IEI EPITOME

Volume 9 | Issue 5 | May 2024

A Century of Service to the Nation

Inside this issue

Editor

Maj Gen (Dr) MJS Syali, VSM (Retd)
Secretary & Director General

Special Contribution

Mr S Chakraverty, Dr K Sen, Mr D Nath, Mr A Deb, Mr A Das, Mr B Mukherjee, Mr S Bagchi, Mr P Barik, Ms P Nath, Ms N Sikdar, Mr S K Mishra

Design & Outlay

Ms H Roy

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8 Gokhale Road, Kolkata 700020

Telephone : 91-33-40106299/248, E-mail : newsletter@ieindia.org, Website : http://www.ieindia.org

Notification for IEI R&D Grant-in-Aid

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To promote appropriate technology, assist in building up design & research talents and, most importantly, to help in nurturing potential R&D venture amongst engineering students pursuing Diploma/UG/PG/PhD courses. The Institution of Engineers (India) had instituted the R&D Grant-in-Aid program way back in 2001.

Every year, the Institution invites applications for funding industry-oriented R&D projects and research initiatives aimed at improving the life-style of common people from engineering students pursuing full time Diploma/UG/PG/PhD engineering program in AICTE/UGC/NAAC approved Institutions / Colleges / Universities. The application form and guidelines are available in our website https://www.ieindia.org. The projects should be carried out under the guidance of faculty members who are Corporate Members of IEI. Membership criteria for student(s), guide(s) and institution(s) are as follows:

Project Category	Student/Applicant Membership	Guide(s) Membership	Institutional Membership
1. Diploma	Exempted [Membership of Student Chapter is desirable]	AMIE/MIE/FIE	Not Mandatory
2. UG (BE/BTech/ Equivalent)	'Student Member' (SMIE)	AMIE/MIE/FIE	Applicant's Institute should preferably be an Institutional Member with NBA/NAAC Accreditation or valid NIRF Rank
3. PG (ME/MTech/ Equivalent)	AMIE/MIE/FIE	MIE/FIE	Applicant's Institute should preferably be an Institutional Member with NBA/NAAC Accreditation or valid NIRF Rank
4. PhD	AMIE/MIE/FIE	MIE/FIE	Applicant's Institute should preferably be an Institutional Member with NBA/NAAC Accreditation or valid NIRF Rank

The soft copy of the duly filled-up applications (in editable format), as per the proforma available on our website www.ieindia.org, should be sent through email to **research@ieindia.org** and one printed copy of the same should reach the following address:

The Deputy Director (Technical)
The Institution of Engineers (India)
8 Gokhale Road, Kolkata 700 020

Kindly go through the guidelines (visit link: **https://www.ieindia.org/webui/IEI-Activities.aspx#RnD-Initiative**) before filling up the application.

Members in the News

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Prof Dr Raghupatruni Bhima Rao, FIE
Former Chief Scientist
CSIR - Institute of Minerals and Materials Technology, Bhubaneswar, Odisha
✉ bhimarao@gmail.com

The Federation of Engineering Institutions of Asia and the Pacific (FEIAP) has announced the awardees of its esteemed **2024 FEIAP Engineer of the Year Award** during the 32nd FEIAP General Assembly, held on 3 May 2024 at Taipei. Among the distinguished awardees is **Prof Dr Raghupatruni Bhima Rao**, nominated by The Institution of Engineers (India) (IEI), a **member economy of FEIAP**.

The FEIAP Engineer of the Year Award celebrates exceptional engineers whose work has significantly impacted their fields and communities. Prof Dr Raghupatruni Bhima Rao's selection for this award underscores the high standards and excellence within The Institution of Engineers (India) and highlights the profound influence of Indian engineers on the global stage.

Prof Dr Raghupatruni Bhima Rao's remarkable contribution to the field of engineering and his unwavering commitment to advancing the profession have earned him this prestigious recognition. Due to his inability to attend the ceremony, Dr G Ranganath, President of The Institution of Engineers (India), accepted the award on his behalf.

We extend our heartfelt congratulations to Prof Dr Raghupatruni Bhima Rao on this outstanding achievement and commend his exemplary contribution to engineering.

Dr Raj Kumar Goswami, FIE
Professor of Department of Electronics & Communication Engineering & Principal
Gayatri Vidya Parishad College of Engineering for Women, Visakhapatnam, Andhra Pradesh
✉ rajkumargoswami@gmail.com

Dr Raj Kumar Goswami was granted a Patent for an invention entitled "**Trellis Coded Modulation System for Improved Bit Error Rate in Fading Channels**".

Patent Number :	522275
Application Number :	202241006256
Date of Filing :	05/02/2022
Date of Grant :	08/03/2024
Application for the term:	20 years from the 5th day of February 2022
Issuing Authority :	The Patent Office, Government of India, Chennai

Members in the News

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Prof C Senthil Kumar, FIE
Professor
Madras Institute of Technology Campus, Anna University, Chennai, Tamil Nadu
✉ cskumar@mitindia.edu

Prof C Senthil Kumar is the one of the Patentee for an invention entitled "**Sinusoidal Toothed Leading Edge Delta Wings**".

