

IEI

Epitome

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A Century of Service to the Nation

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Members

in the News

Dr Pradeep Kumar Singh, FIE

Chairman, Dhanbad Local Centre, The Institution of Engineers (India) & Director, CSIR-CIMFR, Dhanbad

Has been elected as the Fellow of the prestigious Indian Academy of Sciences, Bengaluru, in recognition to his pioneering work in the field of strategic sectors of mining and coal science.



Mr Mahesh Kisan Borate, AMIE

Datta Meghe College of Engineering, Mumbai University

Received the Best Poster Award for his poster titled Development of Design Strategy for Dual Fuel Fired Industrial Furnace: System Identification and Synthesis' presented in ICNTE 2021 organized by Fr C Rodrigues Institute of Technology, Vashi, Navi Mumbai during January 15-16, 2021.

Has been awarded the Special Recognition for Research Excellence in PhD (Regional) Category under IEI BLC-FCRIT Excellence Award. The Award has been jointly presented by The Institution of Engineers (India), Belapur Local Centre and Fr. C. Rodrigues Institute of Technology, Vashi during ICNTE 2021, held at Fr. C. Rodrigues Institute of Technology, Vashi on January 16, 2021.

Mr Saravana Murugan Perumal, FIE

Senior Engineer / Rotating Equipment Engineer, Dubai Petroleum

Elected as the Member of the Institution of Mechanical Engineers, UK.



Dr Omkar Suresh Vaidya, MIE

Assistant Professor, Department of Electronics & Telecommunication Engineering, Sandip Institute of Technology & Research Centre, Nashik, Maharashtra

Conferred with the Best Outstanding Young Researcher National Award 2020 from Kamarajar Institute of Education and Research (KIER), Theni, Tamilnadu for his dedication and excellence in the field of education and research.

Mr T Raveendra Babu, MIE

Executive Engineer, Central Public Works Department, Bhubaneswar

Obtained First Rank in AP LawCET 2020 Common Entrance Examination for admission in 3-year LLB course.



Members

in the News



Mr Logesh Rajendran, MIE,

Research Scholar, Department of Computer Science and Information Systems, BITS Pilani

Won the SILVER AWARD under the Research Scholar category for his case study presentation at the CII MILCA AWARD 2020.

Mr Rao Mannepalli, FIE

Chief Engineer, Raytheon Technologies, USA

Elected as the Fellow of the Royal Aeronautical Society (RAeS), UK.



Dr Naga Eswara Naveen Pasala, AMIE

Department of Mechanical Engineering, NS Raju Institute of Technology, Visakhapatnam, Andhra Pradesh

Qualified for the Award of Degree of Doctor of Philosophy (PhD) in the Faculty of Engineering, Gandhi Institute of Technology and Management (GITAM), Deemed to be University in the year 2021 for the Thesis entitled 'Performance Evaluation of Plastic Gears Composed of Carbon Nano Tubes Reinforced POM/PTFE Blends' under the Guidance of Prof. H Ravisankar, Ph.D, Dept. of Mechanical Engineering, GITAM.

Dr Dhandha Kamal Harikrishna, AMIE

Senior Inspection Engineer, TUV India Private Limited, Ahmedabad

Awarded PhD in Mechanical Engineering from Uka Tarsadia University, Bardoli, Surat on the topic 'Development of Flux assisted Tungsten Inert Gas Welding Process for Modified 9Cr-1Mo Steel', under the guidance of Dr Vishvesh J Badheka, Professor and Head, Department of Mechanical Engineering, School of Technology, Pandit Deendayal Petroleum University, Gandhinagar.



Mr N Hariharan, MIE

Techno-legal Consultant

Elected Sr Vice President (South), Indian Institute of Technical Arbitrators, Chennai for the biennium, ending in 2021.

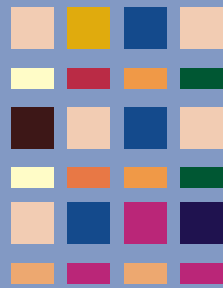
Mr Uthappa M M, FIE

Research Scholar, Visvesaraya Technological University, Belgaum, Karnataka

Participated in the 32nd World Conference on Applied Science, Engineering and Technology, held during 30-31 December, 2020 at Goa, organised by the Institute For Engineering Research and Publication along with an oral presentation on the topic 'A Comparative Study and Analysis of Factors Influencing Project Team Motivation in Large Private and Public Sector Companies in India'.



Publication by Members



Dr E Bhaskaran, MIE

Joint Director (Engineering), Department of Industries and Commerce, Government of Tamil Nadu

Email: e.bhaskaran19@gmail.com

Title of Paper: "The Performance of Women Readymade Garments Cluster", *Productivity : A Quarterly Journal of The National Productivity Council*, 61(2), 2020-21, pp 154-168.

DoI : 10.32381/PROD.2020.61.02.4

Abstract: WRMGC was formed by 30 women entrepreneurs as a special purpose vehicle (SPV) for setting up of a common facility centre under the Government of India scheme, viz., Micro and Small Enterprises Cluster Development Programme (MSE-CDP), engaged in ready made garment manufacture in and around Dhalavaipuram, Virudhunagar district of Tamil Nadu. The objective is to study the Physical and Financial Performance of Women Ready Made Garment Cluster before and after Cluster Development Approach (CDA) and also Difference in Differences of the control and the treated groups. The methodology adopted is collection of primary and secondary data from 375 cluster members and using SCOT Analysis, CAGR, Descriptive Analysis, Correlation Analysis, Regression Analysis, Time Series Analysis, T-Test ANOVA, Difference in Differences Analysis, Value Chain Analysis and development of Cluster Map. To conclude, there is significant increase in no. of units, employment and machinery, which are all an independent variables, and significant increase in Turnover which is a dependent variable. The Difference in Difference (DID) value is a positive one which implies the treated group has got much benefitted on CDA when compared to control group which have not adopted CDA, which also implies that the government's policy on CDA is a success. The WRMGC still needs to tap export market to compete in the global market.



Dr Manoj Wagh, AMIE

Associate Professor, Padmashri Dr Vithalrao Vikhe Patil College of Engineering, Ahmadnagar

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Title of Paper: "The Strength Assessment of Polymer Fiber-Induced Concrete", *Open Journal of Science and Technology*, 3(4), 2020.

https://www.researchgate.net/publication/348116242_Strength_Assessment_of_polymer_fiber_induced_concrete

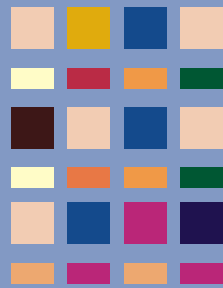
Co-authors: Piyush K Bhandari, Ayan Sengupta

Abstract: Concrete utilization has become one of the basic needs of humans in today's industrialization and urbanization scenario. Ingredients of concrete include cement, sand and aggregates. Cement production is associated with CO2 emission and green house emission issues. Availability of sand and aggregate is also creating serious issue these days. Handling of concrete required technical expertise and day to day research advancements are made to solve issues related to concrete being weak in tensile strength. Weakness in concrete can be mitigated by adding fibers which help to improve tensile strength of concrete. Fibers are available in the form of waste polythene, discarded rubber tyres of automobiles, etc. Polymer fibers can provide better strength. It increases ductility and reduces deflection in large concrete members of structure. In current work, Polythene and rubber tyres were cut down to fine fibers and added in concrete as replacement to cement in different incremental percentages. M30 grade of concrete was prepared. M30 and above grade concrete are generally utilized in construction of industrial flooring. Different tests performed on polymer fiber induced concrete revealed that it can be suitably used as substitute to normal M30 concrete for temperature and impact resistant flooring construction.

