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Documents

1) Thirugnanam, G.[a] , Hameed, J.B.S.[b] , Bharathidasan, B.[c]

A secure fractional-order polar harmonic transforms based image watermarking scheme using funk singular value decomposition
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[a] Department of Electronics and Communication Engineering, Government College of Technology, Thadagam Road, Tamil Nadu, Coimbatore, India
[b] Department of Electrical and Electronics Engineering, B. S. Abdur Rahman Crescent Institute of Science and Technology, Chennai, India
[c] Department of Electronics and Communication Engineering, Sree Rama Engineering College, Tirupati, India

Abstract
In addition to existing cryptographic systems, watermarking technologies have been developed to add extra security. Digital watermarking utilizes embedding or hiding techniques to protect multimedia files from copyright violations. Fundamental procedures of digital watermarking techniques are embedding and extraction. Singular value decomposition (SVD) based Image watermarking schemes become popular owing to its better trade-off among robustness and imperceptibility. Nevertheless, false positive problem (FPP) is a major issue of SVD-based watermarking schemes. The singular value that is a fixed value and does not contain structural information about image is the primary cause of FPP problem. Therefore, Message Digest algorithm image watermarking scheme based on Funk Singular Value Decomposition and Fractional-Order Polar Harmonic Transform (FSVD-FOPHT) is proposed in this paper to address this problem. The MD-5 algorithm is used to extract data from the host and watermark imageries and then create secret key. The FSVD-FOPHT method is utilized to hide watermark information in host image. The secret keys are extracted from hided image using inverse process of Fractional-Order Polar Harmonic Transforms with Funk Singular Value Decomposition algorithm. By using the extraction procedure, watermark image is extracted, and then reconstructs original watermarked image. During extraction procedure, the secret key is used for authentication to address FPP. Then, the proposed method is implemented in MATLAB and performance is analyzed with evaluation metrics, such as Embedding capacity, MSE, PSNR, and NC. The proposed method provide 14.6%, 17.34%, 19.53%, 21.46% and 23.89% high PSNR for cold-snow-landscape-water test image, 14.29%, 16.47%, 18.39%, 20.16% and 21.93% high PSNR for landscape-nature-sky-blue Test image, 16.85%, 19.99%, 22.70%, 27.22% and 29.16% high Embedding Capacity for cold-snow-landscape-water test image 22.83%, 24.64%, 27.92%, 29.60% and 31.77% high Embedding Capacity for landscape-nature-sky-blue Test image 35.38%, 32.63%, 30.95%, 28.61% and 26.08% low extraction time compared with existing methods SVD-CMSF-SIW, FE-IWS-DNN, AR-IWS-DNN, BBET-SHA1-SIW and LSB-DWT-SIW respectively.

Author Keywords
Fractional-order polar harmonic transforms funk singular value decomposition embedding and extraction; message digest algorithm; secure image watermarking

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2) Paramasivan, S.[a] , Rajagopal, T.[b]

Strength studies on concrete using e-plastic waste as coarse aggregate
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[a] Department of Civil Engineering, Sri Krishna College of Technology, Tamil Nadu, Coimbatore, 641042, India
[b] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract
As an important resource for the IT sector and due to the extremely hazardous elements it contains and the low recycling rate, e-plastic waste management and recycling are growing swiftly. E-plastic waste utilization reduces aggregate costs, landfill costs and energy prices. Rapid population growth coexisted with industrialization and a dynamic shift in the volume of garbage produced. These dangerous wastes and other types of waste represent a serious threat to the ecosystem as well as human health. Therefore, the issue of efficient waste management is essential to the preservation of the environment, human health and livelihood. Concrete coarse aggregate made from plastic and recovered e-waste is being tested for feasibility. Testing was done to find out the characteristics of electronic plastic waste when used as coarse aggregate (2%, 4%, 6%, & 8%). These characteristics included specific gravity, water absorption, fineness test, compressive strength, tensile strength and flexural strength of the concrete.

Author Keywords
coarse aggregate replacement; Compressive strength; e-waste; plastic waste

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3) Preethi, G.[a] , Jeyanthi, J.[b]

Biosorption of heavy metals using Gracilaria edulis seaweed – batch adsorption, kinetics and thermodynamic studies
(2023) *Global Nest Journal*, 25 (10), pp. 33-46. Cited 1 time.

DOI: 10.30955/gnj.005259

[a] Department of Civil Engineering, Sri Krishna College of Engineering and Technology, Tamil Nadu, Coimbatore, India
[b] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
Clean water and its requirement are one of the emerging needs in recent days. Water pollution creates more amount of toxic nature to the clean water and it increases the accumulation of poisonous contaminants in the water sources. Heavy metal ions are the type of toxic pollutant released from textile industrial effluent, changes the natural color of clean water. In this study, Adsorption behavior with activated biochar Gracilaria edulis as adsorbent was investigated under batch mode for removing detecting elevated levels of metallic cations in aqueous solutions. The biochar adsorbent was prepared with chemical synthesis process and their surface area analyzed using N2 adsorption process. The presence of targeted heavy metal ions was confirmed using SEM and EDX analysis. The maximum adsorption efficiency of 99.9% of Cr, 97.37% of Ni and 92.73% of Zn heavy metal ions was achieved using the biochar adsorbent. The endothermic reaction in between adsorbent and adsorbent was confirmed using the thermodynamic studies and maximum amount of spent adsorbent was recovered by using desorption process by adding strong hydrochloric acid with 0.3 N.

Author Keywords
batch studies; Biosorption; desorption; Gracilaria edulis; kinetics and thermodynamics

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4) Varadharajan, P.[a] , Karikalan, S.[b] , Kumaresan, P.[a]

Diastereoselective construction of carbazole-based spiropyrrolidines and spiropyrrolizidines via cycloaddition reaction

(2023) *Journal of Heterocyclic Chemistry*, 60 (12), pp. 2081-2091. Cited 1 time.

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[a] Department of Chemistry, PSG College of Arts & Science, Coimbatore, India
[b] Department of Chemistry, Government College of College of Technology, Coimbatore, India

Abstract
A series of new spiro heterocyclic compounds having carbazole and pyrrolidine units were successfully synthesized through a one-pot, three component, 1,3-dipolar cycloaddition reaction in good yields with high diastereoselectivity. Simple reaction, easily accessible chemicals, high yield and diastereoselective formation of monospiropyrrolidine and monospiropyrrolizidine carbazole derivatives in one step are some advantages of this method. The structure of the obtained products was characterized by using spectroscopic techniques. © 2023 Wiley Periodicals LLC.

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5) Nithya, R.[a] , Thirunavukkarasu, A.[a] , Sivasankari, C.[b]

Comparative profile of green and chemically synthesized nanomaterials from bio-hydrometallurgical leachate of e-waste on crystal violet adsorption kinetics, thermodynamics, and mass transfer and statistical models
(2023) *Biomass Conversion and Biorefinery*, 13 (18), pp. 17197-17221. Cited 8 times.

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[a] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[b] Department of Chemistry, Government College of Technology, Coimbatore, India

Abstract
In the present research, nano-sized copper oxide particles (CuO) were synthesized from the bio-hydrometallurgical leachate of electronic waste (e-waste) using chemical and green mediated approaches. Glycine nitrate precursor (GNP) method was adopted to synthesize cCuO and Eichhornia crassipes leaves extract was used to prepare gCuO. Further, to ensure their nano-sized forms, the optical and structural properties were examined. Then, a set of batch trials were planned to compare their removal efficiencies of the cationic dye, crystal violet (CV). The maximum percent removal of 93.8% and 91.3% were observed for gCuO and cCuO, respectively, at pH0 of 8.0 with the initial concentration of 10 mg/L. The acquired batch trial data revealed the maximum adsorptive capacity for gCuO (200.00 mg/g) than cCuO (142.86 mg/g). This enhanced removal can be attributed due to the augmentation of surface functional moieties derived from the various phyto-constituents of E. crassipes. Also, the present study developed regression models predicting the CV adsorption process with high degree of statistical accuracy using artificial neural network (5-5-1 model; <0.5 MSE, R2 >0.99) and response surface methodology (3-3 BBD model, p<0.05, C.I>95%). Conclusively, the desorption results showed that the nano-adsorbents can be efficiently regenerated for the minimum of three successive adsorption-desorption cycles. Graphical abstract: [Figure not available: see fulltext.]. © 2022, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author Keywords
Bio-hydrometallurgical process; Copper oxide nano-adsorbent; Crystal violet adsorption; E-waste; Eichhornia crassipes; Green synthesis

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6) Radhakrishnan, G.[a] , Gopalakrishnan, V.[b]

Retraction notice to “Applications of internet of things (IOT) to improve the stability of a grid connected power system using interline power flow controller” [Microprocessors and Microsystems 76 (2020) 103038] (Microprocessors and Microsystems (2020) 76, (S0141933119306635), (10.1016/j.micpro.2020.103038))

(2023) *Microprocessors and Microsystems*, 103, art. no. 104941, .

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[a] Department of Electrical and Electronics Engineering, Sri Krishna College of Engineering and Technology, Tamilnadu, Coimbatore, India
[b] Department of Electrical Engineering, Government College of Technology, Tamilnadu, Coimbatore, India

Abstract
This article has been retracted: please see Elsevier Policy on Article Withdrawal (https://www.elsevier.com/about/policies/article-withdrawal). This article has been retracted at the request of the Editor-in-Chief. Subsequent to acceptance of these special issue papers by the responsible guest editors, Vyasa Sai, Anand Paul and Ramachandran Varatharajan, the integrity and rigor of the peer-review process of the Special Issue were investigated and confirmed to fall beneath the high standards expected by Microprocessors & Microsystems. Due to a configuration error in the editorial system, unfortunately neither the Editor in Chief nor the designated Handling Editors received these papers for approval as per the journal's standard workflow. The journal has attempted to contact the authors of this article to give them the opportunity to respond to the findings outlined in this notice. However, the journal has not received any substantive response. © 2020 Elsevier B.V.

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7) Srirajarajeshwari, M.[a] , Jeyanthi, J.[b]

Production of sustainable biodiesel from alkaline pretreated dairy effluent using Yarrowia lipolytica
(2023) *Environmental Progress and Sustainable Energy*, 42 (6), art. no. e14271, .

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[a] Department of Civil Engineering, Government College of Technology, Coimbatore, India
[b] Department of Civil Engineering, Faculty of Engineering, Government College of Technology, Coimbatore, India

Abstract
Biodiesel (BD) has grown in popularity over the last few years due to the global energy crisis, in addition to the depletion of reserves and the shortage of oil. The current study investigates the utilization of dairy effluent as a substratum for Yarrowia lipolytica, an oily yeast employed in biofuel generation. The dairy effluent has high biochemical oxygen demand, dissolved solids and, low pH. In this study, based on carbon nitrogen ratio (C/N), the alkaline pretreatment method (KOH 5%) was adopted to grow Y. lipolytica in dairy effluent. After 5 days of growth at 29°C, pH 6.9 (initial pH of dairy effluent), and stirring speed 120 rpm, the growth of Y. lipolytica produced 42.3 g/L biomass. Utilizing an ex-situ transesterification method, the biomass was metamorphosed into BD. Using a modified version of Folch, Bligh, and Dyer's approach, lipid removal was done as the initial step. Moreover, the lipid was transesterified in a KOH catalyst, yielding 61% BD. Utilizing Fourier transform infrared spectroscopy analysis, the produced fatty acid methyl ester was examined. © 2023 American Institute of Chemical Engineers.

Author Keywords
biodiesel; dairy effluent; lipids; oleaginous yeasts; Yarrowia lipolytica

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8) Narasimman, S.[a] , Balakrishnan, L.[b] , Alex, Z.C.[a]

Highly sensitive magnetic field sensor based on uniform core fiber using Mn doped ZnO nanorods as cladding
(2023) *Materials Science in Semiconductor Processing*, 166, art. no. 107732, . Cited 1 time.

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[a] School of Electronics Engineering, VIT, Vellore, 632 014, India
[b] Department of Physics, Government College of Technology, Coimbatore, 641 013, India

Abstract
To realize the magnetic field sensing, pristine and Mn doped ZnO nanorods coated fiber optic sensor is proposed and experimentally demonstrated. In order to create both pristine and Mn-doped ZnO nanorods (5, 10, 15 and 20 at. %), the hydrothermal approach was used and subjected towards various characterization techniques such as XRD, SEM, EDS and XPS. The XRD data show that ZnO crystallized in wurtzite structure, while samples of ZnO doped with Mn (5, 10, 15 and 20 at. %) contained ZnMnO3 impurity phase. The Mn doped ZnO nanorods served as the sensing component of the sensor structure made up of cladding modification technology. The magneto-refractive effect serves as the sensing principle. The effect of applied magnetic field on Mn doped ZnO nanorods coated cladding modified fiber optic sensor was investigated in detail. According to experimental findings, the sensor has an operational magnetic field range of 17.2 mT–190.6 mT and exhibits a maximum sensitivity of 27.2 for Mn doped ZnO nanorods (15 at. %) along with short response/recovery time of 7 s/12 s. The proposed sensor would be appealing due to its low manufacturing cost, reliable sensing structure, and high sensitivity, enabling potential applications in magnetic field measurements. © 2023 Elsevier Ltd

Author Keywords
Fiber optic sensor; Hydrothermal method; Magnetic field sensing; Mn doped ZnO nanorods

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9) Santhosh, V.[a] , Periyasamy, S.[b]

Qualitative improvement of bio-oil derived from hydrothermal liquefaction of liquid fertiliser drained Kappaphycus alvarezii
(2023) *Biomass Conversion and Biorefinery*, 13 (16), pp. 15295-15305.

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[a] Department of Chemical Engineering, Erode Sengunthar Engineering College, Thudupathi, Tamilnadu, Erode, 638057, India
[b] Department of Mechanical Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract
The purpose of this investigation was to explore the possibility of utilising post-sap residues for bio-oil production, that are produced after liquid fertiliser extraction from Kappaphucus alverizii, red macroalgae. The sap — a liquid fertiliser — was expelled by crushing the K. alverizii. The residual macroalgae were hydrothermally liquified at varying operating conditions (temperature, biomass to solvent ratio, residence time, catalyst dose), in order to understand its influence over the productdistribution and composition from thehydrothermal liquefaction (HTL) process. The maximal yield for crude bio-oil was 28.4 ± 0.6 wt.%, which was possible only when the HTL reactor was operated in presence of a ZSM-5 catalyst at 300 °C using 20 g of biomass for 30 min duration. Still, the bio-oil derived from the HTL process seems to possess higher oxygen content. Hence, the hydro-deoxygenation (HDO) process was carried out to upgrade the crude bio-oil into oxygenates less oil. The bio-char along with ZSM-5 derived from the previous HTL process was utilised as a catalyst in the HDO process. Catalysed HDO processes were able to improve the HHV of upgraded oil to 36.7 MJ/kg. Overall, this study implies that the crude bio-oil can be effectively produced from the post-sap residue, which can be further upgraded to calorific-rich fuel. © 2023, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author Keywords
Bio-oil; Hydro-deoxygenation; Hydrothermal liquefaction; Liquid fertiliser; Upgraded oil; ZSM-5 catalyst

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10) Awati, J.S.[a] , Kumbhar, M.[a] , Marimuthu, C.[b] , Jayakumar, J.[c]

Brain Tumor Classification and Identification using PSO and ANFIs
(2023) *International Journal of Electrical and Electronics Research*, 11 (4), pp. 1039-1043.

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[a] Electronics and Telecommunication Engineering, Rajarambapu Institute of Technology, Islampur, India
[b] EIE Department, Government College of Technology, Coimbatore, India
[c] Electrical and Electronics Engineering, Karunya Institute of Technology and Sciences, Coimbatore, India

Abstract
Fast Computer-Aided Diagnostic Systems (CAD) have become instrumental in diagnosing diseases. Brain tumors, in particular, pose a significant health challenge. Traditional tumor detection methods relied on radiologists and biopsy, which are time-consuming and detrimental to patients. Early detection is crucial for effective treatment. This system leverages image processing, SWARM intelligence, and Support Vector Machines (SVMs) to detect and classify brain tumors swiftly and accurately. Image processing encompasses preprocessing, segmentation, and feature extraction, with the Particle Swarm Optimization (PSO) method optimizing feature selection. SVMs identify tumor types. While various techniques exist for tumor detection, none achieve 100% accuracy. This system is engineered to provide precise detection. © 2023 by Jayashree S. Awati and Mahesh Kumbhar.

Author Keywords
Local Binary Pattern (LBP); Magnetic Imaging Resonance (MRI); Otsu's Segmentation; Principal Component Analysis (PCA); Support Vector Machine (SVM) and Particle Swarm Optimization (PSO)

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11) Surendran, R.[a] , Kumaravel, A.[b]

Optimization of wear properties on LM24 aluminium alloy reinforced with nano alumina and graphite using response surface methodology
(2023) *Journal of Ceramic Processing Research*, 24 (5), pp. 899-906. Cited 1 time.

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[a] Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India
[b] Department of Mechanical Engineering, K.S.Rangasamy College of Technology, Thiruchengode, 637215, India

Abstract
The dry sliding wear characteristics of metal matrix composites made of LM24 aluminium alloy reinforced with nano alumina (Al2O3) and graphite (Gr) are carried out. The aluminium alloy hybrid composites were prepared by the stir casting technique. In the present study, the wear behaviour of LM24-Al2O3-Gr hybrid composites with various weight percentages of Al2O3 (1, 3 and 5%) with a constant weight of 1% Gr reinforcement are studied. The parameters taken into account of wear bear behaviour of hybrid composites are applied load (10, 20 and 30 N), sliding distance (500, 1000 and 1500 m), sliding speed (200, 300 and 400 rpm) and Al2O3 (1, 3 and 5%) reinforcement. Wear tests are performed using the design of experiments, L27 orthogonal array on pin-on-disc equipment and identified optimising wear parameters in order to minimize the wear rate of LM24-Al2O3-Gr hybrid composites. The uniform distribution of reinforcement particles (Al2O3 & Gr) in the LM24 matrix is ensured by FEMSEM microscopy. The second-order polynomial regression models and the 3D surface plots are generated based on the wear parameters using response surface methodology. A minimum wear rate of 0.0021 mm3/m and a minimum coefficient of friction of 0.141 are observed experimentally. © 2023, Hanyang University. All rights reserved.

Author Keywords
FESEM; Graphite; LM24 aluminium alloy; Nano alumina; Pin-on-disc

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12) Balakumar, D.[a] , Rangaraj, J.[b]

A Prediction Model Based Energy Efficient Data Collection for Wireless Sensor Networks
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[a] Department of ECE, Annamalai University, Tamil Nadu, Chidambaram, India
[b] Department of ECE (Deputed to GCT Coimbatore), Annamalai University, Tamil Nadu, India

Abstract
– Many real-time applications make use of advanced wireless sensor networks (WSNs). Because of the limited memory, power limits, narrow communication bandwidth, and low processing units of wireless sensor nodes (SNs), WSNs suffer severe resource constraints. Data prediction algorithms in WSNs have become crucial for reducing redundant data transmission and extending the network's longevity. Redundancy can be decreased using proper machine learning (ML) techniques while the data aggregation process operates. Researchers persist in searching for effective modelling strategies and algorithms to help generate efficient and acceptable data aggregation methodologies from preexisting WSN models. This work proposes an energy-efficient Adaptive Seagull Optimization Algorithm (ASOA) protocol for selecting the best cluster head (CH). An extreme learning machine (ELM) is employed to select the data corresponding to each node as a way to generate a tree to cluster sensor data. The Dual Graph Convolutional Network (DGCN) is an analytical method that predicts future trends using time series data. Data clustering and aggregation are employed for each cluster head to efficiently perform sample data prediction across WSNs, primarily to minimize the processing overhead caused by the prediction algorithm. Simulation findings suggest that the presented method is practical and efficient regarding reliability, data reduction, and power usage. The results demonstrate that the suggested data collection approach surpasses the existing Least Mean Square (LMS), Periodic Data Prediction Algorithm (P-PDA), and Combined Data Prediction Model (CDPM) methods significantly. The proposed DGCN method has a transmission suppression rate of 92.68%, a difference of 22.33%, 16.69%, and 12.54% compared to the current methods (i.e., LMS, P-PDA, and CDPM). ©2023 The Authors. Published by AnaPub Publications.

Author Keywords
Adaptive Seagull Optimization Algorithm; Dual Graph Convolutional Network; Extreme Learning Machines; Wireless Sensor Networks

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13) Ponnambalam, N.[a] , Chinnaraju, K.[b] , Chithra, S.[a]

Incorporating of waste from sugar industry and cement industry in concrete
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[a] Department of Civil Engineering, Government College of Technology, Coimbatore, 641013, India
[b] Department of Civil Engineering, College of Engineering Guindy, Anna University, Chennai, 600 025, India

Abstract
As the production of biomass waste from agroindustry grows across the world, a large amount of agro-based ashes ends up in polluting land The utilization of Sugarcane Bagasse ash (SBA) as Supplementary cementious materials (SCMs) contributes to a fixing of issues related to CO2 emissions from cement industry and land pollution in agro-based industry. Individual performance on the utilization of SBA and limestone in concrete reported by many researcher, research on their combined usage in the concrete is limited. As a result, the current work involves the performance evaluation of ternary blended concrete incorporating SBA and limestone. The blended concrete's workability properties, compressive strength, water absorption, Rapid Chloride Penetration Testing (RCPT), Sorptivity, water permeability and electrical resistivity are examined in this paper. It improves the compressive strength and durability properties of ternary blended concrete It was observed that addition of 10-15 % limestone along with 10 % SBA improves the concrete performance. However, exceeding 15 percent had a detrimental impact on concrete properties. The additional alumina contributed by SBA will interact with

limestone that enhance the concrete properties. Utilization of SBA and limestone powder reduces cement consumption in cementitious composites and reduce environmental impact due to un-engineered disposal of SBA. Thus, result in improved sustainable production of concrete. © 2023 Global NEST.

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14) Prabhushankar, N.[a] , Balaji, N.[b] , Sridhar, N.[c]

Effective utilization of industrial and constructional solid waste materials in foundry mould making to prevent environment pollution and conserve natural silica sand
(2023) *Global Nest Journal*, 25 (8), pp. 35-42.

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[a] Department of Mechanical Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641 013, India
[b] Department of Mechanical Engineering, Sri Krishna College of Engineering and Technology, Tamilnadu, Coimbatore, 641008, India

Abstract
Green sand moulding uses silica sand for metal casting. Silica sand mining and delivery to foundries destroy the ecosystem, making metal casting unsustainable. Due to increased sand-casting output and massive civil buildings in India, the silica sand supply is declining. The depletion and shortage of silica sand necessitate the search for viable replacements. Industrial solid waste from large-scale industrialization pollutes land, air, and water. In order to use industrial waste in large amounts, an attempt is made to use it as a replacement for natural resources. The main objective of this research is to reduce the consumption of silica sand in the foundry mould-making process. Silica sand is replaced with industrial solid waste, cupola slag, and construction solid waste sources like spent fire bricks and quarry dust, up to a considerable amount, to save the natural resources. Utilization of solid waste material in the mould-making process will reduce production costs and environmental pollution, like dumping solid waste materials on land. Sand tests like permeability, green compression strength, dry compression strength, and compactability were conducted to assess the moulding properties of these alternative moulding materials. The process parameters considered for this investigation were the percentage of bentonite binder and the percentage addition of alternative mould materials with silica sand. The various sand tests showed that 40%, 30%, and 20% of quarry dust, spent fire bricks, and cupola slag, respectively, will adequately replace silica sand for mould making A bentonite binder of 8% is suitable for quarry dust mould, and a 10% bentonite binder is required for spent fire brick particles and cupola slag to yield better results. Aluminium castings were produced at the optimal mixture of these solid waste particles and silica sand. The results of mechanical tests such as hardness, tensile, and impact tests are comparable to those of silica sand castings. © 2023 Global NEST.

Author Keywords
alternative sources; aluminium castings; cupola slag; eco waste reuse; Quarry dust; spent fire bricks

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15) Raja, T.[a] , Sivanandi, P.[b] , Dhandabani, S.[c] , Murugan, V.[c]

Exploratory of novel thermal barrier coating on diesel engine performance
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[a] Department of Mechanical Engineering, P.S.V College of Engineering and Technology, Tamil Nadu, Krishnagiri, India
[b] Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[c] Department of Mechanical Engineering, Sri Ramakrishna Institute of Technology, Tamil Nadu, Coimbatore, India

Abstract

This research presents an experimental and theoretical evaluation of the effect of poly-composition thermal barrier coatings on the performance and emission characteristics of the compression ignition engine. This work investigated the thermal and physical behavior of thermal barrier coating. The thermal barrier coating was coated into two layers, and the thermal plasma spray method was used to make the coating. The first layer is AT13, and the top layer is Yttria-stabilized zirconia. The coated and uncoated pistons were analyzed in the Ansys, and it has shown the temperature distribution of the pistons. The experimental report shows that the brake thermal and volumetric efficiency was increased by 7.52% and 1.06%, brake-specific fuel consumption was reduced up to 18.91%, emission of carbon monoxide was reduced by 50%, and hydrocarbon was reduced by 52.38%. © IMechE 2023.

Author Keywords
ansys analysis; coatings; combustion; emission; performance; Piston; surface

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16) Karthik, V.[a] , Mohanasundaram, S.[a] , Ramaraju, P.[a] , Jeyanthi, J.[b] , Periyasamy, S.[c]

Study on the production, characterization, and application of coconut fiber biochar for effective removal of Co(II) ions from synthetic wastewater
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[a] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[b] Department of Environmental Engineering, Government College of Technology, Coimbatore, 641013, India
[c] Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia

Abstract
Biochar from coconut fibers was produced, analyzed, and evaluated as a potential adsorbent for Co(II) ions in a synthetic solution. FTIR, XRD, and SEM analysis were utilized to study the topological characteristics of adsorbent material. Batch adsorption experiments were employed to study the effects of initial concentrations of Co(II) ions (10–200 mg/L), pH (8.0–14.0), temperature (20–50 °C), contact time (100 min), and coconut fiber biochar dosage (0.02–0.1 g). Various modeling studies were conducted to investigate the adsorption mechanism of Co(II) ions using coconut fiber biochar. The Freundlich isotherm model (R2 = 0.99) and the pseudo-second-order kinetic model (R2 = 0.99) fit the Co(II) ion adsorption well. When the two models were compared, the Freundlich isotherm model performed significantly better. The maximum monolayer adsorption capacity of coconut fiber biochar for Co(II) ions was determined to be 106.80 mg/g. The thermodynamic results show that under certain conditions, Co(II) ion adsorption onto coconut fiber biochar occurs spontaneously and endothermically. The ability of coconut fiber biochar to desorb Co(II) ions was investigated using various acids as eluents. Hydrochloric acid (HCl) was found to be effective at desorbing Co(II) ions from adsorbed coconut fiber biochar. These findings confirmed that coconut fiber biochar has excellent surface properties for effectively removing Co(II) ions from wastewater. © 2023, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author Keywords
Adsorption; Cobalt ion; Coconut fiber biochar; Desorption; Wastewater

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17) Varun, B.[a] , Gopi, S.[b] , Manikandan, R.[c]

Experimental studies on the effects of reinforcing cowpat ash with aluminium composites
(2023) *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering*, 237 (5), pp. 1888-1899.

