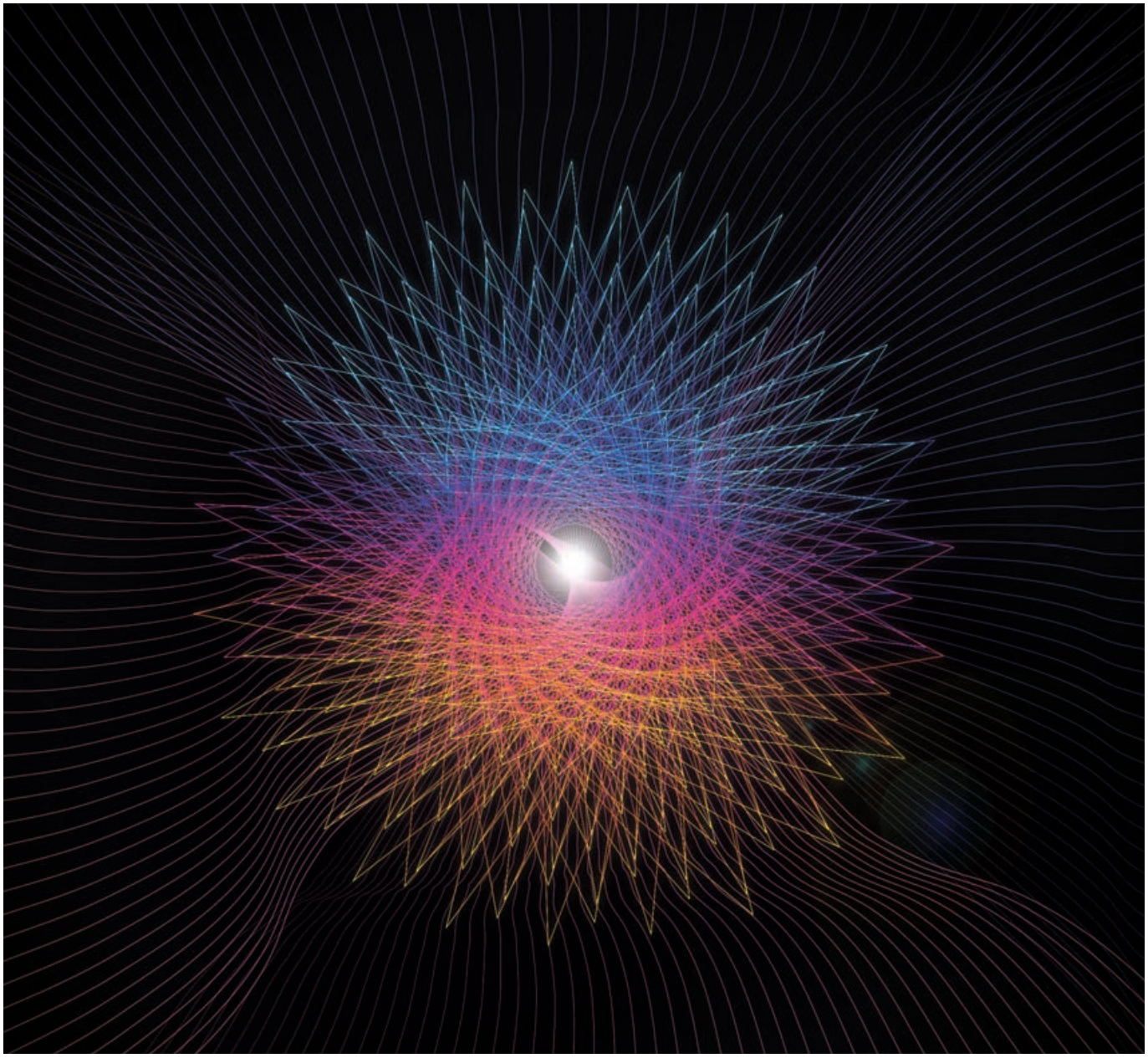
ALLIANCE UNIVERSITY
CENTRE for RESEARCH

RESEARCH PUBLICATIONS

DECEMBER 2024



RESEARCH PUBLICATIONS

DECEMBER 2024

" Research is creating new knowledge. "

Neil Armstrong

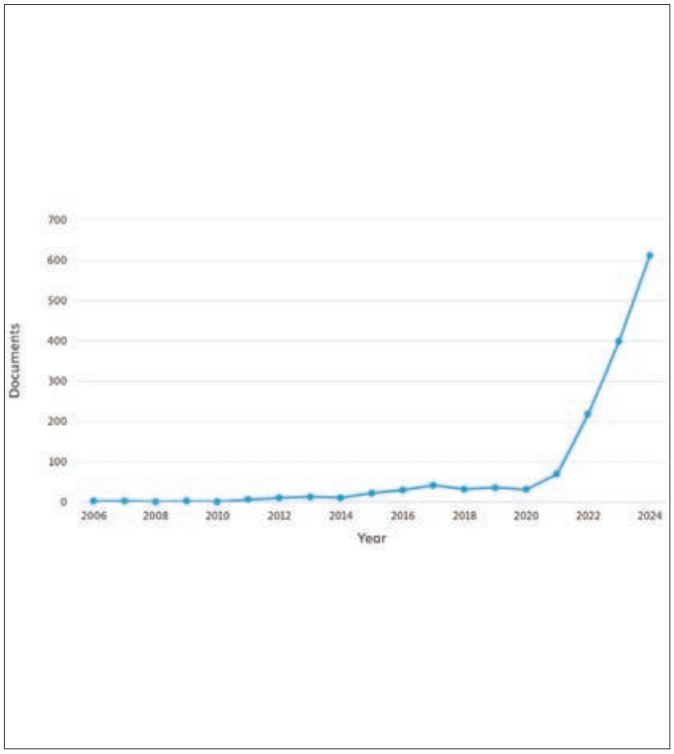
" If we knew what we were doing, it wouldn't be called research, would it? "

Albert Einstein

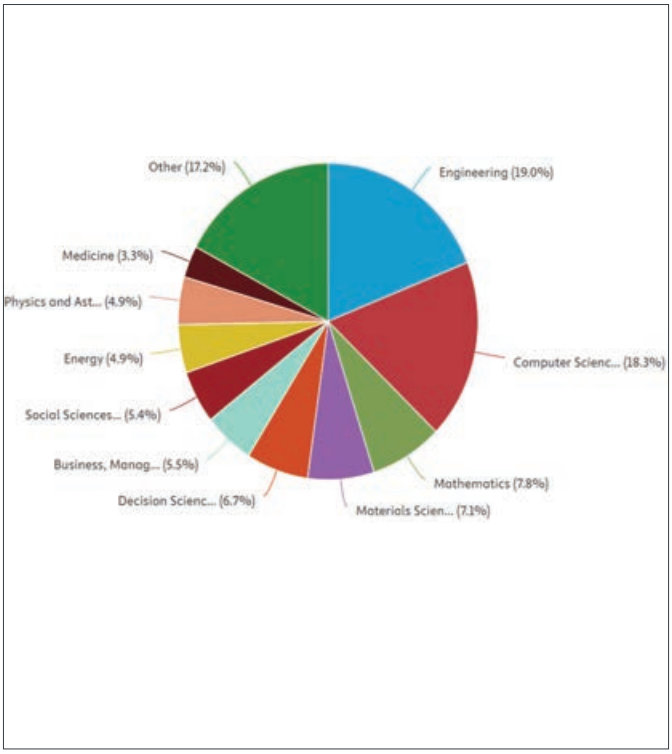
" Research is formalized curiosity. It is poking and prying with a purpose. "

Zora Neale Hurston

Documents by Year



Documents by Subject Area

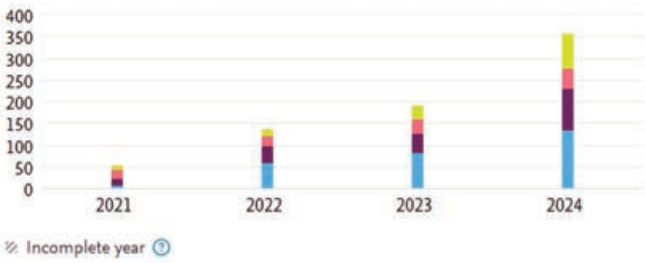


Summary

1293	514	4760	3.7	2.02
Scholarly Output	Authors	Citation Count	Citations per Publication	Field-Weighted Citation Impact

20.2%
All Open Access

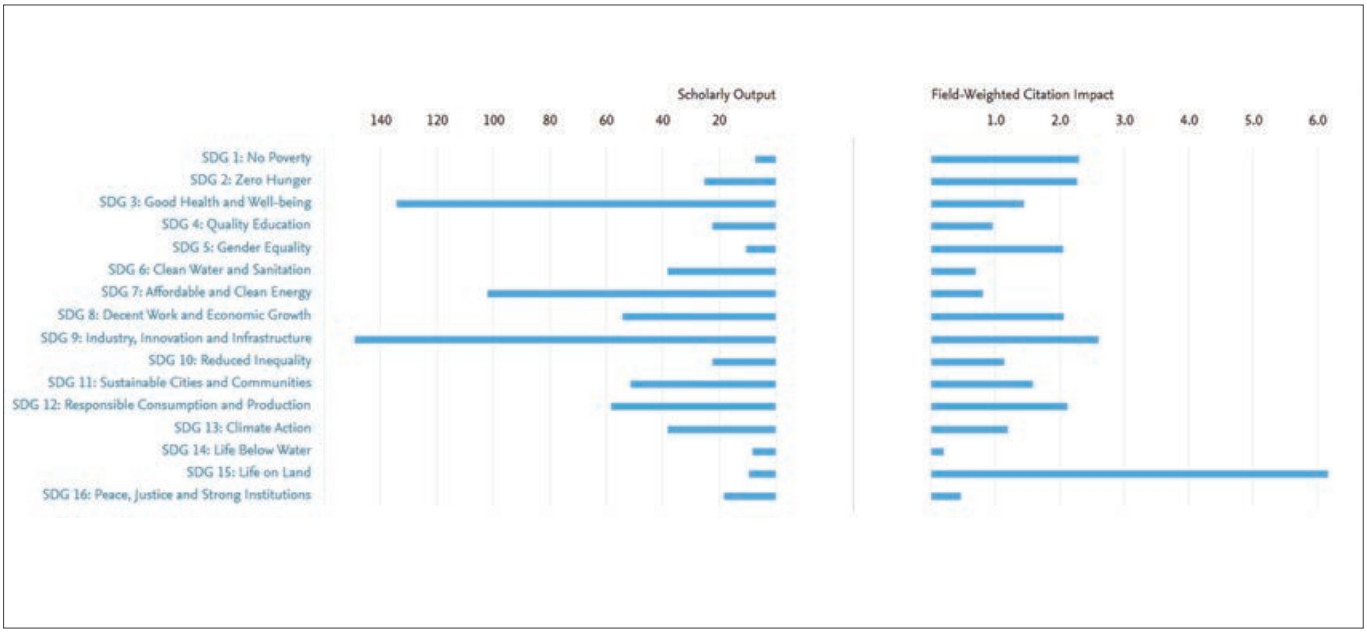
Publication by Journal Quartile



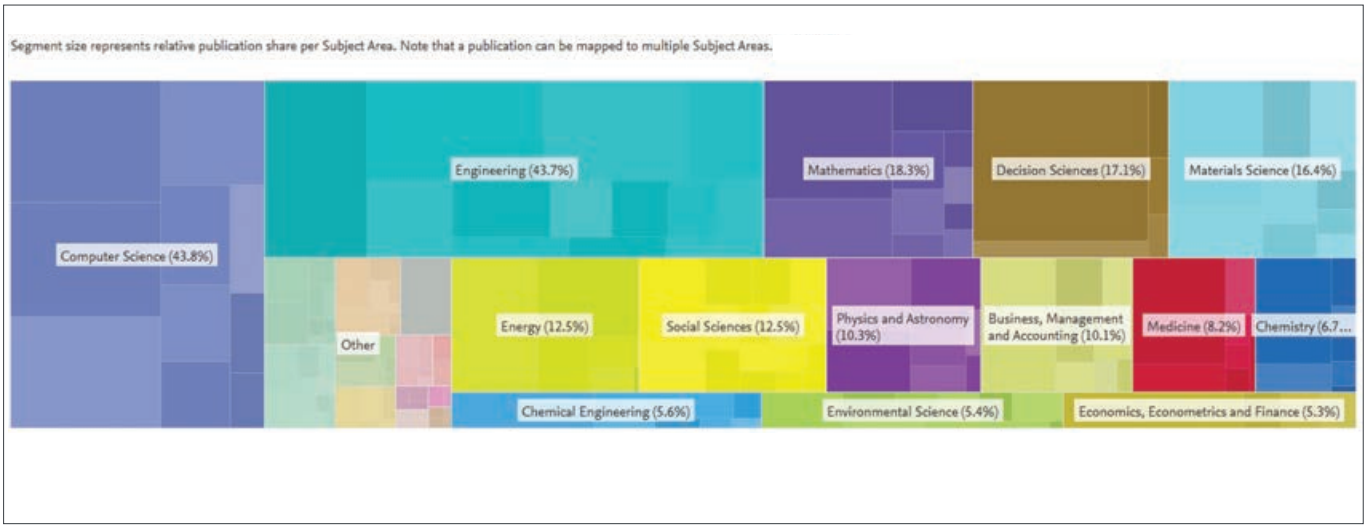
Quartiles	Publications	Publication share (%)
Q1 (top 25%)	286	38.5
Q2 (26% - 50%)	195	26.3
Q3 (51% - 75%)	122	16.4
Q4 (76% - 100%)	139	18.7

Cumulative shares	Publications	Publication share (%)
Q1 to Q2 (top 50%)	481	64.8
Q1 to Q3 (top 75%)	603	81.3

Publication by SDG



Subject Areas



ABOUT ALLIANCE UNIVERSITY

Alliance University is a Private University established in Karnataka State by Act No.34 of year 2010 and is jointly recognized by the University Grants Commission (UGC), New Delhi, Bar Council of India (BCI) and the All-India Council for Technical Education (AICTE), New Delhi. Since its inception in 2010, Alliance University has been a forerunner in higher education, calling out to the new generation of scholars, engineers, scientists, artists, people in business, social reformers helping to shape and transform societies and communities through and beyond, around the world. Alliance University with a vibrant and picturesque campus in Bengaluru, one of the fastest growing cities in India, offers more than 20 undergraduate and postgraduate majors to approximately 7000 students of diverse backgrounds. Currently, that trailblazing spirit makes Alliance University, one of the most sought-after universities in the world, featuring top-ranked academic programmes such as Alliance School of Business, Alliance College of Engineering and Design, Alliance School of Law, and Alliance Ascent College, and newly commenced Alliance School of Liberal Arts.

Alliance University is a leader in global education, with world-class infrastructure, state of the art laboratories, international visiting faculty, exchange programmes with leading universities in the US, UK, and European Union, and linkages with Research Labs across the world. Education at Alliance University is designed to inspire our students to become critical thinkers and to lead and change the world.

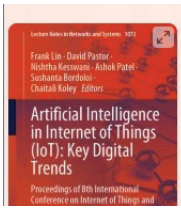
Indexing/Quartile - Scopus/Q4 | **Percentile** - 13th | **Impact Factor** - NA | SDG 03 GOOD HEALTH AND WELL-BEING

A NOVEL HEART DISEASE MONITORING AND PREDICTION USING MACHINE LEARNING ALGORITHM

Senbagavalli M.; Karpagalakshmi R.C.; Sumathi D.; Lenin J.; Prasad G.R.K.; Manikandan A.

Lecture Notes in Networks and Systems Volume 1072 LNNS, Pages 87 - 1032025 8th International Conference on Internet of Things and Connected Technologies, ICIoTCT 2023 Aizawl 29th September 2023 through 30th September 2023 Code 321769

Dr. M. Senbagavalli
Associate Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Artificial Intelligence in Internet of Things (IoT): Key Digital Trends

Proceedings of 8th International Conference on Internet of Things and Connected Technologies (ICIoTCT 2023)

Conference proceedings | © 2025

Abstract

Background: Continuous monitoring of patient health statistics becomes a difficult task in hospitals. Manually, it is difficult to monitor the health of the patients in the hospital continuously. Older and unconscious older people in particular need to be monitored regularly, and their relatives want to be informed about their health at every time. We, therefore, propose a revolutionary system that easily computerizes this task. Our device provides an intelligent device for monitoring patient status, which uses sensors to track hospital patients' health status and informs their relatives in the event of a problem via the Internet. Our system uses temperature, glucose levels and heart rate detection to track health. This task has been proposed to improve the monitoring system by using the Internet of Things (IoT) for hospital applications. Result: The suggested system was developed by MAX30100, LM35, ultrasonic sensor and nodeMCU connected to the Internet. BLYNK IoT Android app has already been used to send the notification via Android Application. The remote healthcare monitoring system is also proposed with cloud service and data analytics as to the aiding features. The readings are captured by mobile phone, which acts as the graphical user interface to get the status of the patient's health. The implemented hardware results illustrate that the suggested model can continuously observe the physiologic parameters and save lives promptly. Conclusion: ML classification algorithms like Regression tree, SVM, and RF analysis for prediction accuracy of patient health data. The proposed RF algorithm's simulation results provide minimum prediction error and high accuracy compared with the existing Regression tree and SVM algorithm.

