

Epitome



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Members

in the News

Dr Lakshminarayana Sadasivuni, FIE

Chairman, IEEE Vizag bay Section

Elected as Chairman for IEEE Vizag Bay Section, recently approved by IEEE with geographical area consisting of Srikakulam, Vijayanagaram, Visakhapatnam, East Godavari, West Godavari and Krishna Districts of Andhra Pradesh.



Mr Ashok Garlapati, MIE

Health, Safety & Environment (HSE) Consultant, Drilling and Technical Support Directorate at Kuwait Oil Company

Honoured as ASSP Fellow (American Society of Safety Professionals). He has more than 30 years of industry experience and has been a catalyst for several HSE initiatives that have led to major improvements.



Dr Naveen B P, AMIE

Associate Professor & Head, Department of Civil Engineering, Amity School of Engineering & Technology, Amity University Haryana

Delivered Lecture on "Science & Engineering of Landfilled Waste Mechanics" at two-day National Workshop on "Recent Trends in Civil Engineering Constructions", organized by Department of Civil Engineering, JSPM's Rajarshi Shahu College of Engineering, Tathawade and in association with Ultra Tech Cement Ltd. & Indian Geotechnical Society (IGS) Pune Chapter during 30-31 May, 2020.



Mr Mahadeva M, AMIE

Assistant Professor, Department Of Civil Engineering, R N S Institute Of Technology, Bengaluru

Honoured with Human Rights Education Association Annual Award for outstanding performance in the field of Research Technology.



Delivered Lecture on "Waste Problem & the Relation to Waste Mechanics", organized by Department of Civil Engineering, NRI Institute of Information Science & Technology, Bhopal on 30 May 2020.

Prof (Dr) Sanjay Agal, MIE

Principal, Dr V R Godhania College of Engineering & Technology, Porbandar, Gujarat

Participated and completed successfully the Online Workshop on Universal Human values on the theme 'Inculcating Universal Human Values in Technical Education', organised by All India Council for Technical Education (AICTE) during 26-30 April, 2020.



Mr P Ramesh Babu, MIE

Assistant Professor, Department of Electrical & Electronics Engineering, Saranathan College of Engineering, Tiruchirappalli, Tamilnadu

Nominated as Member of the prestigious 'Confederation of Elite Academicians of IICDC (India Innovation Challenge Design Contest) by Texas Instruments, DST, AICTE and IIM Bangalore for outstanding contributions and steller commitment to inspiring engineering students to innovate and create ground breaking solutions.



Dr Madhusudan, MIE

Associate Professor, Department of Electronics & Communication Engineering, St. Peters Engineering College, Hyderabad

Dr Madhusudan has been conferred with the Degree of Doctor of Philosophy in Electrical and Electronics Engineering Sciences from Visvesaraya Technological University, Karnataka on the topic 'Evolutionary Optimization of Retiming in Sequential Circuits' under the guidance of Dr U Eranna, Professor and HOD, Ballari Institute of Technology and Management.



Publication

by Members

Dr Jayant G Joshi, MIE

Lecturer in Electronics (Selection Grade), Government Polytechnic, Nashik (MS)

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Title of Paper: “Stub Loaded Rectangular Ring Shaped Tri-Band Microstrip Patch Antenna for Wireless Applications”, *International Journal of Advances in Microwave Technology (IJAMT)*, ISSN: 2456-4346, 5(2), 2020, pp 227-233.

<http://dx.doi.org/10.32452/IJAMT.2020.227233>

Co-authors: Mandar P Joshi and Shyam S Pattnaik



Abstract : This paper presents, design and equivalent circuit analysis of tri-band parasitically stub loaded rectangular ring printed monopole antenna for wireless communication applications. The printed monopole antenna is designed, fabricated and tested. The measured impedance bandwidth ($S_{11} < -10$ dB) is 750 MHz (2.22 – 2.97 GHz), 220 MHz (3.65 – 3.87 GHz) and 1.28 GHz (5.23 – 6.51 GHz) covering Wi-Fi, Wi-MAX and WLAN/Wi-MAX applications respectively. The electrical dimension of monopole is $0.245\lambda_0 \times 0.212\lambda_0$. The proposed antenna is simple and a low profile structure fabricated using low cost glass epoxy substrate (FR4). The overall size of antenna is 60×40 mm². Using slot cut and parasitically coupled stub loading methods, the tri-band monopole antenna has been realized and measured results are found to be in good agreement with simulated results. The equivalent circuit analysis and mutual coupling between the slots are calculated and presented.

Keywords: Equivalent Circuit; Rectangular Ring, Tri-band, WLAN/Wi-MAX



Dr Mohan Kumar Pradhan, MIE

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Title of Book Review: “Microelectro Discharge Machining: Principles and Applications, by Ajay M. Sidpara and Ganesh Malayath”, Boca Raton, FL: CRC Press Taylor & Francis Group, pp 299, *Journal of Micromanufacturing* 3(1)2020, pp 84–86.

<https://journals.sagepub.com/doi/full/10.1177/2516598420917871>

Co-author : R K Patel

Abstract: Micromanufacturing has been the subject of intense research during the last couple of decades due to the growing trend of miniaturization. It has become necessary to manufacture features at the micro and nanoscale. It is a good inscribed book and it will assist the manufacturing society as an initial textbook on micro electro-discharge machining (μ -EDM). This book comprises detailed coverage of μ -EDM from the history of the process to the latest evolutions in the form of μ -EDM variants. It is a good reference book for the researchers to explore the new findings.

Keywords: Micro-manufacturing; Unconventional Manufacturing; Electro Discharge Machining; Difficult to Machine Materials



Publication

by Members

Mr P Ramesh Babu, MIE

Assistant Professor, Department of Electrical & Electronics Engineering, Saranathan College of Engineering, Tiruchirappalli, Tamilnadu

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Title of Paper: "Design and Simulation of MPPT Control for Solar Powered AC Autonomous LED Lighting Applications in MATLAB/Simulink Environment", *International Journal of Engineering and Advanced Technology (IJEAT)*, ISSN: 2249-8958, 9(4), 2020, pp.177-183.