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[a] Department of Mechanical Engineering, Sri Ramakrishna Institute of Technology, Tamil Nadu, Coimbatore, India
[b] Department of Production Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[c] Department of Mechatronics Engineering, Sri Krishna College of Engineering and Technology, Tamil Nadu, Coimbatore, India

Abstract
A brief study is attempted to identify the effects of cowpat ash (CPA) having single reinforcement and also a second reinforcement with titanium diboride (TiB2) in aluminium 7075 alloys through the liquid metallurgy technique. The microstructural and mechanical properties of the fabricated samples are evaluated and compared with the base material to identify the increase and decrease in properties of the composite materials. In the first stage, single reinforced composites (SRCs) with CPA were varied by 2, 4, 6 and 8 weight percentages. It was found that at 6% of CPA the properties have enhanced in the composite materials. In the second stage of the research, hybrid reinforced composites (HRC) were fabricated with 6% CPA which was kept constant and TiB2 were varied by 2, 4 and 6 weight percentages. Among the composition, it was found that at 6% CPA and 4% TiB2 the properties of aluminium 7075 have enhanced. Optical microstructure, SEM with EDAX and XRD for SRC and HRC exhibited uniform distribution of reinforcements and their existence in the matrix respectively. The density has reduced for both SRC and HRCs but porosity has increased with an increase in reinforcement percentage. Hardness has increased by 18.18% for SRC and 34.54% for HRC. Tensile strength has increased by 14.28% for SRC and 29.67% for HRC. The impact strength has gradually decreased by 31.25% for SRC and 43.75% for HRC. Flexural strength has increased by 7.54% for SRC and 15.09% for HRC. The fracture SEM images exhibited cracks, voids, and dimples for tensile and impact specimens for fabricated samples. © IMechE 2022.

Author Keywords
cowpat ash; fractured SEM analysis; Liquid metallurgy technique; mechanical properties; microstructure; titanium diboride

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18) Angelaa Dass, M., Ravathi, M.C., Rama, M., Makesh Kumar, S., Rajeshkumar, K.

Extraction of copper from waste printed circuit board by acid leaching and electrowinning
(2023) *AIP Conference Proceedings*, 2764 (1), art. no. 050005, .

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Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
With the world moving towards the future rapidly, advancements in technologies are a must to fulfil the requirements that are necessary to both people and the industries that are a major part of the growth. This scenario leads to huge accumulation of electronic waste, which is sabotage to the environment and also causes huge wastage of resources. Proper disposal and recovery of resources is a serious measure to be considered. This study mainly focuses on the extraction of copper from waste printed circuit boards through a combined process of acid leaching and electrowinning. At first, pre-Treatment is done using NaOH for the removal of epoxy coating. Then three different acids such as Con.H2SO4, Con.HNO3 and Aqua regia with 7N condition was observed under leaching process. It was observed that nitric acid showed better results of 70% absorbance of copper. The leachates were subjected to an electrowinning process with 3V dosage of current per cm2 and observations were made for 5hrs.The obtained copper was then washed with absolute alcohol, dried and analyzed using ICP-OES. It has been observed that, 45% of copper deposition on cathode was achieved from the leaching solution obtained from concentrated nitric acid, 12% from sulphuric acid and 25% from aqua regia. Apart from metal recovery, the toxicity levels are analyzed using SimaPro version 7.1.1. The results depicted that human are exposed to 90% of carcinogens than the ecosystem and usage of materials for the recovery process is also found to be less. © 2023 American Institute of Physics Inc.. All rights reserved.

Author Keywords
And DVL are some of a terms used in this paper; Full Swing GDI; Modified Mixed Logic Design

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19) Thanigachalam, M., Subramanian, A.V.M., Sigamani, M., Nagarajan, S., Vadivel, S.

Biocompatibility of additively manufactured materials
(2023) *Mechanical Properties and Characterization of Additively Manufactured Materials*, pp. 67-84.

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Government College of Technology, Coimbatore, India

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20) Karthik, V.[a] , Dhivya Dharshini, G.[a] , Senthil Kumar, P.[b c] , Kiruthika, S.[a] , Rangasamy, G.[d e] , Periyasamy, S.[f] , Senthil Rathi, B.[g h]

Ferrite-Supported Nanocomposite Polymers for Emerging Organic and Inorganic Pollutants Removal from Wastewater: A Review
(2023) *Industrial and Engineering Chemistry Research*, 62 (35), pp. 13711-13733. Cited 5 times.

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[a] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[b] Department of Chemical Engineering, Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, Kalavakkam, 603 110, India
[c] Centre of Excellence in Water Research (CEWAR), Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, Kalavakkam, 603 110, India
[d] School of Engineering, Lebanese American University, Byblos, 1102 2801, Lebanon
[e] Department of Sustainable Engineering, Institute of Biotechnology, Saveetha School of Engineering, SIMATS, Chennai, 602105, India
[f] Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[g] Department of Chemical Engineering, St. Joseph's College of Engineering, Chennai, 600119, India
[h] Institute of Sustainable Energy (ISE), Universiti Tenaga Nasional, Selangor, Kajang, 43000, Malaysia

Abstract
In recent years, organic and inorganic contaminants in wastewater (heavy metals, halides, nutrients, dyes, and pathogen-related water pollution) have become a major global problem. There were initially fewer toxins, but as a result of fast industrialization and other human activities, they have rapidly risen. In addition to producing a host of health problems and organ system failure in people, these toxins have had a disastrous effect on the ecological balance of plants, animals, and even microbes. On the basis of nanotechnology, several methods for decontaminating water that use nanoadsorbents and/or photocatalysts are being researched. Due to their improved physical and chemical characteristics, several research studies have focused on the elimination of organic and inorganic pollutants using ferrite-supported nanocomposite polymers as possible affordable substitutes for currently employed materials. In this review, the toxicity of heavy metals and the different adsorption capabilities of metal-doped ferrites, which are employed to detect the pollutants in wastewater, are discussed in detail. Also, it provides various synthesis methods to produce ferrite-supported polymer-based nanocomposites and a current review of them with a special emphasis on their exceptional ability to remove organic and inorganic pollutants from wastewater. As a result, ferrite-supported polymer-based nanocomposites, which are also less expensive and swellable, can act as effective adsorbents for the removal of both organic and inorganic pollutants. It has outstanding performance for sizes between 10 and 30 nm. © 2023 American Chemical Society.

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21) Nithya, R., Thirunavukkarasu, A.

Agro-waste residue-based food packaging films
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Government College of Technology, Department of Industrial Biotechnology, Thadagam Main Rd., Coimbatore, 641013, India

Abstract
Petrochemicals-based nonrenewable sources are the preferential choices for the commercial food packaging industries. As these sources are able to negatively impact the health of the ecosystem by producing vast quantity of nonbiodegradable solid wastes, there is a need to develop technologies based on the alternative and renewable forms of sources. Besides the socioeconomic awareness among the consumers also tend to innovate the food packing technologies with the bio-based resources. Among these, agro-waste residues-based biopolymers find attractive among the researchers as it has many advantages include abundance, availability in multiple forms, able to consume, no toxic or associated health outcomes, and biodegradability. Considering these facts, several technological developments have been made in the recent decade in the food packaging sectors. In this chapter, the different forms of the agro-waste-based biopolymers, their utilization as packing material, and their impact on imparting the functional attributes of the food were comprehensively reported. Also, the chapter identified significant research gaps which could be potentially addressed in the near future for the sustainable development in the field of food packaging and technology.

Author Keywords
Agro-waste-based biopolymers; Food packaging; Research gaps; Sustainability

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22) Manoharan, S.[a] , Jeyadharmarajan, J.[b]

Effect of antioxidant addition on stability and emission aspects of novel biodiesel generated from the yeast Yarrowia lipolytica cultivated on dairy effluent
(2023) *Journal of Renewable and Sustainable Energy*, 15 (5), art. no. 053102, . Cited 1 time.

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[a] Department of Civil Engineering, Research Scholar, Government College of Technology, Coimbatore, 641013, India
[b] Department of Civil Engineering, Faculty of Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract
The continuous utilization of fossil fuel reserves and augmented pollution level leads to inevitable transition toward renewable fuel in transportation sector. Biodiesel is one of the most renowned biofuels across the energy sector in recent decade. Even though biodiesel has many advantages, the stability is a key concern on downside of biodiesel. The presence of oxygenated compounds in biodiesel leads to faster rancidation during prolonged storage period. This research focuses on producing biodiesel from diary waste and assesses the influence of synthetic antioxidant on its stability. The addition of antioxidant showed a significant increase in the induction period (IP) of biodiesel. Tert-butyl hydroquinone (TBHQ) showed superior Induction Period (IP) of 15.28 h at 110 °C, which is due to its radical suppression behavior during ageing. The thermal ageing results also confirmed the potential of the TBHQ blend with the least ageing rate of 0.08 cSt/h. The biodiesel samples showed signs of dehydration and polymerization after ageing, which is detected by FTIR spectra. Finally, the engine testing showed that antioxidant reduces dangerous NOx emission with minor sacrifice toward performance aspects. From the results, it can be seen that the biodiesel from yeast grown dairy wastewater can be a suitable competitor in the alternate fuel market.

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23) Gounder, Y.K., Subramanian, S.

Application of machine learning controller in matrix converter based on model predictive control algorithm
(2023) *International Journal of Power Electronics and Drive Systems*, 14 (3), pp. 1489-1496. Cited 1 time.

DOI: 10.11591/ijpeds.v14.i3.pp1489-1496

Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract
Finite control set model predictive control (FCS-MPC) algorithms are famous in power converter for its easy implementation of constraints with cost function than classical control algortihms. However computation complexity increases when swicthing state is high for converters such as matrix converter, multilevel converters and this impose a serious drawback to compute multi-step prediction horizon MPC algorithm which further increases the computation. To overcome the above said difficulty, machine learning based artificial neural network (ANN) controller for matrix converter is proposed. The training data for ANN controller is derived from MPC algorithm and trained offline with an accuracy of 70.3%. The proposed ANN controller shows a similar and better performance than MPC controller in terms of total harmonic distortion (THD), peak overshoot during dynamic change in reference current and dynamic change in load parameter and less computation with less execution time. Further, ANN controller for matrix converter is tested in OPAL-RT using hardware in-loop (HIL) simulation and showed that it outperforms MPC controller.

Author Keywords
Artificial neural network; Current control; Finite control set model predictive; Hardware in-loop; Matrix converter; Total harmonic distortion

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24) Ayyanar, C.B.[a] , Marimuthu, K.[a] , Sridhar, N.[b] , Mugilan, T.[b] , Alqarni, S.A.[c] , Katowah, D.F.[d] , Sanjay, M.R.[e] , Siengchin, S.[e]

Mechanical and Materialistic Characterization of Poly Lactic Acid/Zeolite/Hydroxyapatite Composites
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[a] Department of Mechanical Engineering, Coimbatore Institute of Technology, Tamilnadu, Coimbatore, 641 014, India
[b] Department of Mechanical Engineering, Government College of Technology, Tamilnadu, Coimbatore, 614 013, India
[c] Department of Chemistry, College of Science, University of Jeddah, Jeddah, Saudi Arabia
[d] Department of Chemistry, Faculty of Applied Science, Umm Al-Qura University, P.O. Box 17236, Makkah, 21955, Saudi Arabia
[e] Natural Composite Research Group Lab, Department of Materials and Production Engineering, The Sirindhorn International Thai-German Graduate School of Engineering (TGGS), King Mongkut's University of Technology North Bangkok (KMUTNB), Bangkok, Thailand

Abstract
The medical sector needs medical devices that are biocompatible or bioabsorbable, and Poly Lactic Acid (PLA) satisfies that need. PLA is a thermoplastic polymer that degrades naturally and has good mechanical strength. In order to create anchors, screws, plates, pins, rods, and mesh for medical implants, polylactic acid, which is harmless, can be broken down into lactic acid. The primary objective of this work is to characterize the mechanical properties and material properties of polymer composite materials reinforced with hydroxyapatite (HAp), zeolite, magnesium, and zinc particulates for biomedical implant applications. Using an injection moulding process, the composite samples were created. Mechanical qualities such as tensile, compression, flexural strength, and shore D hardness were examined in accordance with American Society for Testing and Materials (ASTM) standards. The maximum tensile, compressive, and flexural strength were found to be 39.23 MPa, 36.80 MPa, and 68.25 MPa, respectively, for 65 wt.% PLA + 35 wt.% HAp + 5% wt.% Zeolite polymer composites were observed, and a maximum Shore D hardness of 79.8 SHN was found. Further, material characterizations

were carried out for this composite material. The morphological characterization using Field Emission Scanning Electron Microscopy (FESEM) and Energy Dispersive X-ray (EDAX) analysis was used to analyze the surface morphology and confirm the various proportions of elements in the PLA composites. Fourier-transform infrared spectroscopy (FT IR) was used to confirm the different functional groups. Thermogravimetric analysis (TGA) and derivative thermogravimetric (DTG) analysis were used to study the thermal properties of polymer composites. The results show that the fabricated polymer composites could have better mechanical strength and be suitable for medical implant applications.

Author Keywords
Biomaterial; Chitosan; Hydroxyapatite; Injection moulding; Shore D Hardness; Thermal analysis; Zeolite

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25) Balaji, M.[a] , Balakrishnan, S.[b] , Sathishkumar, N.[a]

Machining characteristics of aluminium oxide bioinert ceramics and optimization of ECDM process parameters
(2023) *AIP Conference Proceedings*, 2861 (1), art. no. 040002, .

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[a] Department of Mechanical Engineering, SNS College of Technology, Coimbatore, 641035, India
[b] Department of Production Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract
A novel technique known electrochemical discharge machining (ECDM) uses physical and chemical phenomena to remove material from non-conductive work pieces. Bioinert ceramics are a type of advanced ceramic with stable physiochemical characteristics that may be used in medical and dental applications, primarily as implants and replacements. Alumina Great hardness, high abrasion resistance, and good wear and friction behaviour are all properties of bioinert ceramics. The compaction process was used to create alumina, which was then machined using the ECDM technique while changing process variables such the duty cycle, voltage, and electrolyte concentration. A Taguchi L9 orthogonal array was used to conduct experiments to assess the material removal rate for each parameter setting. The optimal process parameter was found out based on the Main effect plots and ANOVA table.

Author Keywords
Bioinert ceramics (Aluminium Oxide); ECDM; Material Removal Rate; Taguchi Technique

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26) Sathyapriya, S.[a] , Gayathridevi, K.[a] , Sharvesh, R.[b]

Influence of Biodegradable Vertical Drains on Soft Soil
(2023) *Indian Journal of Environmental Protection*, 43 (8), pp. 750-756.

[a] Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[b] Hindusthan College of Engineering and Technology, Tamil Nadu, Coimbatore, 641 050, India

Abstract
Consolidation parameters are a crucial component in stability analyses of embankments, footings or columns built on clayey soil. The settlement behaviour of the structures and the pore pressure changes need to be looked upon when structures are built over such soil. Prefabricated vertical drains (PVD) are used to accelerate the process of consolidation by permitting pore water pressures to dissipate easily when subjected to overburden pressures. To avoid detrimental impact on the environment due to the use of polymeric materials in vertical drains, biodegradable vertical drains are employed. This paper reports water absorption capacity tests, consolidation tests, discharge capacity tests and numerical analyses carried out for natural prefabricated vertical drains (NPVD). The natural prefabricated vertical drains are made of jute sheath covering core

made-up of bamboo material. The water absorption capacity of fibres used is 8% lesser compared to the other fibres (coir and jute). Consolidation results showed that coefficient of consolidation, coefficient of permeability, coefficient of compressibility, coefficient of volume change and compression index increased with use of a single NPVD in soft clay. Results from discharge capacity test showed a decrease in discharge capacity when compressive stress is increased, at the same hydraulic gradient. The numerical analysis result showed dissipation of pore water pressure while increasing time. © 2023 - Kalpana Corporation.

Author Keywords
Consolidation settlement; Natural fibres; Natural prefabricated vertical drains; Pore water pressure dissipation; Prefabricated vertical drains; Soil consolidation

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27) Gomathy, B.L.J.[a] , Karthik, V.[b] , Periyasamy, S.[c]

Adsorption of co(li) ions using indigenous tamarind seed biochar: Batch adsorption and modeling studies
(2023) *Global Nest Journal*, 25 (6), pp. 120-129.

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[a] Department of Electronics and Instrumentation Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b] Department of Industrial Biotechnology, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[c] Department of Chemical Engineering, School of Mechanical, Chemical, and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia

Abstract
With an estimated volume of 162 thousand metric tonnes in 2020, India is the world's largest producer of tamarind. The country is home to a number of tamarind species, and production is spread out across the country. Farmers and agro-industries continue to encounter numerous challenges in the processing and disposal of waste created during tamarind harvesting and processing. However, because this agricultural waste is disposed of fast, it may pollute the ecosystem. As a result, this study focused on agricultural waste reuse for wastewater treatment, with tamarind seeds serving as the principal source for low-cost adsorbent (biochar) manufacture to remove harmful Co (II) ions rendered as an aqueous solution. Biochar is a form of charcoal produced by the pyrolysis of organic materials such as wood, agricultural waste, and animal manure. The surface characteristics of the synthesized biochar from tamarind seeds were investigated using FTIR spectroscopy, XRD, SEM, and EDAX. Tamarind seeds-based biochar (TSB) achieves maximal Co (II) ion adsorption at 9 pH, 50 °C, 90 min contact period, and 0.14 g/L adsorbent dosage. The Langmuir isotherm and Pseudo-second-order kinetics are the best-fitting isotherms and models for Co (II) ion adsorption using TSB. The maximal monolayer adsorption capacity (qm) of tamarind seeds-based biochar was determined by an adsorption isotherm analysis of 343.5 mg/g for Co (II) ions. Thermodynamic parameters successfully indicate that the current Co (II) ion adsorption utilizing TSB is possible, spontaneous, and endothermic. As a result, the adsorption investigation demonstrates that generated TSB has improved surface characteristics and capacity to remove Co (II) ions from wastewater effectively. © 2023 Global NEST.

Author Keywords
Adsorption; Agricultural waste; Biochar; Co(II) ions; Tamarind seeds; Waste re-utilization

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28) Manoharan, V.[a] , Tamilperuvalathan, S.[b]

Experimental investigation and prediction of ECDM parameters on fiber reinforced SiC composite using hybrid ERNN-based Sparrow Search Optimization
(2023) *Materials Today Communications*, 36, art. no. 106777, . Cited 3 times.

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[a] Department of Robotics and Automation Engineering, Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur, 621212, India
[b] Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract
The Silicon Carbide (SiC) fiber-reinforced SiC ceramic matrix composites have proved their outstanding performance on high thermal applications such as gas turbine engine parts, turbo-pumps, nozzles, and various other aerospace/aero-propulsion system parts. Regardless of their enhanced strength properties, the SiC fiber-reinforced SiC ceramic composite materials are difficult to process using conventional machining methods. Also, SiC fiber-reinforced SiC ceramic promotes a higher tool wear rate while doing conventional drilling operations. Therefore, this study investigates the Electrochemical Discharge Machining (ECDM) parameters on such SiC fiber-reinforced SiC ceramic composite. Besides, the levels of most influencing ECDM input parameters Voltage, Electrolytic Concentration and Duty Cycle are optimized using a novel hybrid machine learning optimizer called Elman Recurrent Neural Network-based Sparrow Search Optimization (ERNN-SSO). The experiment is planned using Response Surface Methodology based on Box Behnken Design (RSM-BBD) and verified using ANOVA. The Material Removal Rate (MRR), Tool Wear Rate (TWR) and Overcut (OC) are considered output performances during this study. The proposed ERNN-SSO has optimized ECDM input parameters at a maximum of 0.03 root mean square error (RMSE), approximately 33 % and 95 % lower than the conventional ERNN and RSM optimization techniques. This study's suggested ECDM input parameters for drilling SiC fiber-reinforced SiC ceramic composite are 95 V voltage supply, 10 %Wt. of electrolytic concentration, and 50 % duty cycle. Because, such optimum ECDM parameters produced a maximum MRR of 370 µg/min with minimum TWR and OC of 283 µg/min and 161 µm during this study. © 2023 Elsevier Ltd

Author Keywords
Box Behnken design; Electrochemical Discharge machining; Electrolytic concentration; Elman Recurrent Neural Network (ERNN); Sparrow Search Optimization (SSO)

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29) Nithya, R.[a] , Thirunavukkarasu, A.[a] , Hemavathy, R.V.[b] , Sivashankar, R.[c] , Kishore, K.A.[c] , Sabarish, R.[d]

Functionalized nanofibers in gas sorption process: a critical review on the challenges and prospective research
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[a] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[b] Department of Biotechnology, Rajalakshmi Engineering College, Chennai, India
[c] Department of Chemical Engineering, National Institute of Technology, Warangal, India
[d] Department of Materials and Production engineering, King Mongkut's University of Technology, North Bangkok, Thailand

Abstract
Air pollution has become the most important environmental and human health threat as it is accounting for about 7 million deaths across the globe every year. Particulate matter (PM) derived from the combustion of fossil fuels, biomass, and other agricultural residues pollutes the atmospheric air which affects the quality of the environment and poses a great threat to human health. Ecological imbalance, climatic variation, and cardiovascular and respiratory problems among humans are significant extortions due to PM pollution. Scientific approaches were initiated to limit the levels of PM in the atmospheric air and the use of nanofiber mats has received wide attention as these possess versatile properties including nanoscale-sized pore structure, homogeneity in their size distribution with high specific surface area, and low basis weight. To exploit their filtration potential towards wide classes of pollutants and also to enhance the capturing efficacy, functionalized nanofibers are currently in practice with tailor-made modifications on the surface. The present review provides a comprehensive report on the different fabrication processes of functionalized nanofibers along with the controlling factors affecting the efficacy of the gas separation process. Also, it provides technical insights on the mass transfer aspects of PM filtration by elucidation their mechanism which can provide vital information on the rate-controlling diffusive flux(es). Conclusively, the practical challenges encountered in the large-scale air filtration systems such as filter cleaning, flow-rate regulation, pressure drop, and extent of reusability are discussed, and the review has identified potential gaps in the current research and can be considered for the prospective research in the area of PM separation process. © 2023, The Author(s), under exclusive licence to Springer Nature Switzerland AG.

Author Keywords
Air pollution; Gas separation process; Mass transfer aspects; Nanofibers; Particulate matter (PM)

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30) Soniya, S.M., Chithra, R.

Performance analysis of cost-effective hybrid polypropylene-steel engineered cementitious composites and prediction based on artificial neural network
(2023) *Structural Concrete*, 24 (4), pp. 4823-4840.

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Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract
Engineered Cementitious Composites (ECCs) is a high-performance fiber-reinforced cementitious composite renowned for their excellent tensile strain hardening behavior. Among the reinforcing fibers, PolyVinyl Alcohol (PVA) featuring sufficient tensile strength but the fiber's cost is relatively high. Hence, this research has attempted to obtain strain-hardening ECC by locally available fibers. Hybridization of Recron 3s PolyPropylene (PP) fibers and hooked-ended steel fibers (SFs) were chosen to improve the strain hardening behavior. According to the compressive test and direct tensile test results, mixes developed with 1.7% PP and 0.3% SF displayed better strain corresponding to ultimate load due to the better dispersion of the fibers. Toughness indices and residual strength factor were also estimated using ASTM C 1018 standards. Based on the observations, slabs contains 1.9% PP along with 0.1% SF has a significant impact on toughness indices and residual strength factor. However, the fracture energy increases by increasing the equivalent steel reinforcing indices from 20 to 55. Finally, the cost of the composites has been compared by frequently used PVA-ECCs from the literature. It could be concluded that the cost could be reduced by around 75% by using the currently used hybrid ECC rather than PVA-ECC. This study also presents the prediction of mechanical properties of hybrid ECC based on the artificial neural network. In conclusion, feedforward neural networks using a backpropagation algorithm and two processing layers demonstrated adequate ability to predict the mechanical properties of hybrid ECCs. © 2022 International Federation for Structural Concrete.

Author Keywords
artificial neural network; aspect ratio; ductility; engineered cementitious composites; polypropylene (PP) fiber; reinforcing index; toughness index

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31) Vimal, A.[a] , Thalaieswaran, S.[b] , Kannan, N.H.[c] , Ganeshan, P.[a] , Venkatesh, S.[a]

A review on the Investigation of Hydrocyclone Performance by shape optimization
(2023) *E3S Web of Conferences*, 405, art. no. 04047, . Cited 2 times.

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[a] Sri Eshwar College of Engineering, Tamil Nadu, Coimbatore, 641202, India
[b] Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[c] PSNA College of Engineering and Technology, Tamil Nadu, Dindugul, 642622, India

Abstract
A hydrocyclone is a centrifugal classifier that separates particles by size using centrifugal force. Applications for hydrocyclones are incredibly varied. It is used to separate solids from liquids, liquids from liquids, and gases from liquids. It is easy to install and use, simple, inexpensive, and low maintenance. It serves as the brain of the mineral processing plant

and is used to process water in important sectors of the textile, petroleum, chemical, paper, and agricultural industries. It is made up of a cylindrical and a conical portion. Three holes are present-Two outputs and one for the feed intake. The under flow was for pollutant outlet and the vortex finder was for water outlet. Pressure drop, geometrical factors, and feed size distribution all have an impact on the hydrocyclone's efficiency. The present work reviews the shape optimization of vortex finder, spigots, air core and walls of the hydrocyclone for enhancing the desired outcome of the hydrocyclone. © ICSTCE 2023

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32) Jacob, A.A.[a] , Balakrishnan, L.[b]

Characteristic investigation and photodetection analysis on Zn1−xHgxO nanoflakes for near ultraviolet-visible photodetectors
(2023) *Journal of Alloys and Compounds*, 949, art. no. 169755, . Cited 1 time.