Keywords: Keywords: Polymer Fibers; Waste Polythene; Rubber Tyres; Compressive Strength; Industrial Flooring



Publication by Members



Ms Uma Kulkarni, MIE

KLE Dr M.S Sheshgiri College of Engineering and Technology, Affiliated to VTU, Belagavi, Karnataka

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Title of Paper: "Power Efficiency Tracking of Induction Furnaces", 2020 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT), Bangalore, 2020, pp. 1-4.

doi: [10.1109/CONECCT50063.2020.9198417](https://doi.org/10.1109/CONECCT50063.2020.9198417)

Co-author: Uday Wali



Abstract: Induction melting is a very energy intensive and dynamic process. Therefore, improving the power efficiency is critical to reduce the cost of production. Saving of just a percent of energy can reduce the power bill considerably. There are several factors that contribute to power efficiency and hence difficult to control these parameters. The melting process and the furnace characteristics are unique to each melt and vary with the melt material and its physical properties. Therefore, developing a maximum power transfer method for induction melting is necessary. We have collected real time data from a 3KHz,40KW coreless induction furnace for several heats. We have considered three different materials viz., Cast-iron, SG Iron and Wrought Iron to tabulate the data to be input to the process. The focus here is to show that the frequency of the system varies with the change in weight of melt instead of a predefined resonating frequency. This variation in frequency increases the melting time and therefore the power consumption. If frequency variations can be reduced, then the power consumption can be reduced. The paper shows that there is scope to improve performance of induction furnace by using a machine learning technique.

Keywords: Frequency; Data Collection; Data Analysis; Power Efficiency; MPPT; Machine Learning.

Mr Swapnil Yashavant Gadgune, MIE

Assistant Professor, Padmabhooshan Vasantraodada Patil Institute of Technology (PVPIT), Budhgaon, Sangli, Maharashtra

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Title of Paper: "Control of Three-Phase PWM Rectifier as Virtual Synchronous Machine Using an Integral Sliding Mode Controller", *Journal of The Institution of Engineers (India): Series B Electrical, Electronics & Telecommunication and Computer Engineering* ISSN 2250-2106 J. Inst. Eng. India Ser. B, 2020.

DoI [10.1007/s40031-020-00523-z](https://doi.org/10.1007/s40031-020-00523-z)

<https://link.springer.com/article/10.1007/s40031-020-00523-z#citeas>

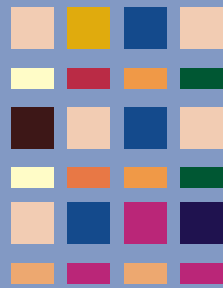
Co-author: PM Joshi



Abstract: This paper discusses the control of PWM rectifier using an integral sliding mode controller (ISMC). The proposed ISMC is able to stabilize the DC link voltage and guarantee the input current sinusoidal. The control strategy is used to operate a rectifier as a virtual synchronous motor. The proposed technique is validated by simulation in MATLAB/Simulink. Unity power factor and precise regulation of the DC link voltage are achieved.

Keywords: VSM; ISMC; PWM; VISMA.

Publication by Members



Mr K Saisarath, AMIE

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Title of Paper: "Feasibility of Biofuels as a Substitute to Conventional Fuels in IC Engines for Mass Transport and Distributed Power Generation", *Distributed Generation and Alternative Energy Journal*, 35 (1), 2020, pp 47-74.

Co-author: Rayapati Subbarao



Abstract: Depletion of petroleum based fuels has been a lot of concern among the governments and researchers around the world. Usage of biofuels in place of the conventional fuels is showing rapid growth because of the favourable characteristics like better performance and time improved emission characteristics. Present paper discusses about different available biofuels and their effectiveness in replacing fossil fuels and also how they affect the technological growth. Different works are compared to bring out the actual scenario with respect to the performance, emission, availability, production and preparation methods. It is observed that much effort is made by the stake holders in order to see biofuels as a viable alternative and as a future fuel for internal combustion engines. Performance improves slightly with the usage of biofuels and reduced emission characteristics may be logical to observe. But it may not be appreciable, considering the series of production processes involved. It still requires lot of time to commercialize and produce biofuels in mass. Also, there have been constraints like the availability of raw materials for the same. It is concluded that biofuels do play significant role in the days to come provided there is much more effort from researchers to simplify the technology in making biofuel as sustainable and cost effective with at least comparable performance.

Keywords: Biofuels; Diesel Engine; Alternative Fuels; Emissions.

Mr R Praveen Kumar, MIE

Department of Electronics and Communication Engineering, Easwari Engineering College, Chennai

Email: praveenkumar.r@eec.srmrmp.edu.in

Title of Paper: "Ingenious Lighting System (ILS) for Smart Cities Using IoT. In: Raj J.S. (eds) International Conference on Mobile Computing and Sustainable Informatics". *ICMCSI 2020. EAI/Springer Innovations in Communication and Computing. Springer, Cham.* pp 161-170.

https://link.springer.com/chapter/10.1007/978-3-030-49795-8_14

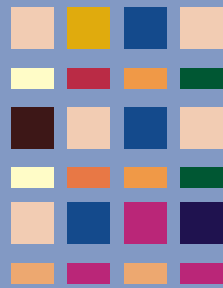
Co-authors: S Smys, Jennifer S Raj



Abstract: The main focus of the smart city relates to safety, expedient, easy process, and improved power consumption. As street light is an important device associated with safety in the urban areas and the reason for the major power utilization, the paper concentrates on developing street lights with adjustable luminance to reduce power usage. The proposed method utilizes the raspberry pi based ingenious lighting system (ISL) to improve energy efficiency and meet the above needs. In this proposed system, an ingenious lighting system is implemented by raspberry pi, and it is used to trace and adjust the entire node. In this proposed system, it consists of three sensors, namely, LDR, IR, and current sensor, which are connected to one lamp node; if one node gets failure, then raspberry pi gets network from another node and it provides to the failure node. This project is highly automated and traces street lamp status and automatically finds node failure, and it is immediately resolved by Raspberry Pi using another node network.

Keywords : Energy Saving; Light Intensity Adjustment; Raspberry Pi; LDR Sensor; IR Sensor; Current Sensor and light Dimmer.