<http://doi.org/10.35940/ijeat.C6557.049420>

Co-author: Dr C Krishnakumar and S Kiruthiga



Abstract: As an AC LED light applications have become a commonplace item of light industry, it has a wide range of usage in garden lighting, cove lighting, office lighting and retail applications. The paper brings out the utilization of Boost converter along with Maximum Power Point Tracker (MPPT) technique for the control of Photovoltaic power. This proposed system includes Boost converter, a single phase full bridge inverter with Sinusoidal Pulse Width Modulation (SPWM) technique. The main concept of this converter includes designing of boost converter that provides an output voltage of 350V DC and single phase SPWM provides 350V, pure sine wave output (230V RMS) applicable to AC autonomous LED Lighting system. In order to bring out a transformer free inverter, the designed boost converter is simulated in the MATLAB Simulink software and the results are shown with low THD as per IEEE standard, with acceptable power factor and higher efficiency.

Keywords: MPPT; Perturb and Observe Algorithm; Boost Converter; Inverter; SPWM

Title of paper: "Design and Implementation of Cloud based Digital Energy Meter using ESP8266", *International Journal of Innovative Technology and Exploring Engineering (IJITEE)* ISSN: 2278-3075, 9(6), 2020, pp.1228-1231.

<http://www.ijitee.org/wp-content/uploads/papers/v9i6/F3817049620.pdf>

Co-authors: A Pradeep, P Rajendra Prasath, R Rishikesh Kumar, J Sharvin

Abstract: Increasing cost in energy sector demands for structured use of energy. It is vital to understand the rate of energy consumption during specific period utilizing Energy Meters. Energy consumption can be measured using a traditional energy meter; however, their use is restricted in inaccessible areas or in occasion of poor visibility resulting in limited functionality. Also, the main drawback is that a person has to take readings area by area from every house and institute make it time consuming. We propose a Cloud based Wireless Energy Meter which can send data via wireless communication (cloud computing) to a PC or mobile phones in the form of E-mails or mobile application notification or through web page; where surveillance and analysis of the data will be made. This computational system can be used to measure energy quantities of transformers and high voltage towers at remote locations, industries, domestic area, and institutions.

Keywords: Arduino; Current Sensor; Energy Meter; IoT; Node MCU; Voltage Sensor



Mr Surendra Singh Pawar, MIE

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Title of Paper: "The First Bridge: An Engineering Excellence", *2nd World Ramayana Conference, 26-28, January, 2020, Jabalpur, pp 67-68.*

Abstract: According to the Puranas, Ramsetu was built under supervision of Lord Rama to cross the sea about 17,50,000 years before. Ramsetu is the oldest relic of our civilization. NASA had confirmed its existence in early 1966 as Adam's Bridge. This paper reveals that, the construction of bridges was well known in the Ramayana-Era. The then aerial survey, application of locally available resources, line and layout, ie, setting of bridge, handling of workforce, time-management, quality-control, effect on flora-n-fauna, testing of bridge, and finally the success of bridge are the key-points, those attract/reflect the modern technology.



Publication

by Members

Ms Parvathy Unnikrishnan, MIE

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Title of Paper: "A Study on the Effects of Process Parameters on the Wear Characteristics of Al 7075 Alloy with Zircon And Graphite Reinforcement", *Materials Today: Proceedings*, 24(2), 2020, pp 483–489.

<https://www.sciencedirect.com/science/article/pii/S2214785320329229>

Co-authors : N Balaje Krishna, Dr S Ilangovan



Abstract: In this paper, the effect of process parameters on the wear properties of Al 7075 alloy reinforced with Zircon and Graphite is examined. Zircon is the major reinforcement and Graphite is the minor reinforcement. The process parameters selected are reinforcement wt% (7%,10%,13%), load (20N,30N,40N) and sliding velocity (1m/s,2m/s,3m/s). The Taguchi Orthogonal Array(L9) was created for the Design of Experiments. The composites were stir cast based on the compositions of the array. Wear test followed by the microstructural examination using SEM was conducted to understand the wear behaviour. A regression model is also created. From the results, it can be observed that the wear increases with an increase in the applied load. The wear rate increases with increase in velocity upto the transitional velocity but decreases beyond that limit. Reinforcement wt% has a positive effect on the wear rate upto a threshold limit.

Keywords: Metal Matrix Composite; Al 7075; Zircon; Graphite; Wear Characteristics; Regression Analysis



Ms Neha Hooda, AMIE

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Title of Paper: "Fusion of EEG and EMG Signals for Classification of Unilateral Foot Movements", *Biomedical Signal Processing and Control*, 60, 2020.

<https://doi.org/10.1016/j.bspc.2020.101990>

Co-authors : Ratan Das, Neelesh Kumar

Abstract: The study of motor cortex represents the presence of functional activity around mesial surface during all lower limb movements. Due to this, the problem of classification for intricate lower limb movements is particularly challenging with existing non-invasive technologies, such as electroencephalography (EEG). The other bio-signal used for detection i.e. electromyography (EMG), underlines the factors such as muscular fatigue and spasm as possible hindrance for efficient task based classification. Methods: This work aims to explore the fusion of both, EEG and EMG, sensing modules to identify unilateral lower limb movements. Four channel sets were formed with optimal selection of EEG and EMG channels. The processed bio-signals were analyzed for parallel as well as cascaded classification of five tasks. The performance has been assessed using two parameters, prediction accuracy (PA) and computational time (CT). Results: The approach successfully classified the five tasks with maximum PA of $(96.58 \pm 2.37)\%$ and CT of $(51.89 \pm 1.15)\text{ms}$ for cascaded scheme. The optimal performance has been achieved with PA of $(90.06 \pm 9.71)\%$ and $(89.81 \pm 9.41)\%$ for channel-set (Ch) i.e. 7-Ch and 3-Ch, respectively. The resulting CT of $(52.82 \pm 3.56)\text{ms}$ and $(65.38 \pm 3.36)\text{ms}$ have been obtained for 7-Ch and 3-Ch, respectively. The parallel scheme resulted in PA of $(85.88 \pm 3.92)\%$ and $(86.16 \pm 3.97)\%$ along with CT of $(33.23 \pm 6.74)\text{ms}$ and $(34.80 \pm 10.42)\text{ms}$ for 7-Ch and 3-Ch, respectively. Conclusion: The obtained results showed a higher PA for the case of cascaded classification compared to the parallel scheme. Promising results have been achieved, for healthy participants and can be used for future applications of robotic device control and rehabilitation.