Author keywords- ESP8266; Internet of Things; MAX30100; Saline bottle; Ultrasonic sensor; Wireless module

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Indexing/Quartile - Scopus/Q2 | **Percentile** - 60th | **Impact Factor** - NA | SDG

BERKELEY WAVELET TRANSFORM AND IMPROVED YOLOV7-BASED CLASSIFICATION TECHNIQUE FOR BRAIN TUMOR SEVERITY PREDICTION

Bahadure N.B.; Routray S.; **Patni J.C.**; Raju N.; Patil P.D.
International Journal of Electrical and Computer Engineering Volume 15, Issue 1, Pages 958 – 969 February 2025

Dr. Jagdish Chandra Patni
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Abstract

Abnormality in brain tissues is a life-threatening illness in humans Un-bias to gender and age if it is unrecognized and untreated within time, will lead to severe complications and extreme conditions. The brain tumor is mainly influenced by a variety of unpredicted and unavoidable reasons. Its evaluation, spread pattern, and identification involves complex assignment. Its early grading and the proper classification ensure effective treatment. The proposed work attempts to extract and classify the tumor region using an automatic classification system for magnetic resonance imaging (MRI) brain tumors. A deep learning convolutional neural network-based architecture YOLO is employed to classify and detect the tumor from brain MR images. The proposed method resulted in superior segmentation, and classification performance in terms of subjective visualization and objective metrics as compared to state of art approaches. The proposed YOLO-based method collectively achieved 98.89% classification accuracy on the BRAINIX and Kaggle datasets.

Author keywords- Berkeley wavelet transform; Convolutional neural network; Magnetic resonance imaging; Wavelet transforms; YOLO

Indexing/Quartile - Scopus/Q1 | **Percentile** - 92nd | **Impact Factor** - 3.8 | SDG

IOT-BASED AUTOMATED SYSTEM FOR WATER-RELATED DISEASE PREDICTION

Nemade B.; Maharana K.K.; Kulkarni V.; mondal S.; **Ghantasala G.S.P.**; Al-Rasheed A.; Getahun M.; Soufiene B.O.

Scientific Reports Open Access Volume 14, Issue 1December 2024 Article number 29483

Dr. GGS Pradeep
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

IoT-based automated system for water-related disease prediction

Bhushankumar Nemade, Kiran Kishor Maharana, Vikram Kulkarni, Surajit mondal, G S Pradeep Ghantasala, Amal Al-Rasheed, Masresha Getahun & Ben Othman Soufiene

Scientific Reports **14**, Article number: 29483 (2024) | Cite this article

Abstract

Having access to potable water is a fundamental right to well-being. Despite this, 3.4 million people die from diseases caused by water each year, and 1.1 billion people lack access to potable drinking water. Although industrialization, durable infrastructure, and rapid development have increased living standards, the water problem has left humanity defenseless. As different human activities have contaminated these water reserves, according to an estimate, water is the cause of 80% of ailments. As a result, it is necessary to permit enough infrastructure to ensure the security of a reliable supply of potable water. Thus, a real-time WBPCB dataset with 17 features and a proposed IoT-based system to collect data are used in this research to address the issue. The research paper provides a system for predicting diseases and forecasting long-term trends. Classification is performed using Random Forest, XGBoost, and AdaBoost, which have accuracy rates of 99.66%, 99.52%, and 99.64%, respectively. Forecasting is performed using LSTM, which has an MSE value for the pH parameter of 0.1631. The paper introduces TS-SMOTE, a novel hybridized time-series SMOTE data augmentation approach. Additionally, it offers an IoT system that uses H-ANFIS to gather data in real-time and identify attacks.

Author keywords- Forecasting diseases; H-ANFIS; IoT-based diseases prediction; Long short-term memory; LSTM; Time-series data; Time-series data augmentation; TS-SMOTE; Water quality prediction; Water-borne diseases prediction

Indexing/Quartile - Scopus/Q1 | **Percentile** - 82nd | **Impact Factor** - 3.4 | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

A REVIEW ON EFFECT OF NANOPARTICLE ADDITION ON THERMAL BEHAVIOR OF NATURAL FIBER–REINFORCED COMPOSITES

Balaji D.; Kumar P.S.; Bhuvaneshwari V.; **Rajeshkumar L.**; Singh M.K.; Sanjay M.R.; Siengchin S.

Heliyon Open Access Volume 11, Issue 115 January 2025 Article number e41192

Dr. Rajeshkumar Lakshminarasimhan
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Abstract

Always, the environment in which humans live needs to be saved from various calamities, and one such calamity is usage of petroleum-based products. Petroleum-based products are derived from various synthetic processes that adversely affect the environment. It may not reflect immediately, but it affects in the near future. They are non-environmentally friendly and cannot progress toward the sustainability factor. The alternative to metallic or synthetic fibers is natural fibers that are derived from plant sources. The demerits of using natural fiber is its less strength; however, this strength can be enhanced by incorporating it as a strengthening component in polymer matrix composite (PMC) materials. Still, the major advantage of using metal is its ability to withstand higher temperatures, whereas PMCs fail in these characteristics. The use of nanoparticles as fillers in the natural fiber–reinforced PMCs is a probable solution to the above problem. This review assesses the thermal characteristics of various nanoparticle-filled natural fiber–based polymer composites. It can be seen from most of the research that the filled polymer composites exhibit better thermal behavior compared with non-filled polymer composites. This consolidation would be useful for researchers to further accelerate their research in this domain.

Author keywords- Nanoparticle; Natural fibers; Polymer composites; Thermal behavior

Indexing/Quartile - Scopus/Q4 | **Percentile** - 16th | **Impact Factor** - NA | SDG

03 GOOD HEALTH AND WELL-BEING

UNVEILING THE ENIGMA: SUDDEN CARDIAC ARREST AMONG YOUTH AND UNCOVERING UNDERLYING CAUSES: A DATA ANALYSIS STUDY

Rao M.M.; **Shrivastava V.K.**

Communications in Computer and Information Science Volume 2268 CCIS, Pages 167 – 178 2025 5th International Conference on Artificial Intelligence and Speech Technology, AIST 2023 Delhi 26 December 2023 through 27 December 2023 Code 323319

Dr. Virendra Kumar Shrivastava
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Abstract

This study focuses on analyzing electrocardiogram (ECG) records related to sudden cardiac death in youth and analyze the factors influencing a sudden cardiac arrest. Sudden cardiac arrest poses a severe threat to life and can result in death if not addressed promptly. Recent American research indicates a 13% increase in sudden cardiac arrest cases among individuals aged between 35–45. Furthermore, the Indian Heart Association has reported that heart disease tends to affect Indians at a younger age compared to other demographic groups, often without prior warning. Studies reveal that Indians tend to experience heart diseases approximately a decade earlier than their Western counterparts. This work aims to conduct data collection and surveys to collect ECG records and other relevant information that is crucial for training the machine learning models to achieve the study outcomes. The study's scope encompasses evaluating the feasibility of the task, identifying relevant datasets, conducting data preprocessing, and assessing the performance using K-Nearest Neighbors (KNN), Support Vector Machine (SVM), and random forest algorithm. Among these, both SVM and Random Forest demonstrated superior performance, with the Random Forest algorithm further fine-tuned to align with the dataset's specific requirements. The refined model exhibited 93% accuracy.

Author keywords- artificial intelligence; chi-square test; ECG dataset; heart failure; image processing; machine learning; Sudden cardiac arrest (SCA)

Indexing/Quartile - Scopus/Q2 | **Percentile** - 58th | **Impact Factor** - 2.67 | SDG

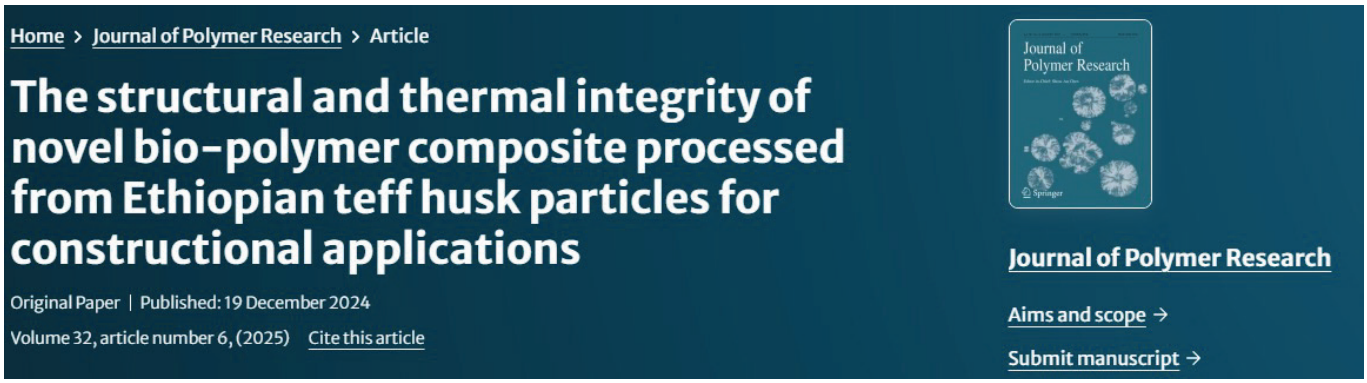
09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

THE STRUCTURAL AND THERMAL INTEGRITY OF NOVEL BIO-POLYMER COMPOSITE PROCESSED FROM ETHIOPIAN TEFF HUSK PARTICLES FOR CONSTRUCTIONAL APPLICATIONS

Gebremaryam G.; Shahapurkar K.; **Chenrayan V.**; Kanaginahal G.; Rojas P.V.; Arunachalam K.P.; Rajagopal R.; Murthy H.C.A.

Journal of Polymer Research Volume 32, Issue 1 January 2025 Article number 6

Dr. C Venkatesh
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Abstract

The inclusion of bio-fillers to develop a newer material to satisfy the needs of the sustainability agenda is a prime strategy followed by the research communities in recent days. In connection with this, the current work is on the utilization of Teff seed coat powder as an efficient reinforcement in epoxy composites. The open casting method was followed to cast four different proportions of teff powder reinforcement like 2.5, 5, 7.5 and 10% along with neat epoxy. The structural and thermal integrity of the material was investigated with tensile, compressive and thermogravimetric analyses. The density analysis explored the decrement trend in density for the increased content of teff particles. An epoxy composite reinforced with 7.5% teff powder claims to be an exceptional candidate for structural applications with improved properties than other variants. Composites of all compositions have 57% to 130% higher modulus and 39% to 70% higher strength than neat epoxy. Scanning electron micrographs are utilized to understand the structure–property relationships. TG/DTG studies showed that adding teff husk did not affect maximum degradation temperature, but the development of char enhanced the initial degradation temperature accomplished when compared to pristine composites.

Author keywords- Composites; Compression; Epoxy; Flexural; Teff husk; Waste utilization

Indexing/Quartile - Scopus/Q2 | **Percentile** - 67th | **Impact Factor** - NA | SDG

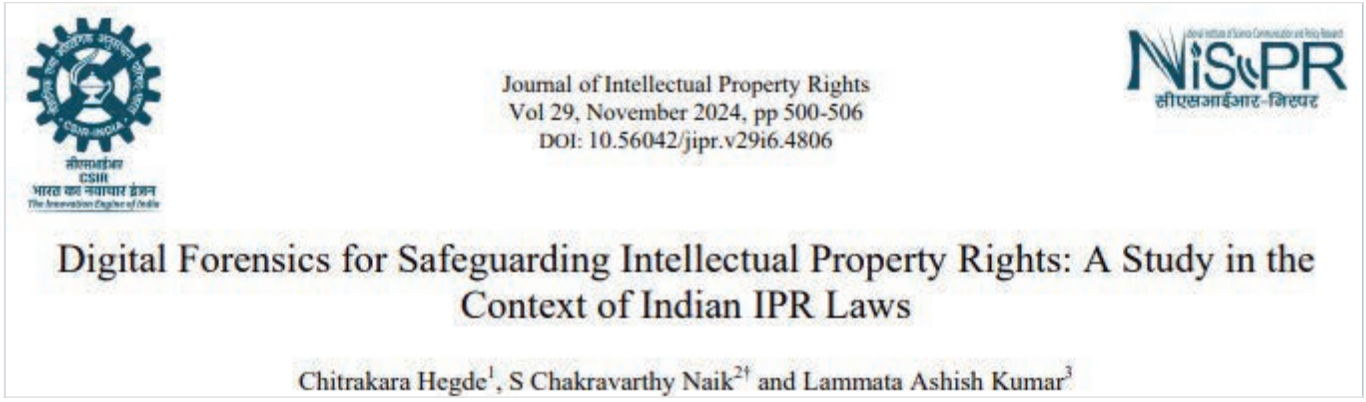
17 PARTNERSHIPS FOR THE GOALS

DIGITAL FORENSICS FOR SAFEGUARDING INTELLECTUAL PROPERTY RIGHTS: A STUDY IN THE CONTEXT OF INDIAN IPR LAWS

Hegde C.; Chakravarthy Naik S.; Kumar L.A.

Journal of Intellectual Property Rights Volume 29, Issue 6, Pages 500 – 506 28 October 2024

Dr. Chitrakara Hegde
Professor,
Department of Sciences,
Alliance University, Bangalore, INDIA



Journal of Intellectual Property Rights
Vol 29, November 2024, pp 500-506
DOI: 10.56042/jipr.v29i6.4806

Digital Forensics for Safeguarding Intellectual Property Rights: A Study in the Context of Indian IPR Laws

Chitrakara Hegde[1], S Chakravarthy Naik[2†] and Lammata Ashish Kumar[3]

Abstract

The protection of intellectual property rights in the digital realm is of utmost importance, particularly in developing countries like India. This paper conducts a thorough investigation into the role of digital forensics in preserving and enforcing intellectual property rights, specifically within the Indian context. Through an extensive review of relevant literature, we identify gaps in current research and propose a comprehensive methodology for examining and addressing intellectual property infringements in the digital domain. The paper incorporates certain examples and cases where digital forensics may be used to counter infringement. By exploring the intersection of digital forensics and intellectual property rights in India, this study contributes valuable insights to the existing body of knowledge, offering practical implications for policymakers, law enforcement agencies, and intellectual property rights holders operating in similar contexts.

Author keywords- Cyber Laws; Digital Forensic; Hypothetical Cases; IPR

Indexing/Quartile - Scopus/Q4 | **Percentile** - 17th | **Impact Factor** - 1.3 | SDG

07 AFFORDABLE AND CLEAN ENERGY

BIOSURFACTANT-MEDIATED SYNTHESIS OF GRAPHENE FLAKES FROM GRAPHITE FOR MICROBICIDAL ACTIVITY

Praseetha P.K.; Gangadhar L.; **Devi S.**; Subburaj S.; Jothinathan M.K.D.; Mushrifa A.F.
Rasayan Journal of Chemistry Open Access Volume 17, Issue 4, Pages 1699 – 1708
October-December 2024

Dr. Supriya Devi
Associate Professor,
Alliance School of Applied Mathematics,
Alliance University, Bangalore, INDIA

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http://www.rasayanjournal.co.in

BIOSURFACTANT-MEDIATED SYNTHESIS OF GRAPHENE FLAKES FROM GRAPHITE FOR MICROBICIDAL ACTIVITY

Abstract

A biologically prolific procedure involving microbes and biosurfactants as surface-active materials allows for the exfoliation of graphite into graphene flakes, harnessing microbial surface activity. In this study, the production of graphene flake has taken an unusual route with a biosurfactant as it is not the easiest method and is required in huge quantities. The biosurfactant was isolated from Pseudomonas aeruginosa. The microbe was isolated, cultured, and stored for surfactant production. The biosurfactant showed positive results for all the seven screening methods tested. The emulsification capacity was 62.7% indicating the highest stability of the biosurfactant to penetrate inside the kerosene. The production of biosurfactant in the mineral salt medium in a shaking condition provided a better result of the highest production which was then used for extraction purposes by autoclaving the culture. The exfoliation process took place once the production was over. The four main characterization techniques both spectroscopic and microscopic have revealed positive results for graphene flake production. The antimicrobial study was conducted to check the withstand capacity of the produced graphene flakes towards microbes and the results show the antimicrobial activity of the flakes. The sensitivity of graphene flakes against biotic discs was studied by antibiotic disc assay and the results show they are sensitive to the commonly administered antibiotics of today.

Author keywords- Antibiotic Sensitivity; Biosurfactant; Graphene; Graphene Flake

Indexing/Quartile - Scopus/Q2 | **Percentile** - 65th | **Impact Factor** - 3.5 | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

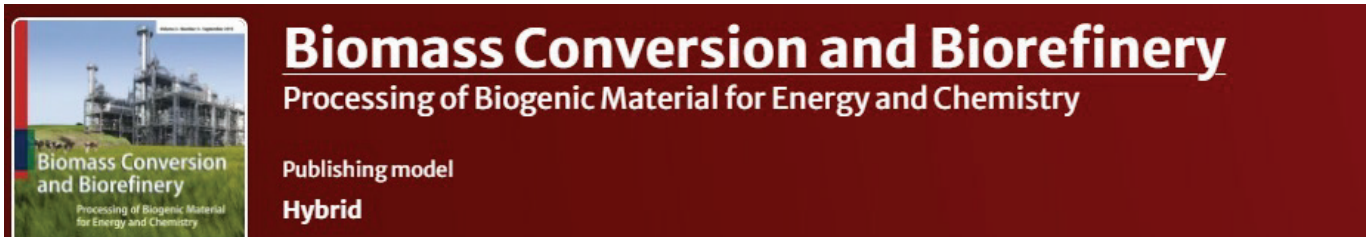
12 RESPONSIBLE CONSUMPTION AND PRODUCTION

BIOWASTE-DERIVED CHITOSAN NANOCOMPOSITE COATINGS FOR THE PRESERVATION OF BANANA

Koymeth S.; Anjana Krishna S.V.; Thomas S.; **Parameswaranpillai J.**; Midhun Dominic C.D.; Susan George J.; Reshmi R.S.; Poornima Vijayan P.