Publication by Members



Dr Ardhendu Saha, FIE

Professor, Department of Electrical Engineering, NIT Agartala, Tripura

Email: arsaagtwave@gmail.com

Title of Paper: “Calibrated non-contact Vibrational Harmonics Measurement based on Self-Vibration Compensated 2D-PSD with MEMS Accelerometer using FFT Analysis”, *IET Science, Measurement & Technology*, 14 (8), 2020, pp 877–882.

doi: 10.1049/iet-smt.2019.0229

Co-authors: Sampa Das, Chanda Sujith Kumar



Abstract: This study presents a novel fast Fourier transform (FFT)-based non-contact vibrational harmonics measurement system using a position sensitive detector (PSD) along with calibration using a piezoelectric accelerometer. Frequency-domain vibrational analysis is required as the changes in machine dynamics are directly related to its failures and could provide more insight into the vibration signal. In this regard, FFT is used for spectral analysis to detect the harmonics in the vibration signal. The novelty of the applied technique for detecting vibrational harmonics lies in its innate contactless nature where the vibration detection sensor i.e. PSD is placed at a particular distance from the vibrating target. Additionally, the parasitic and external vibrations, which might pose unforeseen errors in the detected vibration data, have been nullified by employing a self-vibration technique using an ADXL-345 three-axis accelerometer. The results obtained through PSD have been calibrated via a standard Brüel & Kjaer (B & K) vibration measurement system which uses a piezoelectric accelerometer (B & K accelerometer). The proposed measurement technique is equipped with NI compact RIO-9074 that features a real-time processor and an FPGA. The system was observed to effectively measure the frequency range 5–600 Hz with a maximum relative error of 2% in FFT amplitudes.

Keywords: Frequency-domain Analysis; Accelerometers; Vibration Measurement; Fast Fourier Transforms.

Prof Jayarajan P, FIE

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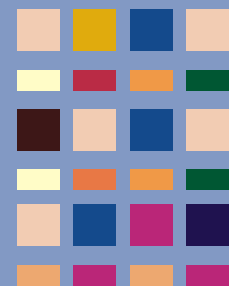
Title of Paper: “Application of Conditional Mean Spectrum in the Seismic Assessment of a Braced Frame Steel Structure”, *IOP Conf. Series: Materials Science and Engineering, International Conference on Materials, Mechanics and Structures, Kerala, 936, 2020, 012030.*

doi:10.1088/1757-899X/936/1/012030



Abstract: Detailed engineering of critical infrastructure and tall buildings require that their response be estimated from nonlinear response history analysis (NLRHA) by subjecting the structure to suites of earthquake accelerograms. Selection of ground motion records due to future earthquake events represent an important step in the robust assessment of structural response. As per the current practice, both site-specific uniform hazard spectrum (UHS) and conditional mean spectrum (CMS) are employed as the target spectra for ground motion record selection. The CMS approach is superior considering that it represents realistic seismic events and also consider the multiple natural periods of the structure. The paper presents the application of conditional mean spectrum in the seismic assessment of an eight-story ordinary braced steel structure built on an example site. The NLRHA was conducted using the ground motions spectrally matched to the CMS at different conditioning periods. It was found that the CMS spectrally matched to larger modal period always result in larger seismic demands. A comparison was also made between seismic demands obtained from UHS & CMS indicating that the structural response parameters are almost the same in both cases except the story shears & drifts which is dominated by UHS in lower floors and by CMS in upper floors.

Publication by Members



Dr Hasmat Malik, MIE

Assistant Professor, NSUT Delhi (Formerly NSIT Delhi)

Email: hasmat.malik@gmail.com

Title of Paper: “A Novel Hybrid Approach based on Relief Algorithm and Fuzzy Reinforcement Learning Approach for Predicting Wind Speed”, *Sustainable Energy Technologies and Assessments*, 43, 2021, 100920.

<https://doi.org/10.1016/j.seta.2020.100920>

Co-author: Amit Kumar Yadav



Abstract: Wind speed (WS) prediction has become popular nowadays due to increasing demand for wind power generation and competitive development in wind energy. Many prediction models are used to predict WS for which wind is non-stationary, nonlinear and irregular. However, they neglect the effectiveness of feature selection methods in WS prediction, thereby creating very challenging for precise prediction of WS and safe operation of the wind industry. To overpower these challenges and further improve WS prediction accuracy, a prediction model is developed based on feature selection technique and prediction models. Therefore this study proposes an adaptive self-learning wind speed (WS) predicting model using fuzzy reinforcement learning (FRL) that is Fuzzy Q Learning (FQL). Proposed FQL based WS predictor model can predict with great accuracy. This is a first effort at developing a forecasting model using FRL for WS prediction. The presented model has no prior knowledge of the system or plant or target speed information. Measured WS is processed through Info Gain attribute evaluator with Ranker search method feature selection purpose which serves as input to the FQL based WS prediction model. The comparison of proposed prediction method and existing machine learning based is carried out using simulations. The performance analysis indicates that the proposed method serves as an important tool for wind potential assessment.

Keywords: Wind Speed; Forecasting; Fuzzy Logic; Q Learning; Fuzzy System; FQL Reinforcement.

Dr Mahesh R Gadekar, MIE

Chartered Engineer

Email: maheshgadekar@ymail.com

Title of Paper: “Use of Water Treatment Residuals for Colour Removal from Real Textile Dye Wastewater”, *Appl Water Sci* 10, 160, 2020.

<https://doi.org/10.1007/s13201-020-01245-9>

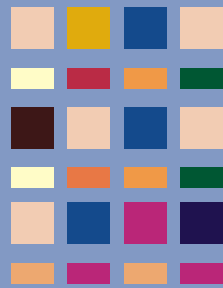
Co-author: M Mansoor Ahammed



Abstract: The use of readily available water treatment residuals (WTR) as a low-cost material for removal of colour from real textile wastewater was investigated. WTR was used in three forms, namely in raw wet form as a coagulant, in the dried form as an adsorbent and as a filtration media in column tests. The results showed a maximum colour removal of 55 and 36% by coagulation and adsorption, respectively, and the corresponding COD removals were 35 and 37%. Coagulation and batch sorption tests showed the effect of initial pH on the colour removal, and maximum colour removal was obtained at an initial pH of 3.0. Long-duration continuous-flow column test using WTR as a filtration/sorption media showed that a maximum colour removal of 60% can be achieved. In column studies, complete exhaustion of the media occurred at 180 and 120 bed volumes, respectively, for initial pHs of 3.0 and 6.2. The study thus shows the potential of WTR for primary treatment of real textile dye wastewater.

Keywords: Textile Dye Wastewater; Water Treatment Residuals; Coagulation; Adsorption; Fixed-bed Column Test.

Publication by Members



Dr G Renuka Devi, MIE

Associate Professor, Department of Electrical & Electronics Engg, Manakula Vinayagar Institute of Technology, Puducherry

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Title of Paper: "Design and Analysis of Fault Tolerate Feature of n-Phase Induction Motor Drive", *World Academy of Science, Engineering and Technology International Journal of Energy and Power Engineering*, 15 (1), 2021, ISNI:0000000091950263, pp 7-14.