Keywords: Electroencephalography (EEG); Electromyography (EMG); Fusion; Lower Limb; Wireless Foot Sensor Module

Publication

by Members

Mr Ravi Sekhar, MIE

Assistant Professor, Mechanical Engineering Department, Symbiosis Institute of Technology, Symbiosis International (Deemed) University, Pune

E-mail: ravi.sekhar@sitpune.edu.in

Title of Paper: "ARX/ARMAX Modeling and Fractional Order Control of Surface Roughness in Turning Nano-Composites", 2019 International Conference on Mechatronics, Robotics and Systems Engineering (MoRSE), 4-6 Dec 2019, Bali, Indonesia.

DoI: 10.1109/MoRSE48060.2019.8998654



Co-authors : T P Singh, Pritesh Shah

Abstract: Control of machining systems is important to ensure manufacturing quality. In this paper, multi input single output system of surface roughness generated during turning of Al/Mg/CNT composites was identified by ARX and ARMAX models of varying orders. The best of identified models were selected for control based on FIT, MSE, order, number of parameters and residuals. FPID controller was employed on the selected models to control output surface roughness. Of the three inputs, one was manipulated at a time keeping the other two constant at their mid levels based on experimental design. FPID parameter λ was also varied for improving controller performance. ARMAX model obtained better time domain characteristics as compared to ARX model. This result was especially evident for manipulated variables of feed rate and depth of cut, which effect surface roughness the most during machining.

Keywords : System Identification; ARX and ARMAX Model; Fractional PID Controller; Turning; Composites; Multi Input Single Output System; Roughness



Mr Rangaswamy B N, MIE

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Title of Paper: "Neutral Current Compensation in Grid Tied Solar PV-BES Utility System using Four Leg VSC based DSTATCOM with SRF Control Strategy", *International Journal of Recent Technology and Engineering (IJRTE)*, ISSN: 2277-3878, 9(1), 2020, pp 2689-2697.

<https://www.ijrte.org/wp-content/uploads/papers/v9i1/A3072059120.pdf>

Co-authors : Saritha M, Sidram MH

Abstract : In this proposed work, Synchronous Reference Frame (SRF) based control algorithm is used in Photovoltaic (PV) grid integration through Distribution Static Synchronous Compensator (DSTATCOM) with Battery Energy Storage (BES) system for simultaneous mitigation of power quality issues and for real power injection. In order to makeover the issues in the quality of power in the system by compensating neutral current, asymmetrical loads in the four wire three phase nonlinear and unbalanced load distribution system. The highest power of PV is tracked using Incremental Conductance (Inc) method and the voltage of DC bus is preserved by Bidirectional DC-DC Converter (BDDC). The proposed system works as PV-DSTATCOM mode which performs DSTATCOM operation by improving power quality with the capability of transferring the generated PV power to the consumers and Grid, and in BES-DSTATCOM mode it supplies power to the utility load. The proposed system is implemented and modeled for 11kV/440V utility system. The results have been obtained using sim power system tools in MATLAB/SIMULINK environment.



Keywords: DSTATCOM; SRF; Voltage Source Converter (VSC); Point of Synchronization (POS); Neutral Current Compensation; Non-linear Load and Unbalanced Load

Publication

by Members

Mr Leelambar Singh, AMIE

Research Scholar, Civil Engineering Department, National Institute of Technology Tiruchirappalli

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Title of Paper: Satellite-derived GRACE groundwater storage variation in complex aquifer system in India, Sustainable Water Resources Management, 6, 43, 2020.

<https://link.springer.com/article/10.1007/s40899-020-00399-3>

Co-author : Subbarayan Saravanan



Abstract : Satellite-based Gravity Recovery and Climate Experiment (GRACE) provides a quantity of available terrestrial water storage and combining the soil moisture from Global Land Data Assimilation System (GLDAS) offering estimation of groundwater storage changes for a region. We applied satellite-driven GRACE–GLDAS data in Weinganga–Wardha and Mahanadi basin to analyze the variation of groundwater storage variation to improve the groundwater monitoring. In situ groundwater-level observation and GRACE and its area application comprise selecting pixel. Correlation analysis was performed between GWSA (actual) and GWSA (grace) using linear regression. It was found that groundwater storage has been decreasing for many years. This study highlights the significance of integrating GRACE sensitivity in the assessment of groundwater storage change in various aquifer systems.

Keywords: Aquifer; Soil moisture; Groundwater storage; GRACE



Dr V Thanigaivelan, MIE

Assistant Professor, Department of Mechanical Engineering, SRM Institute of Science and Technology, Ramapuram Campus, Chennai.

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Title of Paper: “Investigation on the Effect of Diethyl Ether with Hydrogen-enriched Cashew Nut Shell (CNS) Biodiesel in Direct Injection (DI) Diesel Engine Fuel”, 277, 2020, 118165.

<https://doi.org/10.1016/j.fuel.2020.118165>

Co-authors : M Loganathan, V M Madhavan, K Arun Balasubramanian, M Vikneswaran, A Anbarasu

Abstract: The current research paper deals with the experimentation on direct injection diesel engine characteristics for different proportions of diethyl ether in diesel-hydrogen-cashew nut shell liquid blends. Initially, the optimized B20 (20% CNSL and 80% diesel) blend was tested with different proportions of hydrogen such as 4, 6 and 8 L per minute which were optimized at 6 lpm H₂ flow rate. The diethyl ether, of 2%, 4%, and 6% proportions, is blended with B20 in which the 6 lpm H₂ flow rate was maintained as constant. The experiments were conducted in a single-cylinder diesel engine with a constant speed of 1500 rpm. From the experimentation, it was revealed that the brake thermal efficiency got increased whereas the exhaust emission of both Carbon monoxide and hydrocarbon got decreased when H₂ is added with CNSLB20. But the NO_x emission got increased with H₂ addition. Further, the 6 lpm H₂-CNSLB20 and diethyl ether with 6% blends exhibited 43% and 50% decrease respectively in hydrocarbon and CO emissions, when compared to CNSLB20. The brake specific fuel consumption got reduced up to 45% in the fuel combination mentioned above. Meanwhile, when DEE was added with 6 lpm H₂-CNSLB20 fuel combinations, the NO_x emission, in-cylinder pressure, and heat release rate were increased.