Biomass Conversion and Biorefinery Volume 14, Issue 24, Pages 32053 – 32065
December 2024

Dr. Jyotishkumar Parameswaranpillai
Associate Professor,
Department of Sciences,
Alliance University, Bangalore, INDIA



Abstract

The short shelf life of bananas is a major constraint in their storage and distribution. The current research put forward a "wealth from waste" concept to help the local farmers, exporters, and distributors to protect the bananas from fast decay and to benefit the consumer. Herein, an active chitosan-based nanocomposite coating has been developed purely from biosources to enhance the postharvest shelf life of bananas. Cellulose nanofibers (CNF) isolated from garlic skin, along with nanocurcumin derived from raw curcumin, have been used as nanofillers in the chitosan coating formulation. The isolated cellulose nanofibers (CNF) were chemically and morphologically characterized. Atomic force microscopy (AFM) images of the coating films showed that chitosan/CNF/nanocurcumin coating films have nanocomposite topology. The antimicrobial activity of coating films was analyzed, and remarkable antimicrobial capabilities against E. coli have been recorded for chitosan/CNF/nanocurcumin coatings, especially with 0.1 % nanocurcumin content. The physiochemical properties of the banana coated with different compositions of coating formulations were tested, such as weight loss analysis, titratable acidity (TA), total soluble solids (TSS), and pH. The chitosan/CNF/nanocurcumin coating reduced the weight loss percentage of bananas and retained their physiochemical attributes. High level of TA value and low TSS build-up rate were reported for chitosan/CNF/nanocurcumin-coated bananas. The antibacterial activity of nanocurcumin and the gas barrier effect of nanocomposite structuring in chitosan have contributed to the extended shelf life of coated bananas. The shelf life of the coated banana was extended by 8 days compared to the uncoated banana, which over-ripened in 3 days. This coating technique not only extends the shelf life of bananas but also provides an efficient waste management system in the agro-industry, converting large amounts of biowaste into useful products.

Author keywords- Banana; Cellulose nanofiber; Chitosan; Coating; Nanocurcumin; Shelf life

Indexing/Quartile - Scopus/Q3 | **Percentile** - 32nd | **Impact Factor** - NA | SDG

07 AFFORDABLE AND CLEAN ENERGY

ON RANDOM EXTREMA WITH APPLICATIONS TO RENEWAL PROCESSES

Ghosh S.K.; Ravi S.

Journal of Statistical Theory and Practice Volume 19, Issue 1 March 2025 Article number 3

Mr. Suman Kalyan Ghosh

Assistant Professor,
Alliance School of Applied Mathematics,
Alliance University, Bangalore, INDIA

Abstract

Considering the maximum and minimum of a random number N of independent and identically distributed random variables X1,X2,..., with distribution function F, N independent of X1,X2,..., and imposing conditions like concave/convex, log-concave/log-convex on F and/or on the random summand N, a study is done if the properties are preserved by the random extrema. The results are illustrated through two applications to renewal processes.

Author keywords- Compound distributions; Log-concave; Log-convex; Random maximum; Random minimum; Renewal process

Indexing/Quartile - Scopus/Q4 | **Percentile** - 18th | **Impact Factor** - NA | SDG

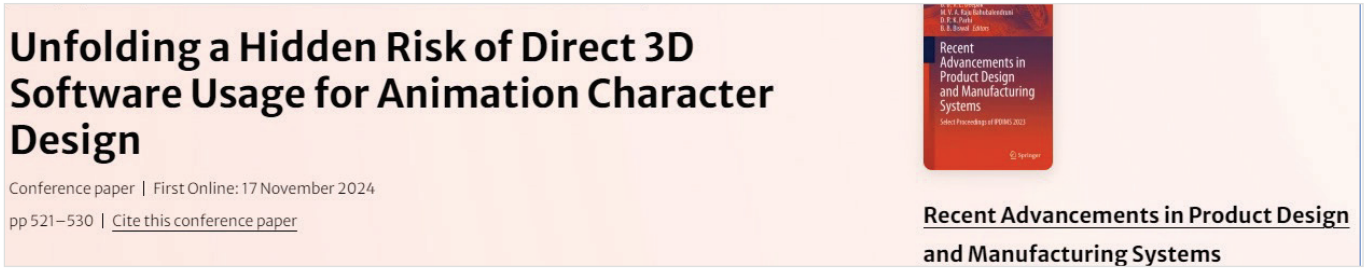
07 AFFORDABLE AND CLEAN ENERGY

UNFOLDING A HIDDEN RISK OF DIRECT 3D SOFTWARE USAGE FOR ANIMATION CHARACTER DESIGN

Karmakar A.; **Chowdhury A.**

Lecture Notes in Mechanical Engineering Pages 521 – 530 2025 5th International Conference on Innovative Product Design and Intelligent Manufacturing Systems, ICIPDIMS 2023 Rourkela 6 December 2023 through 7 December 2023 Code 322989

Dr. Anirban Chowdhury
Professor,
Alliance School of Design & Creative Arts,
Alliance University, Bangalore, INDIA



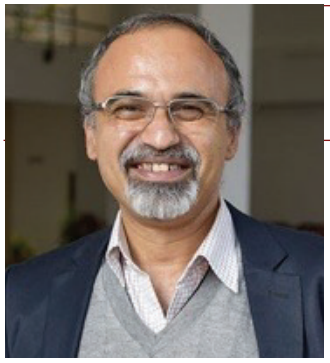
Abstract

In general, animation character design exercise done by designers using design process, in which they draw character concept first and then they generate the 3D model of the character. However, Gen-Z design students like to develop 3D character concept directly using 3D software as they feel it saves time. However, it is sometime difficult to fruitfully express the detailing of the character concept without detail drawings. This research attempted to compare the average ratings of two animation techniques: conventional hand-drawn animation and 3D computer animation in the context of character design. A total of 20 students skilled in traditional hand-drawn animation and another 20 students trained in 3D computer animation were chosen to make up two groups of students (age range = 18–22 years, male: 60% and female: 40%). The research also explored the distribution of scores among students engaged in hand-drawn character design and 3D computer-based character design. It was observed that conventional hand-drawn animated character (Mean = 7.35) and 3D computer animation character (Mean = 6.20) outcomes significantly different in term of average quality scores evaluated by ten experts. These findings suggest that the expert judges found quality in traditional hand-drawn animation character over 3D computer-generated animation character due to detailing of the design. To get more thorough understandings of the quality and preference features of various animation approaches within the field of animation arts, additional investigation and a wider variety of assessments are advised.

Author keywords- 3D computer animation; Animation medium; Character design; Hand-drawn animation; Learning outcomes

Indexing/Quartile - Scopus/Q3 | **Percentile** - 30th | **Impact Factor** - NA | SDG

03 GOOD HEALTH AND WELL-BEING



IMPACT OF THE COVID-19 LOCKDOWN ON STUDENTS' SOCIAL AND PSYCHOLOGICAL HEALTH

Dash M.; Bakshi S.; Muthyala A.

Contributions to Conflict Management, Peace Economics and Development Volume 34, Pages 105 – 114 14 January 2025

Mr. Mihir Dash

Associate Professor & Interim Associate Dean,
Alliance School of Applied Mathematics,
Alliance University, Bangalore, INDIA

Impact of The Covid-19 Lockdown on Students' Social and Psychological Health

Mihir Dash, Suprabha Bakshi, Arpana Muthyala

Conflict Prevention and Peace Management

Abstract

The abrupt closure of educational institutions during the COVID-19 pandemic had a serious impact on students and their studies. Classes were shifted online, many exams were cancelled, many students had to discontinue things that they were working on, and some students lost good job offers that were promised to them. This turn of events resulted in widespread anxiety among the students. The purpose of this research is to analyse the social and psychological aspects of the impact of the lockdown on students. The study was based on an online survey of undergraduate and postgraduate management students from different parts of India. The key findings of the study were that the most important impact of the lockdown on students has been an improvement in their relationships with family, friends, and society, followed by an adverse effect on students' physical and mental health, and finally an enhancement of students' self-actualisation. This last aspect has given students new motivation and hope to face the future with.

Author keywords- COVID-19 pandemic; lockdown; physical and mental health; relationships; self-actualisation; socio-psychological impact; students

07 AFFORDABLE AND CLEAN ENERGY

Indexing/Quartile - Scopus/Q4 | **Percentile** - 10th | **Impact Factor** - NA | SDG

ADVANCEMENTS IN VISION-BASED DEEP LEARNING TECHNIQUES FOR ENHANCING QUALITY INSPECTION IN SUBMERSIBLE PUMP IMPELLERS

Kovilpillai J.A.; Krishnachalitha K.C.; Yadav P.K.; Lalli K.; Jayanthy S.; **Dhar S.**
Lecture Notes in Networks and Systems Volume 1039 LNNS, Pages 377 – 387 2025
7th International Conference on Innovative Computing and Communication, ICICC 2024
New Delhi 16 February 2024 through 17 February 2024 Code 316239

Dr. Judeson Antony Kovilpillai J
Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Abstract

A significant factor and essential operation that ensures submersible pump impellers are inspected for quality to ensure top performance and reliability in different applications. The following paper discusses on how the techniques of computer vision and deep learning facilitate the ability to identify defects of the pump impellers in a quality control unit of the industry. The technical review, in this case, aims at providing a broad survey on a variety of deep and transfer learning approaches to quality control in manufacturing. The purpose of the study is to explore different approaches in identifying and classifying defects of impellers using an open dataset containing 7348 casting manufacturing top-view images. The goal is to explore and evaluate various recent implementations in computer vision and deep learning and arrive at the best approach used to detect defects. A comparative analysis of different novel techniques is also done as a part of this research, and the insights gained from this study can optimize industrial quality control techniques, aligning them with the industrial standards.

Author keywords- Deep learning; Defect identification; Industrial quality control; Submersible pump impellers; Transfer learning

Indexing/Quartile - Scopus/Q4 | **Percentile** - 10th | **Impact Factor** - NA | SDG

07 AFFORDABLE AND CLEAN ENERGY

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING APPROACHES FOR HEALTHCARE

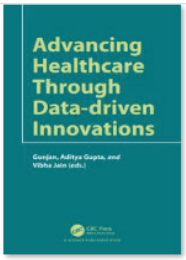
Badi M.

Advancing Healthcare through Data-driven Innovations Pages 13 – 27

19 December 2024

Ms. Manjulata Badi

Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Chapter

Artificial Intelligence and Machine Learning Approaches for Healthcare

By Manjulata Badi

Book Advancing Healthcare through Data-driven Innovations

Abstract

Environmental contamination and the preservation and reuse of natural resources are critical ecological and societal concerns. Reduction and alleviation strategies remain important for pollution management. Artificial intelligence (AI) emerges as a promising solution to address these challenges. This paper reviews advancements in AI technologies for environmental pollution control, offering a comprehensive overview of the benefits, features, and limitations of individual and combined AI techniques. Recent progress in AI-driven pollution reduction and mitigation technologies is explored. Research on AI's role in managing these processes is scrutinized. Notably, expert systems, fuzzy logic, and neural networks emerge as leading methods for process control. In the face of pressing environmental issues, the integration of AI holds immense potential. Its ability to analyze complex data, optimize resource use, and predict pollution trends contributes to more sustainable practices. By leveraging AI-driven technologies, society can actively combat environmental degradation while efficiently managing valuable natural resources. These advancements underscore the significance of AI in shaping a more environmentally conscious and sustainable future.

Indexing/Quartile - Scopus/Q1 | **Percentile** - 75th | **Impact Factor** - 2.2 | SDG

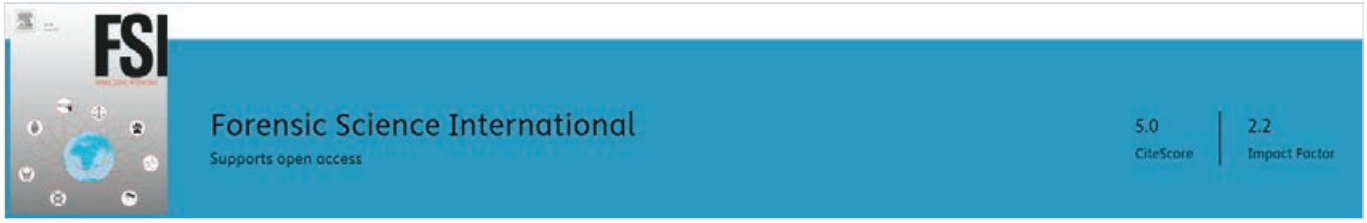
16 PEACE, JUSTICE AND STRONG INSTITUTIONS

A REVIEW ON FORENSIC ANALYSIS OF BIO FLUIDS (BLOOD, SEMEN, VAGINAL FLUID, MENSTRUAL BLOOD, URINE, SALIVA): SPECTROSCOPIC AND NON-SPECTROSCOPIC TECHNIQUE

Hegde C.; Shekhar R.; Paul P.M.; Pathak C.

Forensic Science International Volume 367 February 2025 Article number 112343

Dr. Chitrakara Hegde
Professor,
Department of Sciences,
Alliance University, Bangalore, INDIA



Abstract

The accurate detection, identification, and analysis of biofluids at crime scenes play a critical role in forensic investigations. Various biofluids, such as blood, semen, vaginal fluid, menstrual blood, urine, and saliva, can be crucial evidence. In a murder case involving a knife attack, for instance, bloodstains from both the victim and perpetrator might be present. Sexual assault cases often involve the analysis of semen and vaginal secretions. Biofluid analysis employs a two-tiered approach: presumptive tests for initial identification and confirmatory tests for definitive analysis. This review article focuses on six key biofluids and their forensic significance. In this review, we comprehensively explore the relevant analytical techniques, including non-spectroscopic methods like immunoassays, spot tests, and cytokine profiling, alongside spectroscopic techniques such as Infrared (IR) spectroscopy, Mass Spectrometry (MS), and Raman Spectroscopy (RS).

Author keywords- Biofluids; Forensic analysis; Non-spectroscopic techniques; Spectroscopic techniques

Indexing/Quartile - Scopus/Q4 | **Percentile** - 7th | **Impact Factor** - NA | SDG

07 AFFORDABLE AND CLEAN ENERGY

AN APPROACH TO REVIEW THE CONSTRAINTS OF CHATGPT

Badhiye S.; Borkar P.; Gandhewar C.S.; Kakade I.P.; Sawant K.S.; **Shelke C.**
AIP Conference Proceedings Volume 3214, Issue 14 November 2024 Article number 020041 2nd International Conference on Trends in Material Science and Manufacturing Engineering, ICTMSME 2024 Virtual, Online 6 April 2024 through 7 April 2024 Code 203713

Dr. Chetan J. Shelke
Associate Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

An approach to review the constraints of ChatGPT

Sagarkumar Badhiye ✉; Pradnya Borkar; Chinmay S. Gandhewar; Ishwari P. Kakade; Kaivalya S. Sawant; Chetan Shelke

+ Author & Article Information

AIP Conf. Proc. 3214, 020041 (2024)

Abstract

Chat-GPT is an AI language model that can translate speech, write music, answer survey questions, and even create computer code. It is the most widely used AI chat-bot. However, despite its advanced capabilities the Chat-GPT has a few weaknesses and challenges that accuracy in its implementation and can be affected. Here are some limitations of Chat-GPT. ·Chat-GPT is an AI language model that can perform a variety of tasks such as language translation, songwriting, answering survey questions, and generating computer code but despite its advanced capabilities, Chat-GPT has a few limitations that can affect its performance and accuracy. These limitations include incorrect responses, response biases, lack of human perspective, excessively long responses (words) with the possibility of misinformation or misleading information, potential biases in training data, security risks from information gathers, sense-like but overuse of certain words. They are trained on data that can sometimes give inaccurate or misleading information, be biased, and lead to discriminatory or offensive conclusions. In today's world, although chatbots have the power to be used extensively it is important to be aware of their limitations when using applications.

Indexing/Quartile - Scopus/Q1 | **Percentile** - 85th | **Impact Factor** - 4.9 | SDG

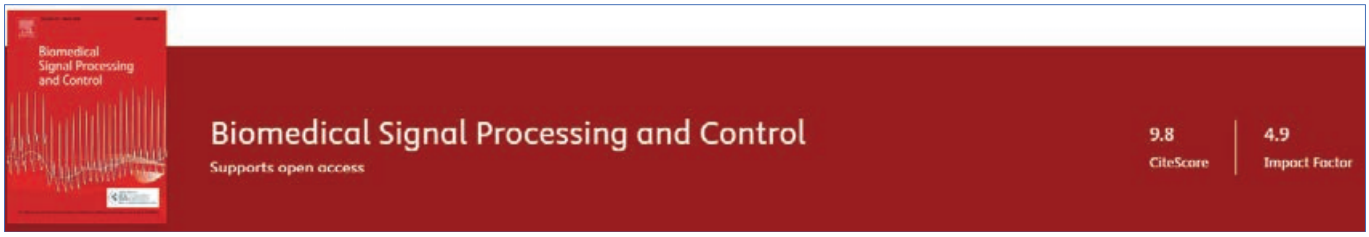
03 GOOD HEALTH AND WELL-BEING

EFFECTS OF OBJECTS AND IMAGE QUALITY ON MELANOMA CLASSIFICATION USING SPATIO TEMPORAL JOINT GRAPH CONVOLUTIONAL NETWORK

Suryanarayana V.; Prabhu Shankar B.; Burri R.D.; Priyanka T.; Saidala R.K.; Sasi Kumar A.; Chauhan P.; **Patni J.C.**

Biomedical Signal Processing and Control Volume 101 March 2025 Article number 107193

Dr. Jagdish Chandra Patni
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Abstract

Malignant melanoma, a highly lethal subtype of skin cancer, is categorized by the abnormal growth of melanocyte cells and is associated with elevated mortality rates. Improving the prognosis of patients with melanoma requires an early and precise diagnosis. Recently, deep learning models have emerged as dominant tools in computer-aided diagnosis (CAD) systems for the categorization of potential melanoma lesions. In clinical settings, obtaining high quality skin images can be challenging due to blurry, noisy, low-contrast images that may contain extraneous objects such as rulers or hair. To overcome these challenges, the Spatio Temporal Joint Graph Convolutional Network (STJGCN) was utilized to detect and classify melanoma from dermoscopy images. The input images are collected from the 2020 Challenge Dataset of the International Skin Imaging Collaboration (ISIC). The input images are provided to Information Exchange Multi-Bernoulli-Filter (IEMBF) based pre-processing for hair noise removal, resizing, random rotations, cropping, and splitting from input dataset. The pre-processed images are provided to Spatio Temporal Joint Graph Convolutional Network (STJGCN) for detecting and classifying melanoma as benign and malignant. The Red Panda Optimization Algorithm (RPOA) is used to fine-tune STJGCN parameters. The proposed EOIQ-MC-STJGCN approach is implemented in Python and various performance metrics are analyzed to assess the efficacy of the proposed approach. The proposed approach attains the highest accuracy of 97.86% in melanoma detection and classification compared to various existing approaches. By demonstrating the efficiency of the proposed EOIQ-MC-STJGCN technique, this research contributes to faster and more accurate melanoma diagnosis, ultimately facilitating earlier intervention and treatment.

