers, which are conducted to test, calculate or examine the set of skills. Also the main purpose of the examination is to select the capable candidates for different positions. For the students main issues are question paper leakage, who suffer from the postponed or cancellation of the examination. Each and every year we hear news about postponed/cancelled exam due to paper leakages in the newspaper or on television. Sometimes the university itself doesn't know how there is leakage of any information content related to question papers. Hence, some student gets good rank in minimum time and with less effort and those students who really deserve the rank will not score even after hard work and maximum efforts. This aspect will create negative effect on students and demoralize the growth of society. So we have come up with a compact and portable solution and decided to design and implement an examination paper leakage protection system based on Arduino Uno. Along with the GPS, GSM modem, Finger print module, keypad, LCD, IR Sensor and electromagnetic lock are used in this system. First the question paper comes to the college from university in an electronic sealed box which is called Electronic Control Box. The Electronic Control Box is an embedded system that was designed using Arduino Uno, which has inbuilt RTC to monitor the Electronic Control Box. If anyone tries to open the box before exam time, the system communicates to the university authorities by sending an SMS (Short Message Service) and exam paper leakage location through GSM (Global System for Mobile communication) and GPS (Gobal positioning system) that "some malfunctioning has taken place with the Electronic Control Box". If the authorized person is absent by clicking the # button the unique OTP. The OTP will tell to the college authority of the college before 10 minutes of the exam. The chief authority will enter on the keypad the box will automatically opened.

## IJRSET JUNE Volume 9 Issue 6 International Journal for Research in Science Engineering & Technology (IJRSET)

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## **IOT BASED AUTONOMOUS ROBOT FOR SAFETY ENHANCEMENT**

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**ABSTRACT:** Robot automation technology is evolving at a rapid pace to meet the world's growing demand for disaster management, rescue operations, and human risk reduction. These tasks necessitate use of multipurpose Robot with IOT. It is necessary to have a user-friendly robot that can be accurately controlled from anywhere by mobile app. The project presented here focuses on the design and development of a new product. Development of a multipurpose Robot which is used in different aspects like bomb-detection Robot and fire-fighting Robot, that can be operated from anywhere. To keep costs down, use locally accessible hardware. This is capable of carrying any complex object (up to 3kg) in a highly efficient manner which is helpful in defence for bringing medicines. The robot had gas, fire, and obstacle detection capabilities.

**Keywords:** [Robot, ESP32, Motor Driver, Submersible pump.]

## **1. INTRODUCTION**

According to National Crime Records Bureau (NCRB), it is estimated that more than 1.2 lakh deaths have been caused because of fire accidents in India from 2019-2021. Even though there are a lot of precautions taken for Fire accidents, man-made disasters do occur now and then. In the event of a fire breakout, to rescue people and to put out the fire we are forced to use human resource which are not safe. With the advancement of technology especially in Robotics it is very much possible to replace humans with robots for Bomb Detection and fighting the fire. This would improve the efficiency of firefighters and would also prevent them from risking human lives. This is about a IOT Based Autonomous Robot for Safety Enhancement, which will automatically sense the fire and start the water pump.

Robot is defined as a mechanical design that is capable of performing human tasks or behaving in a human-like manner. Building a robot requires expertise and complex programming. It's about building systems and putting together motors, solenoids, and wires, among other important components. A multipurpose robot is one that has a small metal detector and fire extinguisher are added to it. By attaching a small fire extinguisher to the robot, the automation put out the fires it detects via Temperature Sensor module and also attaching small bomb to the Robot, it detects the harmful metal with help of metal detector by human controlling it from anywhere. A primary purpose of this undertaking is to provide an incentive for the robotics community to develop what will be a practical application for a real-world robot. Although it is merely a simulation of a real-world scenario, it requires the designers to use practical techniques to create useful designs.

Multipurpose Robots are autonomous robots or remotecontrolled mobile robots designed for military, industrial, domestic applications, from search and rescue to attack. Some such systems are currently in use, and many are under development. Broadly defined military robots date back to World War II and the cold War in the form of the German Goliath tracked mines and the Soviet Tele tanks. The MQB-1 Predator drone was when "CIA officers began to see the first practical returns on their decade-old fantasy of using aerial robots to collect intelligence.

## 2. LITERATURE SURVEY

E Amareswar, G Shiva Sai Kumar Goud, KR Maheswari, E Akhil, S Aashraya, T Naveen

They proposed a robot that can be control using an application running on an android phone. Android phone sends control command via Bluetooth which is interfaced to the controller. The Controller interfaced to the Bluetooth module through UART protocol. According to commands received from the robot motion can be control. This robot is used for detecting bombs.

A Kuna raj, J Joy Mathavan, M Mathushan, G M Kamalesan They proposed a robot which can be controlled from a limited distance by applications in android phone for landmine detection.

In this proposed system we are going to develop a multipurpose Robber. This robber had gas, fire, and obstacle detection capabilities. We also insert camera for live view and this robber is capable of picking up and carrying any complex object (up to 2kg) in a highly efficient manner which is helpful in defence for bringing medicines.



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## VOICE AND MEMS BASED PAGE TURNING ASSISTOR FOR DISABLED PEOPLE

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ABSTRACT: Physically challenged persons must rely on each page turn to read a book and they must exert more effort than typical people. To make page reading easier for disabled people We provided a solution in the form of a voice-assisted page turner to the people. Arduino, which takes voice commands as an input, and turner as the controller, and the motor mechanism as the output unit, the page that is required to be turned is done When the user speaks his desired (direction) (Page must be turned) page name (next page or previous page) in front of the android phone which is connected to the Bluetooth module. The Bluetooth module is fed into the controller, which acts on it. The motor mechanism is set to turn the appropriate page. And if the person is speechless or having speech disorder, they can use their movement of one of their body parts to turn the page depends on the direction of the movement. MEMS Accelerometer is used to sense the movement of the body part and turn the page. As a result, the proposed article is a fantastic chance for anyone who could benefit from it.