Keywords : Hydrogen; Cashew Nut Shell Oil; Diethyl Ether; Pyrolysis

Publication

by Members

Dr Ashok G Matani, MIE

Professor in Department of Mechanical Engineering, Government College of Engineering, Amravati

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Title of Paper: "IoT in Healthcare", *YOJANA, May 2020, ISSN No: 0971-8400.*



Abstract: Internet of Things, or IoT, is a scalable and automated solution that has seen exponential growth in other industries such as automated manufacturing, wearable consumer electronics, and asset management. IoT consists of several functional components: data collection, transfer, analytics, and storage. Data is collected by sensors installed on mobile, end-user hardware like phones, robots, or health monitors. Then, the mobile data is sent to the central cloud server for analytics and decision-making, such as if a machine requires proactive maintenance to prevent unexpected breakdown or if a patient needs to come in for a check-up. The primary challenge is to integrate and streamline digital infrastructure at various stages of the public health response. Many essential items need to be manufactured and transported as quickly as possible, ranging from masks to ventilators to eventually, large volumes of vaccines. IoT helps factories operate more efficiently and keep costs down. The GPS based systems can alert to issues; if a truck were to go off a set path or if needed, allow the driver to alert if they are feeling threatened or unsafe.

Keywords: IoT Sensors; Sensors Installed on Mobile; Health Monitors; Use of Digital and Remote Technologies; Industry 4.0 drives Capabilities



Dr Manikandan V M, AMIE

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Title of Paper: "An Improved Reversible Data Hiding Through Encryption Scheme with Block Prechecking", *Third International Conference on Computing and Network Communications (CoCoNet'19), Procedia Computer Science, 171, 2020, pp 951-958.*

<https://www.sciencedirect.com/science/article/pii/S1877050920310796>

DoI: 10.1016/j.procs.2020.04.103

Co-author: Bini AA

Abstract: Reversible data hiding through encryption is a recently introduced technique in the area of reversible data hiding. In a reversible data hiding through encryption scheme, while encrypting the cover image itself the secret data bits will be embedded. In other words, in a reversible data hiding through encryption scheme, both image encryption process and data hiding task are combined into a single process. In this paper, we improve the existing reversible data hiding schemes which use machine learning techniques by introducing an ensemble learning process. The key idea of the proposed scheme is that during image encryption, the original image will be divided into non-overlapping blocks of size $n \times n$ pixels and in each block, we can embed three-bit from the secret message. One specific pseudo-random byte stream will be used to encrypt a given image block based on the three-bit data that we want to embed into it. For data extraction and image recovery, an ensemble learning approach is used. The experimental study of the proposed scheme on standard medical images downloaded from OsriX data set shows that the proposed scheme outperforms the existing schemes in terms of embedding rate and bit error rate.



Keywords : Reversible Data Hiding; Encryption; Support Vector Machine; Medical Image Transmission

Publication

by Members

Dr Raghavendra C R, MIE

Government Engineering College, Haveri, Karnataka

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Title of Paper: "Optimization of Wear Parameters on Ni-Al₂O₃ Nano Composite Coating by Electrodeposition Process", *SN Applied Sciences 1:131, 2019.*

<https://doi.org/10.1007/s42452-018-0135-3>

Co-authors : S Basavarajappa, Irappa Sogalad

Abstract: The present work concentrates on the nanocomposite coating on the mild steel substrate. The mild steel substrate demands good surface preparation in order to have better adhesive strength of coating. In the light of this, surface is grinded and cleaned later followed by rinsing. In this work, Ni-Al₂O₃ composite coating was successfully coated on mild steel (AISI 1018) substrate. The study on different wear parameters on the specific wear rate is carried on. The experimental design is carried out with 20 trails as per central composite design considering normal load, sliding speed and sliding distance on the samples. The morphology of surface after coating and wear analysis is studied. The results revealed higher wear resistance by the presence of nano-Al₂O₃ particles in the Ni matrix composite coating. The effect of normal load and its interaction with sliding distance are found to be more effective on specific wear rate. The abrasive nature of wear is observed due to the presence of hard Al₂O₃ nanoparticles embedded in the Ni matrix. The chemical composition and distribution of particle analysis is carried out by SEM and EDS micrograph.



Keywords : Ni-nano-Al₂O₃ Coating; Specific Wear Rate; Response Surface Method

Title of Paper: "Influence of Pin Temperature on Dry Sliding Wear Behaviour of Ni-Al₂O₃ Composite Coating on Al6061 Substrate". *J. Inst. Eng. India Sr C 2020, pp 671-681.*

[https://doi.org/10.1007/s40032-020-00584-5.](https://doi.org/10.1007/s40032-020-00584-5)

Co-authors : S. Basavarajappa, Irappa Sogalad

Abstract : The lightweight materials like aluminium is used in most of the automobile, aeronautical applications due to its high strength to weight ratio. In the present study, high-temperature wear behaviour of Al6061 substrate material with Ni-Al₂O₃ nanocomposite coating at different elevated temperatures is studied. The tests were conducted at dry sliding wear conditions. The coating was carried out by electrodeposition process. In addition to high-temperature specific wear, hardness of the glaze layer and friction force of composite coating are investigated. The results reveal that the dominant wear mechanism of the Ni-Al₂O₃ coating was in abrasive nature at 40 °C which turned into completely adhesive nature at elevated temperatures between 80 and 140 °C. The minimum mild wear with reduced frictional force was noticed at 80 °C due to the formation of glaze layer. This anti-wear resistance glaze layer is formed by the sintering of debris and oxide particles at the interface of pin and disc. At 140 °C, severe wear with serious plastic deformation was observed. The improvement in the specific wear is attributed by the presence of nano-Al₂O₃ particles in the Ni matrix and wear resistant glaze layer. This was witnessed by the microstructure observations by SEM, EDS, and microhardness measurements.

Title of Paper : "A Review on Ni based Nano Composite Coatings", *Materials Today Proceedings, May 2020 online.*

<https://www.sciencedirect.com/science/article/pii/S2214785320334647>

Co-authors : S. Basavarajappa, Irappa Sogalad, Santosh Kumar

Abstract : The progress in the metal deposition methods based on electroless and electrodeposition of Ni composite coatings on various substrate surfaces has witnessed heavy interest among researchers. Many recent applications of Ni base coatings made it possible due to their better functional properties. The large number of newer developments became most important by the invention of hard micro to nano particles. Use of these particles as a secondary elements in the composite coating can improve the functional properties of the Ni based coatings. This review reports the state-of-art knowledge available on the Ni coatings with various particle reinforcement viz., SiC, Al₂O₃, B₄C, TiO₂ using watts bath standard. It is noticed that the quality of coating and its corresponding properties depends on the coating properties. The Ni based coatings with embedded micron and nano particles have improved the mechanical and tribological properties. The characterization studies on Ni based coatings with emphasis on wear have been carried out. The SEM and TEM are used to analyse the nano particles distribution and worn surface morphology. The SEM images shows the delamination, pits, grooves formed on the worn surface.