Patent Number :	529447
Application Number :	201641018605
Date of Filing :	31/05/2016
Date of Grant :	21/03/2024
Application for the term:	20 years from the 31st day of May 2016
Names of other patentee:	M Ramakrishna
Issuing Authority :	The Patent Office, Government of India, Chennai

Also he is the one of the Patentee for an another invention entitled "**Saw Toothed Leading Edge Delta Wings**".

Patent Number :	459345
Application Number :	201641018606
Date of Filing :	31/05/2016
Date of Grant :	16/10/2023
Application for the term:	20 years from the 31st day of May 2016
Names of other patentee:	M Ramakrishna
Issuing Authority :	The Patent Office, Government of India, Chennai

Dr Amar Kumar Das, FIE
Dean Research
Gandhi Institute for Technology (GIFT), Bhubaneswar, Odisha
✉ amar.das120@gmail.com

Dr Amar Kumar Das is the one of the Patentee for an invention entitled "**A Novel IOT Based Hybrid Solar Cold Storage for Preservation of Food Stuffs**".

Patent Number :	513306
Application Number :	201931045819
Date of Filing :	11/11/2019
Date of Grant :	21/02/2024
Application for the term:	20 years from the 11th day of November 2019
Names of other patentees:	Dr Saroja Kumar Rout, Prof Srikanta Kumar Dash, Prof Ankit Jena & Dr S Krishna Mohan Rao
Issuing Authority :	The Patent Office, Government of India, Kolkata

Members in the News

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Er S Valai Ganesh, MIE
Assistant Professor (Senior Grade)
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✉ valaiganesh@ritrjpm.ac.in

Er S Valai Ganesh is the one of the Patentee for an invention entitled "**Self Locking Valve to Avoid Water Wastage**".

Patent Number :	531585
Application Number :	201841016882
Date of Filing :	04/05/2018
Date of Grant :	03/04/2024
Application for the term:	20 years from the 4th day of May 2018
Names of other patentees:	Mr S Nirmal Kumar, Mr S Padmasubash, Mr M Paulraj, Mr M Deivanayagam, Dr S Rajakarunakaran, Dr S Rajakarunakaran & Mr G Praburam
Issuing Authority :	The Patent Office, Government of India, Chennai

Dr Debashis Panda, AMIE
Postdoctoral Fellow
Centre for Cryogenic Technology, Indian Institute of Science Bangalore, Karnataka
✉ debashis1003@gmail.com

Dr Debashis Panda is one of the Patentee for an invention entitled "**A System for Twin Cold Finger Mechanically Driven GM Cryocooler and Drive Mechanism**".

Patent Number :	534448
Application Number :	202341026367
Date of Filing :	08/04/2023
Date of Grant :	23/04/2024
Application for the term:	20 years from the 8th day of April 2023
Name of other patentee:	Dr Upendra Behera
Issuing Authority :	The Patent Office, Government of India, Chennai

Members in the News

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Dr Srinivasa Rao Pundru, FIE
Assistant Professor
Mahatma Gandhi Institute of Technology (India), Gandipet, Hyderabad, Telangana
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Dr Srinivasa Rao Pundru presented a paper titled '**Promotion of Article-Article Affiliation-Affiliated Country**' as an **Invited Speaker** through Video Forum in **World Congress of Ocean (WCO)** held on 15-17 November, 2023 at Hotel emisia Sapporo, Sapporo, Japan.

He also presented a paper titled '**Synthesizing Green Hydrogen in Industry**' as a **Keynote Speaker** through virtual mode in the 'European Conference on Renewable Energy and Green Chemistry' held on 06 March 2024.

Er Ashok Kumar Panda, MIE
Executive Engineer
Military College of Electronics and Mechanical Engineering (MCEME), Secunderabad, Hyderabad, Telangana
✉ akp.eme@gmail.com

Er Ashok Kumar Panda presented the paper titled '**Strengthening India's Defence Technology & Engineering Arm: Role & Perspective of Indigenisation**' in the **7th International Conference (COII-2024)** held at Ambalika Institute of Management & Technology, Lucknow during 23-24 February 2024.

Dr Somnath Mahato, MIE
Project Scientist III
Meteorological Training Institute (MTI), Indian Meteorological Department (IMD), Government of India, Dr Homi Bhaba Road, Pashan, Pune, Maharashtra
✉ somnathmahato1@gmail.com

Dr Somnath Mahato had been awarded certificate "**Best Paper of the Session**" for the paper titled '**GIS-GNSS Integrated Cost Efficient Static Monitoring System**' presented in 6th IEEE International Conference on 'Emerging Smart Computing and Informatics' (IEEE ESCI-2024) organized by All India Shri Shivaji Memorial Society's Institute of Information Technology, Pune, Maharashtra during 5-7 March 2024.