**KEYWORDS:** [Arduino Nano, Bluetooth Module, MEMS Accelerometer.]

## **1. INTRODUCTION**

Physically disabled or elderly persons have a hard time meeting fundamental needs like reading a book, and they rely on others to turn the pages for them. Some Turningpage gadgets, such as Page turners that can be operated manually and those that can be operated automatically-A manual page turner is made up of a stick that is held in one hand while the other is used to turn the pages.is maintained in the mouth or in the hand A rubber tip is on the stick. Enables the book's pages to slide more easily. This gadget is useful, User-unfriendly because it necessitates the use of one's lips and hands This is quite uncomfortable since it can cause damage to the mouth's corners. There's a lot of salivation as well. A page-turner that works automatically controllable motors.

So, this proposed system voice, movement-based page turning assistor for physically disabled people along with speech disorder aims at low cost and portability in use which should be operated at effort less for all kinds of disabled people.

### 2. OBJECTIVE

The main aim of this Voice & MEMS based page turning assistor isto make the page turning easier for the people who are differently abled. Physically disabled people must depend on other people for turning the pages while reading a book. So, to give a solution to this problem, a voice-based page turning is introduced. Here the pages turn to next page or previous page by simply giving the voice commands to the android phone which is connected to Bluetooth module. This command reaches to the Arduino nano and the motors which are connected will turn the page in required direction.

If the person is mute (having speech disorder) he/she may not be able to use their voice commands to turn the pages. So, for mute people, a movement-based page turning mechanism is provided. Here a MEMS accelerometer sensor is used to sense the movements of the person. According to their movement of any one of the body part, the pages will turn in the required direction.

### **3. LITERATURE SURVEY**

Here we have taken some of the existing systems for voice-based page turning mechanism. Durga K Prasad Gudavalli, M Sai veerraju, I Swetha monica: They proposed a solution which is in the form of voice assisted page turner, which uses voicerecognition module as its input, Arduino as controller and motor mechanism set as output unit to turn required pages. When user speaks his required (direction in which page has to be turned) page name in front of micro phone of voice recognition module, the controller takes it as input and operates motor mechanism set to turn corresponding page.

Another reference we have considered is by HN Balachandra, S Jnaneshkumar, K Sanjay Nayak: They proposed a system which provides automatic page turning mechanism through voice commands. After turning the page, the content of the page should be read, for that, the whole page is scanned and read out to the user. Hence it useful for aged, disabled and blind people.



# Arduino Based Coal Mine Safety Monitoring and Alerting System for Workers

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**ABSTRACT:** Coal is a major element for development, an important energy source for power generation, and it is an essential part of the manufacturing of alumina, iron, steel, cement, and other resource products necessary for modern living. The extraction of coal from the field is known as coal mining. Safety and security are critical components in the mining sector. Even they take certain precautions to avoid accidents in the underground mines. Still, accidents continue to occur in underground mines, resulting in a greater number of disasters. Temperature, gas, fire, and water are the key elements involved in many accidents. This project monitors these parameters using Arduino UNO and provides safety and alert for coal mine workers to minimize the accidents. To improve underground mine safety, a reliable communication system must be built between underground mine workers and a fixed ground system. The communication network must not be interrupted at any time or under any circumstances. A buzzer is used for alerting the mine workers. Using IoT and Buzzers, this system alerts the admin as well as the workers when any abnormalities are found inside the coal mine. KEYWORDS: Arduino UNO, Coal mine, Monitoring, Alerting

## I. INTRODUCTION

The process of Underground mining operation through human laborers is a highly unsafe scenario where the risks increase with the increase in distance from the ground. The mining operations with unsafe manners are due to different methodologies utilized by the miners for extricating diverse minerals. The longer the mine, the more prominent is the hazard. The safety measures execution is very poor, especially in the coal mine industries. Coal is an essential resource to every nation as it has many commercial applications. The most integral employments of coal are in the production of thermal power, cement, and steel production and as a fuel for numerous applications.

The coal mines have numerous risky stipulations that include high temperature and humidity, and discharge of destructive gases that make unsafe surroundings for specialists working there. Many employees are taking off their occupations in coal mines or are no longer at all inclined to pick such employments as mining. This creates a lot of challenges in the accessibility of employees for the coal mining industry. The security of laborers working in coal mine industries is increasing day by day through technologies. The progressive innovation that enables the mine monitoring methods to become more sophisticated, however, explosions in underground coal mines still happen. The accidents of calamities in coal mines are mainly due to the harsh environments and unsafe working conditions. This makes the need of employing mine checking systems at a high level for coal mines. It is quite hard to analyse all the environmental conditions constantly in a coal mine manually.

A wireless sensor network for coal mining safety systems. In this wireless sensor networks application system, there will be controllers. The controllers will detect the danger and give an alert through RF to the controller and it will raise the alarm in all tunnels and also raise a message on IoT, which will help to take action as soon as

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Original scientific paper

## DAMPING ANALYSIS TO IMPROVE THE PERFORMANCE OF SHUNT CAPACITIVE RF MEMS SWITCH

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**Abstract**. This paper describes the significance of the iterative approach and the structure damping analysis which help to get better the performance and validation of shunt capacitive RF MEMS switch. The micro-cantilever based electrostatic ally actuated shunt capacitive RF MEMS switch is designed and after multiple iterations on cantilever structure a modification of the structure is obtained that requires low actuation voltage of 7.3 V for 3  $\mu$ m deformation. To validate the structure we have performed the damping analysis for each iteration. The low actuation voltage is a consequence of identifying the critical membrane thickness of 0.7  $\mu$ m, and incorporating two slots and holes into the membrane. The holes to the membrane help in stress distribution. We performed the Eigen frequency analysis of the membrane. The RF MEMS switch is micro machined on a CPW transmission line with Gap-Strip-Gap (G-S-G) of 85  $\mu$ m - 70  $\mu$ m - 85  $\mu$ m. The switch RF isolation properties are analyzed with high dielectric constant thin films i.e., AlN, GaAs, and HfO2. For all the dielectric thin films the RF MEMS switch shows a high isolation of -63.2 dB, but there is shift in the radio frequency. Because of presence of the holes in the membrane the switch exhibits a very low insertion loss of -0.12 dB.

Key words: Vibration analysis, RF MEMS switches, material science, FEM tools analysis.

