



ALLIANCE
UNIVERSITY
CENTRE for RESEARCH



ALLIANCE RESEARCH CHRONICLES

JUNE 2025

Volume 6





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UNIVERSITY
CENTRE *for* RESEARCH







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JUNE 2025

Volume 6

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TABLE OF CONTENT

ABOUT ALLIANCE UNIVERSITY	8
ABOUT CENTRE FOR RESEARCH	9
PUBLICATION SUMMARY	12
<hr/>	
A/ SCOPUS/WOS/JOURNALS	
• Hybrid glass/Kevlar fiber reinforced phenolic matrix composites: Thermal degradation and flammability studies	16
• Numerical Analysis of Human Airways Natural Breathing Characteristics	17
• Digital Financial Inclusion and Financial Resilience of Micro and Small Entrepreneurs in Post-COVID-19 in Karnataka	18
• Harmonizing Three-Phase AC Grids A Dual Approach Comparison Of Pv-Battery Energy Storage Sapf Controls	19
• A novel approach to real-time environmental monitoring and autoqmatd air quality enhancement using smart nanostructured sensors with adaptive data processing	20
• Optimized Reversible Full Adder Using Lithium Niobate MZI Based Peres Gate	21
• Agriculture Waste Management and Trade: A Critical Legal Analysis in the Context of Climate Change in India	22
• Probabilistic Distribution System Planning: Integrating Pv-Based Dg, Dstatcom, And Reconfiguration Under Solar Irradiance And Load Uncertainties	23
• Nonlinear growth and cyclical effects of energy: evidence from Fiji with a Fourier NARDL model	24
• Analysis of Co-Ce substituted BaCoxCexFe12-2xO19/PANI Composites: Correlating structural, dielectric, magnetic, and impedance properties for enhanced microwave absorption	26
• Unified Fake News Detection Based on IoST-Driven Joint Detection Models	27
• Leveraging Consumer Technology for Healthcare Systems Using Blockchain Based Bio-Sensor Devices	28
• Advancements in Machine Learning-Based Condition Monitoring for Crack Detection in Windmill Blades: A Comprehensive Review	29
• A comprehensive review of the characterization of raw and surface-modified cellulosic plant fibers and their polyester- and epoxy-based composites	30
• Altermagnetism: Symmetry-driven spin splitting and its role in spintronic technologies	31
• Delivery of perinatal mental health services in India, and the National Nursing and Midwifery Commission Act, 2023: The connotations	32
• Energy efficiency and sustainability in composites industry	33
• Has the Eurasian Economic Union actually increased members' trade	34
• Job content plateau and career commitment: the mediating role of developmental i-deals and the moderating role of proactive personality	35
• Advanced chatter detection in internal turning for industry 4.0: Adaptive Threshold Wavelet De-noising with enhanced ICEEMDAN–Hilbert fusion using Adaptive Probabilistic Neural Network	36
• Air quality index prediction for clearer skies using improved long short-term memory	37
• Design and characterization of Co2+ and Cd2+ doped BaFe12O19/PANI composites for next-generation microwave absorbing and electromagnetic shielding devices	38
• Structural and thermal integrity of kevlar fabric – Crumb rubber sandwich polymer composite	39
• Mitigating machining damage: Advanced modelling of pumice loading effects in Kevlar fibre-pumice sandwich polymer composites at the AWJM zone	40

B/ Scopus (Conference Papers, Book Chapters, Books And Edited Books)

