

3.3.2 Number of research papers per teachers in the Journals notified on UGC website during the year

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal
Human Fatty Liver Monitoring Using Nano Sensor and IoT	Shanker	Computer Science and Engineering	Intelligent Automation & Soft Computing	2023	1079-8587	https://www.techscience.com/journal/iasc
SF-CNN: deep text classification and retrieval for text documents	Shanker	Computer Science and Engineering	Intelligent Automation & Soft Computing	2023	1079-8587	https://www.techscience.com/journal/iasc
Prediction Of Rotor Slot Size Variation Through Vibration Signal Of Three Phase Induction Motor Using Machine Learning	Shanker	Computer Science and Engineering	Journal of. Vibration Engineering and Technologies	2023	2523-3939	https://www.springer.com/journal/42417
Prediction of Rotor Slot Size Variations in Induction Motor Using Polynomial Chirplet Transform and Regression Algorithms	Shanker	Computer Science and Engineering	Arabian Journal for Science and Engineering	2023	2191-4281	https://www.springer.com/journal/13369
Transformer Internal and Inrush Current Fault Detection Using Machine Learning	Shanker	Computer Science and Engineering	Intelligent Automation & Soft Computing	2023	1079-8587	https://www.techscience.com/journal/iasc
Microclimatic HVAC system for nano painted rooms using PSO based occupancy regression controller	Lavanya & Shanker	Computer Science and Engineering	Energy	2023	0360-5442	https://www.sciencedirect.com/journal/energy
Prediction of rotor slot width in induction motor using Dyadic wavelet transform and softmax regression	Shanker	Computer Science and Engineering	International Journal of Emerging Electric Power Systems	2023	1553-779X	https://www.degruyter.com/journal/key/ijeeeps/html?lang=en
Towards Automated and Optimized Security Orchestration in Cloud SLA	Shanker	Computer Science and Engineering	International Journal on Recent and Innovation Trends in Computing and Communication	2023	2321-8169	https://ijritcc.org/index.php/ijritcc
HI-Shaped antenna for non-invasive diabetic measurement and monitors	Shanker	Computer Science and Engineering	ECTI Transactions On Electrical Engineering, Electronics, And Communications	2022	1685-9545	https://ph02.tci-thaijo.org/index.php/ECTI-EEC
Growth and Characterization of Ammonium 4- Methylbenzenesulfonate single crystal as a potential genotoxic applications	Mohamed Hidayathullah & Suresh Kumar	Physics	GIS Science Journal	2022	1869-9391	https://gisscience.net/
Comprehensive Characterization of Ferrochrome Slag and Ferrochrome Ash as Sustainable Materials in Construction	Zunaithur Rahman	Civil Engineering	Journal of Nanomaterials	2022	1687-4110	https://www.hindawi.com/journals/jnm/
Optimization of River Sand with Spent Garnet Sand in Concrete Using RSM and R Programming Packages	Zunaithur Rahman	Civil Engineering	Journal of Nanomaterials	2022	1687-4110	https://www.hindawi.com/journals/jnm/
Batch and packed bed column studies of azo dyes adsorption from the aqueous solutions using activated sugarcane bagasse charcoal adsorbent: isotherm and kinetic studies	Zunaithur Rahman	Civil Engineering	Global NEST Journal	2022	1790-7632	https://journal.gnest.org/
Biosorption of heavy metal ions from the aqueous solutions using groundnut shell activated carbon: batch adsorption, kinetic and thermodynamic studies	Zunaithur Rahman	Civil Engineering	Global NEST Journal	2022	1790-7632	https://journal.gnest.org/
Design of a wind-solar hybrid energy air conditioning system using BLDC motor for the Indian home environment	Mohanasundaram	Electrical and Electronics Engineering	Electrical Engineering	2023	0948-7921	https://www.springer.com/journal/202/
IoT based Customizable Energy Management System using Cloud Computing	Lavanya	Information Technology	Neuro Quantology	2022	1303-5150	https://www.neuroquantology.com/
Retrieving Images and Its Classification by Acumen Mechanism Using Texture Features	Arif Abdul Rahman	Information Technology	International Journal of Food and Nutritional Sciences	2023	2319-1775	https://www.ijfans.org/
Non-invasive method of melanoma detection on the skin surface through extraction of image features using modified CAT optimization algorithm	Prabhakaran	Electronics and Communication Engineering	Current Science	2023	0011-3891	https://www.currentscience.ac.in/
Investigations on the synthesis and growth and structural, spectral, optical, mechanical and thermal properties of non-linear optical single crystals of Bis-L-Seriniumoxalate Dihydrate (BLSOD)	Mohamed Hidayathullah	Physics	Journal of Ovonic Research	2023	1584 - 9953	https://chalcogen.ro/index.php/journals/journal-of-ovonic-research
Investigational work on self-cleaning cement mortar with titanium dioxide in partial replacement of cement	Zunaithur Rahman & Rajalakshmi	Civil Engineering	Materials Today: Proceedings	2022	2214-7853	https://www.sciencedirect.com/journal/materials-today-proceedings
A study to determine human-related errors at the level of top management, safety supervisors & workers during the implementation of safety practices in the construction industry	Nazeer Ahamed	Civil Engineering	Safety Science	2023	0925-7535	https://www.sciencedirect.com/journal/safety-science



An investigation on thermo-mechanical characterization of activated carbon/coconut shell powder reinforced natural composites	Manikandan	Mechanical Engineering	Journal of Process Mechanical Engineering	2022	0954-4089	https://journals.sagepub.com/home/PIE
Development of Machine Learning Based Microclimatic HVAC System Controller for Nano Painted Rooms Using Human Skin Temperature	Lavanya & Shanker	Information Technology	Journal of Electrical Engineering & Technology	2022	1975-0102	https://www.springer.com/journal/42835
Investigation of optical, thermal and mechanical studies on semi organic nonlinear optical diaquabis(L-lactato)magnesium (DLLM) single crystal for optoelectronic devices applications	Mohamed Hidayathullah	Physics	Journal of Materials Science: Materials in Electronics	2022	0957-4522	https://www.springer.com/journal/10854
Machine Learning Based Crop Yield Management	Nadheer Ahmed	Computer Science and Engineering	Journal of Emerging Technologies and Innovative Research	2023	2349-5162	https://www.jetir.org/
Comparison of Geopolymer Concrete With Cement Concrete	Rajalakshmi	Civil Engineering	Journal of Emerging Technologies and Innovative Research	2023	2349-5162	https://www.jetir.org/index.html
Performance of Seashell Powder On Soil Stabilization	Zunaithur Rahman	Civil Engineering	Journal of Emerging Technologies and Innovative Research	2023	2349-5162	https://www.jetir.org/index.html
Investigation of Hollow Block By Using Copper Slag And Sugarcane Bagasse	Inthumathi	Civil Engineering	Journal of Emerging Technologies and Innovative Research	2023	2349-5162	https://www.jetir.org/index.html
Experimental Study on Characteristics Strength of Green Concrete	Inthumathi	Civil Engineering	Journal of Emerging Technologies and Innovative Research	2023	2349-5162	https://www.jetir.org/index.html




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Human Fatty Liver Monitoring Using Nano Sensor and IoMT

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Abstract: Malfunction of human liver happens due to non-alcoholic fatty liver. Fatty liver measurement is used for grading hepatic steatosis, fibrosis and cirrhosis. The various imaging techniques for measuring fatty liver are Magnetic Resonance Imaging, Ultrasound and Computed Tomography. Imaging modalities lead to the exposure of harmful radiation of electromagnetic waves because of frequent measurement. The continuous monitoring of fatty liver is never achieved through imaging techniques. In this paper, the human fatty liver measured through a Fatty Liver Sensor (FLS). The continuous monitoring of the fatty liver is achieved through the FLS. FLS is fabricated through the screen-printing with materials such as graphene and polyacrylic. The fatty liver sensor is placed around the liver surface for continuous measuring fatty liver. The signal acquired from the fatty liver sensor is processed using blind source separation, a filtering technique removes the random noise from the acquired signal. The denoised signal is processed with tunable Q wavelet transform (TQWT), of FLS based fatty liver measurement fatty liver signals. The continuous fatty liver volume measured and analysis are performed through Long-short term memory and internet of medical things (IoMT). The experimental results are validated with ultrasound lab values.