URL: <https://publications.waset.org/10011717/pdf>

Abstract: This paper presents design and analysis of fault tolerate feature of n-phase induction motor drive. The n-phase induction motor (more than 3-phases) has a number of advantages over conventional 3-phase induction motor, it has low torque pulsation with increased torque density, more fault tolerant feature, low current ripple with increased efficiency. When increasing the number of phases, it has reduced current per phase without increasing per phase voltage, resulting in an increase in the total power rating of n-phase motors in the same volume machine. In this paper, the theory of operation of a multi-phase induction motor is discussed. The detailed study of d-q modeling of n-phase induction motors is elaborated. The d-q model of n-phase (5, 6, 7, 9 and 12) induction motors is developed in a MATLAB/Simulink environment. The steady state and dynamic performance of the multi-phase induction motor is studied under varying load conditions. Comparison of 5-phase induction is presented under normal and fault conditions.

Keywords: d-q Model; Dynamic Response; Fault Tolerant Feature; Matlab/Simulink; Multi-phase Induction Motor, Transient Response.



Mr Rahul Kumar, AMIE

Ph.D Research Scholar, Pressure, Vacuum & Ultrasonic Metrology Section, National Physical Laboratory, New Delhi

Email: rprahulprajapati2@gmail.com

Title of Paper: "Past, Present and Future of Blood Pressure Measuring Instruments and their Calibration", *Measurement*, 172, 2021, 108845.

<https://doi.org/10.1016/j.measurement.2020.108845>

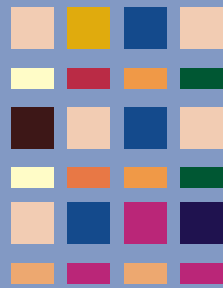
Co-authors: PK Dubey, Afaqul Zafer, Ashok Kumar, Sanjay Yadav

Abstract: Blood pressure (BP) measurement is very important and crucial parameter for monitoring, controlling and treatment of human health conditions. Measurement of BP is performed using variety of instruments. Out of these, (i) mechanical or mercury manometers and (ii) oscillometric digital sphygmomanometers, are the most commonly used devices. Although, the international recommendations (OIML R16-2) for the automatic BP measuring instrument is available, there is no uniform international standard or method of calibration available. In this paper, a terse review of different types of BP measuring techniques and devices, commercially available is presented along with some related important historical developments. A concise and consolidated report of the several existing methods of BP device calibration being used at various National Metrology Institutes (NMIs) and other leading research groups is also included. This would open new lines for the future researchers to standardise a uniform and acceptable calibration method for these devices which is need of the hour.

Keywords: Blood Pressure; Oscillometric Technique; Auscultatory Technique; Non-invasive Blood Pressure.



Publication by Members



Mr S Kannadhasan, MIE

Assistant Professor, Department of Electronics and Communication Engineering, Cheran College of Engineering, Karur, Tamilnadu

Email: kannadhasan.ece@gmail.com

Title of Paper: “Miniaturised Multiband e-shaped Structure Microstrip Antenna for Satellite Communication”, *First International Conference on Advances in Physical Sciences and Materials, Journal of Physics: Conference Series, 1706, 2020, 012110.*

doi:10.1088/1742-6596/1706/1/012110

Co-author: R Nagarajan



Abstract: Microstrip antenna technology has been designed of an E-Shaped antenna structure for Ku-band satellite communication application such as broadcasting, remote sensing and space communication. The proposed E- Shaped structure antenna is used to operate the frequency bands, 2.39 GHz and 2.44 GHz with a return loss less than -20.4 dB. The concept of microstrip based lossy characteristics impedance; hence the effect of high frequency is included in the procedure The proposed E-Shaped structure has been designed with dielectric FR4 epoxy substrate of dimension (60mm X 50mm), dielectric constant $\epsilon_r = 4.4$ and height = 1.8mm and it is fed by coaxial cable 50 Ω matching impedance with the bandwidth of 480 MHz and 640 MHz. The Proposed E-Shaped structure which operates the resonating frequencies in various wireless communication and satellite communication applications. The proposed antenna structure parameters have been analyzed and simulated by using HFSS tool. The simulated results for the proposed antenna are in good results for VSWR, radiation pattern, Gain, Return Loss and Efficiency.

Keywords: E-Shaped; Ku-Band; VSWR; Gain and Efficiency.

Title of Paper: “Design and Development of Environmentally Safe W-Shaped Structure Antenna for Wireless Applications”, *Journal of Green Engineering (JGE), 10(9), 2020, pp 4558-4565.*

Co-author: R Nagarajan

Abstract: This paper proposes the design of a W-Shaped Structure for Wireless applications. The Proposed antenna is designed for wireless applications to produce a dual band of operating frequencies fed with proximity coupled feeding technique. The simulation results are calculated and reported for different parameters such as Reflection Coefficient, Radiation pattern and Directivity. The designed antenna operates for various frequencies at 2.5 GHz to 14 GHz with Increase Gain, Reflection Coefficient and Bandwidth. The Proposed antenna is used to wireless communication from 2, 5 GHz to 14 GHz. The antenna proposed is used in various applications such as Wireless Communication, Wi-FiWiMAX, Radar Communication and Military Communication.

Keywords: W-Shaped; Radiation Pattern; Gain; Return Loss and Directivity.

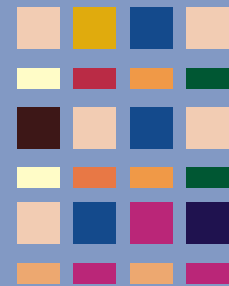
Title of Paper: “Design of U-Shaped Structure with Transmission Line Model for Wireless Applications”, *2020 7th International Conference on Smart Structures and Systems (ICSSS).*

DOI: 10.1109/ICSSS49621.2020.9201992

Co-author: R Nagarajan

Abstract: In this paper a U-shaped structure antenna with equivalent circuit model of frequency selective surface is designed. The U-Shaped structure is given based on the circuit inductance and capacitance on the equivalent circuit model. This method of U-shape is quite fact and accurate analysis for both Transverse electric and magnetic modes. This method has been computing the transverse electric and magnetic modes for U-Shaped with various slots in the open ended waveguides. The U-Shaped structure antenna transforming TEM mode into TE and TM modes radiates from open-ended waveguide. The frequency selective surface provides the various pass bands in which a frequency is presented. To verify the design and simulated results of the U-shaped structure of transmission line model of TE and TM modes measured. The proposed structure can be used in the area of wireless and satellite communication.

Keywords: Slot; Frequency Selective; Gain and Band Pass Filter.



Dr N Kirubanasarathy, FIE

Department of Electronics and Communication, Engineering, Syed Ammal Engineering College, Ramanathapuram, Tamilnadu

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Title of Paper: “QR Image Feature Extraction Effectiveness based on Metrics using Spectral Clustering and Grey Level Co-Occurrence Matrix Algorithm”, *Materials Today: Proceedings*, 33(7), 2020, pp 4112-4116.

<https://www.sciencedirect.com/science/article/pii/S221478532035032X>

Co-author: R Sandha

Abstract: Generation of key for data security is an important feature in cloud environment. Developing key from extracted feature is used to overcome the problem of mathematical attack and vulnerable. The proposed framework differs from prior work in that user-dependent Quick Response (QR) image are utilized to generate more compact and distinguishable features. This extensive paper aims to make analysis on GLCM (Grey level co-occurrence matrix) Algorithm features of QR image with spectral clustering algorithm features of QR image based on time factor. Which is used to the cloud user chooses the best mechanism based on their resource and requirements and help to make their extraction process effectively.