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## A Novel Approach towards using Internet-of-Things in Smart Agriculture Monitoring System

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Abstract-With the introduction of the Internet-of-Things (IoT) in the field of agriculture, the concept of agribusiness has witnessed a surge in the production of high-quality crops, better yearly yield, and reduction in manual labor. This proposed technique is low-cost and easy to implement, which provides farmers with a smart field monitoring system with the aid of a mobile application and also provides a solution to tackle unsolicited climatic conditions without human intervention. Prediction of temperature, humidity, and rain for the next day is also a key feature of the system. In our proposed system, we have used a Node Micro Controller Unit, a Wi-Fi microchip for connectivity, various sensors for monitoring, various actuators for taking suitable actions, and an android application for displaying real-time data. The cloud used for storing real-time data is Firebase. The proposed technique will reduce human efforts to a great extent compared to the traditional way of farming. This concept can be implemented on large farmlands as well as polyhouses. This research proposes a prototype for a smart agriculture management system that would replace the time-consuming traditional farming approach with advanced technology that would not only assist in monitoring but also automate the essential operations without affecting crop quality and production.

Keywords—Internet of Things (IoT), Field Monitoring, Smart Agriculture.

### I. INTRODUCTION

The advancement of technology and innovation has resulted in the amelioration of every single field in an average person's life by making everything keen and astute. The ability to remotely monitor agricultural conditions and infrastructure can free up time, labour, and capital, allowing farmers to concentrate on other activities[1]. Farming adds to an imperative fragment of India's total economy. anticipating normal conditions, Considering and productivity can be extended further. Item quality relies upon data accumulated from the field. Agribusiness is the broadest budgetary domain that contributes significantly to India's progress, but there still remains a dearth of mechanical amelioration in this particular field.

Customary methods require a colossal entirety of time, human exertion, and require persistent checking. There are a couple of issues, for instance, abnormal atmosphere conditions, and the plants may be successfully impacted by disturbance and contamination in the customary methodology which might lead to unwanted hindrances in the proper crop development. Thus artificial farmings are a trend nowadays, for example, poly house farming [2].

A poly house is an enclosed area where the plants are nurtured on a platform that is controlled and is independent of location and other physical conditions. In other words, we can say it is a type of artificial farming. Generally, the poly

house is a structure fabricated using bamboos or iron channels which are made sure about with ultraviolet sheets of certain thicknesses.

In this paper, we have proposed a novel approach to automate the poly houses or large farmlands via internetbased services. We have provided methodologies to reduce the farmer's endeavor to such an extent that he can remotely monitor his farm without being present in that particular place.

#### **II. RELATED WORKS**

A Smart Agriculture Management System (SAMS) was proposed by G.S. Nagaraja et al. to aid farmers in improving the overall crop production [3]. By implementing a strategy called precision agriculture, the device also assists in eliminating resource loss. Gwo-Jiun Horng et al. suggested an IoT technology object detection algorithm for the development of a remote crop harvesting device [4]. A Mobile Net SSD model was the proposed object detection model; it's 84% mean accuracy was better as compared to the other models. Alongside that, an arm movement prediction model was developed using a four-hidden-layer perceptron model; and it achieved 89% mean picking accuracy. Siddhant Kumar et al. suggested gCrop, a smart strategy that uses IoT, image recognition, and machine learning technologies to track leafy crop growth and development and update the status in real time [5]. Leaves are the readily accessible and disposable components that could help to assess the crop's fitness, climate, and maturity dramatically. Muhammad Ayaz et al. suggested that the application of IoT and wireless sensors in agriculture should be illustrated, as well as the difficulties that are likely to be encountered when this technology is combined with conventional farming practices [6]. What type of sensors are available for unique farming applications like soil preparation, crop condition, irrigation, identification of insects, and pests. In [7], Muhammad Shoaib Farooq et al. advised several facets of innovations involved in the field of IoT in agriculture and clarified the key components of smart farming based on IoT.There has been a thorough examination of network architectures used in IoT-based agriculture, covering network design and layers, network topologies, and protocols.

In[8], Md Ashifuddin Mondal et al. suggested an Internet of Things (IoT)-based smart farming approach to deal with adverse circumstances. It is possible to implement smart farming, which provides high-precision crop management, useful data collection, and automated farming techniques. This work provides a smart field management device for agriculture that controls soil humidity and temperature. The IoT environment and how the combination of IoT and DA

## PATIENT MONITORING SYSTEM USING IOT

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**Abstract**— There have been attempts to use modern technology in numerous sectors to improve the quality of human life as technology has improved and sensors have been miniaturized. The healthcare sector is one of the key areas of research where the technology has been adopted. People who require healthcare services find them to be prohibitively expensive, which is especially true in poor countries. As a result, this initiative is an attempt to address a contemporary healthcare issue in society. The project's major goal was to create a remote healthcare system. It is divided into three sections. The Internet of Things (IoT) concepts have been widely employed to connect accessible medical resources and provide patients with smart, dependable, and effective healthcare. One of the paradigms that can use the IoT advantages to improve the patient's lifestyle is health monitoring for active and supported living. I demonstrated an IoT architecture tailored for healthcare applications in this project. The goal of the project was to develop a Remote Health Monitoring System that could be manufactured with readily available sensors and would be inexpensive if mass-produced. As a result, the suggested architecture captures sensor data via Arduino and relays it to the cloud, where it is processed and analyzed for remote viewing. The data is sent to the mobile application and shown on the lcd screen using the wi/fi module ESP2866WIFI/module and NODE mc based on the monitoring and visualization. In the event of a high risk, the notification and alarm beep action is activated.

Index Terms – Arduino, IOT, NodeMCU, WIFI, *mobile application* 

## **I** Introduction

Due to several risk factors such as food choices, physical inactivity, and alcohol usage, among others, the number of persons with chronic diseases in low and middle income nations is increasing. According to a World Health Organization report, 4.9 million people die from lung cancer as a result of snuff use, 2.6 million from being overweight, 4.4 million from having high cholesterol, and 7.1 million from having high blood pressure. Chronic diseases have a wide range of symptoms, progression, and treatment options. Some of them can kill a patient if they aren't detected and treated early enough.

Traditional checkups in specialist health clinics were the standard technique of monitoring glucose levels, blood pressure levels, and heart rhythm for many years. Today's technical advancements have resulted in a wide range of running sensor vital sign reading devices, including as blood pressure cuffs, glucometers, heart rate monitors, and electrocardiograms, that allow patients to take their vital signs on a regular basis.

The daily readings are submitted to doctors, who will prescribe medicine and exercise routines to help patients enhance their quality of life and overcome ailments. In order to improve people's quality of life, the internet of things is rapidly being used in the health sector to care for and monitor patients.