· Geometrical Enhancements Based on Data-Driven Design Decisions	42
· A Practical Guide to Static and Dynamic Econometric Modelling Examples and Analysis with Python Code Embedded	43
· Transfer Learning With Generative Adversarial Networks: Pretrained and Fine-Tuning Approaches in Remote Sensing Application	44
· Generative Adversarial Networks in Object Detection and Segmentation in Remote Sensing Images	45
· Gas-Sensing Application of Nanomaterials	46
· Shivganga Movement in Jhabua: A Sustainable Narrative of Local Governance, Mythology, and Regeneration	47
· Human-robot Interaction in healthcare	48
· Wireless Sensor Networks (WSNs)-Integrated Machine Learning Algorithms for Water Resource Management	49
· Advancing towards 6G Innovations, Challenges and Future Prospects	50
· Railway track flaw detection and classification using CNN with drone technology	51
· Evaluating Feature-Based Image Registration Techniques for Aeroplane and Brain MRI Images using Projective Transformation	52
· Effective Hazard Categorization of Near-Earth Objects with Random Forest Techniques	53
· Neuromorphic-Enhanced Smart ECG Reconstruction with Explainable AI for Green Healthcare Systems	54
· Adaptive Stream Processing Framework for Smart City IoT Networks Using Self-Powered Photodetector-based Data Collection	55
· Smart Air Pollution Monitoring System Using NodeMCU	57
· Hybrid Approach: Combining Hill Climbing and Genetic Algorithms for Traveling Salesman Problem	58
· HESTStream: A Hybrid Edge-Stream Coptand PReffProcessing Framework for Sustainable Smart Cities Using Adaptive Caching and Environmental Monitoring	59
· AI-Driven Nutritional Intelligence: A Predictive Data Analytics Framework for Personalized Dietary Optimization	60
· Markov Decision Processes in Autonomous Robot Navigation	61
· AI-Driven Optimization in Sustainable Smart Greenhouses: Leveraging LARA for Latency-Aware Resource Allocation in Stream Processing Analytics	62
· Convolutional Neural Network for Facial Emotion Detection	63
· AI-Enhanced Cross-Modal Anime Recommendation System with Explainable Deep Learning	64
· Deep Learning-Based Recognition of Handwritten English Characters	65
· ESPEAR: Enhanced Stream Processing for Environmental Analytics and Renewable Energy Integration Using Smart Dielectric Sensors	66
· Predicting Lung Diseases Using Machine Learning on X-ray Images	67
· Frame-Based Knowledge Representation for Intelligent Tutoring Systems	68
· Fuzzy Logic Control System for Smart Home Energy Management	69
· Exploring Machine Learning Techniques for Early Diagnosis of Parkinson's Disease: A Review	70
· Verification of Periodicity of Exons in DNA using Digital Signal Processor (TMS320C6748)	71
· Exploring Ensemble Architectures for Lung X-Ray Multi-Class Image Classification using CNN-LSTM	72
· Propositional Logic for Automated Reasoning in Legal Expert Systems	73
· Enhanced Polyp Segmentation in Colonoscopy Videos using Deep RGB and Depth Fusion Strategies	74
· Design and Simulation of High Gain LNA Using 28nm Technology	75
· Conceptual Understanding of Damped Oscillatory Motion Using Tracker Video Analysis and Modelling Tool	76
· AI-Enhanced Triboelectric Surface Analysis for Smart Urban Accessibility Pattern Detection	77
· Unraveling Dementia Severity: A Deep Learning Approach for Brain MR Image-Based Prediction and Misclassification Analysis	78
· NLP Strategies for Unprecedented Business Intelligence in Virtual Communities: Language-Driven Insights	79

• Enhancing Chest X-ray Pathology Prediction through Data-Driven Approaches and Transfer Learning	81
• Promoting Constructive Online Debates Through Toxic Comment Classifier	82
• Accessible Edugaming: Fostering Inclusive Learning Through Interactive Points, Leaderboards, and Confidence-Building Features	83
• Deep learning-based Crop Monitoring for effective Agricultural-IoT Management	84
• Transfer Learning with ResNet50 for Robust Traffic Sign Recognition: Addressing Challenges in Lighting, Occlusion, and Class Imbalance	85
• Predictive Analytics and the Role of AI-Powered Robo-Advisers in Modern Banking Opportunities and Challenges	86
• Improving Alpha-Beta Pruning Efficiency in Chess Engines	87
• Secure Data Embedding in Digital Images: Enhancing Covert Communication with LSB-Based Techniques	88
• Automated Subjective Answer Evaluation using GenAI and NLP by Enhancing Accuracy, Fairness, and Feedback in Education	89
• Cyberbullying Recognition on social media for an Afro-Asiatic language Content Using Attention Mechanism and Bi-RNN Classifier	90
• NodeMCU-based Smart Car Parking System for Real-Time Monitoring and Efficient Space Utilization	91
• Analysis of Water Quality in Cauvery River by Using PCA with Various Classification Techniques	92
• Recurrent Neural for Time Series Prediction in Finance	93
• TPU-Accelerated Deep Learning for Accurate Satellite Land Classification	94
• Explainable AI Model for Automatic Irrigation System using IOT	95
• AI-Driven Marine Energy Monitoring System with Enhanced Triboelectric Nanogenerators for Sustainable Coastal Communities	96
• Enhancing Early Diagnosis of Autism Spectrum Disorder Using a Bayesian-Optimized Random Forest Algorithm	98
• Enhancing Stock Price Prediction Through Integration of Astrological and Astronomical Data using XGBoost	99
• Evolutionary Algorithms for Optimizing Wind Turbine Blade Design	100
• AI-based Bonsai Species Classification and Care Recommendation System using YOLO	101
• Quantized Hybrid Privacy Preserving Approach for Federated Learning with Flower Framework	102
• An Efficient Approach of Brain Tumor Detection & Extraction using BWT with Auto Enhance Technique	103
• Adaptive Anomaly Detection for Secure Federated Learning in IIoT Environments	104
• Internet of Things-Enabled Smart Agriculture Monitoring and Control System	105