Keywords: Fatty liver sensor; ultrasound; tunable Q wavelet transform; non-alcoholic fatty liver disease; long short-term memory

1 Introduction

Liver does the major activities such as produce bile juice creation, blood filtration, glucose storage, increases digestion process, protein production for blood plasma, removes the harmful chemicals in the body [1]. Liver renders the necessary elements such as cholesterol and lipids, which helps cells to perform functional operations for human body. In hepatocytes cytoplasm, triglyceride accumulation characterizes the fatty liver disease. The fatty liver affects the process of protein production and nutrients in humans. The fatty liver leads to insulin resistance, obesity and increase the risk factors of the cardiovascular [2]. The untreated fatty liver leads to chronic hepatocellular injury, which leads to Non-



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SF-CNN: Deep Text Classification and Retrieval for Text Documents

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Abstract: Researchers and scientists need rapid access to text documents such as research papers, source code and dissertations. Many research documents are available on the Internet and need more time to retrieve exact documents based on keywords. An efficient classification algorithm for retrieving documents based on keyword words is required. The traditional algorithm performs less because it never considers words' polysemy and the relationship between bag-of-words in keywords. To solve the above problem, Semantic Featured Convolution Neural Networks (SF-CNN) is proposed to obtain the key relationships among the searching keywords and build a structure for matching the words for retrieving correct text documents. The proposed SF-CNN is based on deep semantic-based bag-of-word representation for document retrieval. Traditional deep learning methods such as Convolutional Neural Network and Recurrent Neural Network never use semantic representation for bag-of-words. The experiment is performed with different document datasets for evaluating the performance of the proposed SF-CNN method. SF-CNN classifies the documents with an accuracy of 94% than the traditional algorithms.

Keywords: Semantic; classification; convolution neural networks; semantic enhancement

1 Introduction

On the Internet, enormous text documents are available due to the increase in users. Researchers refer to text documents in research articles, coding and dissertations and need appropriate documents during retrieval. The increase in the number of research articles leads to redundant research papers, and retrieving correct documents based on keywords is challenging. Retrieval of research papers is a big challenge for information retrieval [1]. Customized learning content and storing the content in the databases in a hierarchical structure is disclosed to retrieve documents [2]. Adaptive e-learning services have been adopted to provide text documents to the user based on the learner's requirement. A multi-agent system is proposed to automatically retrieving relevant learning material from the Internet [3]. The hybrid technique based on machine learning retrieves research documents [4]. In recent days, deep learning methods have been used in Natural Language Processing (NLP). Deep learning is applied in the



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Original Paper | [Published: 30 January 2023](#)

Prediction of Rotor Slot Size Variation Through Vibration Signal of Three Phase Induction Motor Using Machine Learning

[J. Anish Kumar](#) , [M. Gowthambigai](#), [N. R. Shanker](#) & [J. Jasper](#)

[Journal of Vibration Engineering & Technologies](#) (2023)

63 Accesses | [Metrics](#)

Abstract

Purpose

Induction Motor (IM) is used in various industrial application such as drilling, rolling, paper mills, lathe machine and milling. The faults in IM are avoided through continuous monitoring and control, during running conditions. This research paper presents an innovative method for detecting motor faults such as unbalanced voltage, phase reversal, frequent starting, abnormal speed, low voltage, phase loss, turn-to-turn short circuit, shaft bend and predicting Rotor Slot Size Variation (RSSV) during motor faults.

Methods



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Research Article-Electrical Engineering |

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Prediction of Rotor Slot Size Variations in Induction Motor Using Polynomial Chirplet Transform and Regression Algorithms

[J. Anish Kumar](#) , [N. M. Jothi Swaroopan](#) & [N. R. Shanker](#)

[Arabian Journal for Science and Engineering](#) **48**, 6099–6109 (2023)

120 Accesses | [Metrics](#)

Abstract

For constant monitoring of rotor slot in induction motor, average rotor slot variation (ARSV) prediction is proposed. The rotor slots expand due to thermal stress and high intensity magnetic flux. The magnetic flux with high intensity is created in rotor lamination sheet, because of stretching and curving magnetic flux. The surface of rotor slot exhibits thermal stress due to over current which in turn generates heat and transfers the heat into the rotor lamination surface. The magnetic stress-based rotor slot variation is measured by



Transformer Internal and Inrush Current Fault Detection Using Machine Learning

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Abstract: Preventive maintenance in the transformer is performed through a differential relay protection system, and it protects the transformer from internal and external faults. However, the Current Transformer (CT) in the differential protection system mal-operates during inrush currents. CT saturates due to magnetizing inrush currents and causes false tripping of the differential relays. Moreover, identification of tripping in protection relay either due to inrush current or internal faults needs to be diagnosed. For the above problem, continuous monitoring of transformer breather and CT terminals with thermal camera helps detect the tripping in relay due to inrush or internal fault. The transformer's internal fault leads to high breathing process in the transformer breather, never for inrush currents. During inrush currents, CT temperature is increased. Continuous monitoring of breather and CT of the transformer through thermal imaging and radiometric pixels detect the causes of CT saturation and differentiates maloperation. Hybrid wavelet threshold image analytics (HWT-IA) based radiometric pixels analysis of the transformer breather and CT after de-noising provides an accurate result of about 95% for identification of the false tripping of differential protection system of transformer.

Keywords: Wavelet; threshold; inrush; transformer; breather; current transformer; thermal image

1 Introduction

The power transformer is an electrical device that works with an alternating current for long-distance power transmission. Transformers are used for several applications, such as increasing the voltage level of the secondary side output, distribution of power in industrial and residential areas, etc. The transformers require preventive and predictive maintenance to deliver an uninterrupted power supply. Faults in the transformers occur due to internal or external factors. Internal factors are composed of both electrical and mechanical faults. Electrical faults are due to winding failure and phase faults. Mechanical



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Microclimatic HVAC system for nano painted rooms using PSO based occupancy regression controller

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ABSTRACT

In this paper, PSO-OMRC model is proposed for heating ventilation and air conditioning (HVAC) system. The PSO-OMRC predicts SPT in HVAC for energy saving and thermal comfort of persons in room. PSO-OMRC used data collected from temperature, humidity, PIR, and thermal camera sensors in HVAC installed rooms for SPT prediction. In existing HVAC systems, SPT is constant and consumes more energy. Moreover, SPT prediction using traditional machine learning algorithms considers various parameters such as room temperature, humidity and person count in room. Existing algorithms considers the above parameters for energy saving in HVAC and thermal comfort for persons, whereas other parameters such as room walls and ceiling temperature, human body temperature need to be considered for SPT prediction and for energy saving in HVAC. The PSO-OMRC model predicts the SPT based on number of occupants and microclimatic conditions such as environment temperature, humidity, room wall temperature and ceiling temperature. From experimental results, the utilization of the thermal image occupant model provides significant energy savings in the PSO-OMRC model. In nano coated room, PSO-OMRC model is evaluated with the implementation of a thermal image occupant model to improve energy savings, resulting in approximately 25.2% of energy savings while maintaining the level of thermal comfort.

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1. Introduction

Global warming is higher in metropolitan areas than in other areas such as rural because of pollution and emissions of greenhouse gases. In metropolitan areas, HVAC systems are the major contributor for global warming. HVAC system releases fluorocarbon, CO₂ and consumes high electrical energy [1]. HVAC systems consist of an air conditioner, air handler, compressor, condenser, thermal expansion valve, air filter, chiller, duct system and microcontroller-based temperature controller. There are different types of HVAC system such as heating, cooling and hybrid split, duct free, zoned, centralized and packaged air conditioning systems. Moreover, centralized systems are commonly used in many areas. Nowadays, HVAC system energy usage is monitored through cloud computing [2]. In HVAC system, energy consumption is reduced through occupant prediction and temperature control using artificial intelligence techniques [3]. Energy savings in HVAC systems are achieved using different methods namely ensemble model of machine learning, an adaptive demand controlled strategy [4], occupancy estimation using edge computing for thermal setpoint [5], hybrid approach for temperature control using fuzzy logic optimization [6] and deep reinforcement learning temperature setpoint control [7]. The occupancy

prediction [8] and regression algorithm [9] are traditional algorithms used in temperature controller of HVAC systems.