The Internet of Things (IoT) is described as the integration of all network-connected devices that can be managed via the web and offer real-time data to allow interaction with people who use it.

The Internet of Things, on the other hand, can be viewed via three paradigms: Internet-oriented middleware, things sensors-oriented, and knowledge-oriented semantics. The Arduino is a programmable device that is capable of sensing

## Certifact

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**Abstract**—In this paper we design and build a responsive website for all the faculty members and students of our college to upload certificates. The main objective of the website is to gather certificates from students and faculty and generate reports year wise, department wise, certificate type wise and so on. Here certificate is obtained by student or faculty which is after successful completion of any courses (MOOCS/NPTEL/offline) or by participating in webinars.

The front-end "client side" is developed with the help of HTML, CSS, JavaScript and bootstrap. The back-end "server side" is developed using php. And here we have used database to store all the gathered information. The website will allow a new user to register and get access into the website and who have already registered before can login into the website at any time and can upload their certificates through this website easily.

Admin can login into the website with default login credentials and access the certificates. Admin can even download the certificates in excel sheet or in zip file (all certificates based on specific requirement).

### 1. Introduction

Certifact is aimed at developing a data collection system to an institution by their students and faculty. The proposed system will help institution to gather data i.e., certificates from the students and faculty. A system that will be able to manage data which is collected by students and faculty of an institution and provide easy access. The data i.e., certificates that are obtained after successful completion of any course (online, offline, NPTEL) or webinar (online, offline). The proposed system will be developed with open-source platform on web. This will help the user to access the portal from any location using cloud servers. Admin can login through default login credentials and get access. Admin can view and filter all certificates that are collected by students and faculty. And even download the certificates in excel sheet or in zip file.

1.1 Problem Definition

Present system is a manual one in which users are maintaining documents paper work to store the information It is difficult to collect certificates from each and every student and faculty. And it is very difficult to maintain historical data. More manual hours need to generate required reports. It is tedious to manage historical data which needs much space to keep all the previous years, ledgers, documents paper work.

#### 1.2 Proposed System and its Merits

Certifact is a responsive website. The main aim is to accumulate certificates from students and faculty. New users have to register before uploading certificates. Student and faculty have different registration forms. After successful registration the user will get access to the website. They can login into the portal through their login credentials and upload their certificates. User can also view their uploaded certificates and chat with admin regarding any queries. Admin can view all the certificates and can filter those certificates. Admin can even download those certificates in excel sheet or zip file.

1.2.1 Advantages

Efficient

Certifact is designed in an easy environment and user friendly, that anyone can easily understand the web pages from login page to document submission. Every page is reliable and easy steps to create the account and use. The main important feature is in admin page, the admin can

## Volume XIV, Issue VI, June/2022

### DRIVER DROWSINESS DETECTION USING DEEP LEARNING Ms.P.PRAVALLIKA<sup>1,</sup> Ms. B.DURGA BHAVANI<sup>2</sup>, Ms. P.PAVITRA<sup>3</sup>, Mr.G,DILEEP VARMA<sup>4</sup>, Mr. K.SHANKAR<sup>5</sup>

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**Abstract**– In today's world, driver drowsiness has become one of the leading causes of traffic accidents. Various studies show that if a motorist is appropriately detected as fatigued and is promptly alerted, the number of accidents can be significantly reduced. To detect a drowsy driver, many strategies have been used. An in-depth analysis of several existing strategies for detecting fatigue in a driver is conducted in this project, followed by the development of a deep learning-based model to reliably identify a driver's state utilising a novel technique based on spatiotemporal aspects of the face. It can be determined that when this strategy is employed, the accuracy will significantly improve.

Index Terms- driver fatigue, deep learning, spatiotemporal features

## I Introduction

Driver tiredness is a significant factor in a wide range of vehicle collisions. According to recent findings, fatiguerelated accidents cause 1,200 deaths and 76,000 injuries each year. Every year, road accidents in Sri Lanka result in financial damages of roughly Rs.9.34 billion. As can be seen, there are approximately 2,400 traffic accidents every year, resulting in one death every four hours. Drowsiness is estimated to be the cause of 20% of car accidents resulting in driver fatalities. It was discovered that as a person becomes increasingly sleepy, their driving performance rapidly deteriorates, resulting in more than 20% of all car accidents. When a driver pays less attention, he or she becomes distracted, increasing the risk of a traffic collision.

Because of the increased speeds involved in distraction and the driver's inability to take any avoiding action, or even brake, before the accident, drowsiness-related accidents have all the makings of being more serious. In the realm of accident prevention systems, improving technologies for recognising or avoiding driver fatigue is an important test. Because of the dangers that drowsiness poses on the road, techniques for counteracting its effects must be devised. The loss of awareness that occurs as a result of exhaustion produces a number of changes in the human body and actions.

These side effects and criteria allow us to accurately assess the extent of drowsiness. Different sleepiness detection strategies

can be divided into two categories. The approaches employed in the first gathering identify the degree of fatigue based on physiological changes in the body. The tactics in the first classification include eye status, speech qualities, the time interval between two yawning, head posture, seating carriage, heart rate, and brain signals, to name a few. Additionally, drowsiness causes various alterations in driving style. Following these progressions, techniques in the second category evaluate the driver's sleepiness level. The following factors are considered: steering angle, distance from the following vehicle, lateral position of the vehicle, longitudinal speed, longitudinal speeding up, and lane departure.

#### 2 Literature survey

Commercial truck driver sleepiness is a big hazard that results in thousands of accidents and fatalities each year. The National Highway Traffic Safety Administration's Office of Crash Avoidance Research (OCAR) highlighted driver tiredness as one of the top causes of single and multiple car accidents in a 1994 report (Knipling 1994). According to the National Highway Traffic Safety Administration, 100,000 collisions involving driver drowsiness occur each year, resulting in more than 40,000 injuries.

b) Physical and physiological phenomena, as well as vehicle status factors, can be used to assess a driver's drowsiness. The measurement of brain wave or Electroencephalogram (EEG) (Akerstedt and Gillberg 1990; Huang, Kuo et al. 1996), and eye activity are examples of physical and physiological measurements (Skipper, Wierwille et al. 1984; Dingus, Hardee et al. 1985; Ueno, Kaneda et al. 1994; Ogawa and Shimotani 1997). PERCLOS (PERcent eyelid CLOSure) is one of the most extensively used methods for detecting and measuring

## ANTI-THEFT SECURITY ALERT SYSTEM

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### Abstract

For homes, businesses, and enterprises, security is one of the most important considerations. Unwanted intruders are deterred by having a strong security system. The Internet of Things-based anti-theft technology is ideal for protecting both homes and businesses. This IoT-based security system is set up to track any unexpected movement throughout the whole level of the building. When activated, a single movement could set off an alarm, alerting the property's owners to undesirable guests. It works like this: when you leave a house or a building, the Pir sensor is activated to track any movement in and around the premises. If an intruder were to break into the house, the sensor would send data to the microcontroller, which would then translate it into a signal for the camera to take an image of the intruder. This image is then emailed to the consumers' smartphones automatically.