C/ Patents

• AI-Driven Talent Acquisition and Management System for Predictive Hiring and Employee Development	108
• System and Method for Gamified Talent Screening Using Adaptive Behavioral Challenges	108
• Improved Graph-Based Visual Saliency High Dimensional Image Retrieval System	109
• Polylactic Acid Zinc Composite with Optimized Octet Infill Pattern for High-Strength Tension Cable	109
• Safe Screening Method for Beryllium-Based Hybrid Propellant Thruster for Deep Space Applications	110
• IoT-Integrated Wearable Dual-Device for Continuous Cardiovascular and Pain Sensing	110

D/ Design

• Digital Business Management Device	112
• AI based Alzheimer's Disease Detection Device	113
• Xprinter	114

ABOUT ALLIANCE UNIVERSITY

Alliance reimagines the idea of the university by creating a community that leads the charge against the complex challenges of the 21st century. The university conceives research to be the essence of all teaching and learning practices. A unity between research and teaching is promoted to extend the frontiers of knowledge in order to solve real world problems at the local, national, and global scale. For this purpose, the university seeks to be the nerve centre of interaction between the industry, the government, the civil society, and the community at large.

In times when technological and social change is transforming the very idea of employability, the university embraces the

VISION

Alliance University's vision is to be a world-class University that nurtures talent and catalytically transforms the lives of millions through excellence in teaching, research, service and community development. To uphold a commitment to shaping lives through scholarly teaching and learning, and that which contributes to an equitable and holistic transformation of society at large.

increasing diversity of specializations while retaining the impulse to unify all knowledge.

A designed convergence of the business, engineering, law and liberal arts units precipitates transdisciplinarity as the core academic philosophy.

Freely working across divergent streams of knowledge like psychology and data science, technology and law, physics and philosophy or businesses and rhetoric, transdisciplinarity nurtures a dynamic foundation for the spirit of collaboration, inquiry, and enterprise.

MISSION

The mission of the University is to create and sustain a community of lifelong learners in an environment that emphasizes literacy, critical thinking, and humanistic and scientific inquiry.

The University provides a dynamic, challenging and ethical environment for pursuing high quality teaching, research, learning and service across all areas of University, where students, faculty and other key constituents can interact, collaborate and partner with the global community for creation and dissemination of knowledge and transform lives of people through innovation and excellence in higher education.



ABOUT CENTRE *for* RESEARCH

The Centre for Research of Alliance University has been established to oversee the doctoral program and promote quality research through various Centre of Excellence (COEs) and publications.

The Centre for Research will be the nodal research center for Alliance University and will be committed to facilitating and

VISION

To pioneer transformative research initiatives that propel Alliance University to the forefront of global academia, driving innovation, societal advancement, and contributing to global progress and well-being.

promoting all academic research related activities. The Centre seeks to focus on providing a platform to Researchers and Academicians for thought provoking research on new and emerging fields and revolves around advancing knowledge and innovation within specific fields or interdisciplinary areas.