Keywords : Nano-composite Coating; Electrodeposition; Wear; Microhardness; Roughness; Coating Parameters

Publication

by Members

Dr Matruprasad Rout, AMIE

Assistant Professor, School of Mechanical Engineering, KIIT Deemed to be University, Bhubaneswar

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Title of Paper: “Texture-tensile Properties Correlation of 304 Austenitic Stainless Steel Rolled with the Change in Rolling Direction”, *Materials Research Express*, 7 (1), 2020.

DoI: <https://doi.org/10.1088/2053-1591/ab677c>

Abstract: Rolling, at elevated temperature, with a change in the rolling direction (RD) have been conducted on 304 austenitic stainless steel. Two different sequences of change in RD, after each pass, have been followed viz., change in RD by 90°; designated as cross rolling (CR) and change in RD by 180°; designated as reverse rolling (RR). Effect of this change in RD on texture and tensile properties has been studied through Electron back scattered diffraction (EBSD) and uniaxial tensile test, respectively. In addition, tensile tests have been performed to study the anisotropy in tensile properties. The result shows a significant effect on the texture component formation. RR develops strong Cu and S components whereas CR forms strong Brass component. However, both the rolling sequence produces moderate Goss orientation. The observed tensile properties are correlated with the texture developed by both the processes.



Keywords : Rolling; Texture; Rolling direction; EBSD



Mr Prabhu Dayal Khattar, FIE

Executive Engineer, PTPS, HPGCL, Panipat

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Title of Paper: “Improvement in Reliability & Efficiency in Ball Tube Mills”, *International Journal of Engineering Sciences Paradigms and Researches (IJESPR)*, 48, Special Issue, TAME-2019.

https://www.ijesonline.com/48_Special.php

Co-authors : Tilak Raj, Nikhil Dev

Abstract: In the era of availability based tariff (ABT) & tough competition in power sector and intention of Government to provide round the clock uninterrupted power to the consumers of the state at most competitive rates, it is becoming inevitable to achieve improvement in availability and cost reduction at the same time, though both these goals appear against each other. Factor responsible for reliability improvement and efficiency improvement in Ball Tube Mills are identified and categorized to improve mill availability. Based upon these factors criticality of the factors may be identified and commercial availability may be enhanced through proper diagnosis, corrective actions & best O&M practices.



Keywords : Root Cause Failure Analysis; Coal Pulverization; Screw Conveyor & Connection Rods

Publication

by Members

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Title of Paper: "Research on FPGA Controlled Three Phase PV Inverter using Multi Carrier PWM Control Schemes", *Microprocessors and Microsystems* 76, 2020, 103089.

<https://www.sciencedirect.com/science/article/abs/pii/S0141933119306088>



Co-authors : Dr B Adhavan, K Suresh, K Balachander, Dr M Lordwin Cencil Prabakar

Abstract: Research on FPGA controlled three phase Photovoltaic (PV) inverter using Multi-Carrier Pulse Width Modulation (MC-PWM) is presented in this article. In this proposed work, reduced active switching count, transformers, Single DC input (SDC), modular topologies and redundancy are key advantages. The proposed three-phase five level Multilevel Inverter (MLI) with SDC source using three-phase transformer is controlled by MC-PWM schemes. To evaluate the performance of the inverter, a Phase Disposition (PD), Phase Opposite Disposition (POD) and Alternate Phase Opposite Disposition (APOD) have been proposed. The effectiveness of the inverter is analyzed in terms of Total Harmonic Distortion (THD) by varying the Modulation Index (MI). Field Programmable Gate Array (FPGA) can

realized for generation gating pulses to the inverter. The results were analyzed through MATLAB/Simulink and validated by FPGA based experimental setup.

Keywords : Three Phase MLI; Reduced Switch Count; MC-PWM; THD; FPGA

Title of Paper : "Dynamic Partial Reconfiguration Enhanced with Security System for Reduced Area and Low Power Consumption", *Microprocessors and Microsystems* 76, 2020, 103088.

<https://www.sciencedirect.com/science/article/abs/pii/S0141933119306180>

Co-authors : Dr R Saravana Ram, Dr M Lordwin, Cecil Prabhaker, K Suresh, Kamalraj Subramaniam

Abstract : Field-programmable gate arrays (FPGAs) have travelled far from just being utilized as glue logic to an entire system solution. This is mostly due to their generalized re-configurable nature, lower non-recurring engineering (NRE) expense, and also fast time to market. Owing to the reconfigurable nature of FPGA, a new field called reconfigurable computing that can change the circuit configuration after hardware production came into existence. Application of re-configurable computing for self-adaptive hardware allows hardware to get adapt to various environmental conditions and different needs by swapping or loading disparate computational modules. This work proposes an effectual design methodology (enhanced DPR security system (EDPRSS)) utilized to execute high performance FPGA device in respect of low power consumption along with security for the area reduction. In the proposed technique, hash code generation (HCG) and encryption hardware accelerators can well be dynamically produced on FPGA utilizing partial re-configuration as stated by the application requisites. The system is competent to swap in or swap out the equivalent hardware accelerator during run time, which in turn diminishes the power and area. Here, 2 re-configurable partitions are produced for encryption and also HCG algorithm. Experiential outcomes proved that the proposed technique proffers better performance when contrasted to the other conventional systems.

Keywords : Field-programmable Gate Arrays; Dynamic Partial Reconfiguration; Reconfigurable Parallel Computing and Security; Data Encryption Standard (DES); HCG Algorithm

Title of Paper : "Simulation and Analysis of Three-phase Parallel Inverter using Multicarrier PWM Control Schemes", *SN Applied Sciences*, 2, 958, 2020.