Index Terms-Security, IOT, camera, image, PIR Sensor

## I Introduction

An embedded system is a computing device that is dedicated to a single task. Embedded systems include things like air conditioners, VCD players, DVD players, printers, fax machines, and cell phones. Each of these appliances will include a CPU and unique hardware to fulfil the application's specific requirements, as well as embedded software that is run by the processor to achieve those requirements. "Firm ware" is another term for embedded software. A desktop/laptop computer is a computer that may be used for a variety of tasks. It can be used for a range of tasks, including gaming, word processing, accounting, and software development. The software in embedded devices, on the other hand, is always fixed, as shown below:

Embedded systems are designed to do a single purpose and cannot be programmed to perform several tasks. Embedded systems have a certain amount of resources, especially memory. They don't usually have supplementary storage devices like CDROMs or floppy discs. Embedded systems are required to meet certain deadlines. A specified task must be done within a certain amount of time. Deadlines are strict in some embedded

systems, known as real-time systems. Missing a deadline can result in a disaster, such as death or property damage. Power is a constraint for embedded systems. Because many embedded devices are powered by a battery, power consumption must be kept to a minimum. Nearly 99 per cent of the processors manufactured end up in embedded systems. The embedded system market is one of the highest growth areas as these systems are used in very market segment- consumer electronics, office automation, industrial automation, biomedical engineering, wireless communication, At home we use a number of embedded systems which include digital camera, digital diary, DVD player, electronic toys, microwave oven, remote controls for TV and air-conditioner, VCO player, video game consoles, video recorders etc. Today's hightech car has about 20 embedded systems for transmission control, engine spark control, air- conditioning, navigation etc. Even wristwatches are now

becoming embedded systems. The palmtops are powerful embedded systems using which we can carry out many general-purpose tasks such as playing games and word processing.

#### 2 CIRCUIT OPERATION

#### 2.1 Power Supply:

The input to the circuit is applied from the regulated power supply. The ac input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The

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## FACE EMOTION DETECTION USING DEEP LEARNING

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## Abstract

In our lives emotions are the fundamentals for human beings and play an important role in human cognition. Expressing and recognizing emotions of human are very much important in communication system. Emotions can be expressed through gestures, speech, facial expressions, body language etc. Facial movement is the major role in expressing emotions. Expressing emotions varies from one person to another. Human emotions are classified as: surprise, fear, anger, happy, sad, disgust andneutral.

Emotions effect human both positively and negatively and at time applies on healthof an individual. People while in emotions need to come back to normalcy as quick and as easily as possible. In case of negative emotions effect negatively on body) need (that immediate treatment. Traditionally there are several ways to treat they include listening to music, reading a book, listening to humor, watching a movie, talking to a friend etc., Though these are good ways to overcome emotions, time and place (location) in today's world may have limitations. In today's digital world and days of smart phones we can overcome place and time factors. This necessitated us to think and develop a "Recommendation system" on the state of art technologies and concepts like "DEEP LEARNING". We come up with a solution in the form of "FACE EMOTION DETECTION USING DEEP LEARNING (FED)".

FED aims to personalize emotions driven recommendation of entertainment. To start with a case we have chosen Music as it has a great influence on humans and is widely used for relaxing, mood regulation, destruction from stress, to maintain mental and physical work.

FED is designed to the personalized music recommendation system driven by listener feelings, emotions and activity contexts. FED automates the capture and treatment of emotions by using classification algorithm and "DEEP LEARNING" techniques that categorizing the facial expressions. Though FED is presently focusing on Music, this can be further extended to several other entertainment types and solutions.

**Keywords:** Face emotion detection, Deep learning, Automates the capture treatment and Music.

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### DRIVER DROWSINESS DETECTION USING DEEP LEARNING Ms.P.PRAVALLIKA<sup>1,</sup> Ms. B.DURGA BHAVANI<sup>2</sup>, Ms. P.PAVITRA<sup>3</sup>, Mr.G,DILEEP VARMA<sup>4</sup>, Mr. K.SHANKAR<sup>5</sup>

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**Abstract**– In today's world, driver drowsiness has become one of the leading causes of traffic accidents. Various studies show that if a motorist is appropriately detected as fatigued and is promptly alerted, the number of accidents can be significantly reduced. To detect a drowsy driver, many strategies have been used. An in-depth analysis of several existing strategies for detecting fatigue in a driver is conducted in this project, followed by the development of a deep learning-based model to reliably identify a driver's state utilising a novel technique based on spatiotemporal aspects of the face. It can be determined that when this strategy is employed, the accuracy will significantly improve.

Index Terms- driver fatigue, deep learning, spatiotemporal features

## I Introduction

Driver tiredness is a significant factor in a wide range of vehicle collisions. According to recent findings, fatiguerelated accidents cause 1,200 deaths and 76,000 injuries each year. Every year, road accidents in Sri Lanka result in financial damages of roughly Rs.9.34 billion. As can be seen, there are approximately 2,400 traffic accidents every year, resulting in one death every four hours. Drowsiness is estimated to be the cause of 20% of car accidents resulting in driver fatalities. It was discovered that as a person becomes increasingly sleepy, their driving performance rapidly deteriorates, resulting in more than 20% of all car accidents. When a driver pays less attention, he or she becomes distracted, increasing the risk of a traffic collision.

Because of the increased speeds involved in distraction and the driver's inability to take any avoiding action, or even brake, before the accident, drowsiness-related accidents have all the makings of being more serious. In the realm of accident prevention systems, improving technologies for recognising or avoiding driver fatigue is an important test. Because of the dangers that drowsiness poses on the road, techniques for counteracting its effects must be devised. The loss of awareness that occurs as a result of exhaustion produces a number of changes in the human body and actions.