Books

Dr Pawan Kumar Mishra, FIE
Director
Construction Industry Development Council, New Delhi
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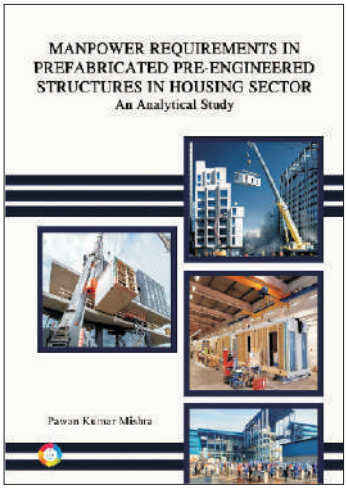
MANPOWER REQUIREMENTS IN PREFABRICATED PRE-ENGINEERED STRUCTURES IN HOUSING SECTOR: AN ANALYTICAL STUDY

About the Book

As the demand for sustainable, cost-effective, and rapid construction solutions continues to grow, the role of skilled manpower becomes increasingly pivotal. This comprehensive exploration, penned by Dr Pawan Kumar Mishra, not only sheds light on the current state of the industry but also navigates the reader through the intricate web of skills, knowledge, and expertise required to propel this sector forward.

In the book, DrMishra meticulously dissects the manifold facets of manpower requirements, offering insights into the training, expertise, and adaptability needed in an era where technology and construction techniques are inextricably intertwined. This book serves as a compass for industry professionals, students, and enthusiasts alike, navigating the complexities of a sector that demands a harmonious blend of traditional craftsmanship and cutting-edge knowledge.

This enlightening journey through the intricacies of prefabricated pre-engineered structures in the housing sector, may this book not only serve as a guide but also inspire a new generation of builders, architects, and visionaries to embrace the challenges and opportunities that lie ahead.



Details of the Book:

ISBN-10	:	9357478582
ISBN-13	:	978-9357478588
Date of Publication	:	18 December 2023
Imprint	:	I I P Iterative International Publishers
Publishers	:	Selfypage Developers Pvt Ltd, Karnataka

Publication by Members

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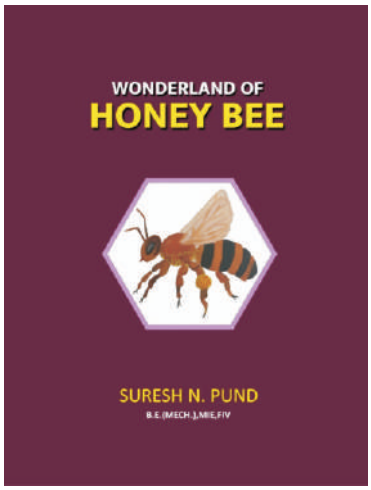
Er Suresh Nivrutti Pund, MIE
Proprietor
Techno Fab, Ozar, Nashik, Maharashtra
snpund@gmail.com

WONDERLAND OF HONEY BEE

About the Book

This book starts with synopsis of beekeeping in India, with a brief information about honey and bees, from the period of Rigveda, Upanishads, and Puranas, beekeeping before and after independence.

Section A deals with social life and anatomy of honey bee. Section B covers cast and creed of honey bees. Section C is about pollination and give products like honey, royal jelly, propolis. Section D narrates engineering significance of hexagonal hive and other. Section E is about her survival. Section F narrates solitary bees, stingless bees, Bumble bees, wasps, ants, termites. Section G has a very rare information about men and women bee scientists, bee organisations in the world and much more.



Details of Book:

ISBN	:	978-81-954433-3-8
Date of publication	:	25 February 2024
Publisher	:	Madhuri S Pund, Nashik
Printer	:	Replica Printers, Nashik

ANNOUNCEMENT

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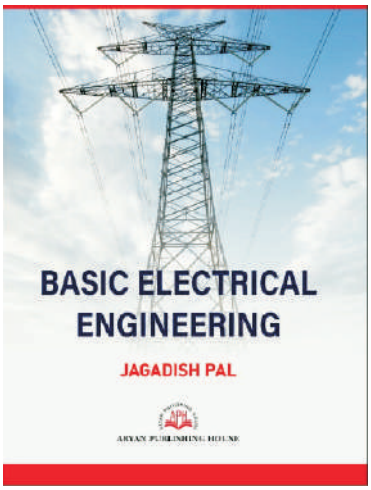
Prof (Dr) Jagadish Pal, MIE
Professor (Retired)
Department of Electrical Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Howrah , West Bengal
✉ jagadishpalee@gmail.com

BASIC ELECTRICAL ENGINEERING

About the Book

This book "Basic Electrical Engineering" is written for the beginners who will study electrical engineering subject. It provides fundamental laws and principles of electrical engineering and presents them in a clear and simple manner. it includes traditional chapters on dc and ac circuits, magnetic circuit, storage battery, dc and ac machines and transformers. It also furnishes electrical power supply systems, electrical installation and measuring instruments. The book additionally provides one advanced chapter on power electronics. Relevant diagrams, figures, curves, tables, illustrative examples, suitable MCQ type questions and many exercises with answers are the asset of the book. This book, | believe, will help the students to acquire an in depth knowledge of the subject.