Thermal comfort refers to the level of perceived coolness by the individuals in a room through HVAC. HVAC system consumes more energy, compared to other household electric appliances. Room environment temperature, humidity level and number of occupant data are collected and applied in neural network for optimization of SPT, reduce energy consumption, and provides maximum thermal for occupants in the room. Sensors are used for controlling the HVAC systems for automatic setpoint temperature. Traditional HVAC system use manual selection [10], the occupant in HVAC installed room never obtains the thermal comfort due to variations in environment parameters such as outer temperature, inside room temperature, humidity and occupant. Estimation of occupant count is crucial to adjust the indoor air temperature for optimal SPT and maximum thermal comfort [11]. In order to solve above problem, estimation of the number of occupants in room, indoor environment parameters and human body temperature are required. For prediction of the optimal setpoint temperature in HVAC system, needs indoor parameters and microclimatic data including wall and roof temperature within the room.

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Prediction of rotor slot width in induction motor using Dyadic wavelet transform and softmax regression

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From the journal [International Journal of Emerging Electric Power Systems](#)

<https://doi.org/10.1515/ijeeps-2022-0214>

Abstract

Predictive maintenance is required for Induction Motor (IM) to avoid sudden breakdown. In this paper, multimodal sensor data are used for prediction of the rotor slot width variation during runtime of IM. Moreover sensor data are visualized through visual image obtained using Scale Invariant Feature Transform (SIFT) and matching dictionary for various faults in motor such as overload, high speed, Broken Rotor bar (BRB), and unbalance magnetic pull. The multimodal sensor signals data acquired from different parts of three phase induction motor are analysed using various transforms such as Over Complete Rational Dilation Wavelet Transform (ORaDWT), Tuneable Q Wavelet Transform (TQWT), Polynomial Chirplet Transform (PCT) and Dyadic Wavelet Transform (Dyadic WT) for various fault conditions and rotor slot width mentioned during runtime condition of motor. The rotor slot width is predicted using Multiple Linear Regression (MLR), Polynomial Regression (PR), Logistic Regression (LR) and Soft-max Regression (SR) methods through the mean value and energy band of the acquired sensor signal. The Dyadic WT and SR perform better for rotor width prediction. **The proposed method such as Dyadic WT and SR provides the prediction accuracy of about 95.2%. From experimental results the rotor slot width expansion more than 2% needs immediate attention to avoid breakdown of motor.**

Keywords: [Dyadic wavelet transform](#); [rotor slot](#); [soft-max regression](#); [squirrel cage induction motor \(SCIM\)](#); [vibration sensor](#)

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Engineering C




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Towards Automated and Optimized Security Orchestration in Cloud SLA

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Abstract: In cloud computing, providers pool their resources and make them available to customers. Next-generation computer scientists are flocking to the cutting-edge field of cloud computing for their research and exploration of uncharted territory. There are still several barriers that cloud service providers must overcome in order to provide cloud services in accordance with service level agreements. Each cloud service provider aspires to achieve maximum performance as per Service Level Agreements (SLAs), and this is especially true when it comes to the delivery of services. A cloud service level agreement (SLA) guarantees that cloud service providers will satisfy the needs of large businesses and offer their clients with a specified list of services. The authors offer a web service level agreement-inspired approach for cloud service agreements. We adopt patterns and antipatterns to symbolize the best and worst practices of OCCI (Open Cloud Computing Interface Standard), REST (Representational State Transfer), and TOSCA (Topology and Orchestration Specification for Cloud Applications) with DevOps solutions, all of which API developers should bear in mind when designing APIs. When using this method, everything pertaining to the cloud service, from creation to deployment to measurement to evaluation to management to termination, may be handled mechanically. When distributing resources to cloud apps, our system takes into account the likelihood of SLA breaches and responds by providing more resources if necessary. We say that for optimal performance, our suggested solution should be used in a private cloud computing setting. As more and more people rely on cloud computing for their day-to-day workloads, there has been a corresponding rise in the need for efficient orchestration and management strategies that foster interoperability.

Keywords: Security, Orchestration, Cloud Computing, Service Level Agreement.

I INTRODUCTION

The term "security orchestration" refers to a technique for linking together and coordinating various security-related instruments and infrastructures. The interconnected layer is what enables automa

have only just begun to explore cloud computing, a cutting-edge technology where many concerns remain unanswered. Business organizations use cloud computing by placing orders for the necessary services. Enterprises enter into contracts with availability of critical

HI-Shaped antenna for non-invasive diabetic measurement and monitors fluctuating diabetes

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Abstract: In this paper, HI- antenna is applied for monitoring the fluctuating diabetes. HI antenna senses the human pancreas dielectric radiation. HI antenna senses the radiation effectively because of shape and size of slot, which covers the pancreas region of human body, without change in crumbling effect during dielectric radiation signal acquisition. The dielectric radiations signal acquisition from pancreas lead to effective monitoring of fluctuating diabetes. However, traditional non-invasive method never monitors fluctuating diabetes, whereas they only measure diabetic value through non-invasive method. Non-invasive method of diabetic measurement never measures fluctuating diabetes due to improper mounting of sensor over the body is the major problem. The proposed HI-shaped antenna is mounted in different part of the human body such as hand, finger, stomach and pancreas for measuring fluctuating diabetes. Among the different part of body, optimized location is the pancreas of measuring diabetes is detected with proposed HI-shaped antenna. Moreover, different type of such as Microstrip antenna, log periodic antenna and are compared with the proposed HI-shaped antenna for diabetes measurement and proposed antenna dielectric signal statical values correlated with diabetic laboratory values. The proposed antenna measures the fluctuation diabetes with 85% accuracy.

Keywords: Antenna sensor- HI-Shaped, fluctuating diabetes, signal statical parameters

1. Introduction

Human with diabetes have rapidly increases due to life style disorder. According to WHO 500 million people are with diabetes in this world. In India, 77 million people are with diabetic disorder. Diabetic disorder arises due to excess in production of insulin by the liver or less use of insulin by the body, which results to high and low blood sugar levels in diabetes mellitus [1]. Diabetes is measured in invasive method using blood samples. Commercially available Non-invasive method of diabetes measurements are Glucosense, TensorTip Glucometer, Contact Lens, iQuickIt Saliva Analyzer, GlucoTrack, Noviosense and Gluco-Wise as in Figure.1 [2]– [7]. Non-invasive devices use any one of the methods such as optical, radiofrequency, electromagnetic, microwave, and electrochemical for diabetic measurement. However, non-invasive measurement of blood glucose from the above devices have mounting problem and crumbling effect.

Measurement of Blood Glucose (BG) is essential for diabetic Management. In this paper, blood glucose measurement method is analysed for their advantages and disadvantages. BG is monitored through invasive method such as continuous blood glucose monitoring



GROWTH AND CHARACTERIZATION OF AMMONIUM 4- METHYLBENZENESULFONATE SINGLE CRYSTAL AS A POTENTIAL GENOTOXIC APPLICATIONS

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Abstract

Single crystal of Ammonium 4- Methylbenzenesulfonate (A4MBS) was prepared by slow evaporation method using water as a solvent. From Single Crystal X-Ray Diffraction studies it is proved that the formation of A4MBS. The existence of functional groups and modes of vibrations of A4MBS confirmed using Fourier transform infra red (FT-IR) spectroscopy studies. The mechanical stability of A4MBS single crystal was studied using Vicker's micro hardness test on prominent plane at different temperature to reveal the anisotropic nature of the compound. The particle size dependency of A4MBS was studied for phase matching behavior.