These side effects and criteria allow us to accurately assess the extent of drowsiness. Different sleepiness detection strategies

can be divided into two categories. The approaches employed in the first gathering identify the degree of fatigue based on physiological changes in the body. The tactics in the first classification include eye status, speech qualities, the time interval between two yawning, head posture, seating carriage, heart rate, and brain signals, to name a few. Additionally, drowsiness causes various alterations in driving style. Following these progressions, techniques in the second category evaluate the driver's sleepiness level. The following factors are considered: steering angle, distance from the following vehicle, lateral position of the vehicle, longitudinal speed, longitudinal speeding up, and lane departure.

#### 2 Literature survey

Commercial truck driver sleepiness is a big hazard that results in thousands of accidents and fatalities each year. The National Highway Traffic Safety Administration's Office of Crash Avoidance Research (OCAR) highlighted driver tiredness as one of the top causes of single and multiple car accidents in a 1994 report (Knipling 1994). According to the National Highway Traffic Safety Administration, 100,000 collisions involving driver drowsiness occur each year, resulting in more than 40,000 injuries.

b) Physical and physiological phenomena, as well as vehicle status factors, can be used to assess a driver's drowsiness. The measurement of brain wave or Electroencephalogram (EEG) (Akerstedt and Gillberg 1990; Huang, Kuo et al. 1996), and eye activity are examples of physical and physiological measurements (Skipper, Wierwille et al. 1984; Dingus, Hardee et al. 1985; Ueno, Kaneda et al. 1994; Ogawa and Shimotani 1997). PERCLOS (PERcent eyelid CLOSure) is one of the most extensively used methods for detecting and measuring

## **COVID19 EXPLORATORY DATA ANALSYIS AND VISULATION USING MAP**

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Abstract– The emerging new coronavirus (2019nCoV), which is caused by the respiratory syndrome coronavirus 2 (SARSCoV2), is today's leading cause of death threat. It's critical to assess the global pandemic's spread so that specific guide strategies can be established for total situational awareness and the application of traditional approaches to mitigate the global effects. This document includes a visual exploratory data analysis of countries based on the number of confirmed, recovered, and death cases, as well as a comparison of mortality and recovery rates for roughly 222 countries around the world. The countries are also clustered using K-means clustering based on the number of confirmed and fatal cases. As a result, this research may be used to assess the rise of risks in a given area by comparing the number of cases via visual analysis and working on the implementation of solutions to control their global expansion.

Index Terms- covid 19, data visualization, SARSCoV2, k-means,

## I Introduction

Experts agree that the only way to combat COVID-19 is to produce a vaccination. This, however, requires that a big enough number of people will receive a vaccine to create herd immunity. Because vaccinations are less effective in older persons, younger generations will need to have extremely high COVID-19 vaccination rates to provide herd immunity [1]. Existing vaccinations, such as those against measles, are already facing significant criticism, with some parents refusing to vaccinate their children. As a result of vaccine reluctance, the number of cases in the 2019 measles outbreak in the United States and worldwide rose [2]. Any future COVID-19 vaccine will virtually definitely have the same negative reaction [3], [4]. Recent pneumonia epidemics around the world have been caused by the deadly 2019 novel coronavirus (2019nCoV), which belongs to the Orthocoronavirinae subfamily. It's the eighth member of this family, and it's not related to MERS-CoV or SARS-CoV [1]. Using cell cultures and molecular technologies, the Chinese Center for Disease Control and Prevention (CDC) detected a novel type of pneumonia on December 12, 2019, which was determined to be non-SARS nCoV. Colds and diarrhoea are caused by the Coronaviridae family of single-stranded, largesized, plus-stranded RNA viruses [2-3]. In number of cases in

Wuhan, a province in Hubei, China [4]. The virus has spread to practically every country on the planet. It is thought to have begun when residents in some Wuhan neighbourhoods came into contact with local fish and wild animal markets, resulting in virus transmission to humans [5-6]. The World Health Organization termed this pandemic virus coronavirus illness (COVID19) (WHO). As of June 12, 2020, there were 7,410,510 cases of COVID-19 worldwide, with 418,294 deaths, according to the WHO's Situation Report 144. Nearly 84,659 cases have been confirmed in China, with 7 new cases confirmed and 4,645 deaths, while cases in other parts of the world are rapidly increasing. 2019nCoV has been called SARSCoV2 by the International Committee on Virus Taxonomy. COVID-19 has been declared a global pandemic, necessitating the use of exploratory data analysis (EDA) in the future to locate such locations and inform people. To stop the outbreak, governments, health specialists, and security officials from all across the world are collaborating. The following section focuses on investigating the COVID-19 epidemic using some simple visualisation techniques.

#### 2 Literature survey

Anti-vaccination information is widely disseminated on the Internet. This work improves on earlier research by investigating the arguments made on anti-vaccine websites, determining the level of disinformation, and examining the

## GAME DEVELOPMENT

### Mr. K.HARSHA VARDHAN SRINIVAS<sup>1,</sup> Mr. DEEPAK PEMMISETTY<sup>2</sup>, Mr. DEBASHISH NANDI, Mr. S.MIRZA DUWAL ALI BAIG<sup>4</sup> , Mrs. R. PRIYA VAIJAYANTHI <sup>5</sup>

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**Abstract**— In today's world, games are a \$200 billion industry, with highly skilled developers working around the clock to create interactive works of art. Project Rescue is a third-person shooter with a strong focus on gameplay and originality. The scenario takes place in space, with a large number of "invaders" attempting to take over the spot where you are. The goal of the game is to eliminate the invaders while keeping your location safe. The game should be adapted to PC devices and made available through the appropriate shop. The game must be able to be expanded in the future for updates and makeovers. The project participants will source all of the assets used in the project. The project concept must include the ability to add multiplayer functionality and the ability to add new levels in the future. The assets and game components must have a "space style" art style, similar to Warframe. The game's size must be lowered to fit the mobile space, and assets must be added from scratch. Except for the PC version, which must adhere to graphical quality criteria. Project Rescue will hopefully provide us with the opportunity to break into this business and make a bold move toward combining our passion and future chances.