Author keywords- Dermoscopic Images; Information Exchange Multi-Bernoulli Filter; Melanoma; Red Panda Optimization Algorithm; Skin Cancer; Spatio Temporal Joint Graph Convolutional Network

Indexing/Quartile - Scopus/Q2 | **Percentile** - 70th | **Impact Factor** - 1.5 | SDG

10 REDUCED INEQUALITIES

17 PARTNERSHIPS FOR THE GOALS

THE DEATH OF MIGRANT WORKERS IN INDIA DURING THE FIRST WAVE OF COVID-19 PANDEMIC

Kumar S.; Patel A.B.

Mental Health and Social Inclusion Volume 28, Issue 5, Pages 766 – 779 2 December 2024

Dr. Sumant Kumar
Associate Professor,
Alliance School of Liberal Arts and Humanities,
Alliance University, Bangalore, INDIA

The death of migrant workers in India during the first wave of COVID-19 pandemic

Sumant Kumar, Avanish Bhai Patel

Mental Health and Social Inclusion

Abstract

Purpose: COVID-19 lockdown imposed by the government in India affected markets, factories, industries, construction sites, restaurants, transport services, etc. in which migrant workers were engaged. Migrant workers expected that after the imposition of the lockdown government will facilitate transportation facilities to their hometowns as they lost their jobs. But due to negligence from both the central and the state governments, neither transportation was arranged nor food, shelter or health facilities were arranged. This paper aims to investigate the causes of the death of migrant workers under the theoretical framework of negligence theory. Design/methodology/approach: The authors have applied the content analysis method and collected 926 death cases of migrant workers from 28 Indian states. The researchers applied this technique as the newspapers in India are one of the largest and most useful sources to generate a report/record on migrant workers causes during the COVID-19 lockdown. During the lockdown period, due to lack of attention from the government, police atrocities, hunger and accidental cases increased which resulted in the death of migrant workers. Findings: The finding of the study proves that during the first phase of COVID-19 lockdown the death cases of migrant workers increased due to negligence by the governments. The number of death cases of migrant workers has been analysed through applying negligence theory which included duty, breach, cause, in fact, proximate cause and harm which increased the death cases. It has been noticed that the central government without any prior notice-imposed lockdown all over India, in which all the states were not received any guidelines or communication which indicate what they have to do or how to handle the Covid-19 situation. Originality/value: To the best of the authors' knowledge, this is an original work of researchers which is basically based on negligence theory.© 2023, Emerald Publishing Limited.

Author keywords- COVID-19; Death; Lockdown; Migrant workers; Negligence

Indexing/Quartile - Scopus/Q4 | **Percentile** - 20th | **Impact Factor** - NA | SDG

07 AFFORDABLE AND CLEAN ENERGY

CREATING A COMPATIBLE DESIGN SOLUTION THROUGH SARI DRAPES FOR VISUALLY CHALLENGED WOMEN OF INDIA

Swaroop S.; **Chowdhury A.**

Lecture Notes in Mechanical Engineering Pages 531 – 544 2025 5th International Conference on Innovative Product Design and Intelligent Manufacturing Systems, ICIPDIMS 2023 Rourkela 6 December 2023 through 7 December 2023 Code 322989

Dr. Anirban Chowdhury
Professor,
Alliance School of Design & Creative Arts,
Alliance University, Bangalore, INDIA

Creating a Compatible Design Solution Through Sari Drapes for Visually Challenged Women of India

Conference paper | First Online: 17 November 2024

pp 531–544 | Cite this conference paper

Recent Advancements in Product Design and Manufacturing Systems

Abstract

Daily, visually impaired women in India encounter hurdles when it comes to clothes. Traditional Indian attire is not only difficult to understand, but it also causes perplexity for the user due to the number of excessive clothing items involved. The aim of this study is to provide a design solution that serves as a substitute for sari. Before creating the design, a survey of fifteen visually impaired women aged 35–60 was conducted. The sari was draped using provided instructions, and the fit of the garment was assessed using wear study. The effectiveness of the two proposed prototypes was evaluated based on feedbacks and observations from sari wearing task. Where applicable, chi-square goodness of fit test was performed on data. It was found that the ready-to-drape sari fit was determined to be 100% satisfactory.

Author keywords- Apparel design; Drape; Fashion; Sari; Visually challenged women

Indexing/Quartile - Scopus/Q1 | **Percentile** - 75th | **Impact Factor** - 2.7 | SDG

03 GOOD HEALTH AND WELL-BEING

ENHANCING BLOOD PLATELET COUNTING THROUGH DEEP LEARNING MODELS FOR ADVANCED DIAGNOSTICS

Dev U.; Singh T.; **Babu T.**; Mandal A.K.; Sharma M.; Mandal A.

SN Computer Science Volume 6, Issue 1 January 2025 Article number 4

Dr. Tina Babu
Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Abstract

Platelet counting is considered an essential factor for the diagnosis of blood clotting disorders as well as other illnesses as COVID-19 and Leukemia. Hemocytometer-based manual techniques are labor-intensive and prone to errors, especially in dynamic settings where platelet clumping develops over time. This work presents a novel method based on a collection of regression and object detection models-MobileNetv2, EfficientDetD0, and SSD MobileNet-that were trained on a large number of microscopic blood smear images. Multiple models have been trained and analysed to find out which models perform well for our dataset and problem. This study demonstrates how deep learning and object detection in blood platelet counting can revolutionize the field by increasing diagnostic precision and efficiency in healthcare systems. Out of all the models trained, we observed that EfficientDet D0 gave us the best performance, with a precision of 0.64, mAP of 0.96 and recall of 0.65.

Author keywords- Blood cells; EfficientDet; MobileNet; Platelets; SSD; SSD MobileNet

Indexing/Quartile - Scopus/Q4 | **Percentile** - 20th | **Impact Factor** - 0.38 | SDG

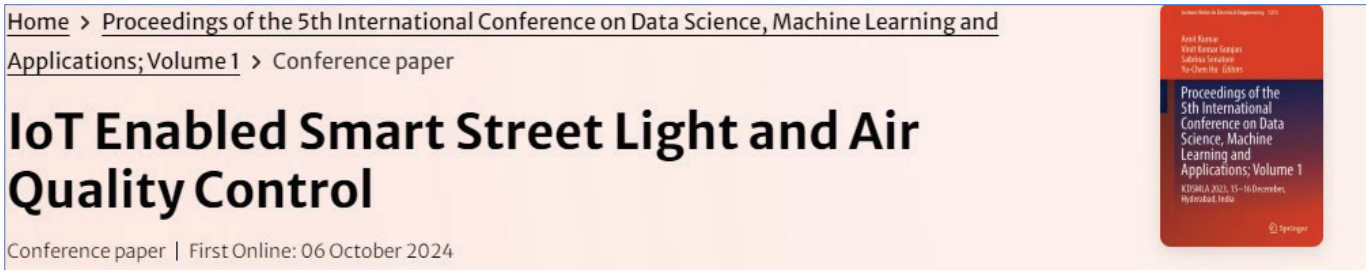
07 AFFORDABLE AND CLEAN ENERGY

11 SUSTAINABLE CITIES AND COMMUNITIES

IOT ENABLED SMART STREET LIGHT AND AIR QUALITY CONTROL

Thomas A.K.; Shekhar H.; Bhagyalakshmi L.; Suman S.K.; Sreelakshmy R.; Bhasha A. *Lecture Notes in Electrical Engineering Volume 1273 LNEE, Pages 843 – 853 2025 5th International Conference on Data Science, Machine Learning and Applications, ICDSMLA 2023 Hyderabad 15 December 2023 through 16 December 2023 Code 321139*

Dr. Aby K. Thomas
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Abstract

The research is based on the concept of smart city comprises the energy efficient operation of street lights measuring the air pollutants and control the pollutants to improve the air quality index. It is primarily built on the concept of piezoelectric effect and photo voltaic cells. It uses IoT to build a method for smart avenue lights systems alongside real-time online tracking of air pollutants. Free electrical energy science from photo voltaic cells and piezoelectric effect became the basis of the independent framework for the proposed device. It well manoeuvres the street bulbs in particular based absolutely on the movement of vehicles and daylight through the infrared (IR) and light detection resistor (LDR) sensors. Moreover, a web based monitoring arrangement is used for identifying faulty street bulbs with the assistance current flow. Based on the wide variety of automobiles surpassed at some stage in the dark, street bulbs dare operated at 2 specific potency i.e., from 50% to 100% with the intensity of 50% with inside missing of automobiles whilst working at 100% when vehicle's approach. This dimming operation now no longer best complements the lifestyles span of streetlights however additionally permits substantial conservation of electricity by as much as 80%. Besides, actual online air pollution tracking allows the government to take appropriate steps whenever air quality index reaches an undesired level and requires immediate purification system to control and improve the air quality.

Author keywords- Air Quality Measurement and Control; IoT; Piezoelectricity; Smart Streetlamps; Solar cells

Indexing/Quartile - Scopus/Q1 | **Percentile** - 96th | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

EMPATHY DEVELOPMENT THROUGH GAME-BASED LEARNING: AN INVESTIGATIVE STUDY ON NURSING PROFESSIONALS

Mohan M.; Passi V.R.; Mohan L.; Praveen S.; Agarwal A.; **Chowdhury A.**; Kumar N.; Sharma R.

Nurse Education Today Volume 144 January 2025 Article number 106409

Dr. Anirban Chowdhury
Professor,
Alliance School of Design & Creative Arts,
Alliance University, Bangalore, INDIA

Empathy development through game-based learning: An investigative study on nursing professionals

Abstract

Background: Empathy is at the core of patient-centred care. Evidence has continually found that empathy helps foster therapeutic relationships and is essential in the delivery of quality healthcare. In India, many factors are barriers to empathy for nursing professionals. Objectives: 1. To design and test a game for Indian nurses to practice empathy. 2. To develop and test reliability of a learner feedback form 3. To test the impact of the game on the empathy of nurses Design and methods: The IDEO design thinking process was followed to design the game. A focus group discussion with 18 nurses helped identify relevant scenarios and barriers to empathy. A scenario of an interaction between a nurse and a cancer patient was identified to create the game. The game mechanics, rubrics, and scenarios were built based on feedback from diverse professionals consisting of doctors, nurses, and UX designers. A learner feedback form assessing usability, contextual specificity, engagement, and perceived learnability was created and its reliability was tested. The game was tested on 60 nurses, followed by administration of the learner feedback form. To assess changes in empathy, an empathy scale was administered before the intervention and seven days after the intervention on 20 nurses. Results: The learner feedback form was found to have Cronbach's Alpha >0.70, and therefore reliable. The responses to the learner feedback form were analysed using the Chi Square test and were found to be positive and statistically significant (p-value<0.001). The differences in pretest and posttest empathy scores were analysed using the Wilcoxon Signed Ranks test and were found to be statistically significant as well (p-value<0.001). Conclusions: The positive response to the learner feedback form, and the improvement in empathy scores after the intervention, indicates that games have a potential role in teaching empathy to Nursing Professionals.

Author keywords- eLearning; Empathy; Game-based learning; IDEO design thinking; Nurses; Testing

Indexing/Quartile - Scopus/Q2 | **Percentile** - 61st | **Impact Factor** - 2.66 | SDG

07 AFFORDABLE AND CLEAN ENERGY

EFFECT OF BIO-WASTE CONCH FILLER ADDITION ON MECHANICAL PERFORMANCE OF GLASS FIBER-REINFORCED EPOXY POLYMER COMPOSITE

Kumar K.V.; Pavendhan R.; **Senthamaraikannan P.**; Sonar T.; Osipov A.
Materialpruefung/Materials Testing Volume 66, Issue 12, Pages 1990 – 1998
December 2024

Dr. P. Senthamaraikannan
Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Effect of bio-waste conch filler addition on mechanical performance of glass fiber-reinforced epoxy polymer composite

Kalidas Vinoth Kumar, Rajangam Pavendhan, Palanisamy Senthamaraikannan, Tushar Sonar and Alexander Osipov

From the journal Materials Testing
https://doi.org/10.1515/mt-2024-0177

Abstract

In this, the effect of conch shell particles on mechanical performance of glass fiber-reinforced polymer (GFRP) composite was investigated. The GFRP composites were prepared using hand layup method. The conch particles were added in the incremental levels of 0, 25, 35, 45, and 55 wt.% to GFRP composites. The C—H stretching vibration and aliphatic amine groups in conch-filled composites confirmed the dispersion of conch particles. The mechanical performance of GFRP composites was evaluated by impact strength, interlaminar shear strength (ILSS), and fatigue strength tests. The GFRP composites fabricated using 35 wt.% of conch shell particles showed higher impact toughness of 35 J in presence of centered notch compared to GFRP composites developed without conch shell particles that showed impact toughness of 13 J. The ILSS of GFRP composites drops by the addition of conch shell particles. The GFRP composites fabricated using 35 wt.% of conch shell particles showed 26.21 % reduced ILSS compared to the GFRP composites developed without conch shell particles. The GFRP composites fabricated using 45 wt.% of conch shell particles exhibited fatigue life of 10,093 cycles. These results suggest that conch filler – GFRP composites can be used for lightweight applications, which are cost-effective and ecofriendly.

Author keywords- conch shell powder; epoxy; glass fiber-reinforced polymer composite; mechanical properties; microstructure

Indexing/Quartile - Scopus/Q4 | **Percentile** - 18th | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

PRESENCE OF GESTALT TRAITS IN A BRAND LOGO AND ITS IMPACT IN EVOKING THE INTENDED MEANING

Srivastav R.; **Chowdhury A.**

Lecture Notes in Mechanical Engineering Pages 691 – 706 2025 5th International Conference on Innovative Product Design and Intelligent Manufacturing Systems, ICIPDIMS 2023 Rourkela 6 December 2023 through 7 December 2023 Code 322989

Dr. Anirban Chowdhury
Professor,
Alliance School of Design & Creative Arts,
Alliance University, Bangalore, INDIA

Abstract

The study delves into applying gestalt theory in visual brand identities, specifically Indian letterform and monogram logos. By categorizing these logos based on high, medium and low gestalt traits, the research aimed to explore how these traits influence consumer perception of the logos' intended meanings. Using a quantitative approach, ten logos were evaluated and through a questionnaire, consumers' interpretations of the logos were collected. The findings highlighted that logos with higher gestalt traits were more communicative and better conveyed their intended meanings compared to those with fewer gestalt traits. This underscores the significance of gestalt principles in designing effective and communicative visual brand identities.

Author keywords- Brand attributes; Gestalt principles; Logo design; Semiotics and symbolic meaning; Visual perception

Indexing/Quartile - Scopus/Q1 | **Percentile** - 77st | **Impact Factor** - NA | SDG

07 AFFORDABLE AND CLEAN ENERGY

OPTIMIZATION AND PERFORMANCE ANALYSIS OF A D-SHAPED POLYMER OPTICAL FIBER SPR SENSOR FOR SELECTIVE DETECTION OF CADMIUM IONS

Mishra A.; Maurya R.; Upadhyay A.; Sharma G.; Gangwar P.K.; **Mishra V.**; Singh V.

Optik Volume 321 February 2025 Article number 172161

Dr. Vivekanand Mishra
Professor,
Department of Sciences,
Alliance University, Bangalore, INDIA

Abstract

This article explores the theoretical optimization and performance analysis of a surface plasmon resonance sensor utilizing a single-mode D-shaped polymer optical fiber for the detection of cadmium ions. In this structure, a sensing layer made of polyvinylpyrrolidone is employed over metal to protect it from environmental chemical reactions and selective sensing application of cadmium ions. Numerical investigations of the proposed structure have been carried out employing the finite element method. By optimizing the thickness of the metal, residual cladding, and sensing layer, the sensitivity and detection accuracy of the surface plasmon resonance sensor are estimated. The proposed sensor can detect the cadmium ions of concentration ranging from 0.5 ppm to 1000 ppm. The highest sensitivity (1500 nm/RIU), detection accuracy (29.6921), and figure of merit (64.4640 /RIU) of proposed sensors is observed at 1 ppm concentration of cadmium ions. Despite some variation, the detection accuracy and figure of merit remain high across all considered concentrations of cadmium ions, indicating the reliable performance of the sensor. Its optimal performance at lower concentrations is particularly beneficial for early detection and continuous monitoring of cadmium contamination.