<https://doi.org/10.1007/s42452-020-2772-6>

Co-author : Dasari, M S

Abstract : Simulation and analysis of three-phase parallel inverter using multicarrier pulse width modulation such as phase disposition (PD), phase opposition disposition (POD) and alternate phase alternate disposition (APOD) are presented in this article. In this proposed work, reduced active switching count, transformers, single DC input, a high degree of modularity and redundancy are key merits and also suitable for renewable energy systems. The proposed three-phase five-level multilevel inverter with single DC source using a three-phase transformer is controlled by multicarrier pulse width modulation schemes. To generate switching pulses for five-level inverter, four carrier signals can be compared with a reference signal. The performance of the inverter is examined by using PD, POD, and APOD by modulation index (MI) starting from 0.4 to 1. Furthermore, the over-modulation region is also analyzed in this paper. The effectiveness of the system is analyzed in terms of total harmonic distortion by varying the MI of the inverter. The simulation results are verified through MATLAB/Simulink.

Keywords : Three-phase MLI; Reduced switch count; MC-PWM; THD

Publication

by Members

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Title of Paper: "Iris Localization and Tracking for Eye Gaze Directed Light Beam in Automobiles", *International Journal of Control and Automation*, 13(4), 2020, pp 471-481.

DoI: <http://sersec.org/journals/index.php/IJCA/article/view/16464>

Co-authors : M Sugadev, L Yogesh

Abstract: Front road visibility for drivers during night time is provided by headlamps of fixed coverage area. The Problem arises at the time of overtaking, when the light beam cannot reach the far left or far right of the vehicle due to fixed coverage area, hence constraining the driver visibility. In this paper, we propose an adaptive forward lighting in automobiles based on the line of sight of the driver. Hence the headlamp can adapt to the driver's view angle and direct the beam to the direction of the view. Both the eye centers (Iris) of the driver is continuously tracked to determine the view angle of the driver. The estimation of eye center is done by using image gradients which contains only dot products that corresponds to a point where most of the gradient vectors intersect and hence arrive the eye center. The eye center estimation algorithm is invariant to scale, rotation, pose and illumination. To increase the accuracy of the estimating the location of the iris, the nose is taken as a fixed reference point. The algorithm is implemented in BeagleBone Black processor and the feedback from the eye gaze is given to the headlamps by triggering the I/O pins of the processor.



Keywords : Gaze Detection; Eye Center Localization; Image Gradients; Headlamp Control

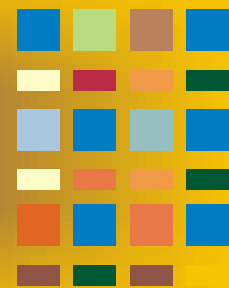
Title of Paper : "Object Detection using Metaheuristic Algorithm for Volley ball Sports Application", *Journal of Ambient Intelligence and Humanized Computing*, Published Online: 2020, Electronic ISSN: 1868-5145, Print ISSN: 1868-5137.

DoI: <https://doi.org/10.1007/s12652-020-01981-5>

Co-authors : S R Balaji, R Manikandan

Abstract: Object Detection has been a great challenge over the years. The reason behind is that, it is applied for numerous real time applications like vision based control, traffic control, video surveillance, sports analysis, etc. But, object detection in a video sequence is a highly challenging task. It has various problems like occlusion, fast moving objects, shadow, poor lighting, color contrast and other static background objects. This reason brought the object detection to be a thrust research area in the field of image processing. In the previous researches the conventional methods of object detection like Frame Difference, Mixture of Gaussian (MoG), Optical Flow etc., still have the above problems. Hence the research focuses on a different approach in object detection using Metaheuristic algorithm for the video sequence of volley ball player in the practice session. In this research three Metaheuristic Algorithms, namely Firefly, Teaching and Learning Based Optimization (TLBO) and Cuckoo Search Algorithm are used. These algorithms are evaluated and compared with the parameters like accuracy, precision, and recall. The result shows Cuckoo Search Algorithm is best suited to object detection especially in this application.

Keywords : Object Detection; Performance Metrics; Firefly Algorithm; TLBO Algorithm; Cuckoo Search Algorithm



Publication

by Members

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Title of Paper: "Attaining High Standards of Safety & Health through Sustainable Development of Dimensional Limestone (Kotah Stone) : A Success Story", *Journal of Chemical, Environmental and Biological, Engineering*, 4 (2), 2020, pp 47-52.

<http://www.sciencepublishinggroup.com/journal/paperinfo?journalid=293&doi=10.11648/j.jcebe.20200402.13>

Abstract: The State of Rajasthan has been gifted with unique mineral reserves of dimensional limestone widely known as Kotah Stone over an area of over 55 sq km. The conventional manual mining of Kotah Stone, has been going on since 1945 but all manual. It has not only degraded the environment severally but also proved to be unsafe. Major part of human efforts has been wasted in non-productive jobs causing excessive fatigue and mental stress, inflicting excessive injuries to eye, leg, foot, arm, fingers and spinal cord. Some time in 1993 industry stood on economical threshold when it felt necessary either to develop an appropriate mining technology or close down all mining activities. A responsible mining technology was innovated by the author based on concept of in-situ cutting & sizing prior to splitting. The process has eliminated many hazardous manual process resulting in sharp reduction in accidents human fatigue and stress. Major part of non-productive effort has been converted in productive increasing productivity by 3.5 times. It has also created cool and clean working environment which keeps worker calm and tolerant and alert against any danger. The technology proved to be blessings for all stake holders. The innovation has fulfilled objectives defined for Responsible mining such as respect for human rights and aspirations of affected community, providing safe, healthy, and respectful workplace, minimising harm to environment and leaving positive legacy.



Keywords: Kotah Stone; Manual; Innovative; Safety



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Title of Paper: "Educational Evaluation and Analysis of Statistical Techniques", *International Journal for Research in Engineering Application & Management*, 6 (2), 2020, ISSN: 2454-9150, pp 286-290.

<https://doi.org/10.35291/2454-9150.2020.0408>

Abstract: The State of Rajasthan has been gifted with unique mineral reserves of dimensional limestone widely known as Kotah Stone over an area of over 55 sq km. The conventional manual mining of Kotah Stone, has been going on since 1945 but all manual. It has not only degraded the environment severally but also proved to be unsafe. Major part of human efforts has been wasted in non-productive jobs causing excessive fatigue and mental stress, inflicting excessive injuries to eye, leg, foot, arm, fingers and spinal cord. Some time in 1993 industry stood on economical threshold when it felt necessary either to develop an appropriate mining technology or close down all mining activities. A responsible mining technology was innovated by the author based on concept of in-situ cutting & sizing prior to splitting. The process has eliminated many hazardous manual process resulting in sharp reduction in accidents human fatigue and stress. Major part of non-productive effort has been converted in productive increasing productivity by 3.5 times. It has also created cool and clean working environment which keeps worker calm and tolerant and alert against any danger. The technology proved to be blessings for all stake holders. The innovation has fulfilled objectives defined for Responsible mining such as respect for human rights and aspirations of affected community, providing safe, healthy, and respectful workplace, minimising harm to environment and leaving positive legacy.