MISSION

1. **Knowledge and Innovation:** Conduct cutting-edge research across disciplines to expand the frontiers of knowledge and drive innovation that addresses global challenges.
2. **Foster Collaborative Partnerships:** Cultivate partnerships with academic institutions, industries, and organizations worldwide to facilitate knowledge exchange, collaboration, and impactful research outcomes.
3. **Empower Research Scholars:** Provide a supportive environment, resources, and mentorship to empower researchers to pursue ambitious research agendas, develop critical skills, and become leaders in their fields.
4. **Address Global Challenges:** Tackle pressing global challenges such as climate change, healthcare disparities, food security, and technological advancement through interdisciplinary research that generates actionable solutions.
5. **Promote Societal Impact:** Translate research findings into real-world applications and policies that positively impact society, foster sustainable development, and contribute to the betterment of humanity and the planet.



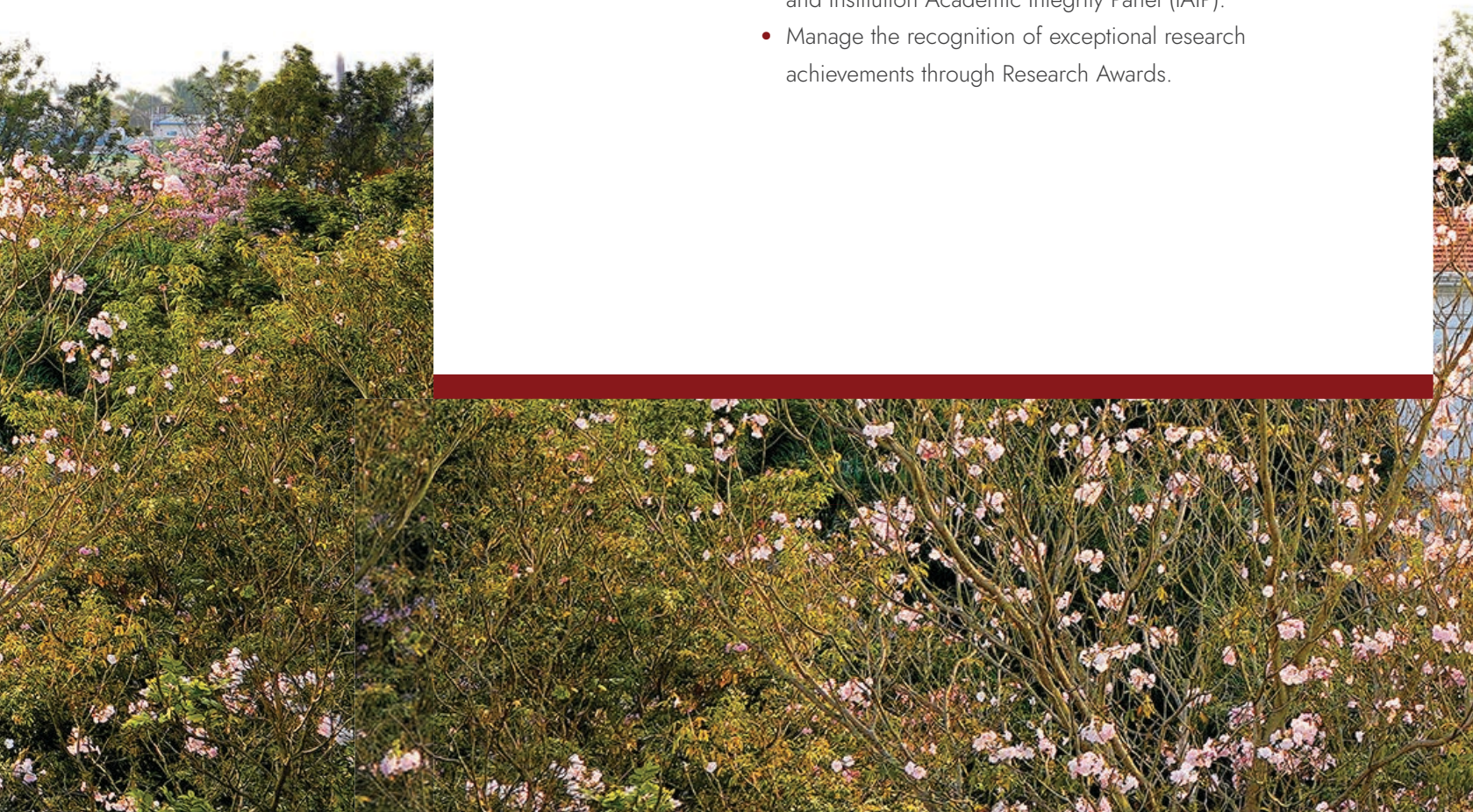
ABOUT CENTRE *for* RESEARCH (Contd.)