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[a] School of Engineering, Emirates Aviation University, Dubai, 53044, United Arab Emirates
[b] Department of Physics, Government College of Technology, Tamilnadu, Coimbatore, 641 013, India

Abstract
The optical band gap of ZnO was modified with the incorporation of Hg ions by co-precipitation method and is taken up for the fabrication of near ultraviolet-visible (NUV-Vis) photodetectors (PDs). Detailed characteristic investigations were carried out using X-ray diffractometer (XRD), transmission electron microscope (TEM), UV-Vis spectrometer and X-ray photoelectron spectrometer (XPS) preceding the fabrication of NUV-Vis photodetectors. The anticipated incorporation of Hg ions into the hexagonal wurtzite structure of ZnO was confirmed by XRD and XPS analysis. A red shift in the ZnO band gap of about ~0.8 eV was observed from optical analysis. Well-appreciated detection of NUV-Vis wavelength was achieved with PDs fabricated using different concentrations of Hg doped ZnO, particularly 15% Hg doping, which showed a maximum responsivity of 64 mA/W and quantum efficiency of 19.86%. © 2023 Elsevier B.V.

Author Keywords
Co-precipitation; Hg doping; Nanoflakes; Optical conductivity; Photodetector; ZnO

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33) Krishnasamy, K.G.[a] , Periasamy, S.[b] , Periasamy, K.[b] , Prasanna Moorthy, V.[c] , Thangavel, G.[d] , Lamba, R.[e] , Muthusamy, S.[f]

A Pair-Task Heuristic for Scheduling Tasks in Heterogeneous Multi-cloud Environment
(2023) *Wireless Personal Communications*, 131 (2), pp. 773-804. Cited 8 times.

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[a] Department of Information Technology, Kongu Engineering College (Autonomous), Perundurai, Tamil Nadu, Erode, India
[b] School of Computer Science and Engineering, Vellore Institute of Technology, Tamil Nadu, Vellore, India
[c] Department of Electrical and Electronics Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[d] Department of Engineering, University of Technology and Applied Sciences, Muscat, Oman
[e] Department of Electrical Engineering, Malaviya National Institute of Technology Jaipur, Rajasthan, Jaipur, India
[f] Department of Electronics and Communication Engineering, Kongu Engineering College (Autonomous), Perundurai, Tamil Nadu, Erode, India

Abstract
Heterogeneous multi-cloud environments make use of a collection of diverse performance rich cloud resources, linked with

huge-speed, performs varied applications which are of computational nature. Applications in the multi-cloud environment require distinct computational features for processing. Heterogeneous multi-cloud domain well suits to satisfy the computational need of very big diverse nature of collection of tasks. Scheduling tasks to distributed heterogeneous clouds is termed NP-complete which leads to the ultimate establishment of heuristic problem solving technique. Identifying the heuristic which is appropriate and best still exists as a complicated problem. In this paper, to address scheduling collection of ‘n’ tasks in two groups among a set of 'm' clouds, three heuristicsPair-Task Threshold Limit (PTL), PTMax-Min, and PTMin-Max are proposed. Firstly, proposedheuristics calculate tasks threshold valuebased on the tasks attributes to determine the tasks scheduling order and then tasks are sorted in descending order of threshold value. Group 1 comprises ([n/2]) tasks ordered in descending value of threshold. Group 2 comprises remaining tasks ([n/2] − 1) ordered in ascending value of threshold. Secondly, tasks form group 1 are scheduled first based on minimum completion time, and then tasks in group 2 are scheduled. The proposed heuristicsare compared with existing heuristics, namely MCT, MET, Min-Min using benchmark dataset. The proposed approaches PTL, PTMax-Min, and PTMin-Max explicitly shows the better results in terms of reduced makespan, completion time, response time and more resource utilization compared to MCT, MET, and Min-min.

Author Keywords
Cloud computing; Heterogeneous; Heuristic; Multi-cloud; Task scheduling

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34) Sivanandi, P.[a] , Gupta, C.[b] , Durai, H.[a]

A Review on Evolution of Aeroelastic Assisted Wing
(2023) *International Journal of Aeronautical and Space Sciences*, 24 (3), pp. 652-688. Cited 8 times.

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[a] Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b] North Eastern Space Applications Centre (NESAC), Department of Space, Government of India, Umiam, Meghalaya793103, India

Abstract
Aeroelastic wings have a significant capacity like normal flyers, to improve the aircraft's overall performance and maneuverability. It is a plugin that allows changing the airfoil-level morphing like changing wing airfoil, wing camber and wing-level morphing like changing the wing reference area, aspect ratio, sweep, twist, folding, and the angle of attack (AOA) in the wing’s various portions. By dynamically adjusting or enhancing the shape for various flight conditions beyond the current ideas, there are still many new openings. The most prominent forms of morphing mechanisms used mostly for 2D and 3D wing configurations are examined in this research. The technology that is commonly utilized to develop and analyze an aeroelastic wing is thoroughly examined. Adapting morphing technology for practical purposes is highly challenging, and several reasons for this are also considered during the review process.

Author Keywords
Aeroelasticity; Camber; Flutter; Folding wing; Morphing; Span morphing; Sweep; Thickness; Unmanned aerial vehicle

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35) Karthik, V.[a] , Karuna, B.[a] , Jeyanthi, J.[b] , Periyasamy, S.[c]

Biochar production from Manilkara zapota seeds, activation and characterization for effective removal of Cu2+ ions in polluted drinking water
(2023) *Biomass Conversion and Biorefinery*, 13 (11), pp. 9381-9395. Cited 6 times.

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[a] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[b] Department of Environmental Engineering, Government College of Technology, Coimbatore, 641013, India
[c] Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia

Abstract
Over years of human evolution and industrialization, water pollution due to heavy metal ions has become a significant consequence, especially with drinking water being unnoticed with very low concentrations. Any heavy metal concentration above this permissible limit is toxic and needs immediate mitigation. Adsorption using activated biochar is an effective method to do so. In this study, biochar was produced from Manilkara zapota through pyrolysis at 700 °C and ball-mill activation was done. Functional analysis of the biochar was done by Boehm titration and point of zero charge and further characterized by FTIR, XRD, and FESEM. The effect of parameters and initial optimization was carried out, and their isotherm, kinetic, and thermodynamic studies were done accordingly. The results show effective removal of copper ions with a maximum removal efficiency of 94% and a maximum equilibrium adsorption capacity of 18.27 mg/g. Batch adsorption study reveals the mechanism of adsorption involved, which tends to be monolayer, homogenous chemisorption exerting spontaneous, endothermic reaction with an increased affinity towards Cu2+ ions. Furthermore, activated sapota seed biochar can be improvised to commercialize the product and make it economically viable in polluted drinking water purification. © 2022, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author Keywords
Adsorption; Biochar production; Copper ions; Drinking water; Heavy metal pollutants

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36) Ponnusamy, P.[a] , Tamilperuvalathan, S.[b]

Performance evaluation and hybrid deep recurrent neural network-based prediction of SS304 turning characteristics using nanoparticles added water emulsified MQL
(2023) *Biomass Conversion and Biorefinery*, 13 (8), pp. 7349-7373. Cited 2 times.

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[a] Department of Mechanical Engineering, Tagore Institute of Engineering and Technology, Deviyakurichi, Attur TK, Salem, 636112, India
[b] Department of Mechanical Engineering, Government College of Technology, Thadagam Main Rd, Tamil Nadu Agricultural University, Tamil Nadu, Coimbatore, 641013, India

Abstract
Due to the enormous applications in aircraft, architecture, machinery parts etc., the SS304 alloy steel should possess some quality outcome during machining. But, achieving such quality during machining is somewhat difficult for SS304 due to enlarged heat generation caused by tool-surface interaction. The superior aim of this proposed work is to enhance the machinability of SS304 with an optimum minimum quantity lubrication (MQL). In this work, the CNC turning operation is carried out in SS304 with different lubricant conditions such as dry, water-emulsified coconut oil (MQL), single, dual, and tri-hybrid nanoparticle immersed MQLs. Based on the machining performance, the best working environment is selected. The experimentation is planned using Box-Behnken design (BBD) of response surface methodology (RSM). The input machining parameters used for measuring the machining outcomes are spindle speed (S), feed (Fd), depth of cut (DOC), and nanoparticles combination in MQL. Besides, the hybrid deep recurrent neural network-black widow optimizer (DRNN-BWO)-based prediction model is carried out to validate the experimental outcomes. The achieved optimal tool wear and surface roughness is 0.09 mm and 0.11 µm. The observed surface roughness is 6.18 times and 4.18 times better than dry and MQL. Compared to the dry and MQL conditions, the noticed tool wear is 2 times and 1.3 times lesser in the proposed dual hybrid nano-MQL condition. The predicted results of DRNN-BWO are closer to the actual outcomes with a better regression value greater than 0.9. © 2023, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author Keywords
Black Widow Optimization; Box-Behnken design; Deep recurrent neural network; Minimum quantity lubrication; Surface roughness

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37) Getachew Gizaw, D.[a] , Periyasamy, S.[a] , Senthil Kumar, P.[b c i k] , Salilih, E.M.[d e] , Redda, Z.T.[f g] , Velusamy, K.[h] , Rangasamy, G.[i j]

Artificial neural network based identification of process dynamics and neural network controller design for continuous distillation column
(2023) *Sustainable Energy Technologies and Assessments*, 57, art. no. 103168, . Cited 3 times.

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[a] Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[b] Department of Chemical Engineering, Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, Kalavakkam, 603 110, India
[c] Centre of Excellence in Water Research (CEWAR), Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, Kalavakkam, 603 110, India
[d] Department of Mechanical Engineering, KAU, PO Box 80204, Jeddah, 21589, Saudi Arabia
[e] Department of Mechanical Engineering, Jigjiga University, PO Box 1020, Jigjiga, Ethiopia
[f] School of Chemical and Bio Engineering, Addis Ababa Institute of Technology, Addis Ababa University, PO Box 385, King George VI St., Addis Ababa, Ethiopia
[g] Department 1, University of Applied Sciences (HTW) Berlin, Wilhelminenhofstraße, Berlin, Germany
[h] Department of Industrial Biotechnology, Government College of Technology, Tamilnadu, Coimbatore, 641013, India
[i] School of Engineering, Lebanese American University, Byblos, Lebanon
[j] Department of Sustainable Engineering, Institute of Biotechnology, Saveetha School of Engineering, SIMATS, Chennai, 602105, India
[k] Department of Biotechnology Engineering and Food Technology, Chandigarh University, Mohali, 140413, India

Abstract
In this study, an equation based nonlinear autoregressive with exogenous input neural network model for a multiple input and output process was proposed to enhance the accuracy of the model, a control system's speed, and robustness. A continuous lab-scale binary distillation column was considered for a case study, and an experiment was conducted. The forward and inverse neural network models have been developed and incorporated into a multivariable internal model control strategy to control the distillate and bottom compositions of the column simultaneously. These models demonstrated excellent performances, as supported by lower mean square error values of 2.73E-05 and 1.26E-04 for the forward and inverse models. Then, the proposed control method was applied to control both set point changes and disturbance changes, and in each case, it is contrasted with the traditional proportional-integral-derivative (PID) technique. The integrated absolute and integrated square errors for the proposed control were 0.1603 and 2.32E-03, respectively, while for PID control, these performance indexes were 0.7822 and 8.67E-03, respectively, for set-point tracking in top composition. Similarly, for bottom composition in tracking set points and rejecting disturbance, these performance indexes were also very less for the neural network control scheme. © 2023 Elsevier Ltd

Author Keywords
Artificial neural network; Distillation column; Ethanol separation; Internal model control; Modeling

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38) Kumar, J.Y.[a] , Gopi, S.[b] , Amirthagadeswaran, K.S.[c]

Redesigning and numerical simulation of gating system to reduce cold shut defect in submersible pump part castings
(2023) *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical*

Engineering, 237 (3), pp. 971-981. Cited 3 times.

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[a] Department of Mechanical Engineering, Sri Ramakrishna Engineering College, Coimbatore, India
[b] Department of Production Engineering, Government College of Technology, Coimbatore, India
[c] Department of Mechanical Engineering, United Institute of Technology, Coimbatore, India

Abstract
Gating system design is an essential element in casting that significantly affects the melt's molten metal flow behaviour, heat transfer, and solidification. Improper gating system leads to pouring-related defects like cold shut, misrun, etc. Submersible pump-bearing block castings produced in one of the leading foundries are rejected due to a cold shut defect. It was identified that the improper gating system is the probable cause for rejection. The bearing block and the existing gating system were modelled in 3D modelling software, and the molten metal flow behaviour of casting was simulated with casting simulation software. Based on the simulation results, the existing gating system was redesigned following established empirical relations. The component with the revised gating system was analysed for flow behaviour through simulation with the software. With the revised gating system, elimination of cold shut is observed, and the revised gating design is recommended to the industry for implementation. The effectiveness of the revised gating system is also validated with pump diffuser casing, which has similar geometrical and material characteristics. The simulation results and experimental validation showed a reduction in flow and surface defects. Appropriate design of the gating system and balanced arrangement of cavities in the gating system are noted to reduce the flow and surface-related defects. It is observed that with the revised gating systems, the percentage of rejection is reduced from 28.36% to 2.34% and 23.43% to 2.45% for the bearing block and pump diffuser casing respectively. © IMechE 2022.

Author Keywords
casting simulation; Cold shut; finite volume method; gating system; surface defect

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39) Solaiyappan, A.

Implementation of Lean Six Sigma Methodology in a Refractory Company
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Department of Mechanical Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract
To enhance the manufacturing process capability of a refractory company, the scope for implementing the Lean Six Sigma (LSS) methodology is analyzed in this work. The DMAIC methodology of Six Sigma is used in this project to determine the Critical To Quality (CTQ) characteristics, defining the possible causes, identifying the variation in sources, establishing the variable relationships, and implementing the control plans. It was found from the DMAIC approach that the quality of Raw Crude, Water Content, and the frequency of using temperature Calibration equipment are the main factors responsible for lowering productivity in Shaft kiln. To improve the productivity of kiln, it was suggested to process the raw crude free of mud, remove the moisture content present in the magnesite stones and take action on changing the frequency of measuring the oil feeding calibration equipment. © 2023, Research Expansion Alliance (REA). All rights reserved.

Author Keywords
DMAIC; Kiln Shaft; Lean manufacturing; Lean six sigma; Refractory

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40) Vani, P.S.[a] , Rathi, S.[b]

Improved data clustering methods and integrated A-FP algorithm for crop yield prediction
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[a] Department of Computer Science and Engineering, Sri Shakthi Institute of Engineering & Technology, Coimbatore, 641062, India
[b] Department of Computer Science and Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract
Big data analysis is the process of gathering, managing and analyzing a large volume of data to determine patterns and other valuable information. Agricultural data can be a significant area of big data applications. The big data analysis for agricultural data can comprise the various data from both internal systems and outside sources like weather data, soil data, and crop data. Though big data analysis has led to advances in different industries, it has not yet been extensively used in agriculture. Several machine learning techniques are developed to cluster the data for the prediction of crop yield. However, it has low accuracy and low quality of the clustering. To improve clustering accuracy with less complexity, a Proximity Likelihood Maximization Data Clustering (PLMDC) technique is developed for both sparse and densely distributed agricultural big data to enhance the accuracy of crop yield prediction for farmers. In this process, unnecessary data is cleansed from the sparse and dense based agricultural data using a logical linear regression model. After that, the presented clustering method is executed depending on the similarity and weight-based Manhattan distance. The genetic algorithm (GA) is applied with a good fitness function to select the features from the clustered data. Finally, the decision support system is computed by the A-FP growth algorithm to predict the crop yields according to their selected features such as weather features and crop features. The results of the proposed PLMDC technique are better in case of clustering accuracy of both spare and densely distributed data with minimum time and space complexity. Based on the results observations, the PLMDC technique is more efficient than the existing methods. © 2021, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

Author Keywords
Big data analysis; Crop yield prediction; Data preprocessing; PLMDC; Sparse and densely data clustering

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41) Sadheesh, S.[a] , Jeyanthi, J.[b]

Analysis of seasonal variation and dispersion pattern of ambient air pollutants in an urban environment
(2023) *Global Nest Journal*, 25 (5), pp. 66-75. Cited 2 times.

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[a] Department of Civil Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India
[b] Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract
The level of air pollution increased in urban areas due to local atmospheric conditions and dispersion of various air pollutants. In this study, the air quality index was carried out in four places in the urban zone and investigated the seasonal variation of PM2.5, PM10, SO2, NO2, and O3 over one year (2021) by considering the meteorological parameters in Coimbatore. Furthermore, fluidyn-PANACHE, a CFD tool, has been used to simulate the dispersion pattern of gaseous pollutants in the selected locations. To track the model, the concentration details of gaseous pollutants were collected and pollutant dispersion under numerous atmospheric conditions (Humidity, Temperature, Pressure). was identified using fluidyn-PANACHE software. From the collected air samples and dispersion pattern, SO2 and O3 show higher concentrations in summer. Particulate matter and NO2 show higher concentrations in winter due to seasonal variations in energy use and atmospheric constancy. Pearson correlation coefficients indicate most pollutants are correlated in Coimbatore except Ozone. Compared to the AQI category given by CPCB, the selected four locations are in the moderate category. However, increased PM10 levels were observed at all the selected zones in winter due to the process of inversion and environmental conditions. © 2023 Global NEST Printed in Greece. All rights reserved.

Author Keywords
air samples; dispersion; fluidyn-panache; inversion; Particulates; pearson coefficient

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42) Vinoth, V.[a] , Sekar, T.[b] , Kumaran, M.[c]

Investigations on the Mechanical Characteristics of the Stainless Steel 316L Alloy Fabricated by Directed Energy Deposition for Repairing Application
(2023) *Journal of Materials Engineering and Performance*, 32 (9), pp. 4138-4150. Cited 3 times.

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[a] Department of Mechanical Engineering, Dhirajlal Gandhi College of Technology, Tamil Nadu, Salem, 636309, India
[b] Department of Manufacturing Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[c] Department of Production Engineering, National Institute of Technology, Tamil Nadu, Tiruchirappalli, 620015, India

Abstract
The present work aims to adopt the directed energy deposition (DED) technique for repairing the hot rolled steel (HRS) by depositing stainless steel 316L (SS316L) material over the hot rolled steel. The mechanical and microstructural characteristics of the as-built DED sample, HRS sample, and repaired samples are evaluated in the present work. The mechanical characteristics such as microhardness and tensile strength of the repaired samples are studied. A succinct comparison is made between the HRS samples and the as-built DED samples. The ultimate tensile strength of the repaired sample (hybrid sample), HRS sample, and the as-built DED sample is found to be 541, 590, and 598 Mpa, respectively. The DED sample has an average microhardness of 228HV, while the HRS sample has an average microhardness of 215HV, and the average microhardness of the interface region is 236HV. This work clarified the difference in microstructural characteristics of the interface region, as-built DED samples, and HRS samples. The samples repaired by DED process possess required metallurgical bonding, and hence, DED process can be used to repair HRS components. © 2023, ASM International.

Author Keywords
additive manufacturing; directed energy deposition; hot rolled steel; repair work; stainless steel 316L

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43) Ramasamy, B.[a] , Jeyanthi, J.[a] , Chinnaiyan, P.[b]

Fe-TiO2 and Ag-ZnO mediated visible light photocatalysis for atenolol and acetaminophen removal – A comparative study and modeling
(2023) *Environmental Nanotechnology, Monitoring and Management*, 19, art. no. 100779, . Cited 4 times.

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[a] Department of Civil Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641013, India
[b] Department of Civil Engineering, Amrita Vishwa Vidyapeeetham, Coimbatore, India

Abstract
Globally, presence of pharmaceutical contaminants (PCs) in environment is a cause of concern. In this study, performance of the green synthesized nano-composites Fe-TiO2 and Ag-ZnO as visible light photocatalyst was evaluated by considering the removal of PCs viz., atenolol (ATL) and acetaminophen (ACT) spiked in treated domestic wastewater. Advanced oxidation process was performed in a batch photoreactor under visible radiation (650 nm). Removal of PCs were studied by considering four experimental factors viz., initial pH (4 to 12), initial ATL and ACT concentration (5 to 20 mg/L), visible photo catalyst concentration (500 to 1500 mg/L) and reaction time (40 to 120 min). Response surface methodology was used, regression models were developed (R2adj > 85 %), and optimization of factors was performed for the contaminant

removal. It was found that, both Fe-TiO2 and Ag-ZnO performed well (ATL removal >63 %, and ACT removal >85 %) though, Fe-TiO2 had higher removal efficiency. It was found that the maximum removal of contaminants occurred when contaminant concentration was 5 mg/L, pH 8, catalyst concentration 1055 mg/L and reaction time 98 min. Characteristics of ATL and ACT photocatalytic degradation was performed and it was found that the contaminant removal was predominantly through the photocatalytic mechanism majorly due to [rad]OH oxidation pathway rather than adsorption and photolytic process. Further, the COD and TOC experiments indicated that >50 % mineralization could be achieved for both ATL and ACT, indicating that both the nanomaterial can be effectively used as a photocatalyst in the visible light radiation. © 2023 Elsevier B.V.

Author Keywords
Design of experiment; MINITAB; Optimum condition; Pharmaceutical contaminants; Photocatalytic experiments

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44) Mariyappan, R.[a] , Palammal, J.S.[b] , Balu, S.[c]

Sustainable use of reclaimed asphalt pavement (RAP) in pavement applications—a review
(2023) *Environmental Science and Pollution Research*, 30 (16), pp. 45587-45606. Cited 12 times.

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[a] Department of Civil Engineering, Bannari Amman Institute of Technology, Tamil Nadu, Erode, 638401, India
[b] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[c] Department of Civil Engineering, Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Tamil Nadu, Chennai, 602 105, India

Abstract
The purpose of this review is to examine the innovative usage of Reclaimed Asphalt Pavement (RAP) in flexible pavement applications. RAP is elucidated as isolated pavement earthly materials consisting of asphalt and aggregates. When the existing/old asphalt is removed for reconstruction, and resurfacing, these materials are generated. Now, it is highly required to classify the available RAP for further essential use in road construction. RAP addresses the issues regarding the diminishing of Virgin Aggregate (VA) sources, storage of material and disposal of RAP material nearby the site. The utilization of RAP includes social benefits like depletion of manufacturing waste, conservation of non-renewable natural stockpiles and low energy expenditure. The reviewed literature reveals that RAP has been utilized mainly for base and sub-base materials on the roads. To summarize, 100% replacement of VA by RAP possessed lesser strength and little resistance to creep and long-lasting deformations. Hence, RAP can be appended with natural aggregate or blended with cement or other admixtures like Fly ash (FA) or confined with geocell. It also accelerates the strength and stiffness of the base and sub-base of pavement as it degrades the failure like rutting and fatigue cracking of pavement due to dynamic loads. © 2023, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author Keywords
Base course; Cementitious materials; Reclaimed asphalt pavement; Sustainable recycled aggregates; Virgin aggregates

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45) Arunagirinathan, S., Subramanian, C.

Analysis of a Li-ion battery state of charge by artificial neural network
(2023) *Bulletin of Electrical Engineering and Informatics*, 12 (2), pp. 792-799.

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Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract
The state of charge (SOC) is a battery residual capacity crucial assessment metric. The need for a precise SOC estimate is very important to ensure the safe functioning of a Li-ion battery and to prevent overload and over-depletion. However, the renewable energy-based standalone application has become a key problem to determine the exact capacity of SOC of the Li-ion battery. To estimate the capacity over time, the battery management system calculates the SOC of a Li-ion battery. This allows for the implementation of intelligent control systems. This paper presents an enhanced radial basis function (RBF) of the SOC battery estimate following the limits and weaknesses of the back propagation (BP) neural network (NN) in estimating battery SOC, such as sluggish convergence speed, poor generalization and can increase the accuracy of the network but it takes time to iterate. Train the enhanced RBF with experimental data in real-time. The trained NN of SOC is compared to actual values and the MATLAB is used to simulate the method to evaluate its accuracy. © 2023, Institute of Advanced Engineering and Science. All rights reserved.

Author Keywords
Back propagation neural; Battery management system; Li-ion; network; Radial basis function; State of charge

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46) Vishnu Priya, M., Ramesh, K.

Optimization of process parameters of the growth of Chlorella vulgaris for the production of biodiesel feedstock (microbial lipid) using sago wastewater as substrate
(2023) *Biomass Conversion and Biorefinery*, 13 (5), pp. 3837-3848. Cited 7 times.

DOI: 10.1007/s13399-021-01401-4

Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract
The present study investigated the growth of microalgae Chlorella vulgaris in sago wastewater as a substrate for biodiesel production. The optimum conditions, namely pH, temperature, carbon dioxide (CO2), and carbon/nitrogen ratio (C/N), were studied. The central composite design (CCD) was developed using four coded factors for the experimental trials. The maximum algal biomass and lipid production was obtained as 26.50 and 14.10 g/L respectively at an optimum condition of pH of 8, the temperature of 35 °C, CO2 of 1%, and C/N ratio of 80. Different growth kinetic models, namely the Malthus equation, Tessier equation, Lineweaver-Burk plot, and logistic equation, were studied. The Lineweaver-Burk model fits the best modeling equation with a maximum specific growth rate of 0.062 h−1 and a Ks value of 0.86 g/L. The fatty acid profile of Chlorella vulgaris confirmed the presence of palmitic and linolenic acid to a percentage of 45.2 and 32.2%, respectively. © 2021, The Author(s), under exclusive licence to Springer-Verlag GmbH, DE part of Springer Nature.

Author Keywords
Biodiesel; Central composite design; Chlorella vulgaris; Growth rate; Sago wastewater

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47) Kanagaraj, R., Kailasam, Y.

GW OPTIMIZATION-BASED MPPT FOR SOLAR PHOTOVOLTAIC SYSTEM
(2023) *ARPN Journal of Engineering and Applied Sciences*, 18 (6), pp. 687-691.

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Government College of Technology, Coimbatore, India

Abstract
The most efficient and cleanest form of renewable energy source for effective power generation is the solar photovoltaic (PV) system. In recent years, solar energy generation has become an essential part of electric power applications. The power produced by the solar PV system is unstable, as it depends upon illumination and global climatic change. So as to

get the uttermost efficacy the solar PV system must be guided at the maximum point. An efficient MPP tracking method has a vital function to play in upgrading the efficacy of a solar PV system. The operational point of the perturb and observe (P&O) approach swings about MPP at a steady state, resulting in power output variations. In this work, the Grey Wolf (GW) optimization-based MPPT is proposed. The GW is a Metaheuristic optimization technique that extracts the highest amount of energy from a solar PV system. The PV module's voltage and current are utilized as inputs and the duty ratio is the indeed output that has been obtained and it is been tested under different operating conditions. Depending on the fluctuations in input power, a DC/DC boost converter is utilized to increase the wattage of the output. To estimate the usefulness of this MPPT, the outcomes of GW are correlated with the P&O approach and outcomes demonstrate the GW MPPT gives better power output and its convergence time is faster than the P&O method for change in irradiation levels

Author Keywords
grey wolf optimization; maximum power point; meta-heuristic; perturb and observe; solar photovoltaic systems

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48) Abinaya, S.[a] , Indira, K.[b] , Karthiga, S.[b] , Rajasenbagam, T.[c]

Time Cluster Personalized Ranking Recommender System in Multi-Cloud
(2023) *Mathematics*, 11 (6), art. no. 1300, . Cited 3 times.