Keywords: Assessment of Learner; Curriculum; Evaluation; Learner Performance; Practicability; Reliability, Scrutiny

Publication

by Members

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Title of Paper: “Deep Neural Networks based Object Detection by Single Shot Detector Model”, *International Journal of Advanced Science and Technology*, 29(7), 2020, pp. 2505-2515.

<http://sersec.org/journals/index.php/IJAST/article/view/18015>

Co-Authors : Nagaraj Bhat, Santosh M Herur

Abstract: Automated systems need dependable, meticulous detection as well as recognition of surrounding objects in real-time surroundings. This paper describes the usage of methods of deep learning using convolutional type of Neural Networks intended for computer vision applications. This study goes one step further and tackles the issue of object detection by Deep Neural Networks, the strategy is not just based on segregating classes but additionally localize the different objects to various classes precisely. The work aims at providing observations and conclusions primarily based on a real-time object detection approach trained by the use of single Shot detector(SSD) model. With addition, evaluating the SSD model together with other popular models like Faster R-CNN is carried out and inferences show that SSD is a much better real-time model.



Keywords : Convolutional Neural Networks; Object Detection; SSD; Faster R-CNN



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Title of Paper: “Recent Developments in Biogas Manufacture and Biogas Utilization: A Review”, *European Journal of Sustainable Development Research*, 4(4), em0135, 2020.

<https://www.ejosdr.com/download/recent-developments-in-biogas-manufacture-and-biogas-utilization-a-review-8366.pdf>

Co-Author : Dr Vikas Narayan

Abstract: The various developments in the areas of biogas manufacture and utilization have been surveyed. This includes alternate / multiple substrates that could be economically employed for biogas production, biogas enrichment (carbon dioxide removal), biochemical desulfurization of biogas, utilization of enriched, desulfurized biogas as automobile fuel (in place of CNG, LNG), for the production of syngas and a host of chemicals (including nitrogenous fertilizers) therefrom, production of phosphatic biofertiliser from ADS (anaerobic digester sludge) and synthesis of liquid fuels (mainly, motor gasoline) using Fischer – Tropsch process. The technical details and economic viability of each process have also been analyzed and highlighted.



Keywords : Biogas Manufacture; Multiple Substrates; Biogas Enrichment; Biochemical Desulfurization; Syngas and Chemical Synthesis; Fischer – Tropsch Synthesis; ADS and Phosphatic Biofertiliser

Publication

by Members

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Title of Paper: “Detection and Classification of Brain Tumor in MRI Images using Deep Convolutional Network”, 2020 6th International Conference on Advanced Computing & Communication Systems (ICACCS), Coimbatore, IEEE Xplore, April 2020, pp. 248-252.



DoI: 10.1109/ICACCS48705.2020.9074375

Co-Authors : Yakub Bhanothu & Govindaraj Rajamanickam

Abstract: Brain tumor is a serious disease occurring in human being. Medical treatment process mainly depends on tumor types and its location. The final decision of neurospecialists and radiologist for the tumor diagnosis mainly depend on evaluation of MRI (Magnetic Resonance Imaging) Images. The manual evaluation process is time-consuming and needs domain expertise to avoid human errors. To overcome this issue, Faster R-CNN deep learning algorithm was proposed for detecting the tumor and marking the area of their occurrence with Region Proposal Network (RPN). The selected MR image dataset consists of three primary brain tumors namely glioma, meningioma and pituitary. The proposed algorithm uses VGG-16 architecture as a base layer for both the region proposal network and the classifier network. Detection and classification results of the algorithm demonstrate that it is able to achieve an average precision of 75.18% for glioma, 89.45% for meningioma and 68.18% for pituitary tumor. As a performance measure, the algorithm achieved a mean average precision of 77.60% for all the classes.

Keywords: Brain Tumor Detection; Glioma; Meningioma; Pituitary; Faster R-CNN; VGG-16; Mean Average Precision; MRI

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Title of Paper: “Suspension Stability Analysis of Cubic Structured Copper and Silver Nano Particles on Water for Heat Transfer Applications”, *Studia Rosenthaliana*, 12 (4), 2020, ISSNNO: 1781-7838, XII(IV), pp341-343.

https://www.researchgate.net/publication/340885583_Suspension_stability_analysis_of_cubic_structured_copper_and_silver_nano_particles_on_water_for_heat_transfer_applications

Co-author : Parthasarathy Saravanan

Abstract : Heat transfer is an important phenomenon which influences more in mechanical equipment for adding and removing the heat to the system. Many researchers have been involved to improve the performance along with size reduction in terms of reducing the cost. During the earlier stage, water, air and lube oil were used for cooling purpose of machine equipment. But, these fluids produced a lower performance due to their lower thermal conductivity. On another hand, the addition of nanoparticles to any base fluid can increases its thermal performance to some extent. Also, it mostly depends on size, shape and volume addition of nanoparticles. The major problem in nanofluids is suspension stability after a considerable brake of operation. The suspension stability is mainly caused by the size and shape of particles. This article shows that the capability of suspension of the cubic shape of nanoparticles(Cu and Ag) in water for a different level of braking times of operations. The light absorption and thermal conductivity were analyzed and found increased with cubic structured nanoparticles than other samples.

Keywords : Cubic Structure; Cu; Ag; Light Absorption; Thermal Conductivity

Programme by Institutional Member

Sathyabama Institute of Science and Technology

The Department of Computer Science and Engineering, School of Computing conducted Faculty Development Programme in association with Muscat College, Sultanate of Oman during 18-20 June, 2020 through organising a Webiner.

On 18 June 2020, Dr Khuram Shahzad, Senior Lecturer and Certified Project Management Professional from Muscat College delivered Lecture on “Managing Risks in Projects”. On June 19 2020, Dr Subrahmanian Muthuraman, Assistant Professor, Faculty of Business Studies, Arab Open University, Oman on “mBraining” and on June 20, 2020, Dr S Anand, Director, Post Graduate Studies and Research, College of Banking and Financial Studies from Muscat College addressed on the topic “Effective Management of Personal Finance”.