Keywords: Crystal Growth, X-Ray Diffraction spectra, FT-IR Spectra, Simple Harmonic generation, Phase change








1. INTRODUCTION

Non Linear Optical (NLO) materials reign the field of Materials Science and extensive researches have been carried out in this field even by interdisciplinary groups all over the globe. The Second Harmonic Generation (SHG) in compounds of high nonlinearity is a greater scope to examine for its applications in information processing, and the apprehension of devices for



Review Article

Comprehensive Characterization of Ferrochrome Slag and Ferrochrome Ash as Sustainable Materials in Construction

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Ferrochrome slag (FCS) and ferrochrome ash (FCA) are by-products generated during the production of ferrochrome alloy in the ferrochrome industry. The use of these by-products as construction materials appears to be an innovative strategy that could provide numerous environmental and socio-economic benefits. However, the residual chromium present in ferrochrome by-products may have some negative effects on the surrounding environment also. In a nutshell, this study provides a thorough and critical examination of ferrochrome slag and ferrochrome ash's suitability for construction, as well as a list of the major shortcomings that must be addressed to accomplish construction sustainability. A detailed summary of the physical, chemical, and mechanical characteristics of ferrochrome slag and ferrochrome ash was presented in the study. Ferrochrome slag from previous studies is said to exhibit better mechanical properties compared to conventional coarse aggregates which contributed to better mechanical properties of concrete. The application of ferrochrome slag as a substitute for natural sand, on the other hand, is considered to have a detrimental impact. As a reason, further research is necessary to determine the impact of replacing conventional fine aggregate with ferrochrome slag on the various mechanical and durability properties of concrete. Ferrochrome ash from previous studies can be used as a partial replacement for cement and unlike FCS, FCA is nonhazardous since no residual chromium traces were present in FCA. Furthermore, the protracted safety and effect on the surrounding environment of ferrochrome slag containing concrete in a variety of exposure conditions have to be fully examined in the near future.

1. Introduction


For decades, the world's population has been quickly increasing due to rapid development and broad urbanization. This fast expansion is consuming natural resources and over

large effect on the environment. Recently, there has been a heavy focus on finding a solution to man-made environmental challenges [1, 2]. Concrete is the most used material for construction. It is the most widely utilized commodity in the world. The utilization of wastes in construction has been a



Research Article

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

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

1. Introduction

Concrete is used as a main source of material in the construction field. It consists of cement, fine aggregate, coarse aggregate, water, and admixtures if required. In general, concrete consists of 60-75% of all in aggregates [1, 2]. Fine aggregate is a natural deposit depleting at faster rates than its reclamation. There is a huge demand for its suitable alternative meeting the requirements of fine aggregate as per Indian Standards [3-5]. On the other hand, some of the promising fine aggregates used in the research community are marble dust, spent garnet sand,

ble, garnet, and foundry industries in any form of concrete production reduces erosion, landslides, and other environmental hazards. Garnet is mostly acquired by digging tiny shallow pits, except in a few locations in Tamil Nadu where it is retrieved from the seashore. Mining is done by hand using pick axes and spades. Drilling and blasting are not required since garnet is extracted from soft worn rocks. Fine abrasive garnet is collected during the processing of beach sands. Dredging, both dry and wet, is used to mine beach sand. Individual minerals, including garnet, are separated in heavy upgrading plants and mineral separation plants. They are advanced to further upgraded



Batch and packed bed column studies of azo dyes adsorption from the aqueous solutions using activated sugarcane bagasse charcoal adsorbent: isotherm and kinetic studies

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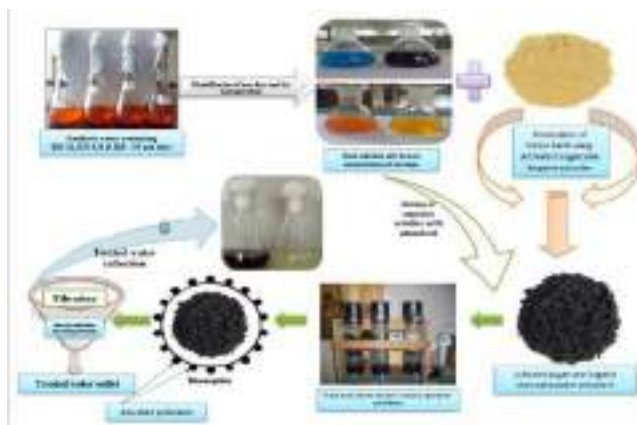
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Graphical abstract



Abstract

Biosorption of azo dyes (RO-16, RB-120 & RB-19) from the aqueous solutions was investigated using the activated sugarcane bagasse charcoal adsorbent. The characteristics of the prepared adsorbent were analyzed by SEM, EDX, FTIR, XRD, TG & DT analysis, and the BET surface area of the sugarcane bagasse adsorbent was examined by N_2 adsorption and desorption techniques. Batch adsorption studies were performed to determine the optimum pH, azo dye concentration, sugarcane dose & temperature, and both Langmuir & Freundlich isotherm studies fit well with the adsorption process. Packed bed column adsorption studies confirmed the earlier breakthrough of the adsorption process, and the column adsorption studies fitted with Thomas, Yoon-Nelson, BDST and Adams-Bohart models. The desorption studies were conducted by adding various concentrations of sulfuric acid, and regeneration of spent azo dyes was done by different cycles.

Keywords: Azo dyes, batch and column studies, sugarcane bagasse, isotherm and kinetic studies, desorption and Regeneration

1. Introduction

Water, Air, and Soil are the most precious natural resources to all substances for living and biological activity on the earth. Among these three, water is one of the essential resources required for every process worldwide. In earlier stages, the water is in an inexhaustible location, and the availability of fresh water is very high due to the presence of various natural and artificial water resources. Recently, freshwater has been required for all significant activities, industrial operations, drinking purposes, etc., and the freshwater requirement is increasing daily because of the need. At the same time, this water gets polluted by various industrial activities, population growth, and other natural or artificial disasters. Environmental pollution has emerged in the past few decades, which may severely affect all living beings (Briffa *et al.*, 2020). There are many industries, and the industrial effluent has toxic pollutants, and without any prior treatment, the effluent was discharged into the natural water sources. Textile industries create too large amounts of effluent with toxic nature (Yaseen *et al.*, 2018). Water treatment is one of the emerging technologies developed recently to remove harmful pollutants from aqueous solutions. Dyes play a vital role in the textile industrial effluent, creating aquatic toxicity and severe health issues. Removing these toxic pollutants is a critical task for researchers, and many industries must bear very high capital and investment costs for the treatment.

Preliminary, Secondary, and biological treatment processes were not suitable for removing the toxic contaminants and other pollutants from the industrial effluent (Shindhal *et al.*, 2020). Due to urgent need, an innovative treatment method is necessary for treating the effluent. Many treatment methods are available, such as Adsorption, Ion exchange, Membrane filtration, Chemical precipitation, etc., to remove or reduce the toxicity level in the industrial effluent (Sathya *et al.*, 2022). The capital and investment costs for these methods are high, and there

Biosorption of heavy metal ions from the aqueous solutions using groundnut shell activated carbon: batch adsorption, kinetic and thermodynamic studies

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Graphical abstract



Abstract

Batch adsorption studies of heavy metals were carried out using activated charcoal groundnut shell powder as an adsorbent material. The groundnut shell was collected and synthesized by chemical synthesis to convert it into charcoal form. The prepared adsorbent's pore size & surface area was analyzed by BET surface analysis using N₂ – adsorption & desorption process. XRD techniques analyzed the crystalline structure of charcoal adsorbent, and the functional groups & behaviour of the surface were analyzed through FTIR, SEM, and EDX analysis. The optimum adsorption parameters of pH, temperature, time of contact between adsorbent and adsorbate, groundnut shell dose, and metal ion concentrations were obtained from the batch studies with an optimum concentration of 20 mg/L, and the mass transfer mechanism and rate-controlling step was identified by isotherm and kinetic studies. The adsorbent with the dose of 2.5 g L⁻¹ removed 87.12% of Cu ions, 92.28% of Pb ions and 95.62% of Hg ions at the pH c