Index Terms – War frame PC Device Graphical quality

#### I Introduction

Project Rescue is a first-person shooter game for one player. This game is available for the PC and Android platforms. With its Shooting Hack & Slash sort of gameplay, this game is designed to be intense while still being a stress-relieving way of entertainment. With a scenario situated in space, there are a slew of invaders who are now computer AI designed to behave as foes. The game's assets and components were entirely created from scratch or obtained from a free open-source platform. The game is also built in such a way that the developers should be able to add new features in the future. There will also be several levels enabling players to modify the game's rythm. As well as the combat's ferocity. The game's

combat style is basic, with little to no stealth, but it will also contain Hack and Slash undertones, giving it a fresh feel. Volume XIV, Issue VI, June/2022 Project Rescue is a game that takes place in space. First Person Perspective, Shooting, Space, and Single Player are the game's genres. The team's game is designed to provide gamers with an intense yet comfortable gameplay experience.

This project also aims to reconstruct all of the world's needed physics systems, resulting in a far more realistic experience. The AI in the game was created from the ground up and is completely unrelated to the gameplay premise. Customized 3D objects, sounds, and music are also used in the game.

textures and shaders that aid in the compression of the game's size in terms of storage. The game is also built in such a way that the developers should be able to add new features in the future. This will allow the game's developers to add more content in future releases. The game presently has numerous levels that the user can play, each with a different geography and gameplay. The fighting system should be simple to use and enjoyable to play, with a fast-paced experience. The game must load quickly, allowing for minimal wait times and a seamless experience.

## GAME DEVELOPMENT

### Mr. K.HARSHA VARDHAN SRINIVAS<sup>1,</sup> Mr. DEEPAK PEMMISETTY<sup>2</sup>, Mr. DEBASHISH NANDI, Mr. S.MIRZA DUWAL ALI BAIG<sup>4</sup> , Mrs. R. PRIYA VAIJAYANTHI <sup>5</sup>

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## **Tampered Image Detection using Neural Network**

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## Abstract

In today's digital world tampering pictures has become a common issue. There are a lot of tampered images floating around digital media. Especially with the advancement of image manipulating software tools which are available online, tampering a digital image has become very easy task. Even though tampered images provide us a significant aesthetic view of the picture they can be used for malicious intent too. These images are much difficult to be detected with human eye which challenges the reliability of digital images as real-world events. The main objective is to detect a digital image whether it is genuine or tampered. The tampered digital images are detected by trained neural network using Error Level Analysis along with a supporting feature Metadata Extractor. The metadata analyser is basically a tag searching algorithm. The rate of compression of the external content in a tampered image will be divergent from that of a genuine image which can be identified by Error-Level analysis. The error level analysed image is given as input to the Multi-Layered Perceptron Network. A Multilayer Perceptron (MLP) is a feedforward artificial neural network (ANN) which consists of input, hidden and output layers. The output layer has two neurons representing fakeness and realness. The digital image is classified as fake or real by a neural network which is trained with the highest success rate and using this desktop application will greatly reduce the spread of the manipulated images.

*Keywords:* Tampered Image, Neural Network, Multi-layer Perceptron, Metadata extractor, Error Level Analysis.

## **1. Introduction**

Tampering or forging an image means altering a digital image by adding or removing few parts from it thereby creating a new image. Sometimes, it is difficult to identify the processed area of the authentic image [1]. In the 21st century, digital images are being used everywhere, not just on social networks, but also in business, government, military, legal, industrial, forensic, medical and fashion institutions. Some of the digital image editing tools are Photoshop, Pixlr, Gimp. Today, these effective images modifying software's allow people to alter an image and regulate those images without difficulty in a quick length of time. Despite

## SPAMMER DETECTION AND FAKE USER IDENTIFICATION

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**Abstract** — Millions of people utilise social networking services all over the world. Users' interactions with social media sites like Twitter and Facebook have a huge impact on daily life, with some unfavourable consequences. Spammers have converted popular social networking sites into a target platform for disseminating a large number of irrelevant and harmful information. Twitter, for example, has grown to be one of the most widely utilised platforms of all time, allowing for an excessive amount of spam. Fake users send unwanted tweets to users in order to advertise services or websites, which not only harm actual users but also waste resources. Moreover, We examine the approaches used to detect spammers on Twitter in this research. Furthermore, a taxonomy of Twitter spam detection algorithms is offered, which groups the strategies into four categories based on their capacity to detect: I fake content, (ii) spam based on URL, (iii) spam in hot topics, and (iv) fake users. The offered methodologies are also compared based on several characteristics, such as user characteristics, content characteristics, graph characteristics, structural characteristics, and temporal characteristics. We expect that the provided study will be a beneficial resource for academics looking for a single platform to find the highlights of current breakthroughs in Twitter spam detection.

Index Terms - spam detection, URL features, graph features SVM, Random Forest, machine Learning

## **I** Introduction

Over the last few years, online social networks (OSNs) such as Facebook, Twitter, Ren Ren, LinkedIn, Google, and Tuenti have become increasingly popular. People use OSNs to keep in touch with one another, share information, plan events, and even establish their own e-business. Between 2014 and 2018, non-profits spent over 2.53 million dollars on funding political advertising on Facebook. OSNs are vulnerable to Sybil attacks due to their open nature and the large amount of sensitive information they hold for its subscribers. Face book noted abuse in 2012, as well as the publication of false news, hate speech, sensational and polarising content, and a few other things. Researchers have also taken an interest in online Social Networks (OSNs) for mining and analysing their vast amounts of data, as well as researching and learning about individuals' behaviours and sleuthing their unusual activities. Volume XIV, Issue VI, June/2022

Researchers have developed a study to anticipate, assess, and justify consumers' loyalty to a social media-based online community by identifying the most effective psychological feature alternatives that predict their customers' perspective. With around two.2 billion monthly active users and one.4 billion daily active users, Facebook's community continues to grow, with a year-over-year increase of St Martin's Day. Face book reported total revenue of \$13.2 billion in the second quarter of 2018, with \$13.0 billion coming purely from advertisements. In 2015, Facebook calculated that over fourteen million of its monthly active users are actually unwanted, i.e., malevolent fake identities created in violation of the website's terms of service. Security and privacy of information Maintaining and meeting these needs are among the first needs of social network users, and meeting them will improve network quality and, eventually, income. To deal with the growing problem of fake/malicious accounts, OSNs are employing a variety of detective algorithms and Page No : 1924



## Virtual Screening and Evaluation Application for Recruitment

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ABSTRACT: Automation is the replacement of manual work with technology to keep up with robust software solutions and reduce manual intervention. By using technology for screening, assessing, and ranking candidates, you can remove any common hiring biases and ensure the process remains completely objective. The main theme of the project is to develop a web application to conduct a virtual interview in the absence of HR by using a micro web-framework called Flask, which is a Python module that lets us to develop web applications. A user-friendly HR panel is provided to the HRs for the quick access of candidate information. An Automated screening system provides great services in selection of talented candidate which also reduces the interaction time and increase in quality of hiring.