Details of Book:

ISBN	:	978-81-944525-5-3
Date of publication	:	January, 2024
Publisher	:	Aryan Publishing House, Kolkata
Printer	:	Replica Printers, Nashik

Book Chapters

Er Vinay Anand, AMIE
Research Scholar
Lovely Professional University, Phagwara, Punjab
✉ vinayanand77@gmail.com

Title of Chapter: Electric Vehicle and Design Using MATLAB
Title of Book: Electric Vehicle Design: Design, Simulation and Applications
Chapter 5, John Wiley and Sons, Wiley online library, April 2024, Print ISBN: 9781394204373, Online ISBN: 9781394205097
DOI: https://doi.org/10.1002/9781394205097.ch5
Co-author: Himanshu Sharma

Abstract: *Electric vehicles, also known as EVs, use an electric motor powered by rechargeable batteries rather than an internal combustion engine fueled by gasoline or diesel. Electric vehicles are gaining popularity in automotive industries due to their environmental benefits, lower operating costs, and improved technology. Electric vehicles have a battery pack that stores energy to power the electric motor. One of the main benefits of EVs is their lower operating costs. EVs are cheaper to maintain and have lower fuel costs than traditional gasoline-powered cars. Additionally, they produce zero emissions, making them a more environmentally friendly option. There are different types of EVs, including battery electric vehicles (BEVs) that are powered solely by electricity and plug-in hybrid electric vehicles that use a combination of electricity and gasoline. While EVs still make up a relatively small percentage of vehicles on the road, they are becoming more accessible and affordable to consumers. As technology improves and more charging infrastructure is developed, EVs will likely become an increasingly popular option for transportation in the future. The BEVs have a battery pack that requires continuous charging, and charging infrastructure and solutions are a significant focus of the researchers. Also, instead of brushless DC motors, the possibility of another type of motor like an induction motor is an area of research. This article enlightens us about the limitations and solutions and also spreads general awareness of Evs.*

Er Chiranjib Sarkar, MIE
Principal Engineer
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Title of Chapter: **Slope Failure and Stabilization of Slope in Transportation Systems in Hilly Areas**

Title of Book: Fifth World Congress on Disaster Management: Volume V

Proceedings of the International Conference on Disaster Management, Routledge, London, 1st Edition, April 2023, Subjects on Environment and Sustainability, ISBN: 978-1-032-35552-8, eBook ISBN: 978-1-003-34209-0 7

DOI: https://doi.org/10.4324/9781003342090

Co-authors: Ankit Som & Sibapriya Mukherjee

Abstract: *Indian transportation network in mountainous terrain and hilly areas suffer due to frequent failure of slope and occurrence of landslide predominantly during the periods of heavy rainfall. This occurs due to disturbance of equilibrium between resisting force and driving. Such failures result in ground movement in the form of slides, creeps, falls, or flows. Therefore, slope stability is a very important part of design of transportation systems, which depends upon ground soil conditions, slope geometry characteristics and pore-water pressure, The construction activities for transportation systems in hilly areas, which include proper topographical survey, fixing of alignment, geotechnical investigation, formation of layout, laying of different subgrade layers with other associated structures, are also quite challenging and risky. Hence, absence of appropriate men-materials-machineries, poor contract documentation, unrealistic assumption, and improper design in DPR stage leads to instability and failure during construction. The present paper focusses on slope failure of transportation systems in hilly areas and its possible remedial measures. A parametric study has been conducted for different soil parameters and water table conditions with a common slope geometry to understand the slope stability criteria. In the present research, an attempt has been made to develop correlation between results with considered parameters, such as, factor of safety against slope failure. Different finite element models have been developed for three separate ground conditions, which are loose to medium sand, medium dense sand and very dense sand layer followed by soft rock layer. It has been found that with the improvement of ground condition from loose to medium sand to medium dense sand and from medium dense to very dense sand factor of safety increases appreciably with reduction of surface settlement by 7-12% and 20-21% respectively. The present case study may help practicing engineers to design transportation systems under similar situations.*

Papers published in the Journals / Proceedings

Er Anand Vikram, FIE
Senior Operation Manager and Station In-Charge and HoD
Indian Oil Corporation Limited, Gurgaon, Haryana
✉ anandvikram18@yahoo.co.in

Title of Paper: **Measurement of Optical Fiber Sensors for Intrusion Detection and Warning Systems Fortified with Intelligent False Alarm Suppression**

Optical and Quantum Electronics, Springer US, 56, April 2024, Electronic ISSN: 1572-817X, Print ISSN: 0306-8919