Keywords: GLCM; Spectral Clustering; QR Image; Image Processing; Comparison between GLCM and Spectral Clustering; Feature Extraction.

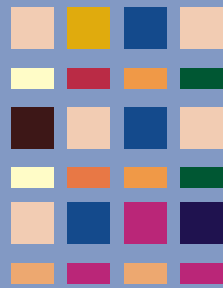
Title of the Paper: “VANET based Self-governed Vehicle Strategy in Association with Multi-object Recognition and Key Mapping Features”, *Materials Today: Proceedings*, 33(7), 2020, pp 3838-3845.

<https://www.sciencedirect.com/science/article/pii/S2214785320346927>

Co-authors: S David, V P Ajay

Abstract: Vehicular technologies are the most important and well-known communication strategy, which enables vehicle to vehicle communication, inter and intra vehicle communication abilities to users to achieve their communication needs. Generally vehicular technologies are acquired from the logics of mobile communication technologies, apart from that the vehicular logics are quite different in the sense of road safety measures but the mobile communication mode concentrates only on communication strategies. Last few decades these vehicular communication medium analysts give more concern on Self-Governed vehicles, which are frequently known as autonomous-vehicles. This intelligent invention assist vehicles with own brain and run the vehicles on road without any human interventions and also this kind of feature raises many questions to analysts such as: how safety norms are concerned over this approach, what are all the safety precautions are required to make this prototypical model to real-time application and so on. These different kinds of queries raise huge pressure to analysts to derive this application. In this paper, a new intellectual approach is designed to provide a solution to vehicular technology issues specifically self-governed vehicular logics, which is called as Self-Governed Intellectual Vehicular Model (SGIVM). The proposed algorithm SGIVM provides a solution to road safety measures along with intelligent traffic manipulations by means of two different methodologies such as Object Recognition Strategy and Key Mapping on road sides/directions. With these two features, a new Self-Governed algorithm is designed and this paper assures best accuracy in results with following parameters such as safety measures, object recognition accuracy, mapping accuracy and vehicle speed maintenance level. The proposed result will prove all these features such as self-governed vehicular medium in association with object recognition and key mapping facility enables good results in outcome and it will be described / proved in detail with following summaries.

Keywords: Vehicular Technologies; Self-Governed Intellectual Vehicular Model; SGIVM.



Mr Rohit Kumar, MIE

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Title of Paper: "Enhancement of the Thermal Durability of Fly Ash-Based Geopolymer Paste by Incorporating Potassium Feldspar", *J. Inst. Eng. India Ser. A*, 2021.

<https://doi.org/10.1007/s40030-020-00498-6>

Co author : Sunil Singh Mayengbam



Abstract: The aim of this research is to study the effect of different percentages of potassium feldspar (KF) (0%, 5%, 10% and 20% by weight) on the proficiency of fly ash (FA)-based geopolymer paste when exposed to elevated temperatures of 300°C, 600°C and 900°C. The percentages (by weight of the source material) of both Na₂O and SiO₂ were fixed at 8% each. The behaviour was evaluated on the behalf of residual strength, weight loss, volumetric shrinkage and physical changes at various temperatures. To observe the changes in microstructure and mineralogy during the thermal exposure, scanning electron microscopy (SEM) images of the samples were studied. After observing the results, good durability was revealed at elevated temperatures when KF was incorporated in FA-based geopolymer paste. At 900°C, the residual compressive strengths of adding KF @ 0%, 5%, 10% and 20% by weight were 22%, 25%, 29% and 42% of those at room temperature, respectively. At 900°C, the geopolymer matrix was observed to be most densified, which imparts superior durability to the specimens.

Keywords: Reinforced Concrete; Fly Ash; Experimental Study; Mechanical Properties; Comparative Study; Performance Evaluation.

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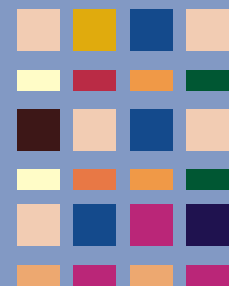
Title of Paper: "Integrated AC and DC Microgrid of Power Management Scheme", *Journal of Critical Reviews*, 7(15), 2020, ISSN- 2394-5125, pp 6326-6333.

Co-author: Vemula Ankalakshmi



Abstract: In this paper the integrated AC to DC micro grid of power management scheme is implemented. Generally there are some drawbacks in existed power management schemes they are interlinked with sharing of power and they regulate the voltage of the interlinked microgrids without considering the specific loading conditions. Hence to overcome these issues autonomous integrated power management scheme is implemented. This scheme will use the special loading conditions before the power is imported to the interlinked AC micro grid. This proposed scheme will reduce the converters in operation while regulating the voltage in DC micro grid. Especially for plug-n-play features for generators and tie-converters the proposed scheme is fully autonomous. Hence by using different scenarios the proposed scheme is validated. Therefore the proposed scheme will give manage the power in effective way by maintaining better voltage regulation.

Keywords: AC Micro Grid; DC Micro Grid; Voltage Regulation; Tie Convertors; Autonomous Power Management Scheme.



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Title of Paper: “Studies on Electrochemical Treatment of Paper Mill Effluent”, *International Journal of Science, Technology, Engineering and Management - A VTU Publication*, 2(3), 2020, pp 24-32.

Co-author: Shivayogimath C B

Abstract: Pulp and paper mill is a water-demanding industry consuming about 60m³ of water for each ton of paper production. Minimization of waste generation and its effective treatment is still a challenging task with highest priority. These effluents contain both organic and inorganic pollutants that include turbidity, tannins, lignin, dioxins etc. Despite various technologies being used to treat these wastes, there is no proven method for cost-effective treatment. Hence, studies were undertaken to assess the feasibility of electrochemical (EC) technique with aluminum electrodes in monopolar parallel connection for the treatment of P&P effluent. A rectangular vessel of total volume of 1.5L was used for the research purpose. The maximum COD, TOC and turbidity reductions of 89%, 72% and 96% respectively were obtained at optimized values of pH 7, cell voltage of 12V and electrolysis time (ET) of 40 minutes. The scanning electron microscopic (SEM) study of the sludge indicated the presence of densely agglomerated spherical particles responsible for effective pollutants removal. Therefore, EC technique can be considered as an effective method for the treatment paper mill effluent.

Keywords: COD; TOC; Turbidity; Electrolysis Time; SEM.

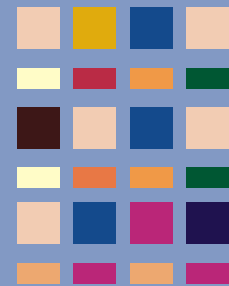
Title of Paper: Pollutants Removals and Energy Consumption in Electrochemical Cell for Pulping Processes Wastewater Treatment: Artificial Neural Network, Response Surface Methodology and Kinetic Studies”, *Journal of Environmental Management*, 281, 2021, 111897.