Author keywords- Cadmium ion detection; D-shaped polymer fiber; Finite element method; Sensitivity; Surface plasmon resonance

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

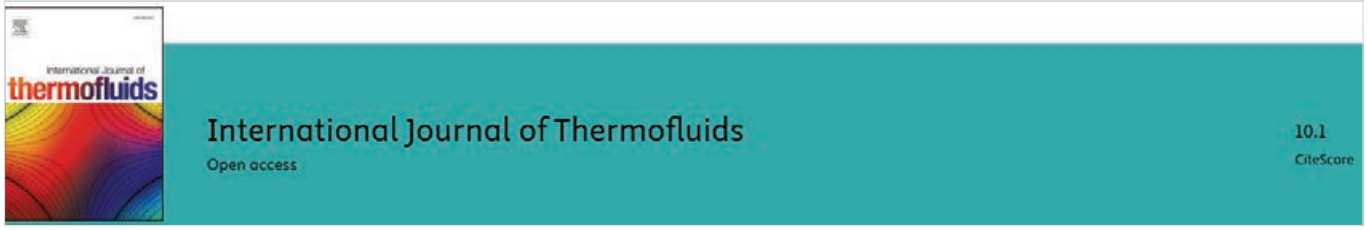
Indexing/Quartile - Scopus/Q1 | **Percentile** - 94th | **Impact Factor** - 10.44 | SDG

HEAT TRANSFER ANALYSIS OF CUO-ZNO/WATER HYBRID NANOFLUID IN A SHELL AND TUBE HEAT EXCHANGER WITH VARIOUS TUBE SHAPES

Behera M.; Nayak J.; **Bal S.**

International Journal of Thermofluids Open Access Volume 24 November 2024 Article number 100972

Dr. Sasmita Bal
Associate Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Abstract

Heat exchangers are widely used in various applications, including heating and cooling systems. Adding nanoparticles to the base working fluid can enhance the fluid's thermophysical properties, thereby increasing the thermal performance of heat exchangers. Further heat transfer enhancement can be done by using a hybrid nanofluid, which contains two or more different nanoparticles. The findings of the paper can be utilized to enhance the thermal efficiency of a shell and tube heat exchanger with different tube shapes and by using CuO-ZnO/ water hybrid nanofluid as a working fluid. Numerical simulations were conducted to model thermal heat exchangers with different configurations. Copper tubes of circular, hexagonal, and elliptical geometry were considered for the experiment. The model is solved using Ansys software with a finite volume approach. The solver employs an upwind-based multidimensional linear approach and upwind discretization schemes. The water inlet velocity in the Shell ranges from 0.5m/sec to 3.2 m/sec at a Reynold number of 10,000 to 15,000 whereas the velocity of cold fluid in the tube varies from 1.4 to 2 m/sec. All experiments were conducted with a 0.01–0.1 %vol % CuO-ZnO (80:20)/ water hybrid nanofluid. The hybrid nanofluid on the tube side is used to cool hot fluid (water) on the shell side. Hybrid nanofluid inlet temperature was maintained at 30°C to cool hot water at 60°C. Hexagonal tube geometry increases the contact surface area, resulting in a 22.11 % increase in heat transfer rate compared to round tubes and an 18.42 % increase compared to round tubes. Experimental and numerical results for the convective heat transfer coefficient, Nusselt number, and pressure drop were also reported.

Author keywords- heat transfer coefficient; Hybrid nanofluid; Nusselt number; Pressure drop; Shell and tube heat exchanger; Thermal performance

Indexing/Quartile - Scopus/Q2 | **Percentile** - 55tht | **Impact Factor** - 1.2 | SDG

07 AFFORDABLE AND CLEAN ENERGY

TWO MIXED VIRTUAL ELEMENT FORMULATIONS FOR PARABOLIC INTEGRO-DIFFERENTIAL EQUATIONS WITH NONSMOOTH INITIAL DATA

Suthar M.; Yadav S.

Journal of Mathematical Analysis and Applications Volume 543, Issue 215 March 2025 Article number 128981

Ms. Meghana Suthar
Assistant Professor,
Alliance School of Sciences,
Alliance University, Bangalore, INDIA

Abstract

This article presents and examines two distinctive approaches to the mixed virtual element method (VEM) applied to parabolic integro-differential equations (PIDEs) with non-smooth initial data. In the first part of the paper, we introduce and analyze a mixed virtual element scheme for PIDE that eliminates the need for the resolvent operator. Through the introduction of a novel projection involving a memory term, coupled with the application of energy arguments and the repeated use of an integral operator, this study establishes optimal L2-error estimates for the two unknowns p and . Furthermore, optimal error estimates are derived for the standard mixed formulation with a resolvent kernel. The paper offers a comprehensive analysis of the VEM, encompassing both formulations.

Author keywords- Error estimates; Mixed intermediate projection; Mixed Ritz Volterra projection; Mixed virtual element method (VEM); Non-smooth initial data; Parabolic integro-differential equations

Indexing/Quartile - Scopus/Q3 | **Percentile** - 35th | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

OPTIMIZING PACKET PROCESSING IN IOT-ENABLED WIRELESS SENSOR NETWORKS: A NOVEL DATA MINING APPROACH

Raju S.V.S.R.K.; **Thomas A.K.**; Ramu K.; Pandey R.; Rao B.M.; Rachapudi V.; Harikumar M.; Kashyap T.

Mathematical Modelling of Engineering Problems Open Access Volume 11, Issue 11, Pages 3192 – 3200 November 2024

Dr. Aby K. Thomas
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Optimizing Packet Processing in IoT-Enabled Wireless Sensor Networks: A Novel Data Mining Approach

S. V. S. Rama Krishnam Raju | Aby K. Thomas | K. Ramu | Rajeev Pandey | B. Madhava Rao | Venubabu Rachapudi | M. Harikumar | Tanuja Kashyap

Abstract

This form of automation endows devices with intelligence, enabling them to assimilate data through sensor nodes and formulate informed decisions. Traditionally, data mining has been portrayed as a safeguard against threats or malfunctions in networks. The primary objective here is to minimize redundancy in information packets recognised by nodules, subsequently transmitted to the cluster head for pre-processing. In the realm of IoT, the sensor node network operates in two dimensions: spatial detection and collection of data by nearby nodes, followed by temporal monitoring at specified intervals. Regardless of the scenario, the proposed approach stands out as the optimal choice. It emphasizes the elimination of redundant characteristics in the detected data, employing a packet classification method for filtering and essential packet mining. The suggested novel data mining (NDM) approach in this study not only supports QoS (Quality-of-Service) for diverse requests and amenities but also facilitates capacity paired, traffic flow accounting, and the observing of recognised information. The effectiveness of an NDM-based Wireless Sensor Network (WSN) tailored for IoT is gauged through various metrics. Simulation results unequivocally underscore the superior performance of the suggested strategy compared to alternative methods. Future endeavours aim to implement this framework in dynamic settings, creating an application tailored to real-time problem-solving.

Author keywords- IoT; novel data mining; NSM; Quality-of-Service; Wireless Sensor Network

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Indexing/Quartile - Scopus/Q1 | **Percentile** - 78th | **Impact Factor** - 1.6 | SDG

HAS FINTECH RESHAPED GLOBAL TRADE? NEW EMPIRICAL EVIDENCE FROM STRUCTURAL GRAVITY MODEL

Kumari M.

Transnational Corporations Review Open Access Volume 17, Issue 1 March 2025
Article number 200105

Dr. Mamta Kumari
Assistant Professor,
Department of Economics,
Alliance University, Bangalore, INDIA

Transnational Corporations Review
Open access
5.2 CiteScore | 1.6 Impact Factor

Abstract

Technological advancements in the financial sector are widely recognized as transformative for global trade and supply chains, significantly improving access to financial services while enhancing the security, efficiency, transparency, and flexibility of transactions between exporters and importers. In this context, the present study investigates the role of financial technology (fintech) in promoting international trade. Drawing on both theoretical and empirical frameworks that link trade and finance, the research explores how fintech innovations reduce trade costs and, in turn, enhance the gains from trade. By estimating a theory-consistent gravity model based on bilateral trade flows from 106 countries over the period 2014–2019, the study reveals that fintech innovations disproportionately stimulate international trade compared to domestic trade. These findings highlight the critical role of fintech in lowering trade barriers and suggest that policies promoting fintech development—such as those fostering innovation in blockchain, payment systems, and financial services—are essential to strengthening global trade competitiveness.

Author keywords- Fintech; Gravity model; International trade; Intranational trade

Indexing/Quartile - Scopus/Q1 | **Percentile** - 85th | **Impact Factor** - 2.6 | SDG

03 GOOD HEALTH AND WELL-BEING

IOT BASED HEALTHCARE SYSTEM USING FRACTIONAL DUNG BEETLE OPTIMIZATION ENABLED DEEP LEARNING FOR BREAST CANCER CLASSIFICATION

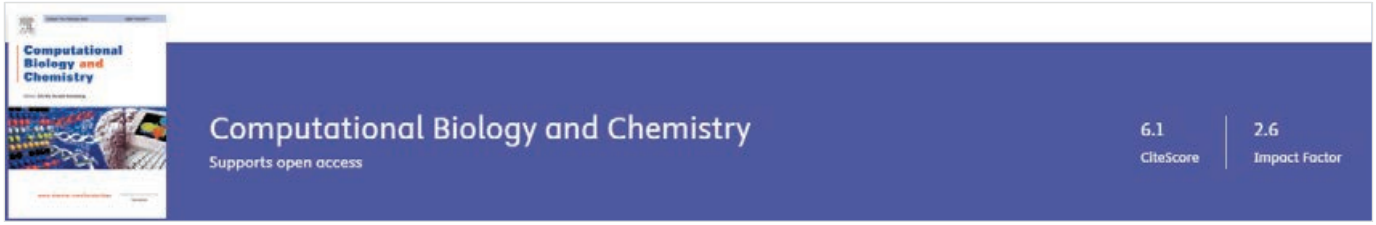
Rani V.V.; Vasavi G.; **Paul P.M.**; Rani K.S.

Computational Biology and Chemistry Volume 114 February 2025

Article number 108277

Dr. P. Mano Paul

Associate Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Abstract

Breast cancer classification plays a crucial role in healthcare, especially in the diagnosis and monitoring of patients. Traditional methods for classifying breast cancer based on histopathological images often suffer from limited accuracy, which can hinder early detection and treatment. Hence, this paper devises a novel Internet of Things (IoT) based healthcare system using SqueezeNet_Fractional Dung Beetle Optimization (Squeeze_FDBO) for breast cancer detection. Initially, IoT network is simulated, and routing of the histopathological images to the Base Station (BS) is established utilizing FDBO, which is obtained by combining Dung Beetle Optimizer (DBO), and the Fractional Calculus (FC). At BS, breast cancer classification is done, where input is first processed by a bilateral filter. Then, blood cell segmentation is effectuated using LadderNet, and then, feature extraction is performed. Finally, the multigrade classification of breast cancer is executed utilizing SqueezeNet tuned by FDBO. The efficiency of Squeeze_FDBO is validated using various performance measures, and it is found to record an accuracy of 0.919, sensitivity of 0.913, specificity of 0.923, Negative Predictive Value (NPV) of 0.920, and Positive Predictive Value (PPV) of 0.908, and a better routing performance with energy of 0.405 J, distance of 6.901 m, and delay of 0.650mS.

Author keywords- Dung Beetle Optimizer; Fractional Calculus; LadderNet; SqueezeNet; SqueezeNet_Fractional Dung Beetle Optimization

Indexing/Quartile - Scopus/Q2 | **Percentile** - 92nd | **Impact Factor** - 5.6 | SDG

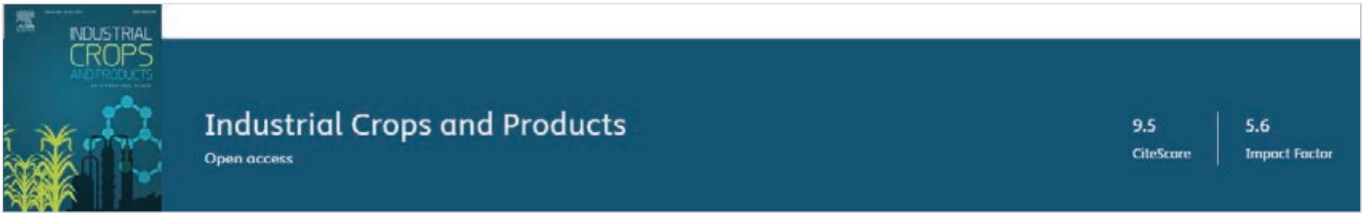
07 AFFORDABLE AND CLEAN ENERGY

CHARACTERIZATION OF NOVEL BIO-PLASTICIZER FROM CISSUS QUADRANGULARIS LINN. STEM: A SUSTAINABLE AND CLEANER MATERIAL FOR FUTURISTIC APPLICATIONS

Ramnath R.A.; **Senthamaraikannan P.; Suyambulingam I.**; Begum S.; Jeyanthi S.; Divakaran D.

Industrial Crops and Products Volume 223 January 2025 Article number 120153

Dr. P. Senthamaraikannan
Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Abstract

There is also an increase in demand for plasticizers derived from natural resources, which are biodegradable. In search of novel bio-plasticizers, Cissus quadrangularis linn. (CQL) plant identified serves as an ideal source for plasticizer from natural sources. In this context, plasticizer is extracted from Cissus quandrangularis linn. stem that are biodegradable and biocompatible. This research paper presents the extraction and characterization of plasticizers derived from Cissus quadrangularis linn. (CQL) stem as a substitute for synthetic plasticizers. Bio-Plasticizers from CQL stem are extracted through chemical processes: amination, alkalization, filtration and surface catalysis. Further to identify its plastic nature, different characterization techniques such as FTIR, Thermal analysis, XRD, density, micrographs from SEM, chemical composition from EDX surface texture from AFM are conducted. TGA results convey that the Cissus quadrangularis linn. plasticizers (CQLP) are thermally stable upto 2230 C and displays a lower glass transition temperature of 58.170 C and these results accomplish the desired thermal properties. Crystalline properties of CQLP are found to be good with values of Crystalline Index 72.95 % and Crystalline Size 2.32 nm and these results displays the crystalline nature of isolated plasticizers. Surface texture of CQLP identified from AFM is smooth and uniform with lower roughness values across horizontal and vertical directions. Results of characterization studies accomplishes that novel CQLP are biodegradable, compatible and possess good plasticizing effect. This research investigation shows that these novel CQLP proves as a reliable alternative to synthetic plasticizers.

Author keywords- Bio-plasticizers; Characterization; Cissus quadrangularis linn. (CQL) Stem; Crystalline Size; Extraction; Thermal stability

Indexing/Quartile - Scopus/Q1 | **Percentile** - 90th | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

EFFECT OF HEAT TREATMENT ON TRIBOLOGICAL BEHAVIOR OF DIRECT METAL LASER SINTERED ALLOY 718

Muthu S.M.; Veeman D.; Asokan V.; Sathishkumar M.; Vadivel Kannan L.; Vignesh M.; **Rajeshkumar L.**

iScience Open Access Volume 27, Issue 12 20 December 2024 Article number 111415

Dr. Rajeshkumar Lakshminarasimhan
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

behavior of direct metal laser sintered alloy 718

S.M. Muthu [1 2], Dhinakaran Veeman [1], Vijayakumar Asokan [1], M. Sathishkumar [3 6] ✉, L. Vadivel Kannan [4], M. Vignesh [3], L. Rajeshkumar [5] ✉

Abstract

The main aim of this work is to enhance the wear performance of the direct metal laser sintered (DMLS) alloy 718 by solution treatment aging (STA) method at room temperature (RT) (28°C) and 400°C in dry sliding conditions. The effect of microstructure, phase analysis, and microhardness on the wear behavior and the influence of STA on the specimen at elevated temperatures were studied. The microstructure revealed the presence of melt pool boundary (MPB) in untreated DMLS alloy while recrystallized grains were observed in the STA-treated alloy. The wear results elucidated that STA-treated alloy exhibited better wear resistance than as-built alloy due to high hardness at both conditions. Severe wear loss occurred at high temperatures caused by the delamination of the brittle oxide glazing layer, while oxidation and adhesive wear were the predominant wear mechanisms. Results also portrayed that the test temperature and STA treatment equally influenced the wear behavior of alloy 718.

Author keywords- Heat treatment; Materials processing; Materials science

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Indexing/Quartile - Scopus/Q1 | **Percentile** - 93rd | **Impact Factor** - 6.0 | SDG

OMICS BIG DATA FOR CROP IMPROVEMENT: OPPORTUNITIES AND CHALLENGES

Vasupalli N.; Bhat J.A.; Jain P.; Sri T.; Islam M.A.; **Shivaraj S.M.**; Singh S.K.; Deshmukh R.; Sonah H.; Lin X.

Crop Journal Open Access Volume 12, Issue 6, Pages 1517 – 1532 December 2024

Dr. Shivaraj S.M.
Assistant Professor
Alliance College of Engineering and Design
Alliance University, Bangalore, INDIA

Abstract

The application of advanced omics technologies in plant science has generated an enormous dataset of sequences, expression profiles, and phenotypic traits, collectively termed "big data" for their significant volume, diversity, and rapid pace of accumulation. Despite extensive data generation, the process of analyzing and interpreting big data remains complex and challenging. Big data analyses will help identify genes and uncover different mechanisms controlling various agronomic traits in crop plants. The insights gained from big data will assist scientists in developing strategies for crop improvement. Although the big data generated from crop plants opens a world of possibilities, realizing its full potential requires enhancement in computational capacity and advances in machine learning (ML) or deep learning (DL) approaches. The present review discuss the applications of genomics, transcriptomics, proteomics, metabolomics, epigenetics, and phenomics "big data" in crop improvement. Furthermore, we discuss the potential application of artificial intelligence to genomic selection. Additionally, the article outlines the crucial role of big data in precise genetic engineering and understanding plant stress tolerance. Also we highlight the challenges associated with big data storage, analyses, visualization and sharing, and emphasize the need for robust solutions to harness these invaluable resources for crop improvement.