DOI: https://doi.org/10.1007/s11082-024-06797-7

Co-authors: Shobhit K Patel & Osamah Alsalman

Abstract: *This research explores innovations in the measurement of optical fiber sensors for intrusion detection, focusing on mitigating false alarms through an intelligent framework. The sensing technique involves tracking light scattered by nanoparticles, utilizing backscattering illustrated by Rayleigh's backscattering. The study integrates parametric intrusion detection and warning system (PIDWS) with intelligent false alarm suppression and minimization techniques, using FFT for efficient detection. A hybrid approach involving neural networks is proposed for reducing false alarms in dynamic network settings. The research emphasizes the intersection of the Internet of Things (IoT) and various intrusion detection systems for long-distance data transfer. The design of the PIDWS is detailed, highlighting efforts to achieve high sensitivity with FFT utilization. Results are showcased through a waterfall, illustrating real-time situations. The fiber Health Report, generated by fiber OTDR, provides insights into optical fiber conditions. The activity detector algorithm is presented as a flexible and robust detection method. In summary, the research contributes valuable insights into advancing optical fiber-based intrusion detection systems and minimizing false alarms. The research is applicable in avoiding intruders in oil pipelines.*

Keywords: *Measurement; Intelligent; Intrusion; Detection; Optical fiber sensor; FFT; Neural networks; IoT*

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Dr Amar Kumar Das, FIE
Dean Research
Gandhi Institute For Technology (GIFT), Bhubaneswar, Odisha
✉ amar.das120@gmail.com

Title of Paper: **Exergetic Performance Optimization and Thermo Economic Analysis of a Variable Compression Ratio Diesel Engine Fueled with Distilled Plastic Oil and Diesel Doped with Nanographene**

Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering, Sage Journal, February 2024, ISSN: 0954-4089, Online ISSN: 2041-3009
DOI: https://doi.org/10.1177/09544089241229563

Co-author: Taraprasad Mohapatra

Abstract: *Due to the fast depletion of fossil fuels, enormous concerns about environmental pollution, and advocacy for waste-to-energy drives from the global perspective, compression ignition engines need a sustainable alternative fuel source. Enormous plastic wastes were generated in health sectors, particularly during post-pandemic. In this context, the study intends to introduce a reasonable solution for such waste plastics recycling by converting them into liquid oil by pyrolysis followed by the distillation process. Distilled waste plastic oil (DPO) extracted from medical plastic waste is a potential alternative diesel source. The performance of the engine significantly increases when nanographene is added with DPO/diesel blends, which act as a combustion improviser. The energy efficiency (η_1), exergy efficiency (η_2), and brake-specific fuel consumption (BSFC), which are regarded as key performance indicators, exhibited promising results when operated with 20% DPO +100 ppm nanographene (20DPO100G) emulsified fuel mixture as compared to normal diesel. When compared to diesel and other fuel combinations, the energy efficiency (η) and exergy efficiency (η) for 20DPO100G fuel mixture were found enhanced by 5.78% and 10.9%, respectively, and lowest by 14.7% for BSFC in comparison to diesel. The optimum energy efficiency, exergy efficiency, and minimum BSFC were obtained for the test engine from response surface methodology multi-objective optimization analysis as 31.44%, 22.12%, and 0.32 kg/kW-hr, respectively, for the composite desirability, D of 0.974. The 100 ppm nanographene emulsified distilled waste plastic pyrolysis oil and diesel blend has the lowest relative cost variation of −14.583.*

Keywords: *Distilled Plastic Oil; Nanographene; Performance; Exergy; Optimization*

ANNOUNCEMENT

Know-Your-Member (KYM)

The Institution of Engineers (India) is **updating the database of all its Corporate Members** along with their achievements for which a Know-Your-Member (KYM) form has been introduced.

Every Corporate Member is requested to kindly fill up the form and forward it along with the self-attested copy of photo ID proof to the address given below:-

The Deputy Director (Membership)
The Institution of Engineers (India), 8 Gokhale Road, Kolkata 700020
Email: datamemb@ieindia.org

The form can be accessed & downloaded at :

https://www.ieindia.org/WebUI/ajax/Downloads/WebUI_PDF/HIGHLIGHTS_DOCUMENT-3332.pdf

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Dr Giridhar Maji, MIE
Lecturer
Department of Technical Education, Training and Skill Development, Government of West Bengal, New Town, West Bengal
✉ giridhar.maji@gmail.com

Title of paper: **A Novel Approach to Organize Blood Donation Camp and Blood Unit Wastage Management**

International Journal of Software Innovation (IJSI), 12(1), 2024, ISSN: 2166-7160, EISSN: 2166-7179, EISBN13: 9798369324318

DOI: https://doi.org/10.4018/IJSI.333517

Co-authors: Partha Ghosh, Takaaki Goto, Leena Jana Ghosh & Soumya Sen

Abstract: *In the countries or areas where the supply-demand ratio of blood is not maintained, the medication process is being deteriorated, and this may be as fatal as death of the patients. It is being observed in different areas in different seasons or may be at the time of festival scarcity of blood may happen. On the other hand, if the blood donation camp is organized frequently, there may be a surplus of blood as it has expiry dates. Along with these issues, due to the transportation or mismanagement, blood units are wasted. These problems are addressed in this research work, and methodologies are proposed to determine the most suitable blood bank with respect to the blood donation camp. Further, a demand forecasting algorithm is used both for predicting the blood unit demand of every blood bank and for transferring excess blood units to the blood bank where it is needed the most, and also, for the efficient transportation of the blood units, taxicab geometry-based paths are employed.*