<https://doi.org/10.1016/j.jenvman.2020.111897>

Co-authors: Adeogun A I, Shivayogimath C B

Abstract : Response surface methodology (RSM) and artificial neural network (ANN) were used for modelling the electrocoagulation removal of pollutants from wastewater from pulping processes. The Design of Experiment based on central composite design was used to investigate the combine effects of pH (5.4–9.0), time (10–45 min) and current density (j) (9–39 mA/m²), on the removal efficiency of the Chemical Oxygen Demand (COD), Total Dissolve Solids (TDS) as well as Turbidity while Energy consumption (EC) was estimated per kg [COD] removed. The kinetics of the process was modelled with pseudo first and second order models. The removability of the COD, TDS and Turbidity were found to be 76.4, 57.0 and 97.13% with Energy consumption of 2.72 kWh/kg[COD] at optimal pH 6.83, current density of 22.06 mA/m², and reaction time of 45 min. The ANN model gave a better fitting of the electrocoagulation process than the RSM, considering the R² of 0.999 and MSE of 0.00753 obtained for the former. The pseudo first order model gave a better analysis of the kinetic data. The characterization of the sludge produced showed the potential of its use as adsorbent for organic or mineral contaminants and recovery of aluminium and other metals. Thus, electrocoagulation with monopolar aluminium electrodes displayed effective and a viable alternative for the pollutants removal from pulp processing wastewater.

Keywords : COD; TOC; Turbidity; Electrolysis Time and SEM.



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Title of Paper: "Effect of Different Hydrophobic Treatments on Properties of Recycled Aggregate Concrete", In: Pancharathi R., Sangoju B., Chaudhary S. (eds) *Advances in Sustainable Construction Materials. Lecture Notes in Civil Engineering*, 68. 2020, Springer, Singapore, pp 121-130.

https://doi.org/10.1007/978-981-15-3361-7_9

Co-authors: Siddique S, Chaudhary S

Abstract: The rapid infrastructure development in India has given rise to problems regarding management of construction and demolition waste. On the other hand, the negative impact of mining for natural resources has raised serious concerns about the environment. The government of India recognising the need of alternative aggregates for concrete permitted the utilisation of recycled and unconventional aggregates in the production of concrete. Previous studies regarding recycled aggregate concrete have mentioned the detrimental effect of recycled aggregates on concrete durability. The current study was designed to investigate the influence of three different types of hydrophobic treatments on mechanical and durability properties of recycled aggregate concrete. The concrete mix was designed to replace natural coarse aggregate by 10, 20 and 30% of coarse recycled aggregate. The recycled aggregate concrete mixes were subjected to (a) mixing-based treatment (b) aggregate-based treatment (c) surface-based treatment method. It was observed that mixing- and surface-based treatments improved the mechanical (compressive and flexural strength) and durability (acid attack, sulphate attack, chloride attack and DIN permeability) performance of concrete. For aggregate-based treatment, high-quality control was required failing which the durability of concrete was compromised.

Keywords : Recycled Aggregates; Hydrophobic Treatments; Compressive Strength; Acid Attack.



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Title of Paper: "Design and Development of Hand Gesture based Communication Device for Deaf and Mute People", 2020 IEEE Bombay Section Signature Conference (IBSSC), Mumbai, 2020, pp. 102-106.

DoI: 10.1109/IBSSC51096.2020.9332208

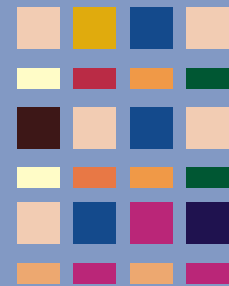
Co-authors: S T Gandhe; Mr Abhishek Sharma; Mr Asit Bhate; Mr Vishal Bhosale; Mr Rushabh Mahale

Abstract: According to World Health Organization (WHO), the 5% of world's population is disabled of speaking and hearing. That makes a large number of people who are deaf and mute in whole world and communications between deaf-mute and a normal person has always been a challenging task. We have developed a cheap, reliable and efficient device that would help deaf-mute people to work with other normal people efficiently towards the development of humanity. In this paper, 3-D accelerometer is used to detect the gesture of disable person and based on it customized database is generated which is processed through node MCU and Raspberry Pi and displayed the message on LCD screen. The Support Vector Classifier algorithm is used in proposed system. The experimental analysis gives comparison of proposed system with existing machine learning algorithm and shows that our system outperforms well in terms of translating complete sentence instead of single alphabet which resulted into increased accuracy of device.

Keywords: 3-D Accelerometer; Deaf and Mute People; Gesture Detection; Node MCU, Raspberry Pi.



Publication by Members



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Title of Paper: “Stock Prediction and Mutual Fund Portfolio Management using Curve Fitting Techniques”, *Journal of Ambient Intelligence and Humanized Computing, Springer, pp 01-14.*

DOI: <https://doi.org/10.1007/s12652-020-02693-6>

Co-authors: Debomita Mondal, Nilanjan Dey, Narayan C Debnath, Soumya Sen

Abstract: Investment in the share market helps generate more profit than the other financial instruments but has the threat of market risk that might lead to a high loss. This risk factor refrains many potential investors from investing in the share market directly. Instead, they invest in different mutual funds that are being managed by experienced portfolio managers. To avoid the risk factors and increase the gain, they put the accumulated capital in multiple stocks. They need to perform many calculations and predictions to overcome the uncertainties and unpredictability and need to ensure higher gains to the investors of that mutual fund. In this research work initially, a data mining based approach employs a curve fitting/regression technique to forecast the individual stock price. Based on the above analysis, we propose a framework to diversify the investment of the capital fund. This method employs buy and hold strategy using both statistical features and basic domain knowledge of the share market. The proposed framework distributes the capital first, by distributing sector-wise, and then for each sector, investing company-wise, as a diversified approach among different stocks for higher return but maintaining lower risks. Experimental results show that the proposed framework performs well and generates a good yield compared to some benchmark and ranked mutual funds in the Indian stock market.

Keywords: Stock Market Analysis; Sector-wise Stock Selection; Stock Price Prediction; Curve Fitting; Mutual Fund Portfolio Management.



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Title of Paper: “Mechanical Properties and Durability Study of Jute Fiber Reinforced Concrete”, *IOP Conf. Series: Materials Science and Engineering, 961, 2020, 012009.*

DOI: [10.1088/1757-899X/961/1/012009](https://doi.org/10.1088/1757-899X/961/1/012009).

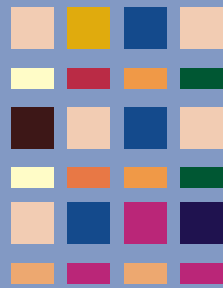
Co-authors: A K Sahu, R P Pathak

Abstract: Natural material/fiber should be used in the construction industry as it finds low cost and improve the properties of the material. Jute fiber is used in research study and carried out an experimental investigation on the mechanical properties of the jute fiber reinforced concrete (JFRC). Natural available jute fiber was chopped to the desired length and it was mixed in concrete to produce JFRC. The chopped jute fiber added in three different percentages i.e. 0.5%, 1.0%, & 1.5% in three various concrete mixes (M25, M30 and M40). Additionally, JFRC concrete specimens cured in the acid medium and examine the compression strength, split tensile strength, and strength reduced under acid curing. Workability results indicated that the slump value (workability) reduced as an increased amount of jute fiber in the concrete specimens. Also, the compressive strength reduced in the acid curing as compared to normal curing. Additionally, Jute fiber increased the compressive and tensile strength of every concrete mix. This research study revealed that natural fiber (jute fiber) can be used as additives to enhance the durability and strength of concrete.