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[a] School of Computer Science and Engineering, Vellore Institute of Technology, Chennai, 600127, India
[b] Department of Information Technology, Thiagarajar College of Engineering, Madurai, 625015, India
[c] Department of Computer Science and Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract
Recommender systems have become a vital tool to identify items for users based on personalized preferences. The personalized ranking or item recommendation generates a ranked list of items for the users. Clustering methods offer better scalability than collaborative filtering (CF) methods since they make predictions within small clusters. The major challenges of recommender systems are accuracy and scalability. Traditionally, recommendation systems are based on a centralized framework that restrains quick scalability for enormous data volumes. The emergence of cloud technology resolves this issue as it handles vast data and supports massive processing. This paper proposes a time cluster personalized ranking recommender system (TCPRRS) in a multi-cloud environment. TCPRRS is a five-stage system that generates recommendations based on temporal information of user consumption and clustering with personalized ranking. Particle swarm optimization (PSO) is utilized for optimizing the solution. The efficiency of TCPRRS is estimated using similarity metrics.

Author Keywords
clustering; collaborative filtering; multi-cloud environment; particle swam optimization; personalized ranking; recommender system; user interest

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49) Paramasivan, S.[a] , Rajagopal, T.[b]

Experimental study on geopolymer concrete with partial replacement of bethamcherla waste stone powder
(2023) *Global Nest Journal*, 25 (4), pp. 185-189. Cited 1 time.

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[a] Department of Civil Engineering, Sri Krishna College of Technology, Tamil Nadu, Coimbatore, 641042, India
[b] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract
The process of making portland cement uses up a lot of resources and has a harmful environment effect since it produces a lot of greenhouse emissions. The by-product of the stone cutting and polishing industries is Bethamcharla waste Stone Powder (BWSP). Each industry produces an average of 513900 tonnes of waste each year, which is then simply deposited on the plains of Bethamcharla. The potential approach to using stone waste powder for civil construction projects is presented in this research. The state of Tamil Nadu has enormous industrial polishing potential. There are around 2000 stone polishing machines in this town as a result of the large amount of stone powder produced during the manufacturing of completed goods and the same powder being dumped in and around the companies. In order to convince civil engineers to employ this new industrial waste material in Geopolymer Concrete (GPC), this research will examine the effects of substituting BWSP for Ground Granulated Blast-furnace Slag (GGBFS). Experimental investigations were conducted toward issues relating to strength. In the amounts of 20, 40 & 60 % by weight of GGBFS, the BWSP was employed as a substitute. Initial total mixes are prepared during the experimental inquiry with varying molarities of 8, 10, 12, 14, and 16 as well as changes to the mix proportions. According to the trials, the 16 molarity and 1:1.32:3.1 (GGBFS: FA: CA) mix with alkaline solution delivered preferable outcomes, allowing for the fullest possible use of BWSP in the mix. The current study provides information on the behaviour of BWSP in Geopolymer Concrete. As determined by the study, the minimum strength of concrete (M25) cannot be affected while using 60% BWSP with 16 molarity for construction. © 2023 Global NEST Printed in Greece. All rights reserved.

Author Keywords
Bethamcherla waste stone powder; geopolymer concrete; GGBFS; strength

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50) Daswin Ebenezer, M.[a] , Kumar, M.[b]

Coastline change rate estimation on the southern coastal districts of Tamil Nadu, India using the multi temporal google earth images and GIS based statistical approach
(2023) *Global Nest Journal*, 25 (4), pp. 95-103. Cited 2 times.

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[a] Department of Environmental Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract
Coastal erosion is the process of wearing away material from the coastal profile due to an imbalance in the supply and export of material from a particular section of the coast which cause property damage, and the loss of land. This study investigates the rate of erosion and accretion along the southern coast of Tamil Nadu which was exposed to a lot of tourism and development activities. The shorelines were delineated for the years 2000,2005,2010,2015 and 2020 on the high-resolution multi-temporal satellite images in the Google Earth Pro software by visual interpretation. The long-term and short-term changes were studied by three statistical parameters functionalized in DSAS v 5.0 tool in ArcGIS 10.6 software such as endpoint rate, net shoreline movement and linear regression rate (Cenci et al., 2018). The positions of the shoreline in 2030 and 2040 are forecasted using the Kalman filter-based forecast tool in DSAS and the changes were analysed. During the study period, the average rate of changes in Kanyakumari is-1.26 m/year, Tirunelveli is-1.01 m/year and Tuticorin is-1.09 m/year. the transects showed significant erosion along 19.54% of Kanyakumari, 3.79% of Tirunelveli, and 17.81% of Tuticorin coasts, and significant accretion is observed in 1.31% of Kanyakumari, 1.07% of Tirunelveli and 3.02% of Tuticorin coasts. The outcome of shows that erosion is prevailing on the Kanyakumari coast and erosion is prevailing in Tuticorin. © 2023 Global NEST Printed in Greece. All rights reserved.

Author Keywords
coastal erosion; DSAS; google earth; shoreline change; shoreline prediction

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51) Saranya, P.[a] , Karunya, R.[a] , Keerthi Varshini, G.[a] , Kowsikan, K.[a] , Prathiksha, R.[b]

In-silico docking studies of selected phytochemicals against papain like protease of SARS-Cov-2
(2023) *Vegetos*, 36 (1), pp. 188-194. Cited 1 time.

DOI: 10.1007/s42535-022-00525-w

[a] Department of Industrial Biotechnology, Government College of Technology, Thadagam Road, Coimbatore, 641013, India
[b] Indian Institute of Technology, Gujarat, Gandhinagar, 382055, India

Abstract
The SARS-Cov-2 virus, which is evolving continuously and causing adverse effects throughout the world, needs an effective drug molecule for its treatment. There are several receptors of SARS Cov-2 which are targeted for its inhibition by many lead molecules both in-vitro and in-vivo. Papain like Protease (PLpro) is one of the two SARS-Cov-2 proteases that can be used as a drug target for SARS Cov-2. It is a coronavirus enzyme that plays a role in the cleavage and maturation of viral polyproteins, assembly of the replicase-transcriptase complex and disruption of host responses. PLpro has also been linked to the cleavage of proteinaceous post translational modifications on host proteins as a means of evading antiviral immune responses. Structure-based drug discovery can be one of the effective methods to screen for various molecules against the target receptors. In this study, PLpro of SARS CoV-2 was chosen as the target for docking. Forty phytochemicals from various plant sources and four synthetic drugs have been screened for their inhibitory potential against PLpro using AutoDock Vina. Phytochemicals such as Tinosponone, Rhoifolin, Rosmanol, Berberin, Nimbin and two other existing drugs Elbasvir and Declatasvir showed higher inhibitory potential in terms of higher binding affinities. ADME and toxicity analysis were also performed to predict the pharmacokinetics and drug likeliness properties. It was concluded from the study that Tinosponone possesss potential inhibitor property of papain-like proteases (PLpro) of SARS CoV-2. Tinosponone from the plant Tinospora cordifolia had a binding affinity of − 9.3 kcal/mol and obeyed the Lipinski rules, making it an effective lead molecule for treating SARS CoV-2. Molecular Dynamics simulation of Tinosponone with PLpro has proved the stability and validity of the binding with RMSD value in range of 0.2 nm when it was run for 50 ns using GROMACS. Therefore, Tinosponone could be considered as a potential inhibitor of PLpro of SARS CoV-2. © 2022, The Author(s) under exclusive licence to Society for Plant Research.

Author Keywords
Docking; MD simulation; Papain-like protease (PLpro); SARS CoV-2; Tinosponone

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52) Murugan, S., Sujithaadevi, S.

Recovery of bioethanol from food waste using Saccharomyces cerevisiae
(2023) *Global Nest Journal*, 25 (3), pp. 87-90. Cited 2 times.

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Department of Environmental Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
Excessive use of fossil fuels results in the rapid depletion of non-renewable fossil energy resources, a rise in fuel cost, and an uncontrolled emission of greenhouse gases which causes a severe threat to the environment. Bio-fuels are being scrutinized as substitutes for current high-pollutant fuels obtained from conventional sources. To meet the global demands, it becomes necessary to find an alternate source of fuel which is bioethanol. In this work, a strategy to promote ethanol production from Leftover Cooked Rice (LCR) by comparing the different types of hydrolysis was proposed. Process integration comprised of mechanical pretreatment of the leftover cooked rice followed by hydrolysis which was then followed by fermentation. The food wastes of weight 50g taken in each of the 3 fermenters were subjected to acid hydrolysis, enzyme hydrolysis, and combined hydrolysis respectively. Commercially available Baker's yeast (Saccharomyces cerevisiae) was used for the fermentation process. The fermented samples were subjected to distillation to separate the bioethanol from them. The amount of bioethanol obtained from combined hydrolysis, acid hydrolysis, and enzyme hydrolysis was 400ml, 150ml, and 350ml respectively. Qualitative analysis of ethanol was done by using the Jones reagent. Hence, bioethanol can be produced from leftover cooked rice using the yeast Saccharomyces cerevisiae. © 2023 Global NEST Printed in Greece. All rights reserved.

Author Keywords

Bioethanol; hydrolysis; leftover cooked rice; qualitative analysis; Saccharomyces cerevisiae

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53) Velumani, M., Jeyadharmarajan, J.

Conversion of novel tannery sludge-derived biochar/TiO2 nanocomposite for efficient removal of Cr (VI) under UV light: photocatalytic performance and mechanism insight
(2023) *Environmental Science and Pollution Research*, 30 (10), pp. 28173-28191. Cited 5 times.

DOI: 10.1007/s11356-022-24124-z

Department of Civil Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract
An investigation on the reduction of Cr (VI) pollutant from tannery effluents using TiO2, SB/TiO2, and c-SB/TiO2 nano photocatalysts was presented in this study. For the preparation of Biochar-based TiO2 photocatalyst (SB/TiO2), tannery sludge was utilized as a precursor. Hydrothermal pre-treatment was adopted to prepare chemically activated SB/TiO2 and SB/TiO2 nanocomposites. The morphology, crystal structure, optical properties, and elemental composition of the prepared catalysts were analyzed by XRD, FT-IR, SEM–EDX, BET analysis, ZPC, PL, TGA, and Raman spectroscopy. The band gap analysis of Photocatalyst was measured using a DRS instrument, and band gap energy of 3.39 eV was obtained for c-SB/TiO2 photocatalyst. The developed c-SB/TiO2 catalyst exhibits a larger specific surface area of 646.85 m2/g than TiO2 and SB/TiO2 (74.58 m2/g and 573.74 m2/g), respectively. The enhanced photocatalytic activity for the pollutant removal was achieved by the photocatalyst due to their wide band gap and effective charge separation. The kinetic rate constant was achieved in the pseudo-first-order model, which fits well for the reduction of Cr (VI). Furthermore, at the optimal conditions of 10 mg/L contaminant concentration, pH 2, and 0.5 g/L catalyst dosage, 98.56% reduction was observed after 180 min of reaction. The OH acts as a major removal pathway for Cr (VI) contaminants with more than 50% reduction in COD. This study proves that c-SB/TiO2 photocatalysts can remove toxic contaminants under UV light irradiation with good recycling performance up to 5 times. © 2022, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author Keywords
c-SB/TiO2; Cr(VI); Hydrothermal Pre-treatment; Photocatalyst; Photocatalytic reduction; UV light illumination

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54) Periyasamy, S.[a] , Beula Isabel, J.[b] , Kavitha, S.[c] , Karthik, V.[d] , Mohamed, B.A.[e] , Gizaw, D.G.[a] , Sivashanmugam, P.[f] , Aminabhavi, T.M.[g h]

Recent advances in consolidated bioprocessing for conversion of lignocellulosic biomass into bioethanol – A review
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[a] Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[b] Department of Energy and Environment, National Institute of Technology, Tiruchirappalli, 620 015, India
[c] Department of Biotechnology, Adhiyamaan College of Engineering, Tamil Nadu, Hosur, India
[d] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641 013, India
[e] Department of Agricultural Engineering, Cairo University, Giza, 12613, Egypt
[f] Department of Chemical Engineering, National Institute of Technology, Tiruchirappalli, 620 015, India
[g] School of Advanced Sciences, KLE Technological University, Hubballi, 580 031, India

[h] School of Engineering, UPES, Bidholi, Uttarakhand, Dehradun, 248 007, India

Abstract
As the world's population grows, it will be necessary to make long-term technical advancements to meet energy needs without jeopardizing the planet's scarce resources. There are several benefits to using renewable energy systems, such as stabilizing energy supply and demand, ensuring food security and economic stability, and protecting the environment from pollution. Bioethanol is a possible alternative for a renewable and long-term energy source. However, for long-term survival and economic viability, it is critical to focus on lower-cost ethanol production for this fuel to compete with petroleum. To make biofuel commercially viable, converting lignocellulose to bioethanol might be more cost-effective, environmentally friendly, and efficient, but it would still require substantial process research and optimization. The production cost of value-added products, i.e., bioethanol, can be reduced by using consolidated bioprocessing to combine enzyme synthesis and secretion with the hydrolysis of polysaccharides and fermentation of accessible sugars in a single operation. This review focuses on biomass pretreatments, process enhancements, recombinant microbial catalysts and enzymes, and metabolic engineering to consolidate bioprocessing. Besides, it delivers an overview to facilitate future research in lignocellulosic biomass for bioethanol production. © 2022 Elsevier B.V.

Author Keywords
Bioethanol; Consolidated bioprocessing; Lignocellulose; Microbial consortium; Pretreatment

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55) Suganthi, R.[a] , Pandi, M.[b]

Improved three phase H-7 transformerless inverter with DPWM to reduce leakage current using CNN based deep learning technique
(2023) *Artificial Intelligence Review*, 56 (2), pp. 1319-1347. Cited 9 times.

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[a] Research Scholar, Government College of Technology, Coimbatore, India
[b] Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract
This investigation presents the three-phase Transformerless Inverters (TLI) for a solar photovoltaic (PV) system connected to a high power grid will be implement with better performance and lower cost. Many clamping topologies are developed in the single phase TLI solar PV system and have proven that they are better than the unclamped inverter topologies. In this proposed research, different DC decoupled transformerless inverter topologies with modified discontinuous PWM technique are derived from three phase H-7 transformerless inverter topologies respectively. Further, active switch and diode-based clamped topologies are proposed in addition. This topology certainly minimizes the fluctuations in the common mode voltage of the inverter during zero voltage state. Meanwhile it creates the path for leakage current flow in the off state grid voltage. Evaluations of leakage current and comparative analysis over the performance in terms of reactive power capability; switching and conduction losses of the device and total harmonic distortion are made for DC decoupled inverter and H-7 transformerless inverter. The validation of the proposed work is realized through the laboratory experiment and MATLAB/SIMULINK platform as well. © 2022, The Author(s), under exclusive licence to Springer Nature B.V.

Author Keywords
CNN-conventional neural network; DPWM-discontinuous pulse width modulation; H-7 inverter; PV system; TLI-transformerless inverter

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56) Kumar, M.[a] , Gokulan, R.[b] , Sujatha, S.[c] , Shanmuga Priya, S.P.[d] , Praveen, S.[b] , Elayaraja, S.[e]

Biodecolorization of Reactive Red 120 in batch and packed bed column using biochar derived from Ulva reticulata
(2023) *Biomass Conversion and Biorefinery*, 13 (3), pp. 1707-1721. Cited 14 times.

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[a] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b] Department of Civil Engineering, GMR Institute of Technology, Rajam, Andhra Pradesh, Srikakulam, 532127, India
[c] Department of Civil Engineering, K. Ramakrishnan College of Technology, Tamil Nadu, Trichy, 621112, India
[d] Department of Chemical Engineering, Mohamed Sathak Engineering College, Ramanathapuram, 623806, India
[e] Department of Civil Engineering, PSG Institute of Technology and Applied Research, Tamil Nadu, Coimbatore, 641062, India

Abstract
A seaweed Ulva reticulata was used to synthesis biochar, and it was used in the removal of Reactive Red 120 (R120). The optimum thermal pyrolysis temperature was found to be 300 °C, and it was confirmed by proximate and elemental analysis of the biochar. The practical applicability of this biochar was explored by conducting the experiments in batch and continuous mode. An up-flow packed bed reactor was used to study the removal of reactive red 120 in continuous mode. The operating parameters like solution pH, contact time, biochar dosage, temperature, initial concentration were studied. A four-parameter model Fritz-Schlunder-IV and pseudo-first-order kinetic model best fitted the experimental uptake with a correlation coefficient of 0.9996 and 0.9951, respectively. The maximum removal efficiency and uptake capacity of 84.2% and 210.5 mg/g were obtained at operating conditions of pH of 2, biochar dosage of 2 g/L, temperature of 30 °C, and initial concentration of 500 mg/L. The partition coefficient was studied to overcome the limitation of the adsorption capacity, and the highest partition coefficient was obtained as 4.13 L/g at 100% breakthrough time with a removal efficiency and uptake capacity of 89.2% and 111.5 mg/g. The thermodynamic study concluded that reactions are spontaneous and endothermic. The continuous study concluded that the uptake capacity of 100.71 mg/g was obtained at operating conditions of bed depth of 25 cm, the flow rate of 0.48 L/h, and initial dye concentration of 250 mg/L. © 2021, The Author(s), under exclusive licence to Springer-Verlag GmbH, DE part of Springer Nature.

Author Keywords
Biochar; Modeling; Packed bed; Reactive red 120; Ulva reticulata

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57) Sathya, A.B.[a] , Thirunavukkarasu, A.[b] , Nithya, R.[b] , Nandan, A.[c] , Sakthishobana, K.[d] , Kola, A.K.[e] , Sivashankar, R.[e] , Tuan, H.A.[f] , Deepanraj, B.[g]

Microalgal biofuel production: Potential challenges and prospective research
(2023) *Fuel*, 332, art. no. 126199, . Cited 48 times.

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[a] Department of Biotechnology, National Institute of Technology, Warangal, India
[b] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[c] Department of Health Safety and Environment & Civil Engineering, University of Petroleum and Energy Studies, Dehradun, India
[d] Department of Biotechnology Bannariamman Institute of Technology, Sathyamangalam, India
[e] Department of Chemical Engineering, National Institute of Technology, Warangal, India
[f] Institute of Engineering, HUTECH University, Ho Chi Minh City, Viet Nam
[g] Department of Mechanical Engineering, College of Engineering, Prince Mohammad Bin Fahd University, Al-Khobar, Saudi Arabia

Abstract
Exponential growth in industrialization can be seen as a direct outcome of the urbanization which results in the continuous depletion of natural energy reserves. The existence of carbon dioxide in the ecosystem is primarily due to the fossil fuel combustion from the variety of energy-driven vehicles. Hence, to reduce its levels in the atmosphere and to prevent the depletion of non-renewable resources, scientific researchers have made significant attempts to provide alternate and

sustainable ways of producing energy. One such noteworthy effort is the biofuel production from the microalgae that has an excellent potential in lipid accumulation and bioconversion. Despite numerous reports are available on the effective biofuel production, the process scaling-up and its commercialization remains in vain. Hence, the present review is intended to critically identify the possible gaps in the current research and to provide potential challenges to be scientifically addressed in the prospective research of biofuel production. © 2022 Elsevier Ltd

Author Keywords
Biofuel; Microalgae; Potential challenges; Research gaps; Sustainable approach

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58) Marimuthu, C.[a] , Manikandan, V.[b] , Jayakumar, J.[c]

ADVANCEMENTS IN PIEZOELECTRIC ENERGY HARVESTING FOR A SUSTAINABLE DEVELOPMENT: A COMPREHENSIVE REVIEW OF ENVIRONMENTAL PREDICTION METHODS
(2023) *Journal of Environmental Protection and Ecology*, 24 (8), pp. 2786-2795.

[a] Electronics and Instrumentation Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[b] Electrical and Electronics Engineering, Coimbatore Institute of Technology, Tamil Nadu, Coimbatore, India
[c] School of Electrical Sciences, Karunya Institute of Technology and Sciences, Tamil Nadu, Coimbatore, India

Abstract
Efficient electrical energy generation is an important topic in engineering research due to the widespread application of electrical devices. This review paper presents a comprehensive analysis of the prediction methods for piezoelectric energy harvesting. Through its literature review, the paper provides a comprehensive summary of PEH, including comprehensive model for energy harvester, latest advancements in piezoelectric materials research, structural optimisation techniques for improving energy harvesters, harvesting energy from individual energy harvesters, strategies for enhancing energy harvesting efficiency, various methods for vibration energy harvesting, understanding the principles of piezoelectricity, characteristics and applications of piezoelectric materials, piezoelectricity and its application in energy harvesting, methodologies for increasing the power generation of piezoelectric devices, piezoelectric energy prediction algorithms. © 2023, Scibulcom Ltd.. All rights reserved.

Author Keywords
optimisation; piezoelectric; piezoelectric energy harvesting

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59) Marimuthu, C.[a] , Manikandan, V.[b] , Jayakumar, J.[c]

SUSTAINABLE ENERGY DEVELOPMENT PREDICTION OF ENERGY HARVESTING SYSTEM WITH AN ADAPTIVE HIERARCHICAL RECURRENT NETWORK AND BIODYNAMIC FUSION OPTIMISATION ALGORITHM
(2023) *Journal of Environmental Protection and Ecology*, 24 (8), pp. 2796-2805.

[a] Electronics and Instrumentation Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[b] Electrical and Electronics Engineering, Coimbatore Institute of Technology, Tamil Nadu, Coimbatore, India
[c] School of Electrical Sciences, Karunya Institute of Technology and Sciences, Tamil Nadu, Coimbatore, India

Abstract
Generating sustainable power by using sustainable energy sources is vital for the growing power demand. Power harvesting or energy scavenging refers to the generation of usable electrical energy from the system environment. It is also vital to make sure that the generated power reaches the end user without any loss. In most renewable-based power generation

methods, optimal power generation and energy forecasting are quite difficult because, in the case of solar, wind, tidal, etc. their power generation purely depends on environmental factors, whereas in the case of piezoelectric-based power generation, its output can be predetermined. Certain processes are necessary to determine the quantity of output produced by the system for a given input. In that aspect, the proposed method investigates the accuracy of output data obtained from the energy harvesting process. The main focus of this work includes vastly improved energy harvesting system predictions, robust handling of missing data, enhanced feature extraction, reduced model overfitting, and improved generalisation capabilities.

Author Keywords
BioDynamic Fusion Optimisation Algorithm; Biogeography-based Learning Elephant Herdling Optimisation; Dynamic Butterfly Optimisation Algorithm; energy harvesting system; sustainable development

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60) Kumar, S.M., Chithra, S.

Multi-response optimization of scc incorporating industrial wastes using taguchi based grey relational analysis
(2023) *Revista Romana de Materiale/ Romanian Journal of Materials*, 53 (3), pp. 228-236.

Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract
In the search for sustainable development in the field of the construction sector, scientific advancements in the use of alternative materials in Self-Compacting Concrete (SCC) are of primary interest among researchers. The present study also attempted to use industrial waste materials such as Fly Ash (FA), Cement Kiln Dust (CKD), and Ecosand (ES) in the preparation of SCC, optimizing their mixture formulation using Taguchi-based Grey Relational Analysis (GRA). Batch optimization trials were conducted using a Taguchi L9 orthogonal array with different replacement levels of CKD (5%, 10%, 15%), FA (25%, 30%, 35%), and ES (10%, 20%, 30%) in SCC. Fresh properties, including slump flow, T500 time, V funnel time, L box passing ratio, and J ring step height, as well as hardened properties like compressive strength, flexural strength, and split tensile strength, were considered as responses. The Taguchi-based GRA results revealed an optimized mixture composition of 53 kg/m3 CKD, 184 kg/m3 FA, and 84 kg/m3 ES. Furthermore, a confirmation test was carried out to validate the model, and the error percentage was found to be less than 10%. ANOVA results indicated that the influencing parameters followed the order of CKD > ES > FA. Based on these findings, Taguchi-based GRA can be considered an ideal tool for optimizing concrete mixes.

Author Keywords
CKD; Ecosand; Industrial wastes; Multi-response optimization; SCC; Taguchi based GRA

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61) Arangarajan, P.[a] , Kumar, C.S.[a] , Shunmugakarpagam, N.[a] , Vijayabhasker, R.[b] , Gayathri, C.[c]

A Improved Training Method for Deep Learning Based Anatomical Classification of X-Rays
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[a] Er.Perumal Manimekalai College of Engineering, Department of CSE, Tamil Nadu, India
[b] Anna University Regional Campus, Department of Eee, Tamil Nadu, Coimbatore, India
[c] Government College of Technology, Department of CSE, Tamil Nadu, Coimbatore, India

Abstract
Every day, numerous medical images are sent to hospitals and tele-radiology facilities. These comprise a variety of techniques and body parts, such as elbow X-rays, head CT scans, and chest MRIs. These should be given to radiologists

who are knowledgeable about the particular anatomy and modality. However, sometimes the scan's technicians enter the incorrect anatomy, employ a different naming scheme, or enter no information at all. There is a need for a vision-based anatomy classification system that can be applied in the absence or corruption of image-related meta-data. Before allocating a case to a radiologist, a manual screen may correctly estimate the anatomy from an X-Ray image. Our proposed solution will provide an automatic anatomy classification with improved training method using deep neural networks. We set out to develop a pre-trained supervised deep learning model that examines X-rays and returns the X-ray's anatomy from a preset set of anatomies in order to solve the given challenge. Here, we also suggest an improved training method to increase classification accuracy. With our present approach, we could accurately map reports and obtain anatomical classification accuracy of more than 95% using X-ray clinical data. © 2023 IEEE.