CORE VALUES

- **Collaboration:** Foster a culture of collaboration, inclusivity, and openness, recognizing the value of interdisciplinary teamwork and partnerships in addressing complex global challenges.
- **Innovation:** Embrace creativity, curiosity, and innovation, encouraging bold and unconventional approaches to research that lead to breakthrough discoveries and advancements.
- **Integrity:** Uphold the highest ethical standards in all research activities, demonstrating honesty, transparency, and accountability in the conduct and dissemination of research.
- **Agility:** Embrace agility and adaptability in response to evolving research landscapes and emerging challenges, fostering a culture of flexibility, innovation, and continuous improvement.
- **Diversity and Inclusion:** Value and celebrate diversity in perspectives, backgrounds, and experiences, fostering an inclusive research environment where all voices are heard, respected, and valued for their contributions.

OBJECTIVES

- Support the Ph.D. Admission process and facilitate the Ph.D. Program across all academic units of Alliance University.
- Providing resources and support for faculty, students, and visiting/full-time scholars engaged in research activities.
- Contributing to the advancement of knowledge through publications, presentations, and other forms of dissemination.
- Fostering collaboration among researchers within and outside the institution.
- Conducting cutting-edge research in specific fields or interdisciplinary areas.
- Addressing societal challenges and promoting solutions through research and innovation.
- Enhancing the reputation and impact of the institution through high-quality research outputs.
- Supporting the professional development of researchers and students through training, mentorship, and networking opportunities.
- Serving as a hub for intellectual exchange, seminars, workshops, and conferences to promote interdisciplinary collaboration and knowledge sharing.
- To oversee the working of Academic Integrity bodies which includes the Department Academic Integrity Panel (DAIP) and Institution Academic Integrity Panel (IAIP).
- Manage the recognition of exceptional research achievements through Research Awards.

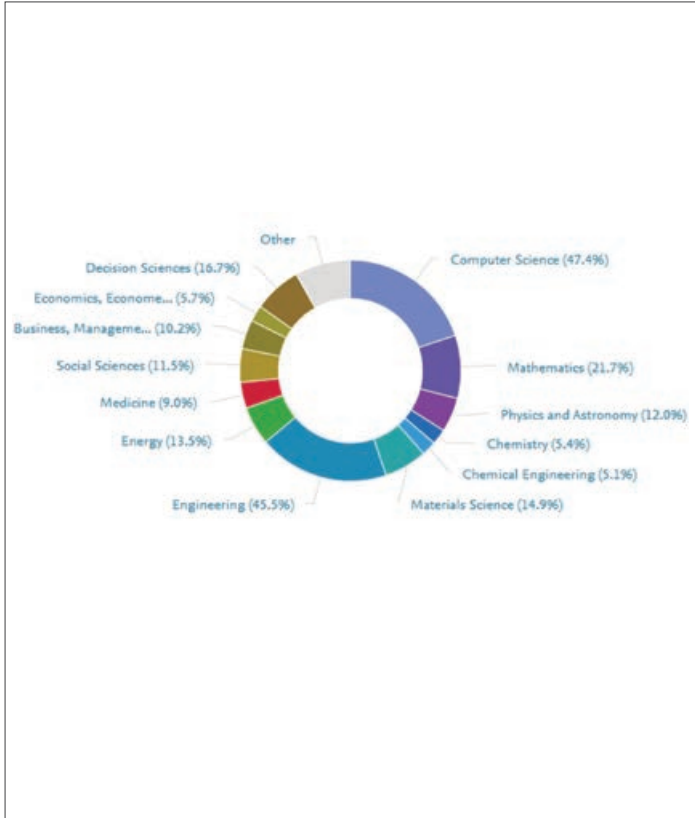
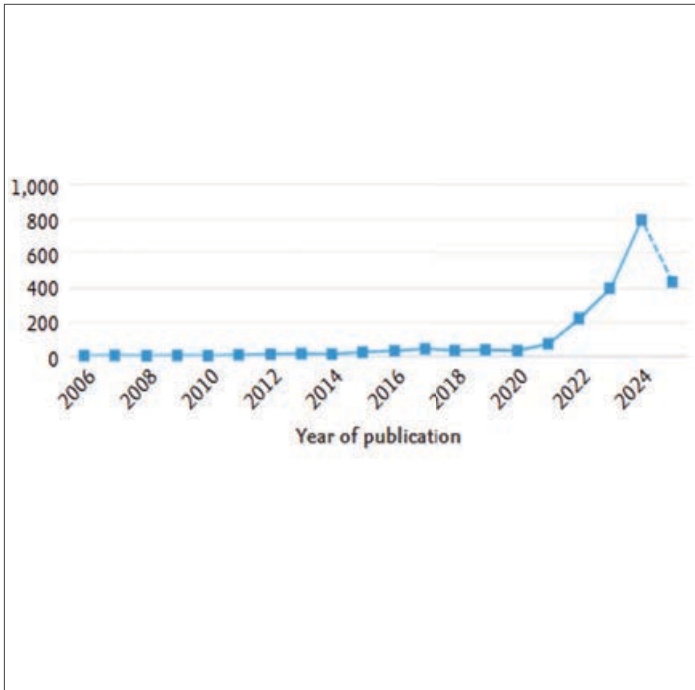