Keywords: Concrete Mix; Jute Fiber; Compressive Strength; Tensile Strength; Acid Curing; Workability.



Publication by Members



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Title of Paper: "Improved ICA Algorithm for ECG Feature Extraction and R-peak Detection", *International Journal of Adaptive Control and Signal Processing*, 35(1), 2021, pp 38-50.

URL: <https://doi.org/10.1002/acs.3186>

Co-authors: Dr V Ramamoorthy, Mr A Parthiban

Abstract: Electrocardiogram (ECG) signal transmission and monitoring plays a paramount role in long-term cardiac monitoring and analysis to provide remote health care in time, especially for the postoperative people and people in remote areas. The accuracy of ECG signals is of fundamental importance in cardiac diagnosis like R-peak detection. So we need to incorporate analytical methods in existing healthcare systems, to capture more meaningful ECG components and to represent physical cardiac sources more clearly. With this aim, hardware optimized FCAICA (fast confluence adaptive independent component analysis) algorithm is proposed to extract pure ECG components from the ECG mixtures. The extracted signals are then subjected to R-peak detection for further analysis. The proposed improved fast confluence adaptive independent component analysis (IFCAICA) method occupies less hardware resources, consumes low power, improves accuracy, and sensitivity in R-peaks detection. In 0.18 nm technology, the IFCAICA consumes 10.13 mW of power and operates with 3.4 MHz operating frequency.

Keywords: ECG; Independent Component Analysis; Long-term Monitoring; R-peak Detection; VLSI.



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Title of Paper: "Optimisation of the Sublimation Textile Printing Process using the Taguchi Method", *Fibres & Textiles in Eastern Europe, Poland*, 29(1) (145), 2021, pp. 75-79.

<http://fibtex.lodz.pl/author3852,Kumar%20Jeyaraman%20Anandha.html>

Abstract: In this paper, printing parameters for the sublimation printing of polyester fabrics like the number of strokes, the sublimation paper weight in grams per square metre, the fusing temperature and time were optimised using the Taguchi experimental design technique. In the evaluations the signal-to-noise ratio was used. Sixteen experiments were performed with respect to the L 16 Orthogonal array design for the Taguchi approach. The results show a considerable improvement in the signal-to-noise ratio as compared to the initial conditions. Through this study, not only can optimum printing conditions for sublimation printed polyester fabrics be obtained but also the significant factors that affect water vapour resistance.

Keywords: Knitted Fabrics; Sublimation Printing; Experimental Design; Taguchi Design; Water Vapour Resistance.



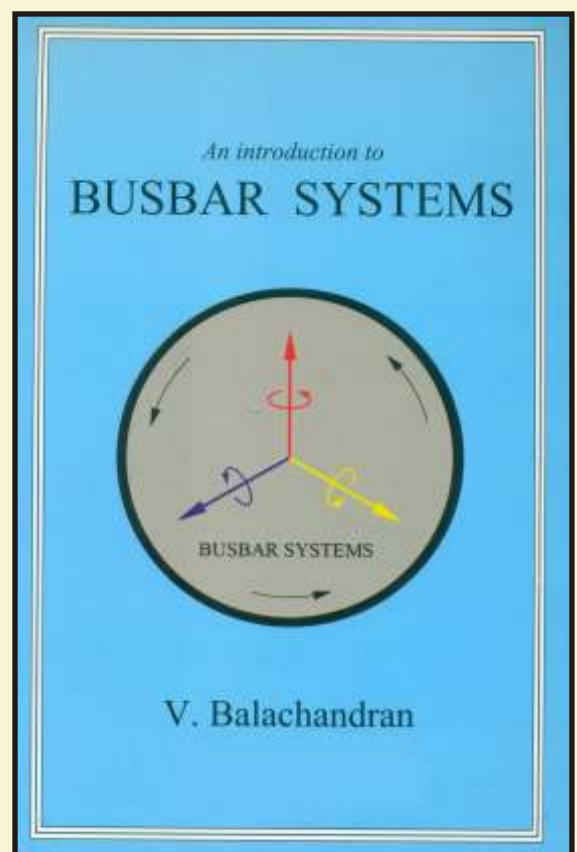
Book Review

An Introduction to BUSBAR SYSTEMS

Mr V Balachandran, FIE

E-mail: bala@busbarsystems.net

The book “An introduction to Busbar Systems” provides a comprehensive treatment of all aspects of the power connections in AC and DC power distribution. Bus voltages range from less than 1 kV for low voltage applications to 1200 kV in ultra-high voltage switchyards and transmission lines. Rated current ranges from less than a few tens of Amperes in a shop floor distribution to 600 kA in an Aluminium extraction plant. It details the conductor, enclosure and insulating material which constitutes the basic building blocks and various processes that these have to undergo during the manufacture of the system. Critical parameters such as impedance, ampacity and short circuit forces are analysed. Different types of connections namely isolated phase bus, non-segregated & segregated phase bus, sandwich bus, cast resin bus, solid insulated bus, gas insulated bus, high-voltage open bus, high-current open bus and cable bus are explained. Busduct and generator connection accessories are described. The book aims to provide unbiased technical information to project authorities, consultants, procurement executives, designers, manufacturers, component vendors, testing engineers, installers, maintenance staff and inspection agencies. A dedicated website <https://busbarsystems.net> has been created for interaction and consultation with experts in the field.