Keywords: *Blood; Blood Donation; Blood Wastage; Forecasting; Lexicographic Optimization, LSTM; Multi-Objective Optimization; Taxicab Path*

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Prof (Dr) Omkar Suresh Vaidya, MIE
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Title of paper: **Securing Cyber Physical System Using Machine Learning: A Survey on Attack Resistant Algorithms**

Revue d'Intelligence Artificielle, International Information and Engineering Technology Association (IIETA), Canada, 38(1), February 2024, pp. 277-284, theme on Cyber Security, ISSN (print): 0992-499X ; ISSN (online): 1958-5748
DOI: https://doi.org/10.18280/ria.380129
Co-authors: Pramod S Aswale & Dipak P Patil

Abstract: *In order to protect Cyber-Physical Systems (CPS) against constantly changing cyberattacks, machine learning (ML) algorithms must be integrated. The goal of this survey is to investigate attack-resistant machine learning methods that improve CPS security. The limits of standard techniques are emphasized while discussing notable issues in CPS security. The survey thoroughly explores a range of machine learning methods, such as K-Nearest Neighbor (KNN), Support Vector Machines (SVM), and Deep Neural Networks (DNN), that are utilized in CPS for behaviour analysis, anomaly identification, and intrusion detection. We discuss the importance of having solid training data and the difficulties in ML model adaptation to the dynamic nature of CPS situations. We examine the trade-offs between responsiveness and precision as well as the effects of false positives and false negatives on attack detection. This paper aims to provide a quick overview of the strengths, limitations, and future prospects of these algorithms, enabling stakeholders to formulate effective strategies for CPS security.*

Keywords: *Cyber-Physical Systems; Cyber-Security Threats; Attacks and Issues; Cyber-Physical Vulnerabilities and Challenges; Security; Privacy and Forensics Solutions; Security and Performance Analysis*

Er Vipin Kumar Sharma, MIE
Additional Superintendent (Mill),
Uranium Corporation of India Ltd, Department of Atomic Energy, Government of India (E), Mabbuchintalapalle, Vemula Mandal, Kadapa, Andhra Pradesh
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Title of paper: **Carbonation and Modeling Study for Process Liquor in Batch Mode Using Flue Gas in the Mining and Mineral Processing Industry**

Chemical Papers, Springer, March 2024, Electronic ISSN: 2585-7290, Print ISSN: 0366-6352
DOI: https://doi.org/10.1007/s11696-024-03379-5
Co-authors: Sunil Kumar Thamida & B Naveen Kumar Reddy

Abstract: *The mining and mineral processing industry generates significant huge amounts of flue gas containing CO2 which is a major cause of the greenhouse effect leading to global warming. This work presents the experimental feasibility study of the carbonation where process liquor is contacted with boiler flue gas as a source of carbon dioxide (CO2). It is in the context of the low-grade mineral ore benefaction process. The carbonation process results in the production of stable carbonate or bicarbonate compounds that can be used as valuable by-products or raw materials in other industrial processes. Trials were conducted for the effective carbonation of process liquor generated in the mineral processing industry, which contains caustic lye. This work presents insight into experiments conducted for the carbonation of process liquor and further reaction modeling. The results were found to encourage pursuing large-scale columns for carbonation or capture of CO2 into alkali liquor in process industries.*

Keywords: *Carbonation; Carbon Emission Control; Boiler Flue Gas; Carbon Dioxide*

Publication by Members

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Er Ebin PM, AMIE
Assistant Professor
Alliance University, Bangalore, Karnataka
✉ pmebin74@gmail.com

Title of paper: **A Breakthrough Approach for Prostate Cancer Identification Utilizing VGG-16 CNN Model with Migration Learning**

2024 IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI), IEEE, 1(1), April 2024, Electronic ISBN:979-8-3503-6052-3, Print on Demand (PoD) ISBN:979-8-3503-6053-0
DOI: https://doi.org/10.1109/IATMSI60426.2024.10503011

Co-authors: U Ananthanagu, Geeta C Mara, Indu B, Roja Thomas & Nivedita Manohar Mathkunti

Abstract: *In the realm of medical visual scrutiny, the accurate identification of prostate cancer holds paramount significance for early diagnosis and effective treatment. This work presents a pioneering method for prostate cancer identification, harnessing the power of deep learning and Migration Learning strategies. Leveraging the VGG-16 Convolutional Neural Network (CNN) framework as the cornerstone, the proposed approach capitalizes on its ability to extract intricate features from medical images. By incorporating Migration Learning, the model is enriched with knowledge gleaned from diverse datasets, enabling it to achieve exceptional performance even with limited medical image data. The methodology entails meticulous dataset curation and preprocessing, ensuring the quality and representativeness of the images. The VGG-16 model undergoes a meticulous finetuning process, accommodating the unique characteristics of prostate cancer images. Performance evaluation is conducted rigorously, utilizing established metrics to gauge the approach's effectiveness. Comparative analysis with contemporary methods showcases the breakthrough potential of the proposed approach. The model gave 93.97% testing accuracy.*