Author Keywords
Anatomy; Classification; Deep learning; Semantic search

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62) Shanmuganathan, S.[a] , Charumathi, R.[b] , Vijayakumari, V.[c] , Gayathri, C.[d] , Ragupathi, T.[e] , Madhan, K.[a]

Detection of DDOS Attacks in Cloud Environment Using Deep Learning
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[a] Mailam Engineering College, Department of CSE, mailam, India
[b] Er.Perumal Manimekalai College of Engineering, Department of CSE, Hosur, India
[c] The Kavery Engineering College, Department of CSE, Tamilnadu, India
[d] Government College of Technology, Department of CSE, Coimbatore, India
[e] Srm Institute of Science and Technology, Department of Data Science and Business System, Tamilnadu, Kattankulathur, India

Abstract
The rapid evolution of cloud computing and the increasing reliance on Software -Defined Networking (SDN) have introduced new challenges in ensuring the security and availability of cloud based services. Distributed Denial of Service (DDoS) attacks, in particular, pose a significant threat to the stability and performance of cloud infrastructures. As network traffic patterns continue to increase and evolve, it is crucial to extract pertinent features that aid in identifying attacks and improving the accuracy of detection. Therefore, effective detection mechanisms are crucial to identify and mitigate DDoS attacks in SDN-based cloud environments. This study presents a novel approach that combines Decision Tree with Long Short-Term Memory (LSTM) for effective DDoS detection in cloud infrastructures. The model is evaluated using the 2019 dataset. The simulation findings validateits efficacy and show that it improves upon existing works in terms of accuracy. © 2023 IEEE.

Author Keywords
Cloud; DDOS; LSTM; SDN

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63) Mathavan, V.[a] , Sumathi, P.[b] , Gayathri, C.[c] , Kumar, C.S.[d] , Ragupathi, T.[e] , Palanivel, N.[f]

Smart Parking and Parking Guidance Using ECNN Algorithm in Convolution Neural Network
(2023) *2023 International Conference on System, Computation, Automation and Networking, ICSCAN 2023*, .

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[a] Mailam Engineering College, Department of CSE, mailam, India
[b] Adhiyamaan College of Engineering, Department of It, Hosur, India
[c] Government College of Technology, Department of CSE, Coimbatore, India
[d] Er. Perumal Manimekalai College of Engineering, Department of CSE, Hosur, India
[e] Srm Institute of Science and Technology, Department of Ds and Bs, Tamilnadu, Kattankulathur, India
[f] Manakula Vinayagar Institute of Technology, Department of CSE, Puducherry, India

Abstract
Smart Parking and Parking Guidance finding parking methods are in demand in modern megacities. This will reduce traffic, air pollution, driver strain and wasted parking time. This paper presents the design and implementation of an improved version of a CNN based on a parking dataset for finding free parking spaces in parking images. The purpose of this paper is to produce a reliable version with fast generalization that can get information about parking, but it is intended for use with technical cameras that display the number of new parking spaces. This paper provides 94% application accuracy when advertising multiple parking lots. This version also achieved an overall accuracy of 94% while receiving single parking and testicle parking information with a digital camera at an alternative parking lot. Previous reasoning suggests that these pictures should have strong generalizability. These generalizations allow the expert version to be deployed in real parking management structures. It can also serve as the basis for a study to gather new information about parking volumes or add more layers to refine and improve versions. © 2023 IEEE.

Author Keywords
CNN; Feature extraction; Parking slot; Smart Parking; Vehicles

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64) Panneerselvi, V.[a] , Muthukrishnan, P.[b] , Shankar, K.[c] , Prabakaran, K.[a]

A Facile One Pot Synthesis and Anticorrosion Potential of Carbazole Linked Quinoline Moiety
(2023) *Asian Journal of Chemistry*, 36 (1), pp. 229-238.

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[a] Department of Chemistry, P.S.G. College of Arts & Science, Coimbatore, 641014, India
[b] Department of Chemistry, SRM TRP Engineering College, Tiruchirappalli, 621105, India
[c] Department of Chemistry, Government College of Technology, Coimbatore, 641013, India

Abstract
A facile and efficient one pot synthesis has been developed for the preparation of quinoline-substituted carbazoles 3-(4-carboxyquinolin-2-yl)-9-methyl-9H-carbazole (Cbz-QCA) and 3-(4-chloroquinolin-2-yl)-9-methyl-9H-carbazole (Cbz-ClQ) by treating 3-acetyl-9-methyl-9H-carbazole (3Ac-Cbz), with isatin under Pfitzinger reaction conditions and utilizing anthranilic acid in the presence of POCl3 through the modified Niementowski method, respectively. The synthesized compounds have been comprehensively characterized through spectral data. The effect of 3Ac-Cbz (1), Cbz-QCA (2) and Cbz-ClQ (3) were assessed as a steel corrosion inhibitor in 1M HCl using weight loss, potentiodynamic polarization and electrochemical methods. The inhibitory effect increases with the synthesized inhibitor concentration, reaching above 84% at higher concentrations of all tested inhibitors. These results indicated that synthesized inhibitors have a good corrosion inhibition. An increase in the concentration of inhibitor leads to a higher percentage of inhibition efficiency, driven by the adsorption of inhibitor molecules onto the metal surface. The scanning electron microscope (SEM) images confirmed the successful outcomes of the experimental inhibitory tests and validate the adsorption process. © 2023 Chemical Publishing Co.. All rights reserved.

Author Keywords
Carbazole derivatives; Electrochemical corrosion; Niementowski reaction; Pfitzinger reaction; Quinoline derivatives

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65) Rajendran, A.[a] , Happila, T.[a] , Saminathan, V.[b] , Bebin, P.K.G.[a] , Jenisha, K.J.[c] , Sudha, K.[a]

Real Time Attendance Entry Using Face Detection and Recognition
(2023) *International Conference on Self Sustainable Artificial Intelligence Systems, ICSSAS 2023 - Proceedings*, pp. 806-810.

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[a] Karpagam College of Engineering, Department of Electronics and Communication Engineering, Coimbatore, India
[b] Shree Venkateshwara Hi-Tech Engineering College, Department of Electronics and Communication Engineering, Erode, India
[c] Government College of Technology, Department of Electrical and Electronics Engineering, Coimbatore, India

Abstract
The human face is the feature that most clearly identifies a person. The face recognition system can be developed using facial traits as a biometric. The most difficult task is frequently keeping track of attendance. While taking attendance traditionally, teachers call the pupils forward and accurately note whether they are there or not. Yet, these conventional methods require a lot of time and effort. The Open CV-based facial recognition approach has been put out in this work. An input image is captured by a camera followed by which the chosen algorithm of Local Binary Pattern Histogram undergoes a testing phase to perform face detection followed by face identification and thus performing attendance logging in real time meeting many real time applications. © 2023 IEEE.

Author Keywords
Attendance; Biometric; Detection; Encoding; Identification; Local Binary Pattern Histogram

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66) Ghosh, S.[a] , Das, P.[b] , Murugesh, S.[c] , De, S.[b] , Chatterjee, S.[b] , Portmann, M.[d]

Energy Aware Smart Sensing and Implementation in Green Air Pollution Monitoring System
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[a] Iit Delhi, UQ-IITD Academy, New Delhi, India
[b] Iit Delhi, Departrnent of EE, New Delhi, India
[c] Government College of Technology, Department of ECE, Coimbatore, India
[d] School of Itee, University of Queensland, Australia

Abstract
The field-deployed Internet-of-Things (IoT) sensor nodes are powered by rechargeable batteries. The nodes are equipped with energy harvesters to harvest energy from the environment to replenish the batteries and continue the sensing operations. However, due to the high energy consumption of the power-hungry sensors, the nodes still suffer from energy depletion issues. Towards a green IoT system, an energy aware adaptive sensing algorithm is proposed in this paper. For a multi-sensing node, a learning-aided smart sensing strategy is developed to find a set of optimal sensors to be activated in the next measurement cycle depending on the cross-correlation factors and the sensing energy consumption. The parameters of inactive sensors are predicted from cross-correlated parameters of active sensors using Gaussian process regressor model. Further, the algorithm is implemented in a solar powered air pollution monitoring system to analyze the performance of this method. The proposed method saves 68% energy of the node compared to the nearest competitive method, while the sensing error is within the limit. © 2023 IEEE.

Author Keywords
Energy awareness; energy harvesting; energy sustainability; green IoT; smart sensing; temporal and cross-correlation

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67) Jayashree, J.[a] , Sathyapriya, S.[b] , Karthik, V.[c] , Periyasamy, S.[d] , Sundramurthy, V.P.[e]

Numerical Study on Load Bearing Capacity of Root-Caisson Foundation
(2023) *Mathematical Problems in Engineering*, 2023, art. no. 7774648, .

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[a] Department of Civil Engineering, Sri Ramakrishna Engineering College, Tamil Nadu, Coimbatore, 641 022, India
[b] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[c] Department of Industrial Biotechnology, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[d] Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[e] Center of Excellence for Bioprocess and Biotechnology, Department of Chemical Engineering, College of Biological and Chemical Engineering, Addis Ababa Science and Technology University, Addis Ababa, Ethiopia

Abstract
Innovation has been made in the caisson foundation to support a very large structure resting over a soft soil stratum known as the root-caisson foundation. This technique was executed in China-Yangtze River Bridge. The root caisson foundation was first implemented in the Yangtze River bridge and discovered that the root improves soil structure interaction and increases vertical bearing capacity by 100%. In the present research, a numerical study of root-caisson foundation under combined vertical and horizontal loading was performed using ABAQUS software. Analysis was performed by varying the parameters of root caisson such as the inclination of roots (30°, 45°, 60°, and 90°) spacing(S) between the root floors with respect to diameter (D) of the caisson as (0.5°D, 0.6°D, and 0.75°D) with different loading conditions and results were compared with normal traditional caisson with the same length (L) to diameter (D) ratio. From the test results, the load-settlement behavior of caisson is nonlinear for individual vertical, and lateral load tests and also the same for the combined loading conditions. It is found that the root-caisson has a higher load bearing capacity as compared to that of the traditional caisson. Moreover, in combined loading, the load bearing capacity increases considerably, compared with the ultimate vertical and lateral load capacity. © 2023 J. Jayashree et al.

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68) Sumithara, A.[a] , Chitra, S.[b] , Kumar, N.M.G.[c] , Ramya, D.[d] , Ravikumar, K.[e]

Implementation of Fuzzy Logic for Controlling the Recharge Rate Electric Vehicles and Minimizing Losses in the Electric Power System
(2023) *Proceedings of the 4th International Conference on Smart Electronics and Communication, ICOSEC 2023*, pp. 289-295.

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[a] Government College of Technology, Department of Electrical and Electronics Engineering, Coimbatore, India
[b] Government College of Technology, Department of Electrical and Electronics Engineering, Coimbatore, India
[c] Mohan Babu University, Sree Vidyanikethan Engineering College, Department of Electrical and Electronics Engineering, Andhra Pradesh, Tirupathi, India
[d] Sathyabama Institute of Science and Technology, Rajiv Gandhi Salai, Department of Electrical and Electronics Engineering, Chennai, India
[e] Karpagam College of Engineering, Department of Computer Science and Engineering(Cyber Securirty), Coimbatore, India

Abstract
The concerns about the environment have also grown considerably, raising serious questions about the harmful effects of pollutants emitted by automobiles. Allied to these reasons, there is also an increase in concerns about energy security and

fossil energy reserves, which have been promoting a considerable dissemination of the use of plug-in electric vehicles (PEVs) in comparison to combustion-powered ones. The integration of EVs into the power grid introduces various challenges, including Dynamic Charging Demand, Grid Congestion, and Balancing Grid Load. Recent techniques to address these challenges include Machine Learning Approaches. This work develops a system based on fuzzy logic to control the recharge rate of plug-in hybrid electric vehicles (HEVs) in order to minimize losses in the electric power system (EPS). This work investigate the optimization strategy to minimize system losses. Also check the influence of the priority entered by the consumer in recharging a plug-in hybrid EV (PHEV). Also the importance of the optimization strategy in the system operation is investigated.

Author Keywords
Distribution operation center; Electric vehicles; Fuzzy logic; Plug-in hybrid EV; Recharge control system; State of charge

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69) Dakshinamurthy, R.[a] , Natarajan, B.[a] , Chelladurai, M.[b]

Synthesized activated carbon derived from discarded styrofoam and effectively removal of nickel (II) from aqueous solutions
(2023) *Revista Materia*, 28 (4), art. no. e20230195, .

DOI: 10.1590/1517-7076-RMAT-2023-0195

[a] Karpagam Academy of Higher Education, Faculty of Engineering, Department of Civil Engineering, Tamil Nadu, Coimbatore, India
[b] Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
Due to the rapid urbanisation and rapid population explosion, there is a vast essential requirement in the dispose of solid waste. Carbonization of Styrofoam is carried out at varying temperature ranges of 300°C to 675°C at an interval of 75°C using KOH as reagent. The Characterisation of power of hydrogen ion, ash and moisture content, fixed carbon, Volatile matter, iodine adsorption value, methyl blue value was conducted. It was found that the acti-vate carbon obtain from the temperature of 525°C has a good carbon characteristic. The batch experiment such has pH, contact time, carbon dosage, agitation speed, potency of Nickel (II) was conducted with the purpose of ascertaining the efficiency of Nickel (II) adsorption. This analysis deals with fixed bed column to remove Nickel (II) from a solution. The results indicated that the sorption-second order kinetic model was the most appropriate fit for the data, and alternative models such as Adams-Bhorat, Thomas, and Yoon Nelson's were also evaluated. Increasing a bed height resulted in better removal of Nickel (II) in all 3 models. Therefore, The utilization of Styrofoam-derived activated carbon as a medium for ongoing Nickel (II) adsorption from an aqueous solution.

Author Keywords
Carbon dosage; Contact time; Fixed carbon; Nickel (II) adsorption; Volatile matter

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70) Marimuthu, C.[a] , Chelliah, M.[b] , Kumar, N.R.[a] , Prakash, R.[a]

Monitoring and Estimation of Phasor Angle of PMU Signals using LabVIEW-DFT Methods
(2023) *14th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2023*, 2023-June, pp. 2010-2016.

[a] EIE, Government College of Technology, Coimbatore, 13, India
[b] EEE, Dhanalakshmi Srinivasan College of Engineering, Coimbatore, 105, India

Abstract
Synchronized Phasor Measurement Unit becomes a part of wide-area measurement system which apply in modern power systems for measurement and control application. Real-time virtual PMU which measures the various signal is designed in LabVIEW and estimates the value of phase of signals by Digital Fourier Transform (DFT) recursive and non-recursive methods. The phasor value collected from polar plot is used to analyse the health condition of the power system and used to compare various sinusoidal and non-sinusoidal signals. © Grenze Scientific Society, 2023.

Author Keywords
Digital Fourier Transform (DFT) signals; non-recursive methods; recursive; virtual PMU

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71) Sekar, T.[a] , Natarajan, E.[b c] , Ang, C.K.[b] , Hong, L.W.[b] , Rajendran, P.[d e]

Modeling of Rotary Tool Adapted Electrochemical Machining of AISI 202
(2023) *IEEE International Conference on Automation Science and Engineering*, 2023-August, .

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[a] Government College of Technology, Department of Mechanical Engineering, Tamilnadu, Coimbatore, India
[b] Faculty of Engineering, Technology and Built Environment, Ucsi University, Kuala Lumpur, Malaysia
[c] Psg Institute of Technology and Applied Research, Department of Mechanical Engineering, Coimbatore, India
[d] School of Aerospace Engineering, Universiti Sains Malaysia, Engineering Campus, Pulau Pinang, Nibong Tebal, Malaysia
[e] First City University College, Faculty of Engineering & Computing, Petaling Jaya, Selangor, Bandar Utama, Malaysia

Abstract
Concurrent achievement of better material removal rate (MRR), surface roughness (Ra) and Overcut (OC) are still considered as one of the challenging tasks in Electrochemical Machining (ECM), particularly on the metals having high toughness. The traditional ECM machine was modified with indigenously designed rotary tool adapter to increase the performance of machining. Meanwhile, experimental design was done to conduct the experiments with different machining conditions. The responses of machining for different set of voltage, tool feed rate, electrolyte discharge rate and, rotary speed using 15% NaCl aqueous solution were observed and measured. Response Surface Methodology (RSM) model was then developed and validated through confirmatory experiments. The best response of rotary adopted machining under same operating conditions are: material removal rate of 361.410 mm3/min, surface roughness of 1.62 µm and overcut of 4.9 % at 18 V, 0.54 mm/min, 12 lit/min and 100 rpm. The results are 11.96% lower in surface roughness, 21.36% lower in overcut when compared to non-rotary tool. © 2023 IEEE.

Author Keywords
aqueous solution; ECM; MRR; overcut; rotary tool; RSM; surface roughness

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72) Thangam, T.[a] , Rathika, N.[b] , Sivasubramanian, M.[c] , Kumar, R.T.[d] , Manohar, V.J.[e] , Kavyalakshmi, A.[f]

Artificial Intelligence Based Reduced Switch Multilevel Inverter for Grid Connected PV Applications
(2023) *Proceedings of the International Conference on Circuit Power and Computing Technologies, ICCPCT 2023*, pp. 1781-1787.

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[a] International Maritime College of Oman, Department of Process Engineering, National University of Science and Technology, Sohar, Oman
[b] Mahendra Engineering College for Women, Department of Electrical & Electronics Engineering, Namakkal, Tiruchengode, India

[c] Sri Venkateswara College of Engineering and Technology, Department of Electrical and Electronics Engineering, Tamil Nadu, Thiruvallur, India
[d] Puducherry Technological University, Department of Electrical and Electronics Engineering, Puducherry, India
[e] Presidency University, Department of Electrical & Electronics Engineering, Bengaluru, India
[f] Government College of Technology, Department of Electrical and Electronics Engineering, Coimbatore, India

Abstract
Due to the rise in computer power, tools, and data collection, artificial intelligence (AI) is becoming more and more prevalent in diverse photovoltaic (PV) system applications. The basics of grid-connected multilevel inverters for PV systems is provided, together with information on the drivers, characteristics, evaluation criteria, topologies, modulation schemes, and selection criteria for various applications. The results of a thorough reliability investigation of basic 15L multilevel inverter (MLI) are examined in this study. The inverter is the most crucial component of a grid-connected PV system. This study provides a survey of the system topologies and grid-connected PV inverters utilized for PV systems linked to the grid. © 2023 IEEE.

Author Keywords
ANN - Artificial Neural Network; MPPT - Maximum Power Point Tracker; PV - Photovoltaic; SEPIC - Single-ended primary-inductance converter

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73) Kumar, A.[a] , Ramasamy, S.[b] , Losito, M.[a] , Gatto, G.[a]

Comparative Analysis of Three Phase Hybrid Transformerless Inverters for PV applications
(2023) *2023 International Conference on Clean Electrical Power, ICCEP 2023*, pp. 254-259.

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[a] University of Cagliari, Department of Electrical and Electronic Engineering, Cagliari, Italy
[b] Government College of Technology, Department of Electrical Engineering, Coimbatore, India

Abstract
Recently, transformerless grid connected inverters are developed for PV system to increase the overall efficiency of the system and to reduce the system cost. The main draw back of the transformerless inverter topology is isolation during grid fault, leakage current (LC) elimination, common mode voltage (CMV) and reactive power compensation. DC and AC decoupled transformerless inverter topologies have been developed to eliminate the drawbacks, these topologies have high switching losses. To eliminate the high switching loss and to improve the reactive power compensation, hybrid transformerless inverter topologies with modified discontinuous pulse width modulation (MDPWM) is proposed in this paper. Mathematical analysis of switching loss and reactive power compensation is carried out. Simulation results are discussed for LC elimination and CMV using MATLAB/Simulink. © 2023 IEEE.

Author Keywords
Common mode voltage; leakage current reduction; reactive power compensation; three-phase transformerless inverter

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74) Andal, N.M., Kaviya, N.

Experimental Investigation of the Effects of Fly Ash on Functionally Graded Recycled Coarse Aggregate Concrete Beams Incorporating Fibers
(2023) *Lecture Notes in Civil Engineering*, 346 LNCE, pp. 371-384.

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Government College of Technology, Coimbatore, 13, India

Abstract
The construction industry's continued expansion encourages larger carbon emissions during the production of building materials, which in turn encourages the concrete industry to pursue sustainability. Two distinct grades of concrete, M30 and M20 were employed in this study. M30 grade concrete is used in the compression zone, and engineered concrete is strategically used to replace the tensile portion of the concrete that surrounds the primary longitudinal reinforcement in an RC member. The investigation consists of determining the bending behavior of functionally graded engineered concrete beams. The RCA content (30% RCA) and 0.75% polypropylene fibers was used as one of the criteria for analyzing how the RCA concrete beams behaved structurally under flexure. © The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd 2023.

Author Keywords
EDS; Functionally graded beam; Polypropylene fibers; Recycled coarse aggregates; SEM; XRD

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75) Karpagam, V.[a] , Narmadhai, N.[b]

Seven levels highly efficient modular multilevel matrix converter (M3C) for low frequency three-phase AC-AC conversion
(2023) *Automatika*, 64 (4), pp. 1255-1267.

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[a] Dr. Mahalingam College of Engineering and Technology, Pollachi, India
[b] Department of EEE, Government College of Technology, Coimbatore, India

Abstract
An Innovative Modular multilevel matrix converter (M3C) is proposed with reduced number of switching device owing to the improved efficiency, reduced cost and minimizes the size. Offshore Low-Frequency AC (LFAC) transmissions are economical with greater reliability for short and intermediate distance transmissions. Similar to HVDC, it increases the transmission capacity and also distance can be increased in LFAC.M3C is proposed as frequency converters for LFAC transmissions which link AC systems operating at 16.7 and 50 Hz. The double αβ0 transform control technique has been the most often used approach for decoupling control of input, output and circulating currents in such applications. The performances of this work’s proposed modular multilevel matrix converters are analysed using simulation in MATLAB/SIMULINK software. © 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

Author Keywords
branch energy balance circuit; Modular multilevel matrix converter (M3C); MOSFET; offshore low frequency AC (LFAC) transmission; PMSG wind turbine; power grid

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76) Sathyapriya, S.[a] , Sharvesh, R.[a] , Karthik, V.[b] , Periyasamy, S.[c] , Sundramurthy, V.P.[d e]

Study on Osmotic Consolidation and Hydraulic Conductivity Behavior of an Expansive Soil Inundated with Sodium Chloride Solution
(2023) *International Journal of Chemical Engineering*, 2023, art. no. 6574646, . Cited 1 time.

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[a] Department of Geotechnical Engineering, Government College of Technology, Coimbatore, 641013, India

[b] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India
[c] Department of Chemical Engineering, School of Mechanical, Chemical and Materials Engineering, Adama Science and Technology University, Adama, 1888, Ethiopia
[d] Department of Chemical Engineering, College of Biological and Chemical Engineering, Addis Ababa Science and Technology University, Addis Ababa, Ethiopia
[e] Center of Excellence for Bioprocess and Biotechnology, Addis Ababa Science and Technology University, Addis Ababa, Ethiopia

Abstract
Canals are a very imperative source of irrigation for the agricultural sector in India. Seepage causes major water loss in canals, and hence, the installation of liners becomes necessary. Compacted clay soils are commonly used as liners in the canals. This structure will most probably be subjected to salinization and desalinization cycles throughout its life. Because of the interaction between the pore liquid and clay particles, physico-chemical influences considerably impact the behavior of clay barriers. In this paper, the effect of interacting fluid on volume change, consolidation parameters, and hydraulic conductivity of compacted clay soil is investigated with the help of a one-dimensional consolidation test. The compacted clay specimens were immersed alternatively with distilled water (DW) and sodium chloride (NaCl) solutions (SW) at constant loading of 10 kPa, which replicates the load conditions in the field canal due to 1 m head of water and incremental loading as per IS 2720 part 15 standards. The experimental results proved that there is a percentage volume change increase of about two times for each stage inundated with 4M NaCl solution than its preceding stages inundated with distilled water at constant loading of 10 kPa. The consolidation rate was accelerated with 4M NaCl solution than the normal consolidation at incremental loading. The permeability coefficient in the salt water-induced sample increased by 217% more than the distilled water-induced sample at incremental loading. Therefore, the soil specimen subjected to alternate salinization and desalinization cycles significantly affects the volumetric and consolidation behavior, leading to decreased life of clay barrier structures. © 2023 S. Sathyapriya et al.

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77) Arivazhagan, A.[a] , Chandrasekaran, S.[a] , Vadivel, S.[b c] , Selvaraj, S.K.[d] , Vediyappan, S.[e] , Gandhirajan, V.[f]

Synthesis, Structural, Spectroscopic and Quantum Chemical Investigation of a Novel 1,4-Diamino-2,5-dichlorobenzenium Picrate Single Crystal: An Efficient NLO Material
(2023) *Polycyclic Aromatic Compounds*, .

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[a] Department of Chemistry, Government College of Technology, Coimbatore, India
[b] Department of Physics, Karpagam Academy of Higher Education, Tamil Nadu, Coimbatore, India
[c] Centre for Material Chemistry, Karpagam Academy of Higher Education, Tamil Nadu, Coimbatore, India
[d] Department of Physics, School of Physics, Madurai Kamaraj University, Madurai, India
[e] SSN Research Centre, SSN College of Engineering, Chennai, Kalavakkam, India
[f] Division of Physics, School of Advanced Sciences, VIT University, Chennai, India

Abstract
A new organic nonlinear optical single crystal, 1,4-diamino-2,5-dichlorobenzenium picrate (DADCBP) has been successfully grown by solvent slow evaporation method. DADCBP crystallizes in a triclinic structure with the centrosymmetric space setup, P-1. The molecular structure of the grown crystal has been determined by NMR spectral analysis. The existence of discrete functional branches of the crystal has been identified by FTIR spectral study. The optical property of the title crystal has been measured by UV-Vis-NIR spectral analysis. PL spectra reveal the emission bands of the grown crystal. The thermal stability of the harvested crystal has been examined by the TG/DTA study. The dielectric constant and loss have been taken to locate the arrangement of charges in the grown crystal. The quantum chemical studies have been performed to analyze the HOMO/LUMO, molecular geometry, and mulliken atomic charge by B3LYP at the 6-311++G (d,p) level of theory. H···H, O···H, C···H, C···C various intermolecular interactions of hydrogen bonds in the DADCBP molecule have been visualized by the Hirshfeld surface analysis. The nonlinear optical (NLO) characteristics like nonlinear absorption coefficient (β), nonlinear refractive index (n2) and susceptibility (χ(3)) have been examined using the Z-scan technique. © 2023 Taylor & Francis Group, LLC.