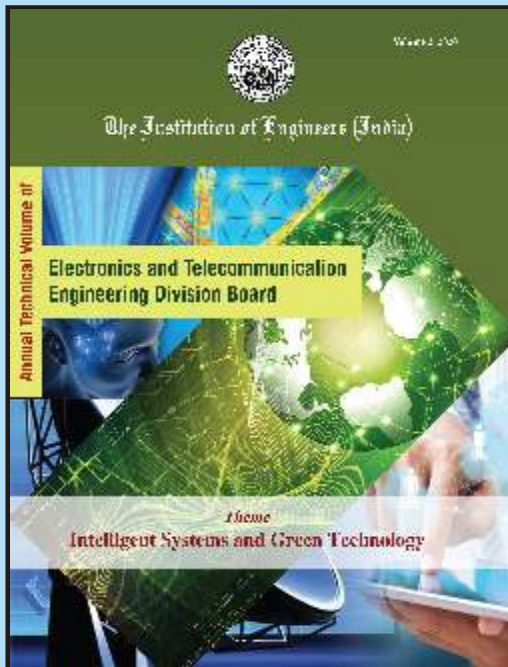


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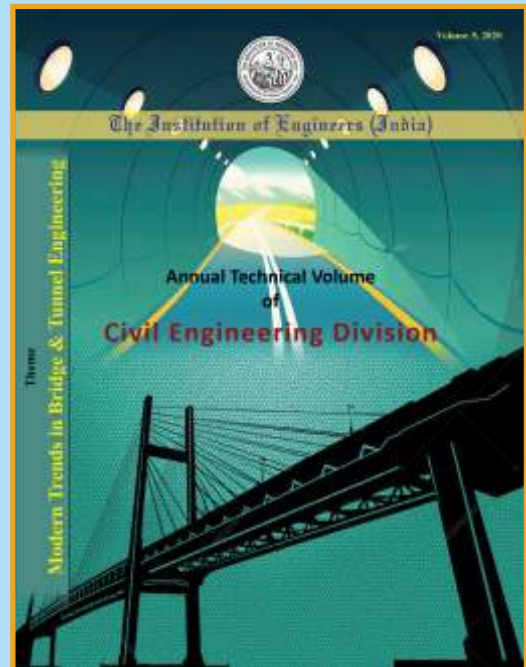
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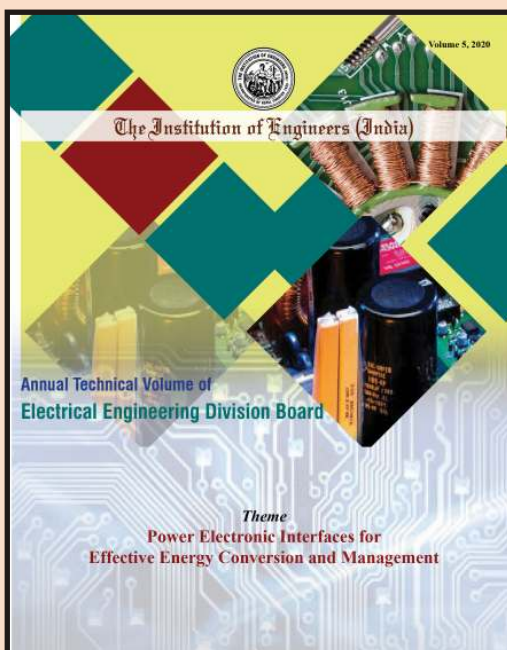
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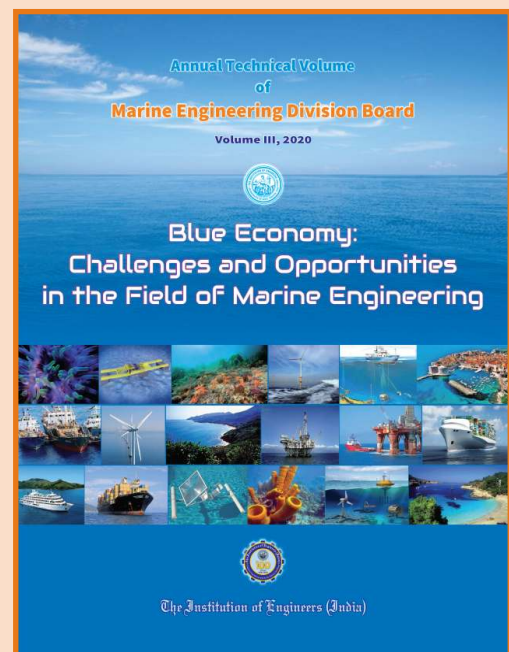
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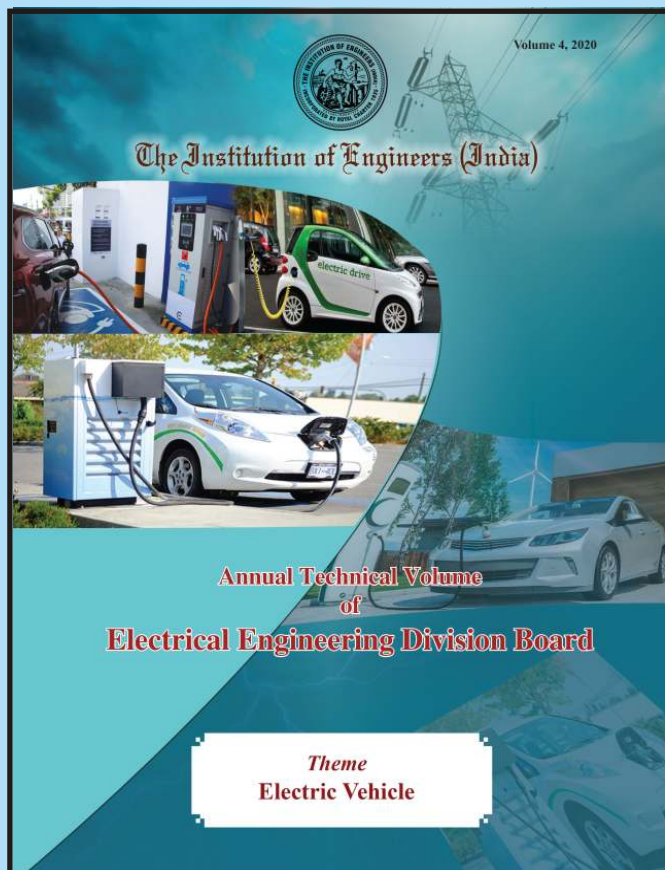
Theme
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Opportunities in the Field of
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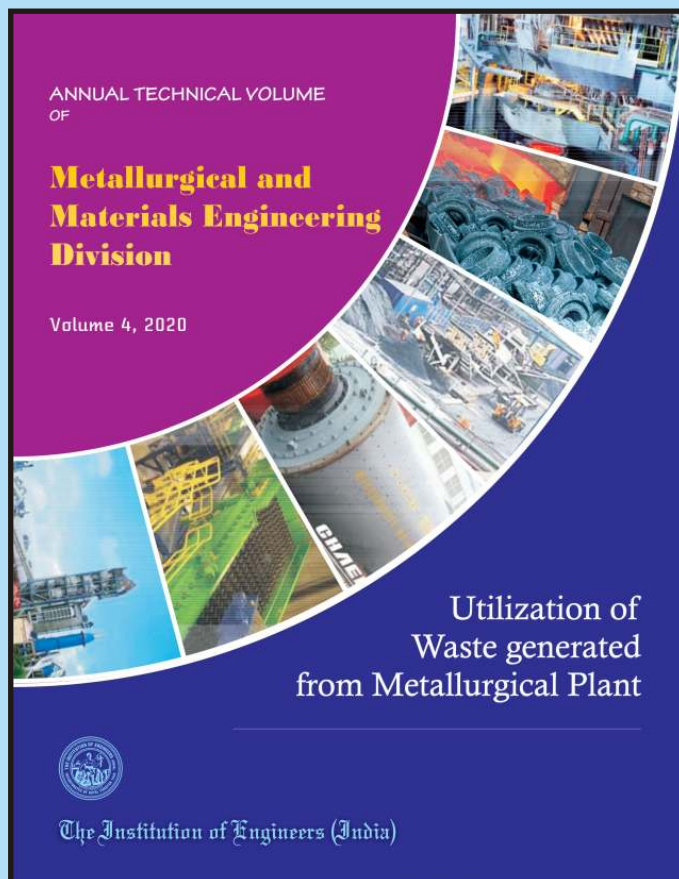
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