Sathees Kumar V
 aqueous solution
 NEST Journal, 24



Keywords: Industrial effluent, heavy metals, groundnut shell powder, batch adsorption, desorption, thermodynamics

1. Introduction

Many pollutants are released into the environment because of various industrial activities and rapid urbanization, creating many problems in the contemporary world. Apart from the organic contaminants, most are non-degradable and harmful to living beings. Heavy metals play an essential role in aqueous toxicity due to their non-degradable and poisonous nature. Usually, the pollutants of metal ions exist in the aqueous solutions because of the discharge of effluent from various industries, such as electro-plating, tanneries, smelting and alloy industries, etc., into the surface water bodies without any prior treatment. Treatment of aqueous solutions from heavy metal pollution was a difficult task in the past, and several ways have been devised to eliminate hazardous heavy metal pollution. Adsorption, Membrane filtration, Ion-exchange, Chemical precipitation, etc., are widely used to control the number of toxic metal ions from the aqueous solutions (Abdulaziz *et al.*, 2019). Excess amounts of secondary sludge generation, highly skilled workers and their needs & huge investments are needed for the above techniques. For this reason, no other process or development was seen in earlier days (Sruthi *et al.*, 2018). There is a need to develop innovative technologies to treat heavy metal pollution with meagre capital and investment costs.

To focus on the new technologies, biosorption was the best treatment technology to remove the pollutants with very low capital and investment costs. It is the process of binding contaminants (Organic/Inorganic) on the surface of the adsorbent by van der Waals' force in between the



adsorbent husk, Coconut shell powder process has many heavy metal ions from the batch studies, Global



Design of a wind-solar hybrid energy air conditioning system using BLDC motor for the Indian home environment

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Abstract

Air conditioners usages in the homes and offices are the top drivers of global electricity demand for the next three decades. This work proposes an innovative grid-independent, hybrid wind-solar air conditioning model to meet future room cooling demand. This model has 0.3 ton capacity, and it is operated with 1.5 kW, 48 V, BLDC motor drive system. In comparison, with the conventional model, the BLDC based model improves the energy efficiency from 13 to 20% and this model costs 952 USD. A virtual 4 kW hybrid model is simulated to analyze the energy generation at the proposed location from different weather conditions to operate this model. This analysis exhibits that a high 57% wind and 69.4% solar energy participation in summer and winter seasons, respectively, in the total energy generated. This hybrid model and simulation analysis also signify that the consumer side source generation is a realistic solution to meet the future air-conditioning demand growth due to global warming.

Keywords Hybrid wind-solar virtual model · Involute wind turbine · Hybrid air conditioning model · Energy efficiency · Brushless direct-current motor

1 Introduction

Electrical energy demand in many countries keeps increasing because of the world's population growth. The extended summer in countries like India necessitates the air conditioner comfort for more than 4 to 5 months period due to the global temperature changes. Although the start of high capacity power plants on a large scale is reasonably a complicated task to meet this increased energy consumption. Ershad et al. [1] analyze present condition, as shown in Fig. 1; a high 42% energy participation of thermal (coal) power plants for the electricity and heat generation all over the world creates painful CO₂ pollution and disastrous global warming.

Dubash et al. [2] mention that the domestic consumption dominates energy consumption-based CO₂ emissions in all states in India with per capita emissions under all scenarios remain modest ranges of 2.5–3.6 t cap⁻¹. These substantial ranges of CO₂ emissions need a serious concern on a low of 12% exists on 2012 to high of 169% expected to increase in 2030. Yenneti et al. [3] report the impact of rapid urbanization and rapid urban population growth rate on energy consumption and subsequent carbon emissions. It is predicted that India is a rapidly urbanizing country and the country's urban population is expected to grow from 31.6 to 57.7% by 2050. Tiewsoh et al. [4] discuss the electricity demand and the Per Capita Energy Consumption (PCEC) in India. The total electricity consumption in the year 2015 is 1000 TWh and is expected to increase to 3000 TWh also the industrial and domestic demands may be the dominant loads that need to be supplied in the year 2030. Sahu [5] mentions a note on PCEC in India and expected CO₂ emissions in the year 2030. The IEA reports state that energy demand for space cooling may consume nearly 40% of electricity growth in buildings in future.

Bhoyar et al. [6] point out that the primary source of the earth's power is from the sun and it is approximately 1.484×10^{18} kWh/year. Only 2.5% of this energy is converted

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IoT based Customizable Energy Management System using Cloud Computing

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Abstract

Electricity is an essential need that is mostly utilised in home, agricultural and industrial sectors. In this paper, dynamic power management is carried out by using Internet of Things (IoT) to track and manage home appliance energy consumption. In the current systems, humans must manually keep track of power consumption details, and it is challenging to estimate how much energy various appliances are using. Furthermore appliance status cannot be accessed and it is impossible for home appliances to consume the predetermined amount of energy. The developed system can track home appliance power usage, and the resulting data is saved in IOT. The proposed work provides a system for smart metering and charging on an energy meter. The prepaid energy metre is a device with a chip for assessing how much electricity is used. In remote monitoring of electricity usage, each object's energy metre has been incorporated with a Global System for mobiles (GSM) based wireless connectivity module. This method has the capability to prevent human error, and remote analysis is also feasible. It automatically update information about the amount of energy used, related percentage will be shown on the Liquid Crystal Display (LCD) and transmitted to the base station continuously. The result shows with Energy Meter more automation operations can be performed and Electricity Board (EB) meter is operated automatically. The Energy Meter has intelligence to avoid manual mistakes. The smart controller collects the energy information of the home appliances which saves in cloud platform for analysis. Home appliances accounted for two-third of the Energy consumed in Average home. It also specifies that roughly one third of energy is wasted. The Proposed smart controller can reduce the amount of energy wasted during the idle state of energy consuming equipments.

Keywords: IoT, Intelligent Controller, Prepaid Energy Meter, GSM, Short Message Service (SMS), Electricity usage monitoring.

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Introduction

Now a days, the electricity has become fundamental and its usage has been increasing in a great extent. Home appliances are occupying major role in wasting power during Standby Mode or idle mode and continue to draw the power that technically called electricity leaking. According to the US Energy Information Administration, Home appliance consumes two-third of the Energy generated and it also specifies that roughly one third of energy is

wasted. The massive energy waste cannot be avoided until its causes are genuinely understood (Santhosh et al, 2021). Energy waste is not just about having inefficient bulbs and setting air conditioner temperature too low. Recognizing how energy is typically lost is the first step in our society's significant effort to eliminate energy loss. The traditional EB meters can be replaced by smart Energy meter with intelligent controller which saves the energy



Retrieving Images and Its Classification by Acumen Mechanism Using Texture Features

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Abstract: The erudite software mechanism of content-based image representation and retrieval is crystal clear that it is perception-based approach. Here it main pragmatic concept is texture images and propose to model their textural concept. The main dexterous melted to estimate textural feature an namely Complexity, texture strength, coarseness, directionality, contrast, busyness and Textron. The ineffable computational measures are based on autocorrelation function (Associated with original image) An anchored comparison is taken among it statistical and structural methods of texture representation. It elicits which features given vivid performance.

Keywords: Texture Classification, Statistical and Structural features, KNN classifier, Image Retrieval.

1. INTRODUCTION

Texture, which has great impact on human visual perception describe to the spatial distribution of gray-level are considered as the concept of deterministic or random repetition of one or several primitives picture form. Micro textures often have small primitives, and macro textures typically have huge primitives[7]. In the areas of classification, segmentation, and form from practical texture and picture retrieval, texture mechanism is highly helpful. There are various kinds of textural features for image classification have been proposed[1]-[3]. From a segmented region only It will defined texture measure. strategies for analysing textures The two primary giants of computation are spatial techniques and frequency-based approaches. The examination of the spectral density function in the frequency-based domain is the general foundation for our choice of frequency-based approaches. These techniques include the wavelet-based Gabor model and the acumen concept Fourier transform. Techniques for spatial texture analysis can be divided into three categories: statistical, structural, or hybrid methods.