Author Keywords

Crystal structure; density functional theory; dielectrics; Hirshfeld surface analysis; NMR; nonlinear optics

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78) Kala, R.[a] , Deepa, P.[b]

Deep learning based brain tumor detection via fuzzy hexagonal membership function
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DOI: 10.3233/JIFS-221990

[a] Department of Computer Science and Engineering, Karpagam College of Engineering, Tamil Nadu, Coimbatore, India
[b] Department of Electronics and Communication Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
Brain tumor is an anomalous growth of brain cells. Segmentation of brain tumors is currently the most important surgical and pharmaceutical procedure. However, manually segmenting the brain tumor is a challenging task due to the complex structure of brain. In recent years, artificial intelligence techniques with the fuzzy logic have shown better results in the field of medicine. In this work, a novel deep learning classification network with fuzzy hexagonal membership function (DLC-FHMF) model has been proposed for accurately segmenting brain tumors. The different MRI modalities namely T1, T1-c, T2 and Flair images are preprocessed using a fuzzy hexagonal trilateral and median filter to eliminate the Rician noise. Afterwards, the DLC-FHMF model is used for segmenting the tumor portion by using the multimodal composition of MRI as input. The fuzzy weights are determined with hexagonal membership functions and convoluted with the corresponding MRI images. The quantitative examination is carried out using the performance metrics namely accuracy, specificity, precision, sensitivity, incorrect segmentation, under-segmentation, and over-segmentation. In addition to the above metrics, the pre-processing metrics include PSNR, RMSE, and SSIM. The experimental fallout portrayals that the proposed DLC-FHMF approach attains a better accuracy range of 99% for detecting brain tumors using the BRATS 2013 dataset. The proposed DLC-FHMF model improves the overall accuracy by 15.1%, 11.1%, 3.0%, 21.2% and 0.5% better than ANN, SVM, NB, DNN and DAE respectively.

Author Keywords
Brain tumor; deep learning; fuzzy logic; magnetic resonance image; segmentation

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79) Balasubramanian, N., Sarangapani, C.

A review on the factors influencing the performance of sustainable ternary cement composites
(2023) *Environment, Development and Sustainability*, .

DOI: 10.1007/s10668-023-03685-0

Department of Civil Engineering, Government College of Technology, Coimbatore, India

Abstract
This paper gives an overview of various factors that influences the performance of Limestone Calcined Clay Cement (LC3) concrete. Among the various research related to ternary cements, this paper discusses the influential factors, based on the strength and durability aspects. The factors such as the type and purity of kaolinite, limestone, gradation of the limestone, concentration of gypsum, calcined clay, limestone ratio, clinker content, water-to-binder ratio, method and effect of calcination, grinding criteria, optimum temperature of calcination, calcined clay content, method of curing and other factors are interpreted. Even low-grade materials with minimum purity have also been found to achieve the desired properties. Therefore depending upon the knowledge of the importance of every parameter, the best quality concrete could be developed with the available source and facilities. With the available quality and quantity of material, sustainable ternary cement could be obtained. By optimizing the various factors that influence the behavior of LC3 concretes, more economical

and durable concrete can be produced. Graphical abstract: [Figure not available: see fulltext.] © 2023, The Author(s), under exclusive licence to Springer Nature B.V.

Author Keywords
Clay type; Limestone purity; Low carbon concrete; Supplementary cementitious material; Sustainable development

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80) Sathyapriya, S.[a] , Sharvesh, R.[b] , Natarajan, C.[c]

Bioremediation of Oil-contaminated Sand
(2023) *Jordan Journal of Civil Engineering*, 17 (3), pp. 419-429.

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[a] Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[b] Hindusthan College of Engineering and Technology, Tamil Nadu, Coimbatore, India
[c] Principal, Hindusthan Institute of Technology, Tamil Nadu, Coimbatore, India

Abstract
The energy demand is set to grow very rapidly and the potential demand for oil around the world is at its highest level. Apart from indigenous oil sources, crude oil is imported by water transportation to fulfill local demand. The occurrence of oil leakage during drilling and transportation in pipelines is a major concern. As a result of this, soil is getting polluted and its geotechnical properties are altered. In this study, the effect of engine oil and diesel contamination on the geotechnical parameters of sea sand has been studied. Further, to enhance the properties of oil-contaminated sand, the bioremediation method was adopted. Sea sand from Ganagalla Peta beach, Andhra Pradesh state, India was taken up for the study. In the laboratory, 4%, 8%, 12% and 16% of engine oil and diesel were used to artificially contaminate the sea sand and geotechnical parameters; namely, compaction, shear strength and permeability, were studied for oil-contaminated sand and compared with those of virgin sea sand. In the next stage, bioremediation of engine oil-and diesel-contaminated sand was carried out to improve the geotechnical properties. It has been found that the geotechnical properties had improved after three days of bioremediation. Fourier transform infrared spectroscopy (FTIR) analysis showed that the contaminated sand is of a lipopeptide nature and showed the presence of carboxyl groups, whereas the IR absorption pattern of the treated sand matches with N-Methyl-N-Vinyl Acetamide.

Author Keywords
Bacillus subtilis; Bioremediation; Compaction characteristics; Diesel contamination; Engine-oil contamination; FTIR analysis; Geotechnical properties; Permeability; Shear-strength characteristics

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81) Rithic, C.H.[a] , Arulmozhi, N.[b]

Real-Time Implementation of RF-based Mobile Fleet Localization and Collision Avoidance System in Wireless Sensor Network for Drones and Gliders
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[a] Government College of Technology, Department of Electronics and Instrumentation Engineering, Tamil Nadu, Coimbatore, India
[b] Government College of Technology, Department of Electronics and Instrumentation Engineering, Coimbatore, India

Abstract

There are more than 35 accidents involving Unmanned Aerial Vehicles (UAV) each year, out of which the absence of an air navigation or air traffic control system has contributed to more than 20 of these incidents. Consequently, the challenge of developing a novel method of operation for an automated air-to-air or UAV-to-UAV collision avoidance system arises. This article investigates the novel idea of traffic collision avoidance and localization systems which is a low-cost and adaptable solution to the problem, which can be easily tailored to meet the needs of the type of UAV. In this paper, a Radio Frequency (RF) module will be fitted on the UAV to create a Wireless Sensor Network (WSN) between the UAVs. The WSN enables UAVs to communicate with each other within the sensor network. The communication structure is specified and contains information like current height, airspeed, current pressure, and current Global Positioning System (GPS). Variables like the maximum speed and maximum cruising altitude of the UAV can be preset. The pilot can remotely adjust these settings using Over The Air updates (OTA), which are accessible using an online dashboard. These data will be used to determine the time to impact. © 2023 IEEE.

Author Keywords
Collision Avoidance; Embedded C; ESP32 microcontroller; Firebase; Heroku Database; Over The Air updates; Python; Traffic Collision Avoidance System; Unmanned Aerial Vehicle

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82) Vallavi, M.S.A., Moorthy, A., Mugilan, T.

Investigation on Tribological Behavior of Heat Treated DIN115CrV3 Steel for Cutting Tool Application by Factorial and Fractional Factorial Design
(2023) *Journal of Engineering Science and Technology Review*, 16 (2), pp. 28-36.

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Department of Mechanical Engineering, Government College of Technology, Tamilnadu, Coimbatore, 641 013, India

Abstract
The manufacturing of machines relies heavily on cutting tools. All of the critical procedures in the machine industry would have to be performed with an unacceptable level of imprecision without the use of effective cutting tools. Selecting an appropriate cutting tool material allows manufacturers to decrease machining times, eliminate unnecessary processes, raise standards of surface smoothness and accuracy, and, ultimately, increase their profits. The heat treated DIN115CrV3 steel is used as a predominant cutting tool material in the industries. Predicting wear rates at various working temperatures were crucial for selecting the cutting tool material. Considering maximum wear resistance was essential in designing the cutting tool. This research attempted to identify the wear rate influence of varying parameters like hardening temperature, tempering temperature, sliding velocity, sliding distance, and load. Each parameter with three levels was selected to design the experiment using Factorial and fractional factorial designs with restrictions. The experiments were conducted as per standard test method to conduct the wear analysis in the pin-on-disc apparatus (ASTM G99) based on the L27 design matrix, and responses such as friction force and wear rate were measured. ANOVA was performed to find out the significance of the measured results. RSM, Excel solver, and Box-Cox approach were used to predict the wear rate and frictional force. The optimized wear rate and friction forces were predicted by a grey relational approach, which was verified by a confirmatory test. The result was that 200 ºC tempering temperature offers the minimum dry wear behaviour. The sliding distance contributes significantly to wear and frictional force compared with other parameters. The hardening temperature 800 ^{o}C, tempering temperature 200 ^{o}C, sliding Velocity 5 m/sec, sliding distance 2000m, and load 25 N are optimal parameter combinations of the dry wear process after the heat treatment obtained by GRA and confirmation. The strength and wear behaviour of cutting tool affects the quality of manufacturing process and also reduces the accuracy industrial products. Hence, the improvements in cutting tool material through optimization is the best way of improve the manufacturing process in industries. © 2023 School of Science, IHU. All rights reserved.

Author Keywords
Box-Cox; cutting tool; DIN115CrV3; dry wear; grey relational approach; heat treatment

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83) Saranya, E.[a] , Sivaramkrishnan, M.[b] , Kaliappan, S.[c] , Tanguturi, R.C.[d] , Arunagirinathan, S.[e] , Gunasekaran, K.N.[f] , Siva Ramkumar, M.[g]

Reinforcement Learning Based Autonomous E-Vehicle Speed Control
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[a] Department of Information Technology, Mahendra Institute of Technology (Autonomous), Mallasamudharam, Namakkal, India
[b] Department of EEE, Karpagam College of Engineering, Coimbatore, India
[c] Department of Electrical and Electronics Engineering, Coimbatore, India
[d] Department of Computer Science and Engineering, Pace Institute of Technology and Sciences, Andhra Pradesh, Ongole, India
[e] Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India
[f] Department of Mechanical Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, India
[g] Dept of EEE, Karpagam Academy of Higher Education, India

Abstract
Greater efficiency in both energy use and traffic flow are two benefits of autonomous self-driving cars. Due to their superior performance, effectiveness, and lack of carbon emission, electric vehicles (EVs) have recently become popular and used in an autonomous vehicle. As EVs are making a splash in the automotive industry, researchers are taking a greater interest in studying, modelling, and simulating them. Controlling EV speed is not an easy task. Modelling and Conventional Proportional Integral Derivative (PID) controller tuning for EV speed regulation are presented in this paper. To design and simulation of EV speed control in MATLAB, the transfer function of EV is derived and considered. PID controller is found to be easy to implement, practical, and provide superior closed-loop performance. Two PID tuning techniques, Ziegler-Nichols (ZN) and a Reinforcement Learning (RL) method are designed to regulate the EV speed. Characteristics of the time domain have been used to perform a comparative analysis. Additionally, the Integral Square Error (ISE) is analysed to determine the optimal PID tuning strategy for EV speed regulation. © 2023 IEEE.

Author Keywords
Electric Vehicle; Integral Square Error; PID Controller; Reinforcement Learning; Speed; Tuning Techniques

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84) Shivappriya, S.N.[a b c] , Harikumar, R.[d e f g h i] , Maheswari, K.[j k l m n o] , Praba, R.D.[p q r s]

Heart Disease Classification Using Multi-Layer Perceptron (MLP) Neural Network
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[a] Department of ECE, Kumaraguru College of Technology, Coimbatore, India
[b] IEEE, United States
[c] IEI, United States
[d] ECE, annari Amman Institute of Technology, Sathyamangalam, India
[e] Anna University, Chennai, India
[f] IETE, United States
[g] IAENG, China
[h] ISTE, United States
[i] IEEE, United States
[j] Department of Mathematics, Kumaraguru College of Technology, Coimbatore, India
[k] Department of Mathematics, China

[l] Research Center for Wind Energy Systems, Kunsan National University, Gunsan, South Korea
[m] School of IT Technology and Control Engineering, Kunsan National University, South Korea
[n] School of Mathematical Sciences, Chongqing Normal University, Chongqing, China
[o] Department of Electrical Engineering, Yeungnam University, Kyongsan, South Korea
[p] SSM College of Engineering, Namakkal, India
[q] Government College of Technology, Coimbatore, India
[r] Kumaraguru College of Technology, Coimbatore, India
[s] Department of Electronics and Communication Engineering, India

Abstract
Ventricular-based arrhythmias are a major cause of heart attacks and sudden cardiac deaths. Accurate detection, classification and prediction of these arrhythmias play a key role for the earlier prediction of heart attacks. The objective of the proposed method is to detect the non-visible (μV) level T-Wave Alterations (TWAs) which is the major cause of sudden cardiac death. Extracted morphological and statistical features from the denoised ECG signal are used to classify six different chronic ventricular arrhythmias. The performance of the classifier is validated with a supervised neural network (NN): Probabilistic Neural Network (PNN), Extreme Learning Machine (ELM), Self-adaptive Resource Allocation Network (SRAN) Classifier and Back Propagation Neural Network (BPNN). Among the four different NNs, the results in terms of accuracy, i.e., 99.8%, obtained clearly indicate a high degree of agreement with the PNN classifier with improved reliability and decreases structural complexity. © 2024 selection and editorial matter, L Ashok Kumar, R. Manivel and Eyal Ben Dor.

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85) Sebasthirani, K.[a] , Ravi, S.[a] , Kumar, C.P.[a] , Maruthupandi, P.[b]

Power Quality Enhancement Using Shunt Active Power Filter with Vienna Rectifier
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[a] Department of Electrical and Electronics Engineering, Sri Ramakrishna Engineering College, Tamilnadu, Coimbatore, India
[b] Department of Electrical and Electronics Engineering, Government College of Technology, Tamilnadu, Coimbatore, India

Abstract
Nowadays, there are a large number of electrical components in domestic, commercial, and industrial applications. The demand for power conversion from one stage to another is necessary for obtaining a proper result in distribution systems. But, it creates power quality problems like voltage spike, voltage dip, swell, harmonics, over voltages, under voltages noise, etc. Harmonics is main representation of power problem in industrial and commercial venues. Conventionally, the passive filters are used to reduce the harmonics content. But, it has some disadvantages like resonance problems and large size, tuning of particular frequency and particular reactive power compensation. To solve the abovementioned problems, active filters are dedicated used to reduce the harmonics content in the power distribution system. In this, the proposed model, three-phase Vienna rectifier is performed to serve as shunt active power filter (SAPF) for reactive power compensation. Fewer switching devices, low circuit losses, and higher power density are the advantages of VIENNA rectifier when compared to PWM rectifier topology. By using MATLAB software, the usefulness and feasibility of the proposed model is tested and certified. Results taken from simulations circuit show that the new proposed model is more effective than other conventional for reducing the harmonic currents filtering action. The three-phase Vienna rectifier-based SAPF can attain and maintain the total harmonic distortion of info source current inside the breaking point recognized by the IEEE-519 Standard. © 2023, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author Keywords
Power quality (PQ); Shunt active power filter (SAPF); Three-phase Vienna rectifier; Total harmonic distortion (THD)

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86) Nigel, K.G.J.[a] , Rajeswari, R.[b]

AI-based performance optimization of MPTT algorithms for photovoltaic systems
(2023) *Automatika*, 64 (4), pp. 837-847. Cited 1 time.

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[a] Department of Robotics Engineering, Karunya Institute of Technology & Sciences, Coimbatore, India
[b] Department of EEE, Government College of Technology Coimbatore, Coimbatore, India

Abstract
Solar models have been drawing much attention in the contemporary electricity environment. Solar energy installations employ various MPPT techniques that generate the most energy. Increasing a solar (PV) device's energy effectiveness has become a key concern for scientists. Multiple MPPT approaches that collect the most power possible using a PV array have been researched. Both primary and intermediate-type procedures will be used in most procedures. The performance and convergence velocity of such a PV device become significant depending on its practical deployment under various conditions. The energy attributes of unit sections collectively serve as the primary energy-extracting elements in specific systems, dependent upon all interior and exterior elements. Considering specific external dynamical circumstances, traditional maximal power point tracing systems will not have the required translation efficacy. For assessing the overall effectiveness of the proposed intelligent maximal power point outlining methodology in partially shaded situations having significant and dynamical variations within ambient parameters, that study contrasts its efficacy using traditional maximal power point tracing techniques. © 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

Author Keywords
dynamical partial shadowing; MPPT method; photovoltaics; PV modules

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87) Sathyapriya, S.[a] , Abdul Fasith, M.S.[a] , Senthil Kumar, P.[b c d e] , Karthik, V.[f]

Geotechnical Investigation and Microanalysis of Black Cotton Soil Amended with Guar Gum and Polyethylene Terephlate Fibre
(2023) *International Journal of Chemical Engineering*, 2023, art. no. 5277425, . Cited 3 times.

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[a] Department of Geotechnical Engineering, Government College of Technology, Coimbatore, 641013, India
[b] Department of Chemical Engineering, Sri Sivasubramaniya Nadar College of Engineering, Tamil Nadu, Kalavakkam, 603110, India
[c] Centre of Excellence in Water Research (CEWAR), Sri SivasubramaniyaNadar College of Engineering, Tamil Nadu, Kalavakkam, 603110, India
[d] School of Engineering, Lebanese American University, Byblos, Lebanon
[e] Department of Biotechnology Engineering and Food Technology, Chandigarh University, Mohali, 140413, India
[f] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, 641013, India

Abstract
Polymer-based soil stabilization has fascinated substantial interest in the field of research intending to gain a better knowledge of the anticipated soil characteristics after polymer treatment. Intricate research on the engineering performance of expansive soil which is highly challenging due to its swell and shrink nature based on variations in water regime, treated with guar gum, a biopolymer made from gum along with polyethylene terephthalate fibre, one of the most generated plastics, resulting in massive waste, is accomplished through this entire experimental investigation. Comprehensive geotechnical tests and microstructural examinations have been performed to optimize the guar gum for enhancement of soil properties and to comprehend the interactive mechanism with the soil. The biopolymer at dosages 0.5%, 1%, 1.5%, and 2% was added to the soil. Polyethylene terephthalate Fibre with an aspect ratio of 28 is used with the soil at an increment of 0.4% up to 1.6%. The optimum dosage of biopolymer was mixed with polyethylene terephthalate fibres, and its effect on geotechnical properties was carried out separately. From the experimental investigations, it is comprehended that there is a

reduction of 27% and 40% in plasticity index and swelling, respectively, at an optimum dosage of 0.5% GG when compared to untreated soil. Furthermore, there is a marginal decrease of 24% in dry density, 310% increase in CBR value, and 33% reduction in compressibility of the soil treated with 0.5% GG with 1.6% PET fibre, when compared to virgin soil. The present study was conducted to improve the subgrade soil strength beneath the pavements. The usage of biopolymer and its combination with polyethylene terephthalate fibres shows that there is a considerable improvement in modifying the geotechnical properties, and its coupling effect contributes to higher California bearing ratio values. According to the outcomes of this investigation, it is proven that biopolymer and polyethylene terephthalate fibre is definitely an alternate to conventional materials. The present study was conducted to improve the subgrade soil strength beneath the pavements. © 2023 S. Sathyapriya et al.

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88) Arokia Mary Caroline, P., Vasanthanayaki, C.

Modelling and Analysis of Mixed Mode EM Emission in EV for Electro-Magnetic Compatibility
(2023) *ICSPC 2023 - 4th International Conference on Signal Processing and Communication*, pp. 116-122.

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Govt. College of Technology, Dept. of Ece, Coimbatore, India

Abstract
The emergence of electric vehicles (EVs) has a great impact on energy utilization and controlling pollution in the environment. The EVs are significantly different from conventional vehicles in terms of a control units such as the use of an electric drive system (EDS) instead of the internal combustion engine (ICE) and other aspects that affect the vehicle's performance. One such unique feature of EVs is the use of power line communication (PLC), where main lines from the battery to other devices is used to exchange information. The high switching characteristics of the EDS as well as the implementation of PLC, have a drawback of generating ElectroMagnetic Interference (EMI). The Common-Mode (CM) and Differential-Mode (DM) currents of the EDS and PLC contribute to the EMI, and separate analysis of both CM and DM is essential, in spite of the Mixed-Mode (MM) analysis, to get the accurate picture of emission levels and for improving the design and performance. Hence, this work aims to model the EM emission of EDS and PLC in the EV using suitable simulation software. For the implementation of the same MATLAB-SIMULINK tool is used. In this work, both CM and DM conducted emission spectrum and general MM spectrum were analyzed. The current through EV systems are the main source of EM emission at high frequency and analyzed results indicate the same. The future scope of this work involves, applying suppression techniques to suffice the Electro-Magnetic Compatibility (EMC). © 2023 IEEE.

Author Keywords
Common mode; Differential mode; Electric drive system; Electromagnetic Interference; Mixed mode; Power line communication

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89) Balan, E.[a] , Saraniya, O.[b]

Novel neural network architecture using sharpened cosine similarity for robust classification of Covid-19, pneumonia and tuberculosis diseases from X-rays
(2023) *Journal of Intelligent and Fuzzy Systems*, 44 (4), pp. 6065-6078. Cited 2 times.

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[a] Department of Electronics and Communication Engineering, Sri Venkateswara College of Engineering, Tamil Nadu, Chennai, India
[b] Department of Electronics and Communication Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
COVID-19 is a rapidly proliferating transmissible virus that substantially impacts the world population. Consequently, there is an increasing demand for fast testing, diagnosis, and treatment. However, there is a growing need for quick testing, diagnosis, and treatment. In order to treat infected individuals, stop the spread of the disease, and cure severe pneumonia, early covid-19 detection is crucial. Along with covid-19, various pneumonia etiologies, including tuberculosis, provide additional difficulties for the medical system. In this study, covid-19, pneumonia, tuberculosis, and other specific diseases are categorized using Sharpened Cosine Similarity Network (SCS-Net) rather than dot products in neural networks. In order to benchmark the SCS-Net, the model's performance is evaluated on binary class (covid-19 and normal), and four-class (tuberculosis, covid-19, pneumonia, and normal) based X-ray images. The proposed SCS-Net for distinguishing various lung disorders has been successfully validated. In multiclass classification, the proposed SCS-Net succeeded with an accuracy of 94.05% and a Cohen's kappa score of 90.70%; in binary class, it achieved an accuracy of 96.67% and its Cohen's kappa score of 93.70%. According to our investigation, SCS in deep neural networks significantly lowers the test error with lower divergence. SCS significantly increases classification accuracy in neural networks and speeds up training.

Author Keywords
chest X-ray; cosine normalization; COVID-19; pneumonia; tuberculosis

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90) Prabhushankar, N.[a] , Balaji, N.[b] , Kaliappan, S.[c]

Effect of sisal/kevlar inter-ply stacking and silane-treatment on mechanical, wear, fracture toughness, drop load impact, and hydrophobicity behavior of cellulose toughened polyester composite
(2023) *Biomass Conversion and Biorefinery*, . Cited 3 times.

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[a] Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[b] Department of Mechanical Engineering, Sri Krishna College of Engineering and Technology, Tamil Nadu, Coimbatore, India
[c] Department of Mechanical Engineering, Velammal Institute of Technology, Tamil Nadu, Chennai, India

Abstract
This study examined the inter-ply alternatively stacked kevlar/sisal fiber’s mechanical, wear, fracture toughness, drop load impact, and hydrophobicity behavior along with cellulose addition. This study also gives an insight to how effectively a biomass-derived fiber is used as potential replacement for synthetic man-made hazardous fibers. The composite laminates were made by room temperature hand layup process and hot cured at 120 °C for 2 h. The laminated composites are then subjected to testing in accordance to respective ASTM standards. The result finding reveals that the composite designation “C3” possessed highest improvement in mechanical properties. Similarly, in wear, the composite designation “C4” records a lowest sp. wear rate and COF of 0.011 mm3/Nm and 0.34. Moreover, in fracture toughness, the composite designation “C3” scored a maximum fracture toughness of 24.74 (K1c) MPa. m and energy release rate of 0.55 (G1c) MJ/m2. This is about 339.43% and 223.52% of improvement compared to the plain resin. Similarly, in drop load impact toughness, the addition of cellulose and fiber stacking order influenced higher penetration resistance. Moreover, there is a strong matrix-fiber adhesion which causes finely fragmented fibers, which are visible through SEM fractography. Finally, the water-absorption behavior proves that composite materials’ hydrophobicity has been maintained not less than 70° despite the addition of cellulose and fiber. These composites, with improved load bearing effect with novel stacking order, could be benefited in manufacturing of building materials, automotive parts, aircraft bodies, and defense gadgets.

Author Keywords
Cellulose; Composites; Fiber; Fracture toughness; Hydrophobicity; Impact toughness

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91) Arunagirinathan, S., Subramanian, C.

Design of fuzzy controller for MPPT of solar photovoltaic system
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Government College of Technology, Department of Electrical and Electronics Engineering, Coimbatore, India

Abstract
In this work, Fuzzy logic controller (FLC) is proposed for solar photovoltaic (SPV) system. The models consist of PV array, step up converter, load and fuzzy logic controller to manage the duty cycle of step up converter. Maximum Power point tracker (MPPT) technique is applied to get utmost output power in SPV system. The entire model is considered and validated in MATLAB. The conventional tracking method like Perturb and Observe (P&O) is compared with intelligence method such as Artificial Neural Network (ANN), FLC. The obtained result shows that the proposed FLC is performed well to obtain the optimum power in considered system compared to P&O and ANN. The usefulness of the numerous MPPT and the suggested scheme is validated by simulation study. © 2023 IEEE.

Author Keywords
ANN; Fuzzy logic controller (FLC); MPPT; P&O; Solar photovoltaic system (SPV)

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92) Nigel, K.G.J.[a] , Jenisha, J.[a] , Rajeswari, R.[b] , Pamela, D.[c] , Manimegalai, P.[c]

Crowd management in public transport to ensure social distancing for prevention of spread of COVID-19
(2023) *International Journal of Engineering Systems Modelling and Simulation*, 14 (2), pp. 80-85.

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[a] Department of Robotics Engineering, Karunya Institute of Technology and Sciences, Coimbatore, India
[b] EEE Department, Government College of Technology, Coimbatore, India
[c] Department of Biomedical Engineering, Karunya Institute of Technology and Sciences, Coimbatore, India

Abstract
There was global shock from COVID-19 epidemic. Social isolation is becoming more crucial as this delicate condition spreads swiftly. Public transit must be enhanced to stop the spread. This paper proposes an IoT method using LoRa technology that might reduce overcrowding and disease transmission in public buses. In the proposed, buses shall have LoRa transmitters and receivers. It is shown on the bus stop's LCD screen and announced over a speaker if the bus is within range of the receiver. An automatic door mechanism limits the number of people inside the vehicle. In the mobile app, the bus occupancy data is sent to Google Firebase. The app also indicates nearby buses, their occupancy, and their estimated arrival time. In certain cases, authorities may utilise this data to analyse and act. This simple technique would improve bus safety and contain COVID-19. Copyright © 2023 Inderscience Enterprises Ltd.