Keywords: *VGG16; Prostate Cancer; Migration Learning; CNN*

Prof Gaurab Kumar Ghosh, AMIE
Assistant Professor (Mechanical Engineering)
Indira Gandhi Institute of Technology, Government of Odisha, Sarang, Dhenkanal, Odisha
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Title of paper: **Evaluation of Tribological Efficacy and EP Lubricity Properties of Gear Oil (EP90) Energized with Molybdenum Disulfide (MoS_2) Nano-Additives**

Journal of Dispersion Science and Technology, Taylor and Francis, January 2024, Print ISSN: 0193-2691 Online ISSN: 1532-2351
DOI: https://doi.org/10.1080/01932691.2024.2303329

Co-authors: Sikta Panda, Ritesh Kumar Patel, Ankit Kotia, Niranjan Kumar & Subrata Kumar Ghosh

Abstract: *The practice of employing efficient lubricants involving functional additives has become imperative in order to enhance engine efficiency, to say the least. The span of an engine's life can be greatly enhanced by gear oil's tribological and thermo-physical properties. Addressing the tribological management of gearbox components within the mechanical sector is a dire necessity. In a quest for exceptional nanolubricants with improved serviceability, present manuscript deals with the dispersion of metallic-sulphide nano dispersants in gear oil lubricant. Nanolubricants were prepared by dispersing molybdenum disulfide nanoparticles (MoS_2 Nps) in gear oil with varying concentrations of 0.1%, 0.3%, and 0.5% by volume (v/v). Then nanolubricants' thermo-physical properties were assessed and contrasted with those of plain gear oil. This was followed by the measurement of the tribological and extreme pressure properties of the nanolubricant samples on a four-ball tester. According to the findings, as compared to gear oil, the prepared nanolubricant yielded a maximum reduction of 9.21% and 9.38% in coefficient of friction and an average wear scar diameter, respectively. A maximum augmentation of 12% in weld load was obtained with 0.3% nanolubricant sample. The wear scar on the steel balls was examined using field emission scanning electron microscope (FESEM) and energy dispersive X-ray spectroscope (EDS). The investigations revealed the presence of ball bearing and surface polishing effects as dominant lubricating mechanisms, which potentially contribute to the enhanced tribological properties of the oil. Hence, adding MoS2 Nps in gear oil may solve many engineering problems related to the lubricity of the base oil.*

Keywords: *Molybdenum Disulfi De Nanoparticles; Tribological Properties; Four Ball Tester; Gear Oil; Ep Characteristics; Nanolubricant Samples*

Published Articles in IEI Journals

Volume 9 | Issue 5 | May 2024

Journal of The Institution of Engineers (India): Series C

|Aerospace, Marine, Mechanical & Production Engineering|
(Electronic ISSN: 2250-0553; Print ISSN: 2250-0545)
[CiteScore: 2.2; h5 Index: 22]
[SCOPUS Indexed & UGC-CARE (India) listed]
For download, use Membership ID through: www.ieindia.org

Volume 105, Issue 2, April 2024

Title: **Application of Multi-Criteria ABC Inventory Classification Approaches to Gearbox Manufacturing Industry**
Authors: **Anand S Shivade & Sagar U Sapkal**
Department of Mechanical Engineering, Walchand College of Engineering, Sangli, Maharashtra, India
DOI: https://doi.org/10.1007/s40032-024-01025-3
Publication date: 15 February 2024
Pages: 271–297

Title: **Design and Development of a Mobile Sit-to-Stand Assistive Device**
Authors: **Satyajit Halder & Sourav Rakshit**
Mechanical Engineering Indian Institute of Technology, Chennai, 600036, Tamilnadu, India
DOI: https://doi.org/10.1007/s40032-024-01030-6
Publication date: 12 March 2024
Page: 299 - 312

Published Articles in IEI Journals

Volume 9 | Issue 5 | May 2024

Title: **Detection of Isomorphism of Kinematic Chains Using two DOF Using CSJV Matrix**
Authors: **Sayeed Ahamad, Sabah Khan & Aas Mohammad**
Deptt. of Mechanical Engineering, Jamia Milia Islamia (Central University), New Delhi, India
DOI: https://doi.org/10.1007/s40032-023-01013-z
Publication date: 27 January 2024
Page: 313 - 326

Title: **Energy-Efficient Fuzzy Scheduling System for Crankcase Covers Manufacturing**
Authors: **Sumit Chawla & Ranganath M Singari**
Applied Science Department (Mechanical), Bharati Vidyapeeth's College of Engineering, Delhi, 110063, India
Mechanical, Production, and Industrial Engineering Department, Delhi Technological University, Delhi, 110042, India
DOI: https://doi.org/10.1007/s40032-024-01026-2
Publication date: 17 February 2024
Pages: 327 - 337