In concerns of concept micro textures, statistical methods produce improved result, whilst structural methods produce better results in terms of concept macro textures. Whether it existing method they are statistical, structural or hybrid, have another drawback not less significant: in the computational cost.

Almost all sorts of textures were perfectly perceived by the human eye. While the automatic processing of these textures is really quite intricate, the human eye could typically perceive the variations between textures reasonably simple.

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perceptual meaning
l statistical models

Non-invasive method of melanoma detection on the skin surface through extraction of image features using modified CAT optimization algorithm

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In this study, melanoma was detected at an early stage using modified CAT optimization algorithm (MCOA) based on non-convex boundary edge extraction, pixel size, shape and intensity variations on the skin. MCOA can detect skin cancer at an early stage by extracting the non-convex border of the affected region prevent cancer spread. Thus melanoma is curable when detected at an early stage. MCOA extracts image features and obtains non-convex boundaries of melanoma in the skin image. The non-convex boundary region leads to visualization of discriminative features of melanoma based on the region of interest and scaling. The proposed MCOA delineates the affected region through non-convex border extraction and edge detection. An accuracy of 85% was obtained in the detection of melanoma using MCOA, when compared to traditional algorithms.

Keywords: Contour refinement, edge detection, melanoma, non-convex boundary, optimization algorithm.

Melanoma detection and optimization algorithm

In India, the mortality rate of skin cancer patients increases by 25% every year¹. Melanoma disease detection at an early stage depends on the expertise of the radiologist/oncologist. Melanoma is a skin cancer which is diagnosed through skin lesions in the images². The lesion appears in irregular shape and boundary, and requires an efficient enhanced algorithm for visual identification from the image³. The skin lesion is extracted from the image based on colour, texture, shape and pixel intensity. The region of interest (ROI)-based skin lesions is clustered to extract the discriminative features for melanoma detection⁴. In clinical diagnosis, skin lesions less than 6 mm in diameter are not detected and rely on skin prick tests for melanoma diagnosis. This test examines only the surface of the skin and not below. The surface of skin is analysed through image segmentation and skin image with low contrast leads to inaccurate diagnosis⁵. The OTSU method segments the skin lesion

region from the image with less accuracy. The particle swarm optimization (PSO) algorithm is used to detect morphological changes in the skin through size, shape, colour and texture feature extraction from the image⁶. The extracted features are used for the detection of melanoma. Decomposition of melanoma image with filter removes artefacts and enhances the contrast. The filtered images have illumination variation in the lesion region and improve the prediction of melanoma⁷. The skin lesions classification is performed through feature extraction and histogram analysis. The histogram analysis is based on the shape, colour and pixel intensity of the lesion region. The segmentation algorithm extracts the lesion boundary, performs feature analysis and improves the visualization of the lesion⁸. Automatic detection of melanoma is done through three main stages. In the initial stage, the lesion image is automatically segmented to determine the lesion area with accuracy. In the second stage, the physical features of the lesion from the image are extracted. In the final stage, the extracted features are used for the diagnosis of lesions and to predict melanoma⁹. Skin cancer lesion prediction from image segmentation algorithm has maximum accuracy¹⁰. The proposed modified CAT optimization algorithm (MCOA) differentiates images such as benign, melanoma and malignant through accurate edge enhancement and extraction. The existing algorithms such as segmentation, enhancement and histogram-based analysis do not segment skin lesion and discontinuity in edge is seen in skin lesion. The proposed MCOA highlights the non-convex border region of skin lesions and extracts features for the detection of skin cancer. The different texture features are delineated for early detection of skin cancer.

Literature survey

Fuzzy *c*-means clustering algorithm has been proposed to classify and detect skin lesions accurately. It performs better than traditional clustering algorithms. The skin lesion classification can also be done using deep learning algorithms¹¹. Automatic detection of skin lesions using YOLOv4 is highly correlated with the non-infected and infected regions, and improves the accuracy of melanoma prediction.

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Investigations on the synthesis and growth and structural, spectral, optical, mechanical and thermal properties of non-linear optical single crystals of Bis-L-Seriniumoxalate Dihydrate (BLSOD)

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From the raw materials L-Serine and oxalic acid, the product Bis-L-Seriniumoxalatedehydrate(BLSOD) was created. By using a slow evaporation process, the individual BLSOD crystals were produced from aqueous solution. According to single crystal X-ray Diffraction investigations, the structure of the produced crystal is monoclinic. The existence of different functional groups and the chemical environment present in the synthesised material were qualitatively determined through the use of Fourier Transform Infra-Red (FTIR) and proton nuclear magnetic resonance (1H NMR) spectrum studies. The crystal's transparency in the visible and near-infra-red areas was confirmed by UV-Visible-Near infrared and photoluminescence spectrum tests, which also looked at the material's viability for device construction. To determine the crystal's machinability, the mechanical properties of the material were carefully examined using Vicker's hardness research. Thermal investigations such as Thermo gravimetric (TGA) and Differential thermal analysis (DTA) have shown the thermal stability of BLSOD and the phases of weight losses. As a function of frequency and temperature, the dielectric constant and dielectric loss of grown crystals were determined. The Kurtz-Perry powder test was used to check both the second harmonic generation (SHG) and then the NLO property of the material.

(Received September 21, 2022; Accepted January 10, 2023)

Keywords: Single crystal, Slow evaporation, TGA, DTA, SHG, NLO



1. Introduction

In recent days, nonlinear optical (NLO) materials have become the key elements in solid state laser and frequency conversion techniques that have important applications in many fields, such as advanced laser-based imaging, optical communication, and data storage systems [1]. In the field of crystal engineering, the evolution of single crystals with self-assembled hydrogen bonds in their molecular structure has received considerable attention [2]. The coherent blue and green light emitted by nonlinear optical materials is important for many applications like displays, high-resolution printing, and signal processing, etc. [3-5]. These NLO materials, in the form of their single crystals, are the basis of all contemporary technology [6-8]. Semi-organic materials have high optical linearity, are resistant to laser-induced damage, have an inherent ultra-fast response

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<https://doi>



Investigational work on self-cleaning cement mortar with titanium dioxide in partial replacement of cement

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


Abstract

Environmental degradation is the world's most pressing issue nowadays. Photocatalytic mortar, often referred to as self-cleaning cement mortar, is a recent trend in concrete technology. Titanium dioxide (TiO₂) is added to cement mortar mixtures as part of the technology. This speeds up the natural oxidation process and pollutant breakdown. Titanium dioxide, a naturally occurring photocatalyst, may degrade gaseous contaminants when exposed to sunshine. The hygiene of the exterior surfaces can be preserved, and air pollution in the surrounding neighbourhood can be decreased. For self-cleaning qualities titanium dioxide is utilized in the mortar as a partial replacement




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A study to determine human-related errors at the level of top management, safety supervisors & workers during the implementation of safety practices in the construction industry

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Highlights

- The present study has made significant additions to the existing knowledge of literatures related to the occurrence of human-related errors by identifying 140 contributing errors behind the occurrence of three major issues such as lack of supply & usage of PPE, improper safety training, poor safety supervision at the level of Top Management (TM), Safety Supervisors (SS) & Workers(W) through in-depth focus interview. The findings of this study will enable the top management, Safety supervisors & workers of the construction organizations to get to know about the errors that occur at their levels. Through this, they can contribute to the prevention of accidents by avoiding such issues at their levels while implementing safety practices such as the supply & usage of PPEs, Safety Training and Safety Supervision.