Author keywords- Big data; CRISPR/Cas9; GWAS; qQTL; Systems biology; TWAS; WGRS

Indexing/Quartile - Scopus/Q1 | **Percentile** - 77th | **Impact Factor** - 4.8 | SDG

07 AFFORDABLE AND CLEAN ENERGY

HYBRID GLASS/KEVLAR FIBER REINFORCED PHENOLIC MATRIX COMPOSITES: THERMAL DEGRADATION AND FLAMMABILITY STUDIES

Krishnasamy S.; Sasikumar R.; Swaminathan G.; Thirukumaran M.; Hema M.; **Parameswaranpillai J.**; Thiagamani S.M.K.; Aravind D.; Chandrasekar M.; Natarajan V.

Polymer Composites 2024

Dr. Jyotishkumar Parameswaranpillai
Associate Professor,
Department of Sciences,
Alliance University, Bangalore, INDIA

spe INSPIRING PLASTICS PROFESSIONALS — POLYMER COMPOSITES

Abstract

In the present work, bio-based phenolic matrix composites (PMCs) were fabricated by reinforcing them with bi-directional glass fiber mats, bi-directional Kevlar fiber mats, and their hybrid combinations. Both fiber mats were treated with (3-glycidyloxypropyl) trimethoxysilane (GPTMS) to enhance fiber-to-matrix adhesion. Subsequently, the fibers were coated with a phenolic binder made from a mixture of phenol-hexamine-based novolac (N) resin and cardanol-hexamine-based benzoxazine (Bz) resin. Then the layers of binder-coated fibers were compressed using a hot press molding machine at 200°C to cure the resins. The developed composites were subjected to thermogravimetric analysis (TGA) and UL-94 V flammability test. The glass fiber (GF-NBz) and Kevlar fiber (KF-NBz) reinforced PMCs show an overall mass loss of ~18.5% and 66% at 850°C. Whereas the hybrid GF/KF fiber-reinforced PMCs exhibit balanced properties of improved thermal stability and higher char yield. The flammability test results show both pure and hybrid samples exhibited a V-0 rating. Based on these observations, the combination of glass fiber and Kevlar fiber-reinforced PMCs may be suitable for automotive applications, such as dashboards, and door panels, with improved performance and fire safety. Highlights: Glass and Kevlar/phenolic and their hybrids were developed using hot press. Fibers coated by (3-glycidyloxypropyl) trimethoxysilane to enhance bonding. GF/KF composites exhibited balanced properties in thermal property. The pure and hybrid samples achieved a V-0 rating under UL-94 V test.

Author keywords- flammability performance; hybrid composites; phenolic matrix composites; thermogravimetric analysis; UL-94 test

Indexing/Quartile - Scopus/Q1 | **Percentile** - 92nd | **Impact Factor** - 1.2 | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

FAMILY RECIPE DIARIES AND CONSUMPTION OF TRANSCULTURAL ANGLO-INDIAN IDENTITY

Das A.

Asian Ethnicity 2024

Dr. Arindam Das
Program Director,
MA Creative Writing and Ph.D. Liberal Arts
Department of Language & Literature
Alliance University, Bangalore, INDIA

Family recipe diaries and consumption of transcultural Anglo-Indian identity

Arindam Das

Received 11 Jul 2023, Accepted 12 Dec 2024, Published online: 19 Dec 2024

Abstract

This article focuses on the present mixed-race Anglo-Indians (a minority community of India) and their ancestrally derived culinary culture. The Anglo-Indians as a race were historically formed at the contact zone of European colonizers and 'native' Indians. The hybrid nature of their culinary culture, vis-à-vis their sociocultural identity, is the prime focus of the research. To this end, I investigate 19 Anglo-Indian family recipe diaries (currently in use) from various regions of India. I read them as markers of the syncretic cultural character of the community. The hybrid identity of the culture, as reflected in their culinary culture, negotiates cultural differences and affiliations and engages with issues of identity and representations, adapts and appropriates colonial legacies, and subverts any homogeneous notion of 'national food culture'.

Author keywords- Anglo-Indian; culinary consumption; hybridity; identity; transcultural

Indexing/Quartile - Scopus/Q1 | **Percentile** - 89th | **Impact Factor** - 4.9 | SDG

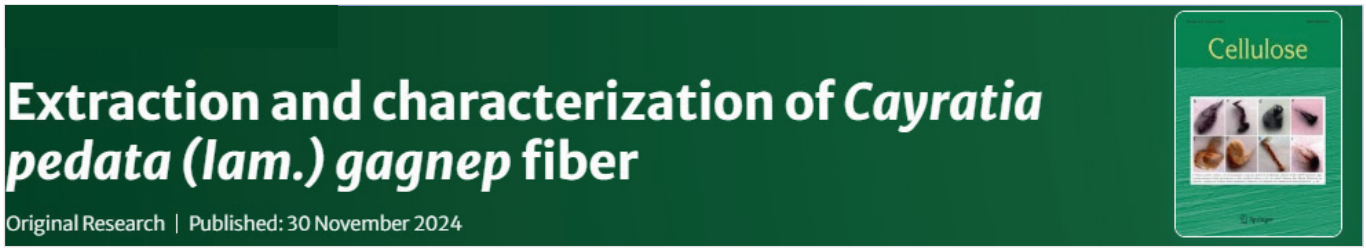
09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

CHARACTERIZATION OF NOVEL BIO-PLASTICIZER FROM CISSUS QUADRANGULARIS LINN. STEM: A SUSTAINABLE AND CLEANER MATERIAL FOR FUTURISTIC APPLICATIONS

Senthamaraikannan P.; Suyambulingam I.; Saravanakumar S.S.; Ismail S.O.; Siengchin S.

Cellulose 2024

Dr. P. Senthamaraikannan
Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Abstract

The quest for sustainability, renewability, manufacturing cost efficiency and environmental friendliness in composite science and technology is ongoing, due to numerous benefits. In this research, mature stems of the Cayratia pedata (lam.) gagnep plant were harvested, and their long fibers were extracted through water retting and comprehensively characterized as a potential reinforcement for polymer matrix composites (PMCs). The results showed that Cayratia pedata (lam.) gagnep fibers (CPGF) with a lower density of 1158.00 ± 52 kg/m3 supported fabrication of PMCs with less weight and high strengths. Hemicellulose and cellulose of 16.47 ± 3.26 and 65.21 ± 5.31 wt% were obtained from CPGF via chemical analysis, respectively. Its crystallinity index of 67.84% confirmed comparatively higher crystalline material. Fourier transform infrared analysis identified the different functional groups in CPGF. The thermal degradation analysis of CPGF demonstrated its suitability as a reinforcing material in PMCs up to a fabrication temperature of 250 °C. The higher kinetic activation energy of CPGF at 97.40 kJ/mol also established its improved thermal stability. The outer shell of the CPGF had debris and non-cellulosic materials, as examined through a scanning electron microscope. Due to impurities, lignin and hemicellulose, untreated fibers were smoother than desired. The mean tensile strength of CPGF was 424.40 ± 24.45 MPa. Weibull distribution was employed to statistically investigate the single CPGF tensile properties. In summary, it can be concluded that CPGF is a better alternative, sustainable, renewable, low-cost and environmentally friendly reinforcing material when compared extensively with several similar plant fibers.

Author keywords- Cayratia pedata (lam.) gagnep fiber (CPGF); Chemical analysis; Crystallinity index; Surface roughness; Thermal degradation

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Indexing/Quartile - Scopus/NA | **Percentile** - NA | **Impact Factor** - NA | SDG

THE IMPACT OF DIGITAL WORKFORCE AND ROBOTICS IN UBIQUITOUS TECHNOLOGY

Mishra A.K.; Bhaskarrao Bahadure N.; Pandey N.K.; Karnatak V.; Dumka A.; **Patni J.C.** *2024 International Conference on Smart Devices, ICSD 2024* International Conference on Smart Devices, ICSD 2024 Dehradun 2 May 2024 through 3 May 2024Code 204280

Dr. Jagdish Chandra Patni
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

The Impact of Digital Workforce and Robotics in Ubiquitous Technology

Publisher: IEEE Cite This PDF

Amit Kumar Mishra ; Nilesh Bhaskarrao Bahadure ; Neeraj Kumar Pandey ; Vijay Karnatak ; Ankur Dumka ; Jagdish Chandra Patni **All Authors**

Abstract

The term globalization refers to the process that is used in order to develop the business in different platforms that are available in different global aspects. Therefore, in order to develop a business on various global platforms, the business organization needs to increase the brand popularity and focus on the improvement of the brand reputation and brand awareness. Therefore, to perform the above-stated functions, business organizations need to utilize different platforms that are available in digital technology. Moreover, it has been observed that digital technology also helps to improve the brand reputation among the population across the world.

Author keywords- Automation system; Biodiversity; Communication Speeds; Digital technologies; Industrial robots

Indexing/Quartile - Scopus/NA | **Percentile** - NA | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SET PARTITIONING HIERARCHICAL TREE BASED IMPROVED IMAGE COMPRESSION TECHNIQUE

Mishra P.K.; Kishore J.; **Patni J.C.**; Rathod A.P.S.; Mehra P.; Bhardwaj V.
15th International Conference on Computing Communication and Networking Technologies, ICCCNT 2024 2024 Kamand 24 June 2024 through 28 June 2024 Code 203877

Dr. Jagdish Chandra Patni
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Set Partitioning Hierarchical Tree Based Improved Image Compression Technique
Publisher: IEEE Cite This PDF
Pawan Kumar Mishra ; Jaydeep Kishore ; Jagdish Chandra Patni ; Arun Pratap Singh Rathod ; Pramod Mehra ; Vivek Bhardwaj All Authors

Abstract

This research work presents compression of digital image which is based on Set Partitioning in Hierarchical Tree (SPIHT) technique. In this Paper, waveform-based compression is presented with great modification and advancement. First Discrete Wavelet Transform (DWT) is used with some modification for changing images from spatial domain to frequency domain. A lifting method is applied to the DWT to achieve the primary goal. Next, a hierarchical tree with changed set partitioning is employed to encode the images for better compression with good resolution.

Author keywords- compression ratio; DWT; MSE; PSNR; wavelet

Indexing/Quartile - Scopus/Q4 | **Percentile** - 11th | **Impact Factor** - NA | SDG

07 AFFORDABLE AND CLEAN ENERGY

NATURAL FIBERS AND ITS POLYMER COMPOSITES: A COMPREHENSIVE REVIEW FROM 2000 TO 2024

Sundarrajan D.; Ganapathy T.; Pandian P.; Divakaran D.; **Suyambulingam I.**

Springer Proceedings in Materials Volume 60, Pages 773 – 813 2024

Dr. Indran Suyambulingam
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Abstract

The use of natural fiber-reinforced polymer matrix composites in transportation diligences is be-coming inevitable because of the material's lightweight, good environmental impact, antibacterial, not producing any harmful chemicals during production, low cost, and excellent characteristics. These fibres have a high hydrophilic nature, shrink-age and have poor dimensional stability and less durability which are the main drawbacks of using them. The interfacial connection between the matrix and fibre has a significant impact on the mechanical characteristics of composites. The mechanical qualities of composites are enhanced by the use of various chemical treatments that enhance the bond between the matrix and fibres. Additionally, a tiny amount of both natural and manufactured fillers, known as additives, boosts the composites' overall mechanical strength. High strength with low-weight compounds yields different manufacturing methods of composites employed in industries based on the requirements and their applications. The aerospace and automotive industries are exploring the use of composites as a possible alternative to conventional high-density materials. The objective is to reduce vehicle weight while enhancing vehicle performance. Natural fibre-reinforced composites, their many chemical treatments, manufacturing methods, additives, and their many uses are all covered extensively in this review article.

Author keywords- Additives; Application of natural fiber; Manufacturing methods of composites

Indexing/Quartile - Scopus/NA | **Percentile** - NA | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

INVESTIGATING AUTONOMOUS AND ADAPTIVE COMMUNICATIONS SYSTEMS FOR ROBOTICS APPLICATIONS

Dakhore M.; **Thota S.**; Narula S.; Dhabliya D.; Faiz A.; Mary I.P.S.

15th International Conference on Computing Communication and Networking Technologies, ICCCNT 2024 Kamand 24 June 2024 through 28 June 2024 Code 203877

Dr. Sridhar T.

Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Investigating Autonomous and Adaptive Communications Systems for Robotics Applications

Publisher: IEEE Cite This PDF

Manish Dakhore ; Sridhar Thota ; Shaweta Narula ; Dharmesh Dhabliya ; Ayaan Faiz ; I.Priya Stella Mary **All Authors**

Abstract

In recent years, there has been a growth in utilization of robotics applications all through more than one industry. Self-reliant and adaptive communication structures are crucial additives of gift robotics applications. Those structures permit controlled and efficient alternate of statistics most of the robotic and its surroundings. This paper offers a survey of research on self sufficient and adaptive communique structures for robotics programs. It examines the position of communique protocols, protocols used for robotics verbal exchange, additives of an adaptive communique device for robotics, and various annoying situations and programs associated with this era. Additionally, this paper introduces associated research topics and contemplates viable destiny commands for this region. In give up, this paper highlights the importance of unbiased and adaptive communication for modern and upcoming robotics applications.

Author keywords- Applications; Associated; Commands; Communication; Protocols

07 AFFORDABLE AND CLEAN ENERGY

Indexing/Quartile - Scopus/Q1 | **Percentile** - 97th | **Impact Factor** - 9.7 | SDG

ADVANCEMENTS IN MACHINE LEARNING-BASED CONDITION MONITORING FOR CRACK DETECTION IN WINDMILL BLADES: A COMPREHENSIVE REVIEW

Ashwitha K.; Kiran M.C.; Shetty S.; Shahapurkar K.; **Chenrayan V.; Kumar L.R.**; Bhaviripudi V.R.; Tirth V.

Archives of Computational Methods in Engineering 2024

Dr. C Venkatesh
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Abstract

Globally, the amount of wind turbines used to produce sustainable, renewable power is always increasing. Achieving dependable and easily accessible performance requires integrating innovative real-time condition monitoring technology. Ensuring the efficacy of wind power generation while maintaining its ability to generate revenue is fundamental. Machine learning (ML) has emerged as a crucial method for monitoring the condition of wind power systems in the past several years. This research study offers a comprehensive and current overview of contemporary condition monitoring technology employed in wind turbines for the purpose of detecting and predicting failures. Emphasizing machine learning algorithms for identifying significant faults and failure modes, preprocessing methods, and evaluation metrics, the review evaluates several references to determine past, present, and future developments in this field of study. Most of the analyzed references come from recent papers, reports, and journal articles that are freely available online.

Indexing/Quartile - Scopus/Q4 | **Percentile** - 6th | **Impact Factor** - 0.2 | SDG

07 AFFORDABLE AND CLEAN ENERGY

ADVANCED HEFFRON-PHILLIPS MODEL FOR DAMPING OSCILLATIONS BASED ON WALRUS AND ENHANCED SNAKE OPTIMIZATION ALGORITHMS

Agrawal N.; **Mahapatra S.**

Suranaree Journal of Science and Technology Volume 31, Issue 6, Pages 1 - 182024
Article number 010337

Dr. Sheila Mahapatra
Professor & Associate Director - Research (Academics),
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

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Original research article

Abstract

A reliable, safe, and secure operation of power systems is essential for all-round development. Low-Frequency Oscillations (LFO) hamper the smooth operation of the system. This manuscript develops an Advanced Heffron-Phillips Model (AHPM) for damping oscillations based on a higher-order Synchronous Machine (SM) Model 1.1. The effectiveness of AHPM is compared for the system without any controller and with Power System Stabilizer (PSS) based on Walrus and Enhanced Snake Optimization Algorithms (ESOA) for three loading conditions. The best damping results are obtained with AHPM, including PSS based on ESOA. The damping ratios (98.60%, 94.50%, and 78.90%) for the three loading conditions obtained with ESOA are higher than with the Walrus algorithm. The settling time, undershoot, and overshoot are also less with ESOA. The simulation is performed with MATLAB R2020. The challenges associated with integrating renewable energy sources into the grid can be met by this AHPM due to better mathematical modelling. By using AHPM with PSS based on ESOA, a robust, secure, and reliable power system is created. Based on four novel strategies, the ESOA tuned the parameters of PSS and produced excellent damping results due to improved performance in terms of speed, accuracy, convergence, and optimization. The simulation can be carried out on multimachine power systems to demonstrate the effectiveness of optimization algorithms. The multi-objective function can be designed for improving stability.

Author keywords- Algorithms; Controller; Damping; Eigenvalues; Oscillations; Parameters; Power System; Robust; Stability

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Indexing/Quartile - Scopus/Q4 | **Percentile** - 11th | **Impact Factor** - NA | SDG

MULTIFUNCTIONAL POLYMER COMPOSITES: DESIGN, PROPERTIES, AND EMERGING APPLICATIONS—A CRITICAL REVIEW

Ganeshkumar S.; Rahman H.A.; Gowtham T.M.; Adithya T.; **Suyambulinagm I.**; Maniraj J.

Springer Proceedings in Materials Volume 60, Pages 637 – 649 2024

Dr. Indran Suyambulingam
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA


Conference paper

Multifunctional Polymer Composites: Design, Properties, and Emerging Applications—A Critical Review

Conference paper | First Online: 27 November 2024

pp 637–649 | Cite this conference paper

Proceedings of the International Conference on Eco-friendly Fibers and Polymeric Materials

Abstract

This critical review delves into the multifunctional realm of polymer composites, scrutinizing their design, mechanical properties, emerging applications, and associated challenges. The imperative for materials capable of seamlessly integrating diverse functionalities in modern industries propels the exploration of multifunctional polymer composites. Design strategies underscore the importance of molecular-level composition, reinforcement integration, and computational modeling for precise multifunctionality control. Synthesizing mechanical properties highlights these composites' pivotal role in meeting varied performance requirements while addressing challenges in achieving a harmonious balance. Thermal management strategies showcase innovative approaches for applications in electronics and aerospace. Advances in processing techniques, characterization methods, and emerging applications demonstrate the transformative potential of multifunctional polymer composites. However, challenges persist, including achieving synergistic functionality and ensuring sustainability. Future research directions focus on novel nanomaterials, smart additives, and collaborative interdisciplinary efforts to unlock new dimensions in multifunctionality. As multifunctional polymer composites evolve, addressing challenges and embracing innovation promises to reshape industries and contribute to technological advancements.