**KEYWORDS:** PYTHON, AUTOMATION, FLASK, MYSQL-WORKBENCH 8.0 CE

## I. INTRODUCTION

Recruiting by implementing automation is a category of hiring process that allows companies to automate recruiting tasks and workflows. This project is aimed at developing a web application for conducting virtual interview in the absence of HR. The proposed system will help HR. So, when HR is in tight schedule, overloaded with hiring process and at the time of mass hiring the concern web application plays a major role. The system consists of features like Automated resume screening which reduces time to hire by saving recruiters spend hours of time for manually reading resumes, evaluation of answers, conducting strict interview. Whereas Automation is User-friendly to candidate, which benefits in continuous monitoring during interview. Candidate can able to seek the help of technical support if any technical issue is taken place. Hence this automated system is not only feasible to candidate but also for the HR as well. The system consisting of HR panel which helps to get candidate information like number of candidates attended interview, pictures of candidate during interview, Resume of the candidate and introduction of candidate. So automated system which is connect to database provides the facility to the all the HRs to access the candidate information any time with the help of HR panel. The system will automatically transfer the candidate information which was stored in database to the HR panel.

## **II. OBJECTIVES**

Automation Provides consistency, accurate candidate performance tracking also Reduces Recruiter intensive administrative activities. Because of this Virtual recruiting process Unlimited time savage, energy and resources for the company, limited human error and workforce bias. Provides the facility to easily choose the best performed candidate during mass hiring. This type of hiring environment is User-friendly environment for interview to candidate.

## **III. LITERATURE SURVEY**

The migration of educational evaluation methods when comes coming towards the concept of virtual assessment process is a combination of the virtual assessment system with speech recognition system. The voice will be so used to evaluate the answers. Not only by using key

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## **Disease Prediction Based on Symptoms by Using Decision Tree And Random Forest In Machine Learning**

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## ABSTRACT

Article Info	The medical care space is one of the unmistakable examination fields in the
Volume 8, Issue 3	ongoing situation with the fast improvement of innovation and information.
Page Number : 419-427	Dealing with the colossal measure of information of the patients is troublesome.
	Taking care of this information through Big Data Analytics is simpler. There are
Publication Issue :	a ton of methodology for the treatment of different infections across the world.
May-June-2022	AI is an arising approach that aides in expectation, determination of an illness.
	This venture portrays the expectation of illness in light of side effects utilizing
Article History	AI. AI calculations, for example, Support Vector Machine, Decision Tree and
Accepted: 10 June 2022	Random Forest are utilized on the gave dataset and anticipate the sickness. Its
Published: 25 June 2022	execution is finished through the python programming language. The task
	exhibits the best calculation in light of their exactness. The exactness of a not
	entirely set in stone by the presentation on the given dataset.
	<b>Keywords</b> : CNN, KNN, Machine learning, Disease Prediction,

## I. INTRODUCTION

Medication and medical care are probably the most essential pieces of the economy and human existence. There is a colossal measure of progress on the planet we are living in now and the world that existed half a month back. Everything has turned frightful and unique. In this present circumstance, where everything has turned virtual, the specialists and medical attendants are investing most extreme amounts of energy to save individuals' lives regardless of whether they need to peril their own. There are likewise a few distant towns which need clinical offices. Virtual specialists board-ensured are specialists who decide to rehearse online by means of video and telephone arrangements, as opposed to face to face arrangements yet this is beyond the realm of possibilities on account of crisis. Machines are constantly viewed as better compared to people as, with no human mistake, they can perform undertakings all the more productively and with a reliable degree of precision.

Sickness indicator can be known as a virtual specialist, which can foresee the infection of any persistent with no human blunder. Additionally, in conditions like

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## Structured information extraction and analysis of Twitter data

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## ABSTRACT:

Researchers have gathered Twitter data to investigate a variety of subjects. This growing body of knowledge, however, has yet to be comprehensively examined in order to consolidate Twitter-related articles. Traditional methods of manually selecting and analysing samples of topically related papers have constrained the scope of existing literature review studies. The objectives of this retrospective study are to identify the most popular Twitter-based research topics, summarise the temporal trend of topics, and interpret the evolution of topics over the last ten years. This work uses an efficient and effective approach to systematically mine a large number of Twitter-based studies in order to characterise the relevant literature. This study gathered relevant papers from three databases and used text mining and trend analysis to uncover semantic trends and track the evolution of research subjects over the course of a decade. In more than 18,000 manuscripts published between 2006 and 2019, we discovered 38 topics. This study discovered that although 23.7 percent of topics showed no significant trend (P > 0.05), 21% of topics had increasing trends, and 55.3 percent of topics had decreasing trends. These hot and cold topics are divided into three categories: application, methodology, and technology. Researchers, educators, and publishers will benefit from the contributions of this study, which can be used in the developing field of Twitter-based research.

KeyWords:Literaturereview,socialmedia,survey,textmining,topicmodeling,Twitter.

Twitter is a computer-mediated online communication tool that is shaping an emerging social structure. This social networking site has 1.3 billion accounts and 336 million active users, who send 500 million tweets every day [1]. Twitter users can post "tweets," which were formerly limited to 140 characters and are now limited to 280 characters. Tweets are publicly viewable unless they are kept private, and Twitter users can demonstrate their reaction to and engagement with a tweet by retweeting it, clicking the like button, tagging someone's user name, or commenting to the tweet's author [2].

Twitter has also made data collection easier by providing Application Programming Interfaces (APIs). A user can apply for a developer account to gain access to the API. 1 The user has access to four keys after the application is approved: consumer key, consumer secret, access token, and access secret [20]. These keys allow the user to access Twitter data such as tweets and