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An investigation on thermo-mechanical characterization of activated carbon/coconut shell powder reinforced natural composites

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Abstract

The main objective of this study is that, to develop the possibility of exploration on the usage of coconut shell (CS) and its derivative of natural activated carbon (AC) filler material, in the motive to fabricate the natural filler reinforced hybrid composite. In this particular study, E-Glass fiber has been chosen as the primary reinforcement and various proportions of CS and AC powder have been selected as the filler components along with the epoxy resin (matrix). Six variants of laminates have been fabricated (GFE, 3% CS, 6% CS, 3% AC, 6% AC and 6% CS/AC) by keeping the E-glass fiber and epoxy as the constant mixture. Besides that, to validate the physical and thermal stability of the composites tests like, Fourier infrared spectroscopy, thermogravimetric analysis (TGA), Scanning Electron Microscope, Tensile, Flexural, Impact, Heat Deflection Test (HDT), Thermal conductivity and Moisture absorption tests have been conducted on all combinations. During the tests, it has been observed that tensile (3% AC—384 MPa), flexural (3% AC—435 MPa), impact (3% AC—19.5 kJ/m²), HDT and moisture values (0% Particulate—0.475%) have shown a significant surge in hybrid composites by slightly compromising the fall of value in moisture absorption on AC composites.



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Development of Machine Learning Based Microclimatic HVAC System Controller for Nano Painted Rooms Using Human Skin Temperature

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Abstract

In this paper, a microclimatic data based occupancy regression controller (ORC) is proposed for heating, ventilation, and air conditioning (HVAC) systems and is termed microclimatic HVAC (M-HVAC). Microclimatic data consist of various measurements such as PIR, CO₂, humidity, wall, floor and roof temperatures, as well as human skin temperature for the prediction of the optimal thermal setpoint temperature in an M-HVAC system. Microclimatic conditions have a major role in building energy consumption and indoor thermal comfort. Human skin temperature, wall, floor and roof temperatures in the room are obtained through a thermal camera. ORC controller performance is evaluated on the SiO₂ nanocoated room walls for high energy savings. Up until now, researchers have focused on the optimization of thermal setpoint temperature (SPT) using indoor air temperature and room occupant count data, but have never addressed the microclimatic conditions. ORC predicts the optimal SPT after including the microclimate data. M-HVAC systems implement the ORC using a Raspberry Pi board connected with sensors and a thermal camera. ORC leads to thermal comfort in a room and reduces energy consumption. ORC improves prediction accuracy through regression analysis and reduces the energy cost of about 23.9% when compared to the traditional method. ORC provides high thermal comfort of about 97% with higher energy savings than the traditional method of temperature setpoint.



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Sections

Figures

References

[Abstract](#)

[References](#)

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PRINCIPAL
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Investigation of optical, thermal and mechanical studies on semi organic nonlinear optical diaquabis(L-lactato)magnesium (DLLM) single crystals for optoelectronic devices applications

Published: 03 August 2022

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R. Raja, R. Sugaraj Samuel, V. Chithambaram, G. Viju, S. Janarthanan & A. Mohamed Hidayathullah

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Abstract

The Diaquabis(L-lactato)magnesium (DLLM) single crystals have been grown by slow evaporation solution growth technique. The lattice parameters and crystalline nature of the grown DLLM crystals have been studied by single and powder X-ray diffraction (XRD) analyses, respectively. The chemical composition and the corresponding functional groups of the grown DLLM have been confirmed by Fourier transform infrared (FTIR) and proton nuclear magnetic resonance (1H NMR) spectral studies. The optical transparency of DLLM in the visible region has been confirmed by ultraviolet–visible–near infrared (UV–Vis–NIR) spectrum and it has also been ensured with maximum wavelength emission from photoluminescence study. The bandgap of the DLLM material was calculated from optical absorption studies. The mechanical property of the material is studied and discussed in detail. The thermogravimetric differential thermal analysis (TG/DTA) ascertained the thermal stability of the material. The second harmonic generation (SHG) of DLLM crystal has been determined by the standard Kurtz and Perry powder method. The surface morphology of the grown DLLM crystal was observed by field emission scanning electron microscope (FESEM) analysis and the presence of the elements in the compound was confirmed with an energy-dispersive X-ray analysis (EDAX) study.

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[Sections](#) [Figures](#) [References](#)

[Abstract](#)

[Data availability](#)

[References](#)

[Acknowledgements](#)

[Funding](#)

[Author information](#)

[Ethics declarations](#)




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MACHINE LEARNING BASED CROP YIELD MANAGEMENT

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Abstract—Farmers face several challenges when growing crops like uncertain irrigation, poor crop selection, etc. Especially in India, a major fraction of farmers faces challenges to select appropriate crops and fertilizers. Moreover, crop failure due to disease causes a significant loss to the farmers, and has a huge impact on the economy. This paper aims to leverage the power of machine learning techniques to optimize crop yield and enhance agricultural productivity. To provide practical recommendations, the system incorporates a user-friendly interface that allows farmers to input their specific parameters and receive customized suggestions. These recommendations may include suitable crop varieties, fertilizer selection strategies, and cure for plant diseases, all tailored to maximize crop yield based on the machine learning models.

I. INTRODUCTION

Our paper contains a combination of multiple modules that will help farmers to yield better crops. Our system has three modules (Crop recommendation, Fertilizer recommendation and Disease detection).

Crop Recommendation – The paper aims to develop and implement machine learning algorithms to accurately predict crop yields based on real-time and historical data. The models will be trained using a comprehensive dataset comprising diverse crops, regions, and agricultural parameters. The trained models will then be validated and tested using independent datasets to evaluate their performance and accuracy. The ultimate goal is to create a reliable and user-friendly crop yield prediction system that can assist farmers, policymakers, and agricultural stakeholders in optimizing agricultural practices, ensuring sustainable production, and addressing food security challenges. By leveraging the power of machine learning algorithms and incorporating real-time data inputs, this paper endeavors to revolutionize crop yield prediction, enabling farmers to make data-driven decisions, and optimize resource allocation.

Fertilizer Recommendation – The efficient use of fertilizers is crucial for maximizing crop productivity while minimizing environmental impact. Traditional fertilizer recommendation methods often rely on general guidelines or expert knowledge, which may not consider the specific needs of individual crops, soil types, or environmental conditions. However, with the advancements in machine learning techniques, it is now possible to develop more accurate and personalized fertilizer recommendation systems. By adopting a machine learning-based fertilizer recommendation system, farmers can optimize nutrient management, minimize fertilizer waste, reduce environmental pollution, and improve crop yields. It recommends suitable fertilizer for the crop based on the following parameters: Nitrogen, Phosphorus and Potassium and it will suggest some good ways to use the fertilizers and cultivate crops. The system can adapt to changing soil conditions, crop varieties, and weather patterns, ensuring continuous improvement and responsiveness.

Disease Detection – By implementing deep learning, we detect the type of disease the crop is affected by and suggest a cure to that disease so that the farmers can benefit and enable them to implement targeted management strategies such as precise pesticide application or crop rotation. The system can aid in reducing the reliance on broad-spectrum pesticides, optimizing resource allocation, and improving overall crop health and productivity.

This paper aims to develop a reliable and user-friendly system that assists farmers in detecting and diagnosing crop diseases accurately and in a timely manner. By harnessing the power of machine learning, we can enhance crop health, increase yields, and contribute to sustainable and resilient agricultural practices.



COMPARISON OF GEOPOLYMER CONCRETE WITH CEMENT CONCRETE

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ABSTRACT

Cements which are used for construction work are generally OPC or PPC and the production of this kind of cement not only consumes huge amount of the natural resources i.e., limestone and fossils fuel but also produces almost 0.9 tons of CO₂ for 1 ton cement clinker production. Also, world cement production generates 2.8-billion-ton man-made greenhouse gas annually. Geo-polymer concrete is totally different in materials and chemistry which is synthesized from waste material like fly-ash (Class F or C). It is an inorganic 3D polymer which is synthesized by activation of aluminosilicate source like fly ash (waste materials). Due to its high mechanical properties combined with substantial chemical resistance, low shrinkage and creep and environment friendly nature (very less amount of CO₂ production in comparison with OPC), it is a novel construction material for future. It was seen that geo-polymer concrete made of fully Fly-ash or partial replacement results with 80% reduction in CO₂ emission compared to OPC. Exhaustive studies in various processes and parameters show that geopolymer concrete is superior to cement concrete, which is a very good candidate material for future.