Author Keywords
bus management; COVID-19; crowd management; ESP32; IoT

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93) Kandasamy, J.[a] , Ramachandran, R.[a] , Veerasamy, V.[b] , Irudayaraj, A.X.R.[c]

Fuzzy-Recurrent Network based Distributed Frequency Control of Multi Microgrid system

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[a] Government College of Technology, Department of Electrical Engineering, Coimbatore, India
[b] Nanyang Technological University, Department of Electrical and Electronic Engineering, Singapore, Singapore
[c] Universiti Putra Malaysia, Department of Electrical and Electronic Engineering, Selangor, Serdang, Malaysia

Abstract
This paper proposes a distributed control strategy (DCS) for coordinating frequency control of multi microgrid (MMG) system. A leader-follower based consensus control law is derived for controlling each individual MG in the cluster. An adaptive fuzzy tuned recurrent neural network (FRNN) technique is proposed to design the optimal fractional order proportional-integral-derivative (FOPID) controller for distributed generation in the MG. A Lyapunov based objective function is developed to derive the dynamics, for weight updation of the RNN through gradient descent approach. The initial bias values of RNN are obtained via the Fuzzy approach for optimal operation of the FOPID controller. The proposed controller is tested for distributed frequency control of the MG system which coordinately controls the frequency of the MMG system. The performance of the controller is validated through various test cases and implemented in Hardware-in-the-loop using OPAL-RT simulation. The results show that the proposed control outperforms than other state-of-the-art. © 2023 IEEE.

Author Keywords
Distributed Control Strategy; Fractional-order control; Multi Microgrid System; Recurrent Neural Network

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94) Angappan, G.[a] , Sivaraj, S.[b] , Bhuvaneshwaran, P.[c] , Thanigachalam, M.[d] , Sekar, S.[c] , Rathanasamy, R.[a]

Integration of IoT in Energy Management
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[a] Department of Mechanical Engineering, Kongu Engineering College, Perundurai, Tamil Nadu, Erode, India
[b] Department of Robotics and Automation, Easwari Engineering College, Ramapuram, Tamil Nadu, Chennai, India
[c] Department of Food Technology, Kongu Engineering College, Perundurai, Tamil Nadu, Erode, India
[d] Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
Digital technologies in recent years have conquered the energy-based industries for achieving better business opportunities through adoption of certain business strategies. The main advantage of Internet of things (IoT) in energy sector was to interconnect the automate and monitor regularly through software interface. So that, the defect or error, which occurred during production process, can be easily located and resolved. Through online condition monitoring, the performance of the machine can be assessed with the application of certain algorithms. In energy industries, IoT made huge revolution in energy management, automation and distribution. IoT facilitates huge profit to investors for improving the workflow with reference to the data based on demand and usage of product. The devices with IoT would communicate each other and perform many tasks without any human intervention. Thus reduces human effort and minimizes the overall cost. Some of the major drawbacks of IoT in energy sectors are security issues and development of tasks for performing more cycle of works were tedious one. The importance of energy usage and their management in various energy sectors are discussed in this chapter © 2023 Scrivener Publishing LLC.

Author Keywords
Energy management; Industry 4.0; Internet of things; Mechanical vibration; Smart grid; Transportation of energy

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95) Hari Krishnan, G., Rajasenbagam, T.

Classification of Cotton Weeds in the Cotton Farms Using Deep Transfer Learning Techniques
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Government College of Technology, Coimbatore, 641013, India

Abstract
In current world, the automated weed control systems must important to identifying and locating the weeds from the main plant. The recognition and removal of weeds in the preliminary time is essential for increasing the productivity of the main plant. In recent years, deep learning algorithms give the better performance for the various complex tasks like image processing, audio and video processing, etc. This research paper presents the idea of classifying the various weeds from the main plant using various pre-trained models. The cotton plant was chosen as the main plant with some of its most common weeds was chosen for this work. But one of the major problems in real-world scenario is the soil, dust, etc., present in between of main plant and the weed. So, this paper proposed a methodology to segment the weeds and main plant images from others at very first stage of process. Then, the segmented images fed into the pre-trained CNN models like VGG16, ResNet50, InceptionV3, MobileNet, and InceptionResNetV2 for the classification task. © 2023, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author Keywords
Deep learning; Image segmentation; Machine learning; Weed classification

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96) Balaji Ayyanar, C.[a] , Marimuthu, K.[a] , Mugilan, T.[b] , Gayathri, B.[c] , Sanjay, M.R.[d] , Khan, A.[e] , Siengchin, S.[d]

Novel Polyalthia Longifolia seed fillers loaded and E-glass fiber-reinforced sandwich epoxy composites
(2023) *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering*, . Cited 3 times.

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[a] Department of Mechanical Engineering, Coimbatore Institute of Technology, Tamil Nadu, Coimbatore, India
[b] Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[c] Department of Chemistry, Coimbatore Institute of Technology, Tamil Nadu, Coimbatore, India
[d] Natural Composite Research Group Lab, Department of Materials and Production Engineering, The Sirindhorn International Thai-German Graduate School of Engineering (TGGS), King Mongkut's University of Technology North Bangkok (KMUTNB), Bangkok, Thailand
[e] Chemistry Department, Faculty of Science, King Abdulaziz University, Jeddah, Saudi Arabia

Abstract
The research aims to develop new polymer composites using Polyalthia longifolia seeds (PLS) particulates-loaded epoxy composites through open layup molding technique with different wt.% of PLS fillers (PLSF) (10, 20, 30,40, and 50 wt. %). As per ASTM standards, the composite specimens were fabricated and carried out the tensile strength, compressive strength, flexural strength, and Shore D hardness. Among the different weight percentages of composites, the 30 wt. % of PLSF-loaded epoxy composites exhibited the maximum tensile strength of 18.5 ± 0.5 MPa, compressive strength of 22.5 MPa, the flexural strength of 22 MPa, and Shore D hardness of 92 ± 0.5 SHN. The strength of the 30 wt. of PLSF-loaded epoxy composites was further enhanced by incorporating single layer of 400 GSM E-glass fiber on both sides of the composites and attained the maximum strength of 26.5 ± 0.5 MPa. The PLSF-loaded epoxy composite specimen was carried out the Fourier transform infrared spectroscopy (FTIR) and found the presence of different functional groups. The surface morphology and elemental compositions of 30 wt. % PLSF-loaded epoxy composite was found through filed emission electron microscope (FESEM) and energy dispersive X-ray spectroscopy (EDX). The average length of fillers was found as 2.25 ± μm through FESEM. The newly developed PLSF-loaded and E-glass fiber-reinforced epoxy sandwich composites would be used where the strength is less significant. © IMechE 2023.

Author Keywords
DSC; epoxy; FESEM; Polyalthia longifolia seeds; TGA

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97) Nagarajan, A.[a] , Victoire, A.A.[b]

Optimization Reinforced PID-Sliding Mode Controller for Rotary Inverted Pendulum
(2023) *IEEE Access*, 11, pp. 24420-24430. Cited 8 times.

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[a] Government College of Technology at Coimbatore, Tamilnadu, Coimbatore, 641013, India
[b] Anna University Regional Campus at Coimbatore, Tamilnadu, Coimbatore, 641046, India

Abstract
The control of a rotary inverted pendulum (RIP) is challenging because it is an underactuated, highly sensitive, and unsteady system. Sliding mode control (SMC) is a nonlinear control method with high-frequency switching control. Designing a proportional integral derivative (PID) controller for a RIP is challenging due to its nonlinearity and instability in open-loop characteristics. The primacy of the SMC over the PID is the stability of the closed-loop. Hybrid control of a PID-SMC controller can provide better performance because this technique demonstrates less chatter, higher precision, no oscillation, and adequate gain tuning. To achieve gain tuning, the PID and SMC parameters must be optimized. Thus, this paper proposed a congruently tuned control strategy (CTCS) to fine-tune the controller parameters. The proposed strategy uses an improved whale optimization algorithm (WOA), i.e., the modified Manhattan distance updated WOA (MMD-WOA) to identify effective coefficient values for the sliding surface to reduce tracking errors while reaching the desired position. The proposed CTCS for a RIP with the MMD-WOA was implemented, and the results are very promising. © 2013 IEEE.

Author Keywords
congruently tuned control strategy; optimization; Rotary inverted pendulum; sliding mode control; stability criteria

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98) Henitha Banumathi, A., Jeyapriya, S.P.

A Numerical Study on Hydrodynamic and Liquefaction Analysis of Coastline Protected with Geotubes
(2023) *Lecture Notes in Civil Engineering*, 300, pp. 193-206. Cited 1 time.

DOI: 10.1007/978-981-19-6998-0_18

Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
Protection of shorelines from dynamic wave attacks is a significant problem in Coastal Engineering. Under the action of wave loading, a change in pore water pressure would be generated along the shoreline which is the major factor for the seabed liquefaction and shear failure. Geotubes are the new systems that have been widely utilized as breakwaters to reduce wave impacts and to promote sediment nourishment by reducing sea erosion at the sheltered area. The major failures of the geotubes are due to the instability of the ocean floor and the sliding of geotubes because of high wave attacks. Simulation of these failures and finding the factors responsible for the failure is difficult through field observations and general laboratory tests. Hence, a study was undertaken on these aspects on a coastline named Mandaikadu which is located in Kanyakumari District, Tamil Nadu. This coastline is generally habituated with fisherman settlements, the fishing harbour, tourism, and beach sand mining. Sea erosion is a significant problem in such areas of coastline. In this study, numerical models were constructed and examined for the stability of Mandaikadu's coastline under dynamic conditions using PLAXIS 3D software. Two basic cases were considered for the analysis, i.e., coastline without geotubes and the one

protected with geotubes of varying diameters and studied for wave-induced liquefaction by varying the depth of groundwater level. From the analysis, instability of the geotubes and the ocean floor was observed due to change in parameters such as void ratio, effective stress, and soil displacements with respect to the depth. The results of the analysis indicate that the stability of geotubes decreases with increase in the diameter of geotubes. The bottom edge geotubes on each side of the geotube embankment are the most critical geotubes which shows the maximum displacement. By lowering the groundwater level, there is an increase in global safety factor, and hence, the stability of both geotubes and ocean floor can be increased.

Author Keywords
Coastline; Geotubes; Liquefaction; Numerical modelling; PLAXIS 3D

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99) Mugilan, T.[a] , Sridhar, N.[a] , Santhosh, S.[b] , Teddy Jefri, G.[c] , Yokesh, K.S.[c]

Optimization of DEFORM-3D simulated drilling of UNSS31603-steel by integrated MOORA coupled PCA technique
(2023) *Materials Today: Proceedings*, .

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[a] Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[b] Department of Robotics and Automation, SRM Easwari Engineering College, Tamil Nadu, Chennai, 600 089, India
[c] Department of Engineering Design, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract
Due to its creep and stress-rapture strengths, superior formability, and high temperature tensile, UNS S31603 alloys are regarded as a good machinability material. As a result of the increased heat and thrust force generated by the cutting process, increased tool wear and damage are an inevitable byproduct of increased cutting speed and feed rate at the cutting edge. Drilling parameters are the only variable that can be changed to affect the temperature, and hence the wear and tear on the drill bit. In this inquiry, a 3D FEM has been proposed to study the drilling process simulation of UNS S31603 to reduce the drilling temperature, thrust force and drilling time. With DEFORM, a computer simulation model has been run to examine temperature changes as a function of cutting speed and feed rate. This study found that raising either the feed rate or the cutting speed resulted in a corresponding rise in temperature. With the aid of the unique optimization approach, integrated MOORA coupled PCA, the input process variables have been optimized. From the optimization, the optimized input parameters were identified as 260 rpm speed, 1.2 mm/min feed rate and the drill point angle of 90 degrees in order to achieve the minimum cutting force of 312 N and minimum temperature of 540 °C. At long last, optimal findings have been obtained that can assist cut down on the excessive development of heat, thrust force, and drilling time. © 2023

Author Keywords
DEFORM 3D; Drill point angle; MOORA-PCA; Optimization; Temperature; Thrust force

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100) Rajupillai, K.[a] , Alessa, N.[b] , Eswaramoorthi, S.[c] , Loganathan, K.[d]

Thermal Behavior of the Time-Dependent Radiative Flow of Water-Based CNTs/Au Nanoparticles Past a Riga Plate with Entropy Optimization and Multiple Slip Conditions
(2023) *Entropy*, 25 (1), art. no. 76, . Cited 2 times.

DOI: 10.3390/e25010076

[a] Department of Mathematics, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[b] Department of Mathematical Sciences, College of Sciences, Princess Nourah bint Abdulrahman University, P.O. Box 84428, Riyadh, 11671, Saudi Arabia

[c] Department of Mathematics, Dr. N.G.P. Arts and Science College, Tamil Nadu, Coimbatore, 641048, India
[d] Department of Mathematics and Statistics, Manipal University Jaipur, Rajasthan, Jaipur, 303007, India

Abstract
This communication deliberates the time-reliant and Darcy–Forchheimer flow of water-based CNTs/gold nanoparticles past a Riga plate. In addition, nonlinear radiation, heat consumption and multiple slip conditions are considered. Entropy generation is computed through various flow parameters. A suitable transformation with symmetry variables is invoked to remodel the governing mathematical flow models into the ODE equations. The homotopy analysis scheme and MATLAB bvp4c method are imposed to solve the reduced ODE equations analytically and numerically. The impact of sundry flow variables on nanofluid velocity, nanofluid temperature, skin friction coefficient, local Nusselt number, entropy profile and Bejan number are computed and analyzed through graphs and tables. It is found that the nanofluid velocity is reduced by greater porosity and slip factors. The thickness of the thermal boundary layer increases with increasing radiation, temperature ratio, and heat consumption/generation parameters. The surface drag force is reduced when there is a higher Forchheimer number, unsteadiness parameter and porosity parameter. The amount of entropy created is proportional to the radiation parameter, porosity parameter and Reynolds number. The Bejan number profile increases with radiation parameter, heat consumption/generation parameter and the Forchheimer number. © 2022 by the authors.

Author Keywords
HAM; heat consumption/generation; MWCNTs; radiation; SWCNTs

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101) P, P.[a] , T, S.[b] , M, V.[b]

Experimental investigation on CNC turning of SS304 using nano particle based minimum quantity lubrication
(2023) *Materials Today: Proceedings*, . Cited 1 time.

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[a] Depatment of Mechanical Engineering, Tagore Institute of Engineering and Technology, Deviyakurichi, Tamil Nadu, Attur, 636 112, India
[b] Depatment of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract
Stainless steel 304 has excellent mechanical qualities, good fatigue resistance, and resistance to oxidation. Additionally, the turning of SS304 under MQL needs to be addressed. This work aims to evaluate the machinability study using carbide cutting inserts and nanoparticle-assisted MQL on CNC turning. As a methodology, Response Surface Methodology, Box Behnken Design, and response surface optimization were used. Based on the fitted regression model, a 3D plot was used to analyse the collected machining data. Researchers have been attracted to nano fluids over the last decade due to their improved thermal conductivity and heat extraction capability. The current study creates a new nanofluid by adding HBN nano particles in cutting fluid. Likewise, its machining performance is assessed while turning an SS304 workpiece utilising the minimum quantity lubrication (MQL) technique based on nanoparticles. Additionally, the outcomes are examined with MQL with conventional cutting fluid and dry machining. The experimental study clearly shows that HBN nano fluid performs better than conventional cutting fluid with MQL and Dry machining in terms of surface roughness, tool wear, Flank Wear. © 2023

Author Keywords
CNC turning; Cutting temperature; Flank wear; HBN Nano fluid; MQL; Surface roughness

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102) Priya, N.S.[a] , Chudar Azhagan, S.A.[b]

Influence of succinic acid species on structural, spectroscopic,optical, Z-scan, frequency doubling, photoconductivity and antibacterial properties of glycine single crystals

(2023) *Digest Journal of Nanomaterials and Biostructures*, 18 (1), pp. 55-68.

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[a] Department of Physics, Nehru Institute of Engineering and Technology, Coimbatore, India
[b] Department of Physics, Government College of Technology, Coimbatore, India

Abstract
With succinic acid as an additive, glycine single crystals were grown by conventional solvent slow evaporation route. Effect of succinic acid on the growth, optical and dielectric properties of glycine polymorphs has been investigated. The occurrence of functional groups has been identified by vibrational FTIR spectrophotometer. The low value of dielectric constant and dielectric loss at higher frequency range attested the grown crystal for frequency doubling applications. The laser damage threshold energy of the grown crystal was calculated. Third order nonlinear susceptibilityχ(3) (esu) of succinic acid added glycine crystals were evaluated from Z-scan experiment.

Author Keywords
Dielectric material; Photonic applications; Succinic acid; γ-glycine

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103) Sathees Kumar, V.[a] , Raja Murugadoss, J.[b] , Gokulan, R.[c] , Ramkumar, S.[d]

Studies on influence of process parameters in upgradation of bio-oil derived from HTL of domestic household waste: Application of response surface methodology
(2023) *Global Nest Journal*, 25 (1), pp. 40-46. Cited 1 time.

DOI: 10.30955/gnj.004445

[a] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[b] Department of Civil Engineering, Nadimpalli Satyanarayana Raju Institute of Technology, Andhra Pradesh, Visakhapatnam, 531173, India
[c] Department of Civil Engineering, GMR Institute of Technology, Andhra Pradesh, Rajam, 532 127, India
[d] Department of Civil Engineering, Kongunadu College of Engineering and Technology, Tamil Nadu, Trichy, 621 215, India

Abstract
This research focuses on hydrothermal gasification (HTG) and hydrothermal liquefaction (HTL) studies to produce bio-hydrogen from domestic mixed waste. HTG and HTL studies were studied at temperatures of 300–450°C and 300–400°C, correspondingly, with a catalyst level of 6 wt %. The sol-gel technique was used to make the Bentonite/Nb-TiO2 catalyst. For a solvent-waste proportion of 14 millilitre/gram, an C2H5OH-water proportions of 2:2, and a period of one-hour, maximum H2 output from HTL was 30 wt % (catalyst loads: 4 wt %) and HTG was 40 wt % (catalyst loads: 5 wt %). As C2H5OH acts as half-solvent and ideal solvent to bio-mass capacity it shot up H2 result in the HTG procedure by methanation, gas water shift and improving responses in the organization. The second output of the HTL procedure was bio-oil, which yielded 35 wt % with O/C as well as H/C standards of 1.2 and 1.0, respectively, and an HHV of 42 Mega Joule/kilogram. In the HTL system, mechanistic procedures such depolymerization, hydration, reduction, and hydrolysis generated in a larger proportion of gaseous product. Thermal and the solvent-to-waste proportion is the ideal factors in the H2 synthesis procedure, according to experimental analysis. Energy nexuses from domestic mixed trash are taken over in this research.

Author Keywords
bio-oil; Domestic waste; HTG; HTL; RSM

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2-s2.0-85146446731

104) Senthamizh Sankar, S.[a] , Anandh, K.S.[a] , Rama, M.[b]

Examining the Influence of Various Factors that Affect Construction Professionals Lifestyle – A Case of Tamil Nadu and Kerala
(2023) *Lecture Notes in Civil Engineering*, 284, pp. 625-634. Cited 1 time.

DOI: 10.1007/978-3-031-12011-4_50

[a] Department of Civil Engineering, College of Engineering and Technology, SRM Institute of Science and Technology, SRM Nagar, Tamil Nadu, Kattankulathur, 603203, India
[b] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India

Abstract
The construction sector has a low quality of lifestyle when compared to other occupations due to a variety of problems associated with their work. The work-life balance is also harmed as a result of the unhealthy lifestyle prevalent among construction professionals. The factors that contribute to the scarcity of construction personnel ready to work in their sector are investigated in this study. This study reveals several common factors affecting construction professionals' lifestyles to improve their quality of life. The first step was to conduct a literature study to identify and summarize significant lifestyle influencing factors. Then, hypotheses were given on the impact of five different factors (financial, organizational, quality-health and environmental, work-related, and social) on construction professionals' lifestyles. The information gathered from 180 construction professionals in Tamil Nadu and Kerala via questionnaires was statistically examined. The findings revealed that these five factors have a major impact on the lifestyle of construction professionals. The financial factor is the primary factor that influences the lifestyle of construction professionals by affecting their socio-economic position. This pioneering study presents a detailed overview of the current construction professional lifestyle and the essential factors that influence it. The association between each factor and the more relevant factors was discovered using statistical analysis, which will serve as a guide for researchers, policymakers, and construction professionals to conduct additional research and improve the current lifestyle. A healthier lifestyle will increase an employee's productivity and, as a result, the company's worth. © 2023, The Author(s), under exclusive license to Springer Nature Switzerland AG.

Author Keywords
Construction; Construction professionals; India; Lifestyle; People in construction; Work-life balance

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105) Sivaranjani, S.[a] , Rajeswari, R.[b]

Retraction Note: Internet of Things Based Industrial Automation Using Brushless DC Motor Application with Resilient Directed Neural Network Control FED Virtual Z-Source Multilevel Inverter Topology(Wireless Pers Commun, (2018), 102, (3239–3254), 10.1007/s11277-018-5365-6)
(2023) *Wireless Personal Communications*, 128 (2), p. 1507.

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[a] Department of EEE, VSB Engineering College, Tamilnadu, Karur, 639 002, India
[b] Department of EEE, Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract
The Editor-in-Chief and the publisher have retracted this article. This article was submitted to be part of a guest-edited issue. An investigation concluded that the editorial process of this guest-edited issue was compromised by a third party and that the peer review process has been manipulated. Based on the investigation's findings the Editor-in-Chief therefore no longer has confidence in the results and conclusions of this article. The authors have not responded to correspondence regarding this retraction. © 2022 Springer Science+Business Media, LLC, part of Springer Nature.

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106) Narasimman, S.[a] , Balakrishnan, L.[b] , Alex, Z.C.[c]

Highly Selective and Rapid Detection of Ethanol Using Ni-Functionalized ZnO Nanoflakes Coated Fiber Optic Sensor
(2023) *IEEE Sensors Journal*, 23 (1), pp. 344-352. Cited 5 times.

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[a] Sri Venkateswara College of Engineering and Technology, Department of Electronics and Communication Engineering, Chittoor, 517127, India
[b] Government College of Technology, Department of Physics, Coimbatore, 641013, India
[c] School of Electronics Engineering, Vellore Institute of Technology, Vellore, 632014, India

Abstract
Recently, the fabrication of ethanol sensor is of great technological interest toward detection of ethanol in myriad application areas such as fuel and chemical processing, food packaging analysis, breath alcohol analyzers, and clinical applications. Parallelly, the emerging trend of nanotechnology facilitates highly sensitive, miniature, and cut-price sensors with better power consumption. In accordance with this context, the current research work deals with the effect of metal (Ni) functionalization on ZnO nanoflakes for volatile compound (VC) sensing applications. A Co-precipitation method was utilized to synthesize pristine and Ni-functionalized ZnO nanoflakes. Furthermore, various material properties were critically investigated using X-ray diffraction (XRD), scanning electron microscope (SEM), and energy-dispersive spectrometer. The XRD results have shown that synthesized nanoparticles were in a hexagonal wurzite structure. The SEM image revealed that the average size of the nanoflakes is around 200 nm. A cladding modification technology was employed to fabricate the fiber optic sensor (FOS) head and Ni-functionalized ZnO nanoflakes as the sensing layer was formulated by a dip coating process. Furthermore, the sensor response of Ni-functionalized ZnO nanoflakes was investigated for various VCs such as acetone, ammonia, ethanol, methanol, hexane, and chloroform. Noticeably, the FOS based on Ni-functionalized ZnO showed better selectivity toward ethanol along with enhanced sensitivity (30.04) than pristine ZnO. Thus, the functionalization of Ni enhances the gas sensing competency of ZnO through the catalytic property, indicating the potency of the proposed sensor as a substantial tool for ethanol detection. © 2001-2012 IEEE.

Author Keywords
Co-precipitation; ethanol sensor; fiber optic sensor (FOS); nanoflakes; ZnO:Ni

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107) Rama, M., Shanthi, V.M.

Study on Strength, Permeability and Micro-structure of Pervious Concrete Blended with Metakaolin
(2023) *Jordan Journal of Civil Engineering*, 17 (1), art. no. 6626, pp. 10-22. Cited 3 times.

Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
Pervious concrete is a developing construction material used for sustainable solutions which helps restore the groundwater level based on its draining ability. The existing research studies address the strength and permeability of pervious-concrete materials and only limited data is available on the microstructural characteristics of pervious concrete. In this study, a characteristic analysis was carried out at micro-and macro-levels to identify the behaviour of pervious concrete using three aggregate gradations. To attain the wide pore network in pervious concrete, fine aggregates were not added in mixes and metakaolin was added at 5% intervals up to 20% of cement. At the macro-level, strength, porosity and permeability were tested and at the micro-level, XRD, FTIR, SEM and EDAX analyses were used for pervious-concrete mixes with metakaolin. The maximum strength of pervious-concrete was achieved in a 4.75-9.5 mm size aggregate mix at 10% addition of metakaolin with cement. Micro-structural studies revealed that the addition of metakaolin significantly reduces anhydrous calcium hydroxide. A significant draining performance of more than 1 cm/s was attained in most of the pervious-concrete mixes due to high porosity and permeability. Hence, pervious concrete is considered as a sustainable alternative material that can address environmental problems.

Author Keywords
Metakaolin; Micro-structure; Permeability; Pervious concrete; Porosity

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108) Sridhar, N., Aezhisai Vallavi, M.S., Mugilan, T.

An integrated approach of FEM analysis using DEFORM 3D and experimental investigation of forces developed in Al-Si7Mg
(2023) *Materials Today: Proceedings*, 80, pp. 888-895. Cited 1 time.

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Department of Mechanical Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India

Abstract
The machining process is a vital role in manufacturing industries. This work takes an alternative method to predict machining parameters and related to the machining process can be fulfilled to introducing process simulation by finite element analysis (FEM). This research article reveals FEM based simulation model of cutting force in turning on Al-Si7Mg. The turning tool insert has been selected as coated carbide. The simulation was carried out with help of Johnson Hook material model for effective computational method to predict the cutting forces during turning. The result indicates an increase in cutting force with rise in the rate of feed. The predicted force generated during cutting were compared with the experiment results, an acceptable error percentage of 9 % has been achieved. The FE simulations give direction to manufacturers to pick out the effective cutting conditions for the precision machining process while not conducting too several expensive experimental runs. In order to effectively fulfil the process analysis, surface roughness (Ra) and material removal rate (MRR) have been investigated and examined. The main interaction effect of machining parameters was examined to show that material removal rate is increase with a decrease in cutting speed, while surface roughness is decreased with increases in cutting speed. © 2022

Author Keywords
Cutting force; DEFORM 3D; Material removal rate; Surface roughness; Taguchi design

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109) Udhaya, A.R., Rajeswari, B., Mugilan, T.

Static structural investigation of helical compression spring utilizing different materials for an automobile suspension system
(2023) *Materials Today: Proceedings*, 80, pp. 653-658. Cited 2 times.