Author keywords- 3D printing; Carbon nano materials; Natural fiber composites; Polymer

Indexing/Quartile - Scopus/Q2 | **Percentile** - 65th | **Impact Factor** - 3.5 | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

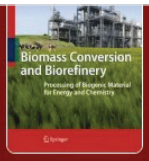
EXTRACTION AND CHARACTERIZATION OF BIOMASS MICROCRYSTALLINE CELLULOSE FROM TERMINALIA CATAPPA LEAVES FOR FOOD PACKAGING APPLICATIONS

Senthamaraikannan P.; Sunesh N.P.; Divakaran D.; Keerthiveettil Ramakrishnan S.; Suyambulingam I.; Siengchin S.

Biomass Conversion and Biorefinery 2024

Dr. P. Senthamaraikannan
Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Extraction and characterization of biomass microcrystalline cellulose from *Terminalia catappa* leaves for food packaging applications



Biomass Conversion and Biorefinery

Abstract

In this research, microcrystalline cellulose was extracted from Terminalia catappa plant leaves (TCLC) through various chemical methods such as neutralization, alkalization, slow pyrolysis, acid hydrolysis, and bleaching. Thermal analysis, scanning electron microscopy, X-ray diffraction analysis, and Fourier transform spectroscopy were employed to get more data pertaining to the isolated cellulose. The crystalline size of the isolated cellulose powder was measured to be 12.69 nm, and it exhibited a notable crystallinity index of 51.09%. Upon scanning with a scanning electron microscope, a smooth and spherical surface is observed. The differential thermogram curve demonstrates that the maximum temperature of degradation occurs at 319.33 °C. The micro-sized particles, with a predominant diameter ranging from 100 to 120 µm, are recognized utilizing ImageJ. The density of extracted cellulose is 1.426 g/cm3. Cellulose-reinforced poly-L-lactic acid biofilms were also prepared. The tensile strength (23.05 MPa) of the 2% TCLC-filled poly-L-lactic acid biofilms was higher than that of films without filler material (20.65 MPa). All the above outcomes conclude that TCLC-filled poly-L-lactic acid biofilms can be used in food packaging applications.

Author keywords- Biofiller; Biofilm; Biomass; Biomaterial; Cellulose; PLA; Terminalia catappa leaves

Indexing/Quartile - Scopus/Q4 | **Percentile** - 11th | **Impact Factor** - NA | SDG

07 AFFORDABLE AND CLEAN ENERGY

DEVELOPMENT AND CHARACTERIZATION OF SPRAY PYROLYSIS NICKEL COATED NATURAL BAMBOO FIBER REINFORCED POLYMER COMPOSITE

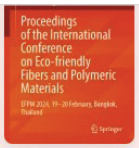
Ratheesh A.K.; Jones Retnam S.B.; Anandh M.D.; Harini V.; **Suyambulinagm I.**; Edwin Sahayaraj M.

Springer Proceedings in Materials Volume 60, Pages 585 – 599 2024

Dr. Indran Suyambulingam
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Development and Characterization of Spray Pyrolysis Nickel Coated Natural Bamboo Fiber Reinforced Polymer Composite

Conference paper | First Online: 27 November 2024
pp 585–599 | Cite this conference paper



Proceedings of the International Conference on Eco-friendly Fibers and Polymeric Materials

Abstract

The escalating demand for electricity and the depletion of nonrenewable resources necessitate a transition to renewable energy sources, notably wind power. Wind turbines, pivotal in this transition, rely on sturdy turbine blades traditionally composed of polyester resin and glass fiber for strength and stiffness. However, the nonrenewable and non-biodegradable nature of these materials prompts a search for more sustainable alternatives. Natural fibers, such as bamboo, emerge as promising substitutes due to their abundance and environmental friendliness. While natural fibers may not match the strength of glass fiber, innovative solutions like metal coating, employing nickel through spray pyrolysis, bolster the mechanical properties of the composite material. This approach facilitates the replacement of up to thirty percent of the glass fiber, promoting sustainability without compromising performance. The application of nickel coating not only enhances strength but also provides exceptional corrosion resistance, crucial for withstanding harsh environmental conditions over the windmill's anticipated twenty-five-year lifespan. Moreover, the thin layer of metal coating mitigates the risk of debonding associated with gel coatings, ensuring structural integrity and longevity. Mechanical tests, including tensile, flexural, hardness, and wear resistance evaluations, validate the efficacy of the newly coated fiber-reinforced polymer composites. The results demonstrate improved mechanical properties, affirming the viability of this eco-friendly solution for wind turbine blades.

Author keywords- Bamboo fiber; Mechanical property; Nickel coating; Spray pyrolysis; Wind mill blade

Indexing/Quartile - Scopus/NA | **Percentile** - NA | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

EXAMINING THE INTERPLAY BETWEEN TECHNOLOGY AND TRADE IN SOUTH COUNTRIES THROUGH A STRUCTURAL GRAVITY MODEL ESTIMATION

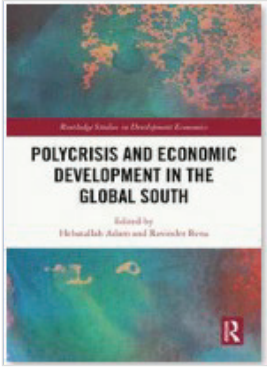
Kumari M.

Polycrisis and Economic Development in the Global South Pages 184 – 197

1 January 2024

Dr. Mamta Kumari

Assistant Professor,
Department of Economics,
Alliance University, Bangalore, INDIA



Chapter

Examining the Interplay between Technology and Trade in South Countries through a Structural Gravity Model Estimation

Abstract

In recent times, the importance of technology in the growth of the nation cannot be undermined. The theoretical and empirical research on technology-trade relationships offers a consensus that cross-country differences in technological advancement determine trade patterns. However, there is a scarcity of literature analyzing the unbiased estimate of the influence of technology on bilateral trade, as the non-discriminatory feature of technology infrastructure restricts the identification of its impact on trade in a standard gravity model with fixed effects. The study is the first of its kind and analyses a significant question, i.e., whether technology primarily enhances international trade or internal trade, by using a theoretically consistent structural gravity specification. The study has been conducted in the context of South countries (emerging South countries and rest of the South), which are currently facing lots of development challenges. The study uses indicators, such as landline phone subscriptions, mobile cellular subscriptions, and individuals using the internet, as a proxy for technological development. Overall, the study finds that international trade flows are more affected by the advancement in ICT infrastructure than domestic ones. These results support policies aimed at encouraging infrastructure investment to leverage higher potential gains from trade. The results are robust to alternative proxies for technology, control for governance quality, and omitted variable bias.

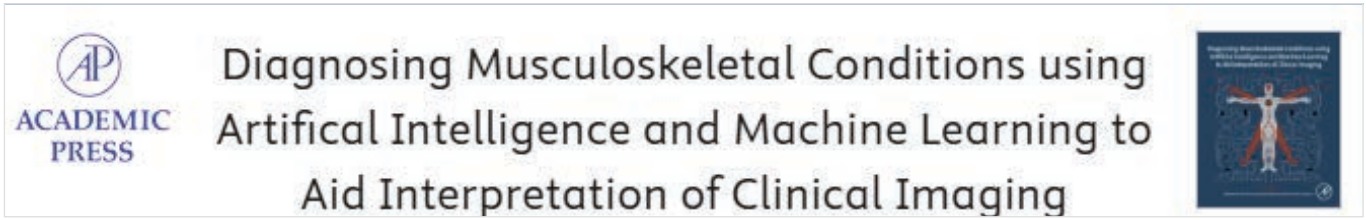
Indexing/Quartile - Scopus/NA | **Percentile** - NA | **Impact Factor** - NA | SDG

07 AFFORDABLE AND CLEAN ENERGY

ANALYSIS AND IDENTIFICATION OF GOUT FLARES USING MACHINE LEARNING

Sungheetha A.; Rajesh Sharma R.; Blake J.; Chinnaiyan R.; Adere K.; Shifaw B. Diagnosing Musculoskeletal Conditions using Artifical Intelligence and Machine Learning to Aid Interpretation of Clinical Imaging Pages 179 – 194 1 January 2024

Dr. Akey Sungheetha
Associate Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA



Abstract

The feasibility and efficacy of using simple machine learning (ML) and natural language processing (NLP) methods to recognize and predict gout flares (GFs) from electronic medical records are examined in this chapter. The lack of adequate diagnosis codes for gout flares makes it challenging to perform reliable database studies. Computer-based implementation techniques use ML and NLP on digitalized clinical notes to identify gout flares automatically. To create an analytical paradigm using ML algorithms, the application of differential metabolites as well as conditions implicit in frequent gout flares coupled with infrequent gout flares using metabolomics need to be addressed. The development of the early detection of acute gout is also covered in this chapter. This is important because it allows medical professionals to provide targeted interventions quickly for pain relief to stop the disease from progressing, which increases the probability of proven long-term joint function. The potential for prompt GF detection based on primary observations of symptoms by nurses in the emergency room is thoroughly investigated. The creation of prediction models for hospitalization risk factors associated with flares in patients with gout is also explored. Factors influencing inpatient GFs remain unclear. Research aims to develop a predictive model for GFs among hospitalized patients with comorbidities. Furthermore, the chapter examines the role of patients with gout using the European League Against Rheumatism (EULAR) and American College of Rheumatology (ACR) classification measures, focusing on a multicenter study conducted by the Egyptian College of Rheumatology involving musculoskeletal ultrasound (MSUS) sections. Clinical, laboratory, and demographic data were analyzed, and MSUS scans of metatarsophalangeal joints were evaluated. Exploration of these topics attempts to highlight the increased risk of cardiovascular disease, particularly coronary heart disease (CHD), in patients with gout. Screening for CHD in patients with gout using basic clinical criteria remains challenging.

Our goal is to develop an ML-based diagnostic model to minimize the risks of missed diagnoses and overly thorough examinations.

Author keywords- Early detection; Hospitalization risk; Machine learning; Metabolomics; Natural language processing

Indexing/Quartile - Scopus/Q2 | **Percentile** - 74th | **Impact Factor** - 2.8 | SDG

07 AFFORDABLE AND CLEAN ENERGY

BIOFIBER FROM MUSA PARADISIACA L., PEDUNCLE BIOMASS WASTE: EXTRACTION AND CHARACTERIZATION FOR POLYMER COMPOSITES SUITABILITY STUDY

Shamshath Begum S.; **Suyambulingam I.; Senthamaraikannan P.**; Suhailuddin S.H.; Aprajith K.; Kumar R.

Journal of Natural Fibers Open Access Volume 21, Issue 1 2024 Article number 2433039

Dr. Indran Suyambulingam
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Biofiber from *Musa paradisiaca L.*, Peduncle Biomass Waste: Extraction and Characterization for Polymer Composites Suitability Study

S. Shamshath Begum, Indran Suyambulingam, P. Senthamaraikannan, S. H. Suhailuddin, K. Aprajith & **R. Kumar**

Article: 2433039 | Published online: 05 Dec 2024

Abstract

The Musa paradisiaca L. peduncle natural fiber (MPPNF) was characterized by atomic force microscopy (AFM), Fourier Transform Infrared Spectroscopy (FTIR), chemical analysis (CA), scanning electron microscopy (SEM), energy dispersive X-ray analysis (EDX), single fiber tensile test (SF-TS), X-Ray diffraction (XRD), and thermogravimetric analysis (TGA). AFM result suggests that this fiber has less impurity and a spiky topology. The FTIR graph confirms the presence of cellulose (CE) as there is a disappearance of C-O stretch at 1305 cm−1 peak. Chemical analysis shows a CE content of 67.9%. The SF-TS has shown that the TS of the fiber is 172 MPa. The modulus and elongation % were evidenced as 4.81 GPa and 4.8%, respectively. The results obtained suggest that it has a crystallinity index (CI) of 48%. The density of this fiber was found to be 1040 kg/m3. The thermal stability of the fiber remains intact until the degradation occurs at 339°C. All the above results convincingly prove that this MPPNF can be used as reinforcement for composites.

Author keywords- biofiber; biomass; cellulosic fiber; Musa paradisiaca L; natural fiber; peduncle

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Indexing/Quartile - Scopus/NA | **Percentile** - NA | **Impact Factor** - NA | SDG

TI-DIFFUSED LiNbO3 BASED REVERSIBLE TR GATE: AN ELECTRO-OPTIC DESIGN AND APPLICATIONS

Chowdhury B.; **Awasthi S.**; Majumder A.; Metya S.K.

Iranian Journal of Science and Technology - Transactions of Electrical Engineering

2024 Article number 022102

Dr. Shashank Awasthi

Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Abstract

In recent times, reversible logic has been fast tracked in an attempt to reduce the excess heat generation in conventional CMOS circuits so as to meet Landauer's limit of kTln2. This can be done in the most convenient way by utilising photons instead of electrons. There have been quite a few works carried out on various optical switches (OS) to implement optical reversible gates along with arithmetic and logical circuits. In this regard, the electro-optic Mach Zehnder interferometer (EO-MZI) is an efficient OS that initially employs electrode voltage to determine lights propagation path through it. This paper targets to explore a Titanium (Ti) diffused Lithium Niobate (LiNbO3)-based EO design of a reversible TR gate with an optimum MZI count. Furthermore, this TR gate is used to design an EO reversible 2:1 multiplexer, where the Feynman gate is embedded to act as a select line. The study also intends to design a 2N:1 RMUX with a full analysis of counts of ancilla inputs, garbage outputs, the Feynman gate, the TR gate, and the MZI. The design and simulation are carried out in the OptiBPM tool to verify the truth table, whereas the mathematical power modelling is validated through MATLAB. A system-level analysis of the TR gate is analyzed as a function of Ti diffusion length and wavelength in terms of extinction and coupling ratio.

Author keywords- Mach–Zehnder Interferometer; Reversible Logic; Reversible multiplexer; TR gate

Indexing/Quartile - Scopus/NA | **Percentile** - NA | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

OPTIMIZATION OF YOLOv8 FOR DEFECT DETECTION AND INSPECTION IN AIRCRAFT SURFACE MAINTENANCE USING ENHANCED HYPER PARAMETER TUNING

Pasupuleti S.; **Ramalakshmi K.**; Pattisapu V.M.

International Conference on Electrical, Electronics and Computing Technologies, ICEECT 2024 Greater Noida 29 August 2024 through 31 August 2024 Code 203960

Dr. K. Ramalakshmi

Professor & Deputy HOD (In Charge) & Director - Centre of Excellence (Computer Vision),
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Optimization of YOLOv8 for Defect Detection and Inspection in Aircraft Surface Maintenance using Enhanced Hyper Parameter Tuning

Publisher: IEEE Cite This PDF

Shailaja Pasupuleti ; Ramalakshmi K ; Varaha Madhavi Pattisapu **All Authors**

Abstract

Aviation repair is governed by strict standards, because maintaining the integrity of aircraft surfaces is essential. Conventional inspection techniques, which frequently rely on manual examinations, are time-consuming and prone to human mistake. Through a SEM model picture collection of aircraft surface flaws, this study investigates the improved use of YOLOv8 (You Only Look Once version 8) for diagnosing and identifying surface concerns in aviation maintenance. In order to precisely identify, locate, and classify different defect kinds, such as aggressive pitches and thin resists, it presents a revolutionary ensemble deep learning approach. In order to particularly assess SEM pictures with defects including gaps, potential gaps, line collapses, bridges, and micro bridges, the research entails training MobileNet backbone models. To further enhance detection and classification performance, the suggested approach combines predictions from several models using a Weighted Box Fusion (WBF) ensembling strategy. According to experimental findings, the optimized YOLOv8 model outperforms conventional YOLOv8 models in terms of accuracy and speed thanks to its WBF ensembling and MobileNet backbone. This sophisticated model is excellent at spotting a variety of surface flaws, such as corrosion, fractures, and other irregularities. Aircraft surface restoration has advanced significantly with the integration of MobileNet and WBF into the improved YOLOv8 model, improving Mean Average Precision (mAP) for difficult defect categories. Metrics like the F1-score, accuracy, precision, recall, specificity, and confidence score are used to assess how well this method is at reliably detecting and localizing different types of defects in SEM pictures by utilizing deep learning.