INTRODUCTION

1.1 GENERAL

The production of one ton of cement emits approximately one ton of carbon dioxide to the atmosphere which lends to global warming conditions. A need of present status is, should we build additional cement manufacturing plants or find alternative binder systems to make concrete? On the other scenario huge quantity of fly ash are generated around the globe from thermal power plants and generally used as a filler material in low level areas. Alternative binder system with fly ash to produce concrete eliminating cement is called "Geopolymer Concrete"

Geopolymers are a type of inorganic polymer that can be formed at room temperature by using industrial waste or by-products as source materials to form a solid binder that looks like and performs a similar function to PPC. Geopolymer binder can be used in applications to fully or partially replace PPC with environmental and technical benefits, an 80-90% reduction in CO₂ emissions and improved resistance to fire and aggressive chemicals.

Geopolymer cement is made from aluminium and silicon, instead of calcium and silicon. The sources of aluminium in nature are not present as carbonates and therefore, when made active for use as cement, do not release any quantities of CO₂. The most readily available raw materials containing aluminium and silicon are fly ash and slag.

The main process difference between PPC and geopolymer cement is that PPC relies on a high-energy manufacturing process that imparts high potential energy to the material via calcination. This means the activated material will react readily with a low energy material such as water. On the other hand, geopolymer cement uses very low energy materials, like fly ashes, slags and other industrial wastes and a small amount of high chemical energy materials (alkali hydroxides) to bring about reaction only at the surfaces of particles to act as a glue.



PERFORMANCE OF SEASHELL POWDER ON SOIL STABILIZATION

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ABSTRACT

Usage of sea shells like clams, mussels, oysters are wasted every day. It further raises the quantity of sea shell material waste. This contributes to numerous issues with the environment and climate. Million tons of sea shells are produced as the waste generated today create odours and promote microbial growth and emit CO₂ in lesser extent as they biodegrade and lead to environmental pollution will linger in the atmosphere, posing a number of environmental problems. therefore, excess will be utilized successfully in any sector of technological advancement. They have been made into necklace, buttons, belt buckles, earrings by adding sea shell powder wastes to the clay soil, we have to know about the changes in the strengths like, Atterbergs limits and Unconfined Compression test. The soil collected for the investigation is from the southern district of Tamil nadu, India. The different percentage of plastic powder was replaced to improve the soil property. In India, increase in population coupled with heavy laden loads of vehicles conveying heavier stresses concentrates especially on roads running in clayey soil zones which create significant problems for pavement and hence need to be stabilized. And by coordinating on the sea shell powder as part of the dose of 2.5%, 5%, 7.5%, 10%, are used as stabilizers.

Keywords : Stabilization; Soil; Characters; Properties; Sea shell

1 INTRODUCTION

1.1 General

Clay soils have wide development in Bombay, western part of Madhya Pradesh, part of Gujarat, and in some parts of Tamil Nadu. Here, large area is occupied by soils derived from the Deccan trap. Clay soil absorb water heavily, swell, become soft and lose strength. These soils are easily compressible when wet and possesses a tendency to heave during wet condition [1,2].

Clay soil shrink in volume and develop cracks during summer. They are characterized by extreme hardness and cracks when dry. These properties make them poor foundation soils and earth construction material. The stability and performance of the pavements are greatly influenced by the sub grade and embankment as they serve as foundations for pavements. For developing a good and durable road network in clay soil areas, the nature



INVESTIGATION OF HOLLOW BLOCK BY USING COPPER SLAG AND SUGARCANE BAGASSE

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ABSTRACT

This study discusses the result of the experimental investigation of hollow block behaviors under compression. Hollow blocks are considered non-structural elements as they do not contribute to the strength of the slab. Bagasse ash has been chemically and physically characterized, and partially replaced in the ratio of 0%, 5%, 10% and 15% by weight of cement in hollow blocks and 30% fine aggregate was partially replaced with copper slag. The size of the hollow block is to be 425 x 225 x 225 mm. Tests like Water absorption, the Density of the hollow block and compressive strength at 7 and 14 days were obtained. An experimental investigation was conducted to evaluate the mechanical properties of hollow block mixtures. Therefore, it is possible to use sugarcane bagasse and copper slag as cement replacement materials to improve quality and also to reduce the cost of construction materials such as mortars, and concrete interlocking blocks.

1. INTRODUCTION

1.1 GENERAL

Hollow blocks are one of the best substitutes for conventional burnt clay hollow bricks in the construction industry. Hollow blocks are light in weight and hollow, imparting thermal insulation to the buildings, Cement concrete hollow blocks have a prominent place in the modern building industry. They are cost-effective and better alternatives to burnt clay bricks under their good durability, fire resistance, partial resistance to sound, thermal insulation, small dead load, and high speed of construction. Concrete hollow blocks are usually larger than the normal clay building bricks and less mortar is required, faster construction is achieved. Cement concrete hollow blocks have a prominent place in the modern building industry.

A viable solution to the disposal problem would be the use of SCBA and municipal solid waste incineration (MSWI) bottom ash for civil engineering applications such as raw materials in producing concrete blocks, pavement blocks and kerbs. This will help to reduce disposal costs, preserve landfill capacity, conserve natural resources, and reduce environmental impacts.



EXPERIMENTAL STUDY ON CHARACTERISTICS STRENGTH OF GREEN CONCRETE

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ABSTRACT

Green concrete is capable for sustainable development and is characterized by the application of industrial wastes to reduce the consumption of natural resources energy and pollution of the environment. The Marble sludge powder can be used as filler and helps to reduce the total voids content in concrete. Natural sand in many parts of the country is not graded properly and has excessive silt, on the other hand Quarry rock dust does not contain silt or organic impurities and can be produced to meet the desired gradation and fineness as per the requirement. Consequently, this contributes to improve the strength of the concrete.

Through reaction with the concrete admixture, Marble sludge powder and quarry rock dust improved the pozzolanic reaction, micro-aggregate filling, and concrete durability. This paper presents the feasibility of the usage of Quarry rock dust and Marble sludge powder as hundred percent substitutes for natural sand in concrete. An attempt has been made in Durability studies on Green Concrete compared with the Natural sand concrete. It is found that the compressive and durability studies of concrete made of Quarry rock dust are nearly 14% more than the conventional concrete. Application of Green Concrete is an effective way to reduce environment pollution and improve the durability of concrete under severe conditions.

INTRODUCTION

1.1 General:

Green concrete is a revolutionary topic in the history of concrete industry. This was first invented in Denmark (1998). Green concrete has nothing to do with colour. It is a concept of thinking environment into concrete considering every aspect from raw materials manufacture over mixture design to structural design, construction, and service life. Green concrete is very often also cheap to produce, because, for example, waste products are used as a partial substitute for cement, charges for the disposal of waste are avoided, energy consumption in production is lower, and durability is greater. Green concrete is a type of concrete which resembles the conventional concrete but the production or usage of such concrete requires minimum amount of energy and causes least harm to the environment.

The CO₂ emission related to concrete production, inclusive of cement production, is between 0.1 and 0.2 t per tonne of produced concrete. However, since the total amount of concrete produced is so vast the absolute figures for the environmental impact are quite significant, due to the large amounts of cement and concrete produced. Since concrete is the second most consumed entity after water it accounts for around 5% of the world's total CO₂ emission (Ernst Worrell, 2001). The solution to this environmental problem is not to substitute concrete for other materials but to reduce the environmental impact of concrete and cement.

The potential environmental benefit of society of being able to build with green concrete is huge. It is realistic to assume that technology can be developed. Which can have the CO₂ emission related to concrete production. With the large consumption of concrete this will potentially reduce the world 's total CO₂ emission by 1.5-2%. concrete can also be the solution to environmental problems other then those related to CO₂ emission. It may be possible use residual product from other industries in the concrete production while still maintaining in a high concrete quality. During the last few decades society has become aware of the deposit problems connected with residual products, and demands, restrictions and taxes have been imposed. And as it