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ABC of Hadoop, Docker & Ansible First Edition

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PES Institute of Technology and Management, Shivamogga, Karnataka

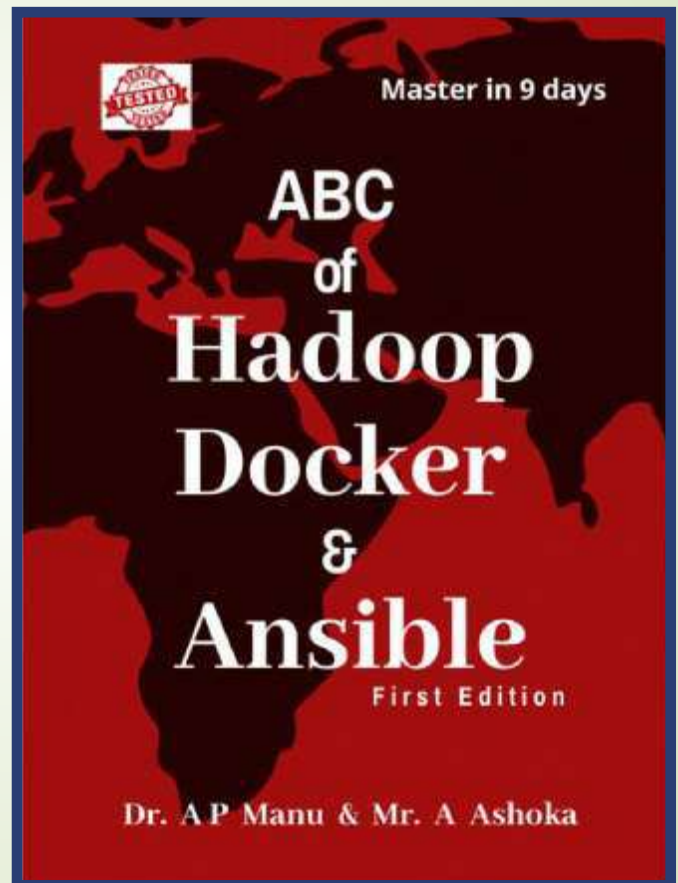
Mr A Ashoka

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ISBN : 978-93-5406-698-6

This book covers all the essential skills needed for a Linux Systems Engineer/Administrator role. I am glad that the authors have done comprehensive research while authoring the book, keeping in mind all the essential skills required for a fresher to get a job in the IT industry and also covers the advanced topics specific to the most in-demand skills like Hadoop, Docker, and Ansible. Overall, it is a very well written book for the beginners who are preparing to ace the job interviews. Besides covering the basics, the authors have delved into the tools used in DevOps such as Docker, and Ansible which makes this book very special as it serves as a guide to the beginner to understand the great value DevOps adds to the IT.

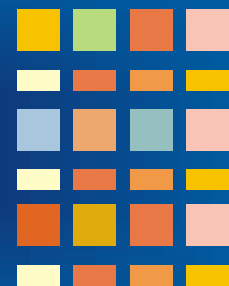


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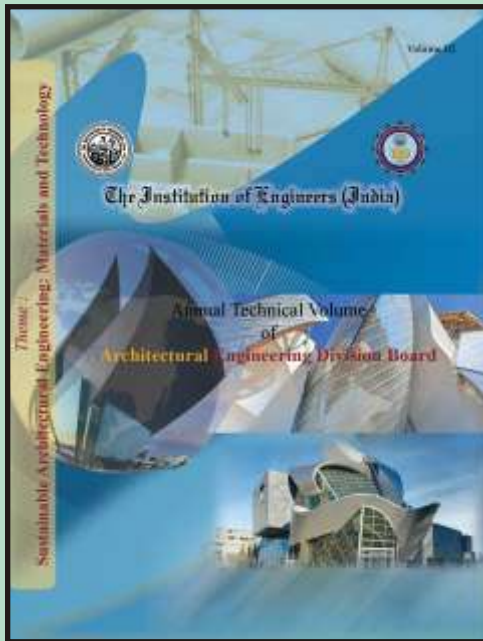
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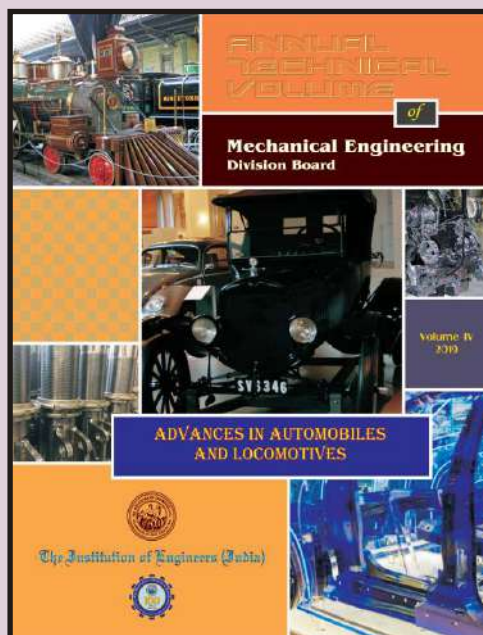
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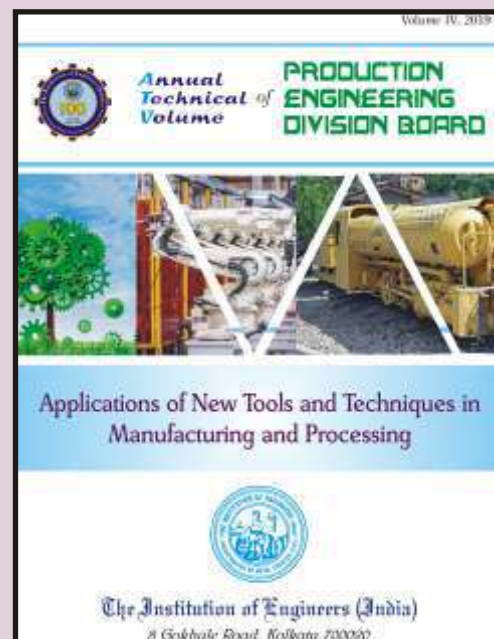
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