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Authors: **Rita Pimpalkar, Anil Sahu, Adik Yadao & Rajkumar Bhimgonda Patil**
GH Raisoni College of Engineering and Management, Wagholi, Pune, 412207, Maharashtra, India
Center for Safety, Reliability, and Optimization (CSRO), Pimpri Chinchwad College of Engineering, Nigdi, Pune, 411044, Maharashtra, India
Department of Mechanical Engineering, Dwarkadas J Sanghvi College of Engineering, Mumbai, 400056, Maharashtra, India
DOI: https://doi.org/10.1007/s40032-024-01027-1
Publication date: 14 February 2024
Pages: 339 - 355

Title: **Task-Specific Ergonomic Workstation Design in Manual Cashew Kernel Separating Activity**
Author: **Krishna Chaitanya Mallampalli**
School of Design, Vellore Institute of Technology (VIT), Vellore, Tamil Nadu, India
DOI: https://doi.org/10.1007/s40032-024-01028-0
Publication date: 13 February 2024
Pages: 357 - 369

Title: **Prospects of Additive Manufacturing Technology in Mass Customization of Automotive Parts: A Case Study**
Authors: **Abhinav Sarma & Rajeev Srivastava**
Department of Mechanical Engineering, Motilal Nehru National Institute of Technology Allahabad, Prayagraj, 211004, Uttar Pradesh, India
DOI: https://doi.org/10.1007/s40032-024-01029-z

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Publication date: 27 February 2024
Pages: 371 - 386

Title: **Correction to: Impacts of Fluid and Thermal Effect on Straight Through Labyrinth Seal: A Review**

Authors: **Saurav Das, Saikat Das, Kuheli Mondal, S Amith Kumar, Hoong Thiam Toh, Aminudin Bin Hj Abu & Waleed Fekry Faris**
Gopalan International School, Bangalore, India
Department of Aerospace Engineering & Engineering Mechanics, University of Cincinnati, Uptown West Campus, Cincinnati, Ohio, 45221, USA
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Sl. No.	Name of the Course	Scheduled Dates
1.	Coating & Paint Technology	03 - 05 Jun 24
2.	Best Practices in Energy Auditing of T&D Systems	04 - 07 Jun 24
3.	Climate Change and its Impact on Soil Biodiversity	05 - 07 Jun 24
4.	Air Pollution Monitoring & Modeling using Software Applications – Theory & Practical's.	05 - 07 Jun 24
5.	Emerging Trends in Drilling & Blasting Operations in Mining & Civil Engineering Projects	05 - 07 Jun 24
6.	Recent Advances in Planning, Design, Construction & Maintenance of High Rise Buildings	10 - 14Jun 24
7.	Effective Utilization of ChatGPT Office Administration	10 - 14 Jun 24
8.	Organizational Culture Assessment, Change Management & Strategic Leadership (Developing a Positive Culture where People and Performance Thrive)	10 - 13 Jun 24
9.	Total Quality in Vigilance	10 - 12 Jun 24
10.	Digital Surface Modeling using GIS Techniques-Hands on Practice	10 - 14 Jun 24
11.	Skill Enrichment Programme for Technical Officers of Defence, Government and PSU's	11 - 13 Jun 24
12.	Substation Automation and Smart Grids	11 - 14 Jun 24
13.	Industrial bearings Revisited- Maintenance, Condition Monitoring, Analysis and Prevention of Failures	18 - 21 Jun 24
14.	Remote Sensing and GIS applications in Global Warming and Climate Change	19 - 21 Jun 24
15.	Application of GIS, GPS & RS in Environmental Data Management.	19 - 21 Jun 24
16.	Cyber Security Tools & Security Audit	19 - 21 Jun 24
17.	Reliable Mine & Land Surveying through Advanced Technology - Total Station, DGPS,3D Laser Scanner, LiDaR, Drones, GIS, Remote Sensing Demonstration and Hands-on Training on Instruments	18 - 21 Jun 24
18.	Road map for getting NABL accreditation	19 - 21 Jun 24
19.	GEM Procurement Procedures – Gem Account operation from Basic to expertise (Buyer module)	24 - 28 Jun 24
20.	Dam Safety Guidelines - Monitoring and Protection Measures and Emergency Action Plan	24 - 28 Jun 24
21.	Coding for CFD simulations using Python	25 - 27 Jun 24
22.	Engineering Optimization: Traditional Vs Non-Traditional Methods	25 - 27 Jun 24
23.	Personality Development(An Ordinary to Extraordinary Personality Empowerment)	25 - 27 Jun 24
24.	Advanced Course on Effective Spares Parts Inventory Management	25 - 28 Jun 24
25.	Environmental Issues, Challenges and Pollution Control Strategies in Thermal Power Plants	25 - 27 Jun 24
26.	Land use Management - Land Reclamation & Rehabilitation	26 - 28 Jun 24