Author keywords- aircraft surfaces; hyper-tuned yolov8; mobilenet; surface defects; weighted box fusion; yolov8

Indexing/Quartile - Scopus/Q4 | **Percentile** - 11th | **Impact Factor** - 0.32 | SDG

ECO-FRIENDLY FILLERS FOR POLYMER COMPOSITES: A COMPREHENSIVE REVIEW 2000–2024

Ganapathy T.; Uthayakumar G.; Raja P.; Divakaran D.; **Suyambulingam I.**

Springer Proceedings in Materials Volume 60, Pages 839 – 864 2024

Dr. Indran Suyambulingam
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Conference paper

Eco-Friendly Fillers for Polymer Composites: A Comprehensive Review 2000–2024

Conference paper | First Online: 27 November 2024

pp 839–864 | Cite this conference paper

Proceedings of the International Conference on Eco-friendly Fibers and Polymeric Materials

(EFPM 2024)

Abstract

This meticulously crafted manuscript weaves together an eight-year odyssey, chronicling the rise of eco-friendly fillers in the world of polymer composites, an arena where sustainability is now the chorus to the melody of advancement. It delves deep into the labyrinth of bio-based particles and recycled materials, each narrating a unique saga of ecological harmony and material prowess. The manuscript unfolds like a tapestry of intricate challenges, showcasing how these green warriors, once overshadowed by their synthetic counterparts, have risen to prominence. It highlights the alchemy of transforming challenges into opportunities through novel techniques such as surface modification and advanced compounding, and reinforcement outcomes. This narrative extends beyond mere technicalities, embracing the life cycle assessment of these materials, eloquently speaking of their journey of sustainability. This holistic approach provides a panoramic view, capturing the essence of reduced carbon footprints and a march towards a future less reliant on non-renewable resources. The review is visionary, projecting into the realm of possibilities where the intersection of nanotechnology and smart functionalities hint at a future where polymer composites are not only eco-friendly but are marvels of innovation in the use of ecofriendly fillers as reinforcement.

Author keywords- Additives; Bio composite; Bio fillers; Reinforcement

Indexing/Quartile - Scopus/Q1 | **Percentile** - 94th | **Impact Factor** - 7.9 | SDG

07 AFFORDABLE AND CLEAN ENERGY

TINY MACHINE LEARNING APPROACH FOR GRID-BASED MONITORING OF UAV TRACKING AND CYBER-PHYSICAL SYSTEMS IN HYDRAULIC SURVEYING

Kiran A.; Ramesh J.V.N.; Quraishi A.; **Patni J.C.**; Keshta I.; Byeon H.; Raparthi M.; Sandhu M.; Soni M.

IEEE Transactions on Intelligent Transportation Systems 2024

Dr. Jagdish Chandra Patni
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Tiny Machine Learning Approach for Grid-Based Monitoring of UAV Tracking and Cyber-Physical Systems in Hydraulic Surveying

Publisher: IEEE Cite This PDF

Ajmeera Kiran ; Janjhyam Venkata Naga Ramesh ; Aadam Quraishi ; Jagdish Chandra Patni ; Ismail Keshta ; Haewon Byeon **All Authors**

Abstract

With the advancement in Tiny Machine Learning (ML) technologies, their application in enhancing unmanned aerial vehicles (UAVs) for hydraulic engineering surveying and mapping has become increasingly significant. TinyML's integration offers a leap in processing efficiency and capabilities, particularly in addressing challenges such as UAV search and monitoring due to loss of contact or forced landings. The usage of medical cyber-physical systems in healthcare can revolutionize existing service delivery methods. The study focuses into the spatial grid mapping technique for three-dimensional information, the PTZ camera spatial grid target locking algorithm, and the UAV detection and image correction algorithm. The UAV target is processed using the surveying UAV target tracking method. TinyML techniques are essential for processing and analyzing these photos quickly. Precise UAV identification and tracking are made possible by the combination of image recognition and radar data, which are then processed using TinyML algorithms. This study explores the complexities of algorithms designed specifically for TinyML, such as tracking, UAV detection, grid mapping, and 3D grid space division. Experimental results validate the enhanced capability of this. The results show how well the proposed technique maps and surveys water conservation regions while promptly catching, locking onto, and tracking drones. The algorithm in this study betters than the YOLO, SSD, and RetinaNet algorithms in the recognition and detection of image-oriented surveying and mapping drones.

Author keywords- grid-based tracking; hydraulic engineering surveying; image recognition algorithms; Unmanned aerial vehicles (UAVs)

Indexing/Quartile - Scopus/NA | **Percentile** - NA | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

AI POWERED CHATBOT FOR MENTAL HEALTH TREATMENT

Jayabhaduri R.; Vijayaraghavan A.; Ajay Karthik R.; Ceralaathan G.; Sai Sailesh S. *Proceedings - 1st International Conference on Technological Innovations and Advance Computing, TIACOMP 2024 Pages 168, Bali 29 June 2024 through 30 June 2024 Code 204072*

Dr. Jayabhaduri R
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

AI Powered Chatbot For Mental Health Treatment

Publisher: IEEE Cite This PDF

Jayabhaduri R ; Aadesh Vijayaraghavan ; Ajay Karthik R ; Ceralaathan G ; Sai Sailesh S **All Authors**

Abstract

In the recent days, most people of all ages have their mental health affected by various factors like stress, anxiety, depression, fear, phobia and trauma. Hence it is mandatory for people to take care of their mental health. People may hesitate to approach therapists in real life due to societal stigmas. As many people are unable to access or afford mental health services, our research work aims at developing a SAAC Mental health chatbot to mimic a therapist to provide personalized support and guidance, learn about an individual's unique needs and preferences, and tailor their responses accordingly with 24/7 support by handling speech and text queries. SAAC chatbot also maintains chat history and notifies users by sending alerts to ensure follow-ups.

Author keywords- Anxiety; Chatbot; Depression; Fear; Mental Health; Phobia; Speech; Therapist; Trauma

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Indexing/Quartile - Scopus/Q2 | **Percentile** - 65th | **Impact Factor** - NA | SDG

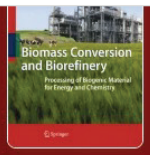
A SUSTAINABLE BIOMASS-BASED MICROCRYSTALLINE CELLULOSIC BIOFILLER FROM CISSUS QUADRANGULARIS LINN PLANT STEM: BIOMASS TO BIOMATERIAL APPROACH

Divakaran D.; **Suyambulingam I.**; Srisuk R.; Techawinyutham L.; Sunesh N.P.; Rangappa S.M.; Siengchin S.

Biomass Conversion and Biorefinery 2024

Dr. Indran Suyambulingam
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

A sustainable biomass-based microcrystalline cellulosic biofiller from *Cissus quadrangularis* Linn plant stem: biomass to biomaterial approach



Biomass Conversion and Biorefinery

Abstract

The agro-waste materials possess a wide range of prospective applications, especially after the recycling process. In many areas, plants grown without water are rich in cellulosic fibre throughout all parts. In this regard, cellulose was extracted from the plant Cissus quadrangularis Linn stem in this investigation. To optimise the efficiency of cellulose extraction from waste, various chemical methods can be utilised, such as acid hydrolysis, neutralisation, bleaching, and slow pyrolysis. Fourier transform spectroscopy, UV—visible spectroscopy, thermal analysis, scanning electron microscopy (SEM), and X-ray diffraction analysis (XRD) were all employed to gain further insights into the isolated cellulose. The cellulose powder exhibited a crystalline size of 12.30 nm and a crystallite size of 65.08% as measured using XRD analysis. When subjected to SEM, a spherical and abrasive surface was detected. The differential thermogram curve indicates that degradation occurs at a maximum temperature of 377.31 °C. Using ImageJ, the microparticles, with an average diameter of 60—80 µm, were distinguished. AFM was utilised to evaluate the surface roughness and skewness of the particles. The density of the isolated cellulose is 1.513 g/cm3, and the yield percentage was 69.08%. Consequently, enhancing its properties could potentially increase the feasibility of cellulose for future applications.

Author keywords- Biofiller; Biomass; Biowaste to biomaterial; Cellulose; Cissus quadrangularis Linn stem

Indexing/Quartile - Scopus/Q2 | **Percentile** - 66th | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

A COMPARATIVE STUDY OF LEARNING OUTCOMES OF SELF-DIRECTED AND INSTRUCTOR-LED LEARNING FOR POSTGRADUATE STUDENTS IN AN INDIAN B-SCHOOL

Kundu S.; Das M.

Journal of Education for Business 2024

Dr. Sukanya Kundu
Associate Professor & Area Chair,
Alliance School of Business,
Alliance University, Bangalore, INDIA

A comparative study of learning outcomes of self-directed and instructor-led learning for postgraduate students in an Indian B-School

Sukanya Kundu & Maitreyee Das

Published online: 17 Dec 2024

Abstract

Access to internet has exposed today's learners to wide pool of knowledge. But acquisition of information, analyzing, and applying it depends upon the learner's level of preparedness and engagement. Using the method of experiment the researchers tried to understand how the effectiveness of self-directed learning and instructor-led learning varies with the above-mentioned parameters. Our findings broadly indicate that while the learning outcome with self-learning scores better than that of instructor-led learning in the courses where understanding and remembering the concepts is more important, the opposite happened for the courses where the application of the concepts get a higher focus.

Author keywords- Learning outcome; self-directed and instructor-led learning; students' engagement; students' preparedness

Indexing/Quartile - Scopus/Q4 | **Percentile** - 11th | **Impact Factor** - 0.32 | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

MECHANICAL PERFORMANCE AND SUSTAINABILITY OF POLYMER COMPOSITES—A CRITICAL REVIEW

Ganeshkumar S.; Kumar S.B.; Kumar K.M.; Hariharan D.; **Suyambulinagm I.**; Arockiasamy F.S.

Springer Proceedings in Materials Volume 60, Pages 623 – 635 2024

Dr. Indran Suyambulingam
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Mechanical Performance and Sustainability of Polymer Composites—A Critical Review

Conference paper | First Online: 27 November 2024

pp 623–635 | Cite this conference paper

Proceedings of the International Conference on Eco-friendly Fibers and Polymeric Materials

Abstract

In the wake of Industry 4.0, marked by unprecedented technological advancements, the field of materials science has witnessed a surge in research endeavors aimed at enhancing the mechanical performance of materials while concurrently minimizing their weight. Polymer composites have emerged as frontrunners in this pursuit, showcasing unique properties and synergies unattainable by traditional materials. This critical review delves into the intricate interplay of mechanical performance and sustainability within the realm of polymer composites, unraveling the multifaceted advancements that have propelled their predominant role in critical sectors such as aeronautics, automotive engineering, and various industrial applications. The review emphasizes the mechanical properties crucial for diverse applications, particularly focusing on friction, durability, and wear performance. By synthesizing and comparing experimental findings alongside microstructure studies conducted under various mechanical loading conditions, valuable insights into the nuanced behavior of polymer composites are distilled. Moreover, the article explores the integration of novel composite materials, such as marble dust and silica, showcasing their potential to augment mechanical properties across various applications. The review culminates in a comprehensive guide for researchers, providing insights into the intricate process of material ratio selection to achieve predetermined mechanical strengths in composite materials. Overall, this refined abstract serves as a precise overview of the critical review, emphasizing its focus on elucidating the mechanical performance and sustainability aspects of polymer composites.

Author keywords- Carbon fibers; Composites; Industry 4.0; Polymer; Sustainability

Indexing/Quartile - Scopus/NA | **Percentile** - NA | **Impact Factor** - NA | SDG

10 REDUCED INEQUALITIES

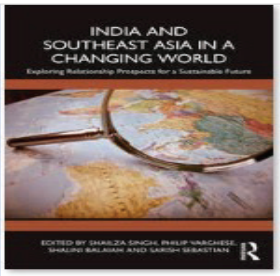
17 PARTNERSHIPS FOR THE GOALS

INDIA'S TRADE RELATIONSHIP WITH RCEP MEMBERS IN THE CONTEXT OF ACT EAST POLICY

Ray A.; **Deepika M.G.**

India and Southeast Asia in a Changing World: Exploring Relationship Prospects for a Sustainable Future Pages 103 – 116 1 January 2024

Dr. Deepika M. G.
Professor,
Department of Economics,
Alliance University, Bangalore, INDIA



Chapter

India's Trade Relationship with RCEP Members in the Context of Act East Policy

By Amlan Ray, M.G. Deepika

Book India and Southeast Asia in a Changing World

Abstract

India's Look East Policy was initiated in the early nineties during the new economic regime of liberalization, privatization, and globalization. It was renamed as Act East Policy in 2014 with further steps to strengthen economic relationships with Southeast Asia, Japan, and South Korea. In the meantime, India signed three major trade agreements with ASEAN, Japan, and South Korea during 2009–11. In 2012, the Regional Comprehensive Economic Partnership (RCEP) negotiation began, in which the above countries were important members. India eventually quit from RCEP negotiation. Trade affects relationships between partner countries. Our chapter analyses the above three trade agreements with respect to tariff reduction, safety measures, and rules of origin (RoO). The chapter further analyses the implications of these agreements on India's trade balance which influenced the negotiating stance of the country in RCEP. The study considers the major product groups in the World Integrated Trade Solution (WITS) database and analyses the import and export patterns of India in this region. The FTAs worked to the advantage of the partner countries as the Indian market was highly protected before the agreements and the reduction of tariff helped the FTA partners to enhance their exports to the Indian market. The trade data for the decade following the agreements show that Indian imports increased after the FTAs, while exports could not go up similarly, which resulted in burgeoning trade deficits. Less utilization of the FTA route is also evident in the cases of Indian exporters due to complexity of the process and low awareness.

Indexing/Quartile - Scopus/Q4 | **Percentile** - 11th | **Impact Factor** - NA | SDG

09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SOLID STATE REACTION METHOD FOR NANOMATERIALS SYNTHESIS: A COMPREHENSIVE REVIEW ON CHARACTERIZATION, PROPERTIES, AND APPLICATIONS

Basha S.A.; Cole S.; Divakaran D.; **Suyambulingam I.**

Dr. Indran Suyambulingam
Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Solid State Reaction Method for Nanomaterials Synthesis: A Comprehensive Review on Characterization, Properties, and Applications

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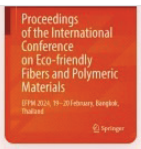

Proceedings of the International Conference on Eco-friendly Fibers and Polymeric Materials

Abstract

The solid state reaction (SSR) method, which is widely used in materials science and chemistry, can be used to synthesize a wide variety of compounds, including ceramics, intermetallics, and oxides. This comprehensive work provides a general overview of the approach, along with a discussion of its guiding principles and applications in the synthesis of new materials. Direct interaction between solid reactants at high temperatures, usually in a controlled environment or under pressure, is the foundation of the SSR process. Diffusion, crystalline development, and internal solid-phase chemical processes are the foundations of this approach. Some common steps in a solid state reaction, like reactant mixing, heating, and cooling are described in the overview. The importance of temperature profiles, stoichiometry, and precursor choice in determining the calibre of the final product is emphasized. In this review, various materials that can be produced using the solid state reaction approach are examined. This includes ceramic superconductors, phosphors, batteries, catalysts and battery components. Characterizing methods for measuring the phase purity and inspecting the microstructure of solid state reaction products, such as X-ray diffraction (XRD), scanning electron microscopy (SEM) and other spectroscopy techniques are emphasized. The review talks about how the solid state reaction process affects the environment and emphasizes how solvent-free it may be. This requires the development of novel precursor materials, the use of state-of-the-art characterization techniques, and the use of computer modeling in order to produce new materials with specified properties.

Author keywords- Nanomaterials; Solid state reaction method; XRD

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03 GOOD HEALTH AND WELL-BEING

FEDERATED ENSEMBLE FOR LUNG PNEUMONIA DETECTION

Sharma V.; Challa V.K.R.; Pranavi P.; Singh T.; **Nair R.R.**

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Dr. Rekha R Nair

Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Federated Ensemble for Lung Pneumonia Detection

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Vishwash Sharma ; VenkataHemant Kumar Reddy Challa ; Pasupuleti Pranavi ; Tripty Singh ; Rekha R Nair All Authors

Abstract

In the realm of medical imaging, the detection of lung pneumonia through automated methods has garnered significant attention due to its potential to augment diagnostic processes. This study proposes a novel approach, termed Federated CNN Ensemble, aiming to enhance the accuracy and robustness of pneumonia detection from chest X -ray images through federated learning and ensemble techniques. The proposed method leverages convolutional neural networks trained locally at distributed medical institutions, thereby preserving data privacy and security while harnessing collectiveintelligence. By aggregating the learned models through an ensemble strategy, our approach achieves superior performance in pneumonia detection compared to standalone CNN models. This research contributes to the advancement of automated medical diagnosis systems, offering a promising avenue for scalable and collaborative disease detection in healthcare settings.

Author keywords- DeepLearning; Ensemble models; Federated Learning

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07 AFFORDABLE AND CLEAN ENERGY

ENSEMBLE TRAINING APPROACH BASED ON MULTIVARIATE EMPIRICAL MODE DECOMPOSITION AND CONVOLUTION NEURAL NETWORK FOR PERIOCULAR RECOGNITION

Sheela R.; **Rajagopal S.**

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Dr. Smitha Rajagopal
Assistant Professor,
Alliance College of Engineering and Design,
Alliance University, Bangalore, INDIA

Abstract

The paper suggests an ensemble training method that utilizes a quick adaption of the Fast Adaptive Multivariate Empirical Mode Decomposition (FA-MVEMD) and a convolutional neural network (CNN) for periocular recognition. Initially, the periocular images go through pre-processing. After pre-processing, a single-level discrete wavelet transform decomposes the image, resulting in the LL, LH, HL, and HH coefficients. The LL coefficients undergo extra decomposition into K quantity of Intrinsic Mode Functions (IMFs) using the Fast Adaptive Multivariate Empirical Mode Decomposition (FA-MVEMD). The Intrinsic Mode Functions (IMF), along with the residual and HH coefficients, form K+2 ensemble images. During the training stage, the CNN model is trained with ensemble images. During the testing phase, the K+2 ensemble images are created on the test image. These K+2 ensemble images are classified as yielding K+2 outcomes. The actual classification result is obtained based on the maximum number of similar matching results. The evaluation was performed using metrics such as UBPIr, AR, CASIA Iris rank 1, rank 2, equal error rate (EER), and area under the curve (AUC). The proposed approach achieves rank-1 recognition accuracy of 93.47%, 98.23%, and 98.03% on UBPIr, AR, and CASIA Iris datasets, respectively.

Author keywords- Convolutional neural network; Discrete wavelet transform; Empirical mode decomposition; Periocular recognition; Rank-1 recognition accuracy

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