DOI: 10.1016/j.matpr.2022.11.064

Department of Mechanical Engineering, Government College of Technology, Coimbatore, India

Abstract
This present work aims to perform the finite element analysis of a helical compression spring used in electric three-wheelers, considering various spring materials. A helical compression spring stores energy in the shock absorber of an automotive suspension unit. The spring material must be elastic and have enough energy to tolerate external mass changes. The elastic characteristics of a spring material and its stability are investigated using static structural analysis in ANSYS. The selected spring materials for this current investigation are Spring Steel (SPS), Stainless Steel (SS), Mild Steel (MS), and Chromium Vanadium steel (CVS). The total deformation and equivalent von-mises stress of selected spring materials are predicted. A comparison has been made between the chosen steels, and the maximum deformation was found as 11.59 mm in both spring steel and chromium-vanadium steel. Hence, the best suitable spring material was selected based on equivalent Von-mises stress. The minimum von-mises stress has been observed at spring steel, and the value is 911.0 MPa. Thus, the spring steel was selected as a suitable material for helical compression springs in road conditions. © 2022

Author Keywords
Chromium Vanadium Steel; Mild Steel; Spring; Spring Steel; Stainless Steel; Structural

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2-s2.0-85142500469

110) Rajeswari, B.[a] , Manikandan, C.[b] , Amirthagadewaran, K.S.[a c]

Analyzing Wear Resistance Characteristics of Al 5052/Al2O3/Gr Stir Cast Hybrid Composite
(2023) *Lecture Notes in Mechanical Engineering*, pp. 293-302.

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[a] Government College of Technology, Tamilnadu, Coimbatore, 641013, India
[b] C.M.S. College of Engineering and Technology, Tamilnadu, Coimbatore, 641032, India
[c] United Institute of Technology, Coimbatore, India

Abstract
The composite materials are mainly used in engineering sectors due to its reliable mechanical properties. Al5052 alloy generally having high corrosion resistance property, but its wear rate is high, so it will be used in limited applications. The aim of this study is improving mechanical properties of Al5052 reinforced with Al2O3 and graphite. Composite materials with different proportions of Al2O3 and graphite have been fabricated using stir casting process. The production of aluminum matrix composites in liquid processing technique leads in economical process. Samples were prepared using Al5052 with aluminum oxide Al2O3 (2%, 3%, and 4%) and graphite (2%) as reinforcements. The distribution of reinforcement and matrix elements is examined through microstructure analysis such that the mechanical properties were found for improving its strength. The evaluation of mechanical properties revealed that wear resistance increased with increasing reinforcements. © 2023, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author Keywords
Microstructure; Reinforcements; Stir casting; Wear resistance

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111) Arun Kumar, K.[a] , Rajeswari, B.[b]

Design and Development of Seed Drill Attachment to Tractor-Drawn Cultivator
(2023) *Lecture Notes in Mechanical Engineering*, pp. 111-122.

DOI: 10.1007/978-981-19-4606-6_12

[a] Department of Mechanical Engineering, Sri Shakthi Institute of Engineering and Technology, Coimbatore, 641062, India
[b] Department of Mechanical Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract
To overcome the difficulties faced by manual sowing, seed drill attachment for sowing groundnut with a specific mechanism that would not damage seeds while drilling is designed. Since the annual usage of the seed drill is very less it is designed as an attachment to the tractor-drawn cultivator. Hence, the cost of equipment is reduced and it can be stored effectively during an idle period. The mechanism used for indexing and drilling seeds is cup feed type. It is designed to attach it with nine tynes cultivator so it has nine discs with 16 cups on each disc. The row-to-row distance of drilling is 9 inches. The box of seed drill attachments is designed based on the angle of repose of seeds. Based on the design seed drill attachment is manufactured and evaluated by conducting trails on it and readings are tabulated. Analyzing readings it is suggested that, to obtain an optimum seed rate of 86 kg/ha using seed drill, the tractor has to be run at the speed range of 4–6 km/h. © 2023, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author Keywords
Cultivator; Kharif crops; Seed drill; Sowing

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112) Mohanapriya, V.[a] , Sakthivel, R.[b] , Pham, N.D.K.[c] , Cheng, C.K.[d e] , Le, H.S.[f] , Dong, T.M.H.[g]

Nanotechnology- A ray of hope for heavy metals removal
(2023) *Chemosphere*, 311, art. no. 136989, . Cited 24 times.

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[a] Research scholar, Department of Civil Engineering, Government College of Technology, Coimbatore, 641013, India
[b] Department of Mechanical Engineering, Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Coimbatore, India
[c] PATET Research Group, Ho Chi Minh City University of Transport, Ho Chi Minh City, Viet Nam
[d] Department of Chemical Engineering, College of Engineering, Khalifa University, P.O. Box 127788, Abu Dhabi, United Arab Emirates
[e] Center for Catalysis and Separation (CeCaS), Khalifa University, P.O. Box 127788, Abu Dhabi, United Arab Emirates
[f] Faculty of Automotive Engineering, School of Engineering and Technology, Van Lang University, Ho Chi Minh City, Viet Nam
[g] Institute of Engineering, HUTECH University, Ho Chi Minh City, Viet Nam

Abstract
Environmental effects of heavy metal pollution are considered as a widespread problem throughout the world, as it jeopardizes human health and also reduces the sustainability of a cleaner environment. Removal of such noxious pollutants from wastewater is pivotal because it provides a propitious solution for a cleaner environment and water scarcity. Adsorption treatment plays a significant role in water remediation due to its potent treatment and low cost of adsorbents. In the last two decades, researchers have been highly focused on the modification of adsorption treatment by functionalized and surface-modified nanomaterials which has spurred intense research. The characteristics of nano adsorbents attract global scientists as it is also economically viable. This review shines its light on the functionalized nanomaterials application for heavy metals removal from wastewater and also highlights the importance of regeneration of nanomaterials in the view of visualizing the economic aspects along with a cleaner environment. The review also focused on the proper disposal of nanomaterials with crucial issues that persist in the adsorption process and also emphasize future research modification at a large-scale application in industries. © 2022 Elsevier Ltd

Author Keywords
Adsorption; Heavy metals; Nanomaterials; Pollutants; Regeneration

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113) Anantha Prabha, P.[a] , Suchitra, G.[b] , Saravanan, R.[c]

Cephalopods Classification Using Fine Tuned Lightweight Transfer Learning Models
(2023) *Intelligent Automation and Soft Computing*, 35 (3), pp. 3065-3079. Cited 2 times.

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[a] Department of Computer Science & Engineering, Sri Krishna College of Technology, Tamil Nadu, Coimbatore, 641042, India
[b] Department of Electronics and Communication Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641013, India
[c] Department of Marine Pharmacology, Faculty of Allied Health Sciences, Chettinad Academy of Research and Education,

Chengalpattu, Tamil Nadu, Kelambakkam, 603103, India

Abstract
Cephalopods identification is a formidable task that involves hand inspection and close observation by a malacologist. Manual observation and identification take time and are always contingent on the involvement of experts. A system is proposed to alleviate this challenge that uses transfer learning techniques to classify the cephalopods automatically. In the proposed method, only the Lightweight pre-trained networks are chosen to enable IoT in the task of cephalopod recognition. First, the efficiency of the chosen models is determined by evaluating their performance and comparing the findings. Second, the models are fine-tuned by adding dense layers and tweaking hyperparameters to improve the classification of accuracy. The models also employ a well-tuned Rectified Adam optimizer to increase the accuracy rates. Third, Adam with Gradient Centralisation (RAdamGC) is proposed and used in fine-tuned models to reduce the training time. The framework enables an Internet of Things (IoT) or embedded device to perform the classification tasks by embedding a suitable lightweight pre-trained network. The fine-tuned models, MobileNetV2, InceptionV3, and NASNet Mobile have achieved a classification accuracy of 89.74%, 87.12%, and 89.74%, respectively. The findings have indicated that the fine-tuned models can classify different kinds of cephalopods. The results have also demonstrated that there is a significant reduction in the training time with RAdamGC. © 2023, Tech Science Press. All rights reserved.

Author Keywords
Cephalopods; classification; deep learning; fish; IoT; lightweight models; transfer learning

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114) Usha, S., Abishake, M.S., Anbezhil, G., Dhanasekar, S.

Increasing the wind power generation by modifying the windmill mechanism
(2023) *Materials Today: Proceedings*, 72, pp. 3075-3080. Cited 3 times.

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Government College of Technology, Coimbatore, 641 013, India

Abstract
The population-consuming resources are expanding by the day; the resources are mostly used in a limited fashion. As a result, a technique for connecting natural resources with growing populations is necessary. Wind turbine technology produces the highest power of any currently available renewable energy source, but it only converts energy into electricity in one direction of wind flow. Power creation is constrained since the current technique is intended to produce energy by receiving input from just one direction. This initiative aims to address this problem. This project's mechanism uses wind energy in both clockwise and counter-clockwise directions as input. Under perfect conditions, this system creates a lot more electricity than the existing traditional windmill system. This output is attained by changing the windmill's gearbox transmission system from a planetary gear system to a simple gear train system along with intermediate gear. As a consequence, if the wind blades allowed the two directional effects, then using this system the wind turbine blade's rotational position is reversed. Therefore, it can obtain an increase in power production by the recommended designed mechanism. These effects are analyzed by ANSYS Fluent software and the results are used to prove this increased output energy than the existing domestic windmills. In terms of electricity and energy conservation, this project shows a successful output. © 2022

Author Keywords
Gear train; Gear transmission system; Power generation; Renewable energy sources; Spur gear; Wind energy; Windmill

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115) Mahalekshmi, T.[a] , Maruthupandi, P.[b]

Multiobjective Economic/Environmental Dispatch Using Harris Hawks Optimization Algorithm
(2023) *Intelligent Automation and Soft Computing*, 36 (1), pp. 445-460. Cited 2 times.

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[a] Jansons Institute of Technology, Tamilnadu, Coimbatore, 641659, India
[b] Government College of Technology, Tamilnadu, Coimbatore, 641013, India

Abstract
The eminence of Economic Dispatch (ED) in power systems is significantly high as it involves in scheduling the available power from various power plants with less cost by compensating equality and inequality constrictions. The emission of toxic gases from power plants leads to environmental imbalance and so it is highly mandatory to rectify this issues for obtaining optimal performance in the power systems. In this present study, the Economic and Emission Dispatch (EED) problems are resolved as multi objective Economic Dispatch problems by using Harris Hawk's Optimization (HHO), which is capable enough to resolve the concerned issue in a wider range. In addition, the clustering approach is employed to maintain the size of the Pareto Optimal (PO) set during each iteration and fuzzy based approach is employed to extricate compromise solution from the Pareto front. To meet the equality constraint effectively, a new demand-based constraint handling mechanism is adopted. This paper also includes Wind energy conversion system (WECS) in EED problem. The conventional thermal generator cost is taken into account while considering the overall cost functions of wind energy like overestimated, underestimated and proportional costs. The quality of the non-dominated solution set is measured using quality metrics such as Set Spacing (SP) and Hyper-Volume (HV) and the solutions are compared with other conventional algorithms to prove its efficiency. The present study is validated with the outcomes of various literature papers. © The Authors.

Author Keywords
clustering technique; harris hawks; non-dominated solution; Optimization

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116) Gurumoorthy, K.[a] , Balaraman, S.[b]

Controlling the Speed of renewable-sourced DC drives with a series compensated DC to DC converter and sliding mode controller
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[a] Department of EEE, Amrita College of Engineering and Technology, Tamil Nadu, Nagerkoil, India
[b] Department of EEE, Government College of Technology, Tamil Nadu, Coimbatore, India

Abstract
A solar-powered drive for the separately excited DC (SEDC) motor drive system has been proposed and validated. The proposed system uses a set of two cascaded series compensated buck boost converters (SCBBCs) and a push pull DC to DC converter. The maximum power point tracking (MPPT) for the solar PV energy harvesting system is based on a sliding mode controller (SMC) and the SCBBC next to the solar PV source is used for this purpose. The armature winding of the SEDC motor receives the required isolated DC voltage from a push pull converter that is powered from a common DC link that carries a battery. The field winding of the SEDC motor is fed by the second SCBBC. The speed of the SEDC motor is regulated by a separate sliding mode controller implemented in the second SCBBC. A detailed state space analysis of the SCBBC and related mathematical modelling of the complete system are presented. The simulations were carried out in the MATLAB SIMULINK environment, and an experimental prototype was developed utilizing a 200 W 110 V SEDC motor. © 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

Author Keywords
average state space modelling; series compensated buck boost converter; sliding mode controller; Solar photo voltaic systems; speed regulation of DC motors

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117) Kumar, M.S.[a] , Purosothaman, T.[b]

Multivariate Broadcast Encryption with Group Key Algorithm for Secured IoT
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[a] Department of Computer Sceince and Engineering, Sri Ranganathar Institute of Engineering and Technology, Coimbatore, 641110, India
[b] Department of Electronics and Communication Engineering, Government College of Technology, Coimbatore, 641013, India

Abstract
The expanding and ubiquitous availability of the Internet of Things (IoT) have changed everyone's life easier and more convenient. Same time it also offers a number of issues, such as effectiveness, security, and excessive power consumption, which constitute a danger to intelligent IoT-based apps. Group managing is primarily used for transmitting and multi-pathing communications that are secured with a general group key and it can only be decrypted by an authorized group member. A centralized trustworthy system, which is in charge of key distribution and upgrades, is used to maintain group keys. To provide longitudinal access controls, Software Defined Network (SDN) based security controllers are employed for group administration services. Cloud service providers provide a variety of security features. There are just a few software security answers available. In the proposed system, a hybrid protocols were used in SDN and it embeds edge system to improve the security in the group communication. Tree-based algorithms compared with Group Key Establishment (GKE) and Multivariate public key cryptosystem with Broadcast Encryption in the proposed system. When all factors are considered, Broadcast Encryption (BE) appears to become the most logical solution to the issue. BE enables an initiator to send encrypted messages to a large set of recipients in a efficient and productive way, meanwhile assuring that the data can only be decrypted by defining characteristic. The proposed method improves the security, efficiency of the system and reduces the power consumption and minimizes the cost.

Author Keywords
decryption; encryption; group key; Internet of things; public key; security; software defined network

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118) Raghappriya, M.[a] , Kanthalakshmi, S.[b]

Sliding mode observer-based fault detection for helicopter system
(2023) *Journal of Control and Decision*, 10 (4), pp. 465-475. Cited 1 time.

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[a] Department of Electronics and Instrumentation Engineering, Government College of Technology, Coimbatore, India
[b] Department of Electrical and Electronics Engineering, PSG College of Technology, Coimbatore, India

Abstract
Fault detection of non-linear systems is of great importance in control systems reliability. Undetected faults could lead to irreparable damage. This paper deals with fault diagnosis of helicopter system in the presence of uncertainties and disturbances. To deal with sensor, actuator and component faults, the observer-based diagnosis scheme which employs sliding mode observer is designed. Faults are modelled as an additive and multiplicative fault which is introduced as an abrupt and intermittent fault into the system. Observer inequality constraints and gain matrices are solved using a Lyapunov-based approach. The results display the effectiveness of the designed observer and the ability to handle faults.

Author Keywords
actuator and component faults; Fault diagnosis; residual generation; sensor; sliding mode observer

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119) Kuppusamy, M.[a] , Balaraman, S.[b]

An elite hybrid strategy for solar photovoltaic system based optimized cascade controller under uniform and partial shading conditions
(2023) *Optimal Control Applications and Methods*, 44 (1), pp. 23-52. Cited 2 times.

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[a] Department of Electrical and Electronics Engineering, Government College of Engineering, Tamil Nadu, Bargur, India
[b] Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract
A hybrid technique for maximum power point tracking (MPPT) for a photovoltaic (PV) system is proposed in this paper. The proposed hybrid system is combination of Wing suit Flying Search (WFS) and modified Transient search optimization (MTSO), therefore it is called WFS-MTSO method. The proposed controller has three processes: (i) to identify the operating level of photovoltaic (uniform or in PSC), (ii) to estimate the maximal power point using WFS technique, and (iii) to ensure the photovoltaic system runs on the estimated maximum power point (MPP) by MTSO optimized cascade controller. This method begins with a sense of irradiance and temperature. The proposed photovoltaic system has two components. The first one is WFS maximal power point tracking algorithm attain maximal power point. The second one is MTSO optimized cascade controller to force the photovoltaic system to activate at maximal power point. Here, the proposed hybrid technique is utilized at MPPT to diminish tracking error and oscillation across MPP for optimizing power output. The proposed optimized cascade control improves the system efficiency by averting interruptions previously they propagate to the system. Finally, the performance of proposed hybrid system is executed on MATLAB/Simulink working platform and the performances are compared with various existing approaches. The statistical matrices, like mean, median, and standard deviation is analyzed the tracking efficiency of the proposed WFS-MTSO approach. © 2022 John Wiley & Sons Ltd.

Author Keywords
DC-DC boost converter; maximum power point tracking; partial shading conditions; PV array

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120) Arivumani, V.[a] , Balaraman, S.[b]

Angular symmetrical components-based anti-islanding method for solar photovoltaic-integrated microgrid
(2023) *Automatika*, 64 (1), pp. 1-21.

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[a] Department of Electrical and Electronics Engineering, Government College of Engineering, Krishnagiri, Bargur, India
[b] Department of Electrical and Electronics Engineering, Government College of Technology, Coimbatore, India

Abstract
This article examines how an innovative Angular Symmetrical Components of Voltages be applied to islanding detection and voltage unbalance factor estimation at a photovoltaic inverter-based distribution unit. Positive and Negative Sequence Components are converted into a polar form such as Line Aggregate RMS (LARMS) Voltage and Tangent Angle of Unbalance (TAU) which are determined from two line voltage signals. Three voltage relays are replaced with a single relay which compares the LARMS voltage and TAU with threshold limits to identify the condition of balance. ASCOV relay does not generate the trip signal in a non-islanding situation such as linear load switching and nonlinear load switching. The Non-Detection Zone (NDZ) of this ASCOV relay is very low compared to other relays. The proposed anti-islanding method is tested in a SPV powered microgrid using MATLAB/SIMULINK and the performance was studied under islanding and non-islanding events. Consequently, the simulation outcome indicates that the proposed technique effectively identifies the islanding condition with less computation time as 1 s and the performance of the proposed relay is compared with existing relays. The voltage unbalance factor determined by the proposed method is very close to the actual value in all types of unbalance conditions. © 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

Author Keywords
Angular symmetrical components; generalized phase voltage; line aggregate RMS; non-detection zone; passive anti-islanding; phase sequence index; tangent angle of unbalance

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121) Aswini, C.[a] , Valarmathi, M.L.[b]

Artificial Intelligence Based Smart Routing in Software Defined Networks
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[a] Department of Information Technology, Government College of Technology, Coimbatore, 641013, India
[b] Department of Computer Science and Engineering, Dr. Mahalingam College of Engineering and Technology, Pollachi642003, India

Abstract
In a non-static information exchange network, routing is an overly complex task to perform, which has to satisfy all the needs of the network. Software Defined Network (SDN) is the latest and widely used technology in the future communication networks, which would provide smart routing that is visible universally. The various features of routing are supported by the information centric network, which minimizes the congestion in the dataflow in a network and provides the content awareness through its mined mastery. Due to the advantages of the information centric network, the concepts of the information-centric network has been used in the paper to enable an optimal routing in the software-defined networks. Although there are many advantages in the information-centric network, there are some disadvantages due to the non-static communication properties, which affects the routing in SDN. In this regard, artificial intelligence methodology has been used in the proposed approach to solve these difficulties. A detailed analysis has been conducted to map the content awareness with deep learning and deep reinforcement learning with routing. The novel aligned internet investigation technique has been proposed to process the deep reinforcement learning. The performance evaluation of the proposed systems has been conducted among various existing approaches and results in optimal load balancing, usage of the bandwidth, and maximization in the throughput of the network.

Author Keywords
Content aware routing; deep learning load balancing; software defined networks

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122) Gogoi, R.[a] , Dutta, B.[b] , Mahakavi, P.[a] , Chithra, R.[c] , Surya, S.[d]

An Experimental Investigation on the Impact of Basalt Fibres on Recycled Aggregate Concrete
(2023) *International Journal of Pavement Research and Technology*, 16 (1), pp. 176-194. Cited 5 times.

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[a] Department of Civil Engineering, Amity School of Engineering and Technology, Amity University Madhya Pradesh, Gwalior, India
[b] Department of Civil Engineering, IIT Kanpur, Uttar Pradesh, Kanpur, India
[c] Department of Civil Engineering, Government College of Technology, Tamil Nadu, Coimbatore, India
[d] Department of Civil Engineering, J. N. N Institute of Engineering, Kannigaipair, Tamil Nadu, Thiruvallur, India

Abstract
In this paper, an attempt is made to understand the effectiveness of the use of basalt fibre in recycled aggregate concrete.

For this experimental study, the fresh and hardened properties of concrete samples made of recycled aggregate and incorporated with basalt fibres are investigated. The concrete samples made of recycled aggregate are reinforced with different dosages of basalt fibre varying from 0 to 0.5%, with an increment of 0.1%. From the preliminary analysis, the optimum dosage of basalt fibre which results in maximum efficiency of recycled aggregate concrete is found to be 0.2% by volume. In further investigation, experiments are conducted to evaluate the structural performance of two types of beams, one made of 100% natural aggregate and the other made of 50% recycled aggregate and 50% natural aggregate. The beams are reinforced with 0.2% basalt fibres. It has been observed that the performance of beams made of basalt fibre reinforced recycled aggregate concrete composites are reasonably close to that of conventional concrete. This can be used as an indicator of the fact that basalt fibres can be adequately used as structural material and that existing analytical models and codes for conventional concrete can also be applied to recycled aggregate concrete composites.

Author Keywords
Basalt fibre; Conventional concrete; Durability; Mechanical properties; Recycled aggregate

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123) Muthuraj, G.S.[a] , Balaraman, S.[b] , Raja, P.[c]

DFIG-based Wind Energy Conversion System Using Matrix Converter Under Unbalanced and Harmonic Grid Conditions with Band Pass-FIR Filters
(2023) *IETE Journal of Research*, 69 (7), pp. 4589-4604.

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[a] Department of Electrical and Electronics Engineering, Dr. Sivanthi Aditanar College of Engineering, Tamil Nadu, Tiruchendur, 628 215, India
[b] Department of Electrical and Electronics Engineering, Government College of Technology, Tamil Nadu, Coimbatore, 641 013, India
[c] Department of Electrical and Electronics Engineering, National Institute of Technology, Tamil Nadu, Trichy, 620 015, India

Abstract
This paper presents a modest control strategy of a doubly fed induction generator (DFIG)-based wind electric conversion system (WECS) with matrix converter, under unbalanced and harmonic grid conditions. Tedious sequence decomposition process and complex control reference calculations are avoided in the proposed control methodology. To obtain power grid-friendly operation, Band Pass-finite impulse response (BP-FIR) filters are designed to achieve four different control targets: sinusoidal stator current, sinusoidal rotor current, smooth stator real and reactive power and constant electromagnetic torque. In addition to active power reference from Maximum Power Point Tracking (MPPT) controller and desired reactive power reference, BP-FIR filters are used to synthesize space vectors of direct matrix converter. The effectiveness of the proposed approach is tested for a wide range of wind speeds.

Author Keywords
Balanced rotor current wind turbine (WT); Balanced stator current; Band Pass-Finite Impulse response (BP-FIR); Doubly fed induction generator; Filter; Matrix converter (MC); Space vector modulation (SVM); Unbalanced grid voltage; Wind energy conversion systems (WECS)

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124) Thirunavukkarasu, A.[a] , Nithya, R.[a] , Sivashankar, R.[b] , Sathya, A.B.[c] , Rangabhashiyam, S.[d] , Pasupathi, S.A.[a] , Prakash, M.[a] , Nishanth, M.[a]

Green soap formulation: an insight into the optimization of preparations and antifungal action
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[a] Department of Industrial Biotechnology, Government College of Technology, Coimbatore, India
[b] Department of Chemical Engineering, Hindustan Institute of Technology and Science, Chennai, India
[c] Department of Biotechnology, Aarupadai Veedu Institute of Technology, Chennai, India
[d] School of Chemical and Biotechnology, SASTRA University, Thanjavur, India

Abstract
Ultrasound-assisted extract of Acalypha indica was used to prepare the green soap formulation. Previously, D-optimal mixture design was used to optimize the mixture of oil components including coconut oil (A, 34–56%), soybean oil (B, 19–31%), castor oil (C, 14–23%), sunflower oil (D, 4–6%), and olive oil (E, 5–9%). Linear regression models were proposed to predict the responses, i.e., hardness (Y1), iodine (Y2), and iodine number saponification (INS) (Y3), and validated with a high degree of statistical accuracy (Fcal > Ftab; df = 4, p < 0.0001; R2 > 0.9950). Optimization results revealed that the formulation containing 44.57% A, 23.62% B, 17.44% C, 5.37% D, and 9.0% E would yield 41 Y1, 62 Y2, and 159 Y3. The chemical properties of the optimized soap formulation were quite comparable concerning the standard soap specifications (IS13498). Further, this formulation was supplemented with Acalypha indica extract to prepare the green soap, and its antifungal activity was determined using the agar dilution method. [Figure not available: see fulltext.]. © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author Keywords
Acalypha indica; Antifungal activity; D-optimal mixture design; Green soap formulation

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125) Narayanan, S.[a] , Ramesh, K.[b] , sakthivel, R.[c]

Optimization of nozzle hole number for a diesel engine fueled with kapok methyl ester blend
(2023) *Energy Sources, Part A: Recovery, Utilization and Environmental Effects*, 45 (3), pp. 7423-7435. Cited 2 times.

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[a] Mechanical Engineering, SNS College of Engineering Coimbatore, Coimbatore, India
[b] Mechanical Engineering, Government College of Technology, Coimbatore, India
[c] Department of Mechanical Engineering, Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Coimbatore, India

Abstract
It is evident from the past investigations that the biodiesel improves the quality of combustion and elevates the thermal efficiency. But the inevitable fact that enhanced combustion quality enhances NOx emissions. This works aims at decreasing NOx emissions by changing the injector hole number (IHN) so that the wall impingement may be reduced which would reduce the NOx emissions. The experiments are conducted for three different nozzle configurations (four holes, five holes, and six holes) for three different kapok methyl ester blends (20%, 30%, and 40%) for three loads. The Performance and emission parameters are optimized using a 3*3*3 matrix (load, biofuel blend, and IHN). As expected results indicate reduction of NOx with increase in IHN. CO, HC, and smoke also see a mild decrement with increase in IHN. Brake-specific fuel consumption (BSFC) decreases with increase in IHN whereas slight increase of BSFC is observed with increase of fuel blend. © 2019 Taylor & Francis Group, LLC.

Author Keywords
Diesel engine; NOx; nozzle; optimization; specific fuel consumption

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