<p>2,121 Documents</p>	<p>722 Authors</p>
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Documents by Subject Area

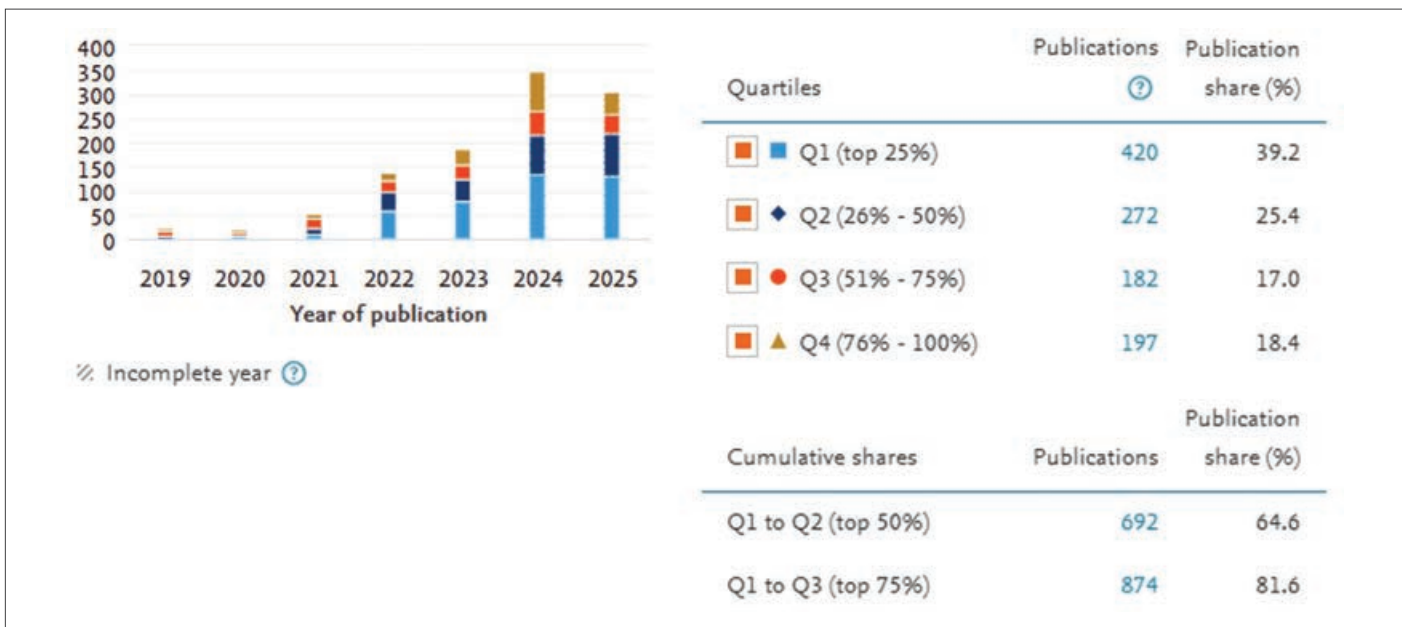
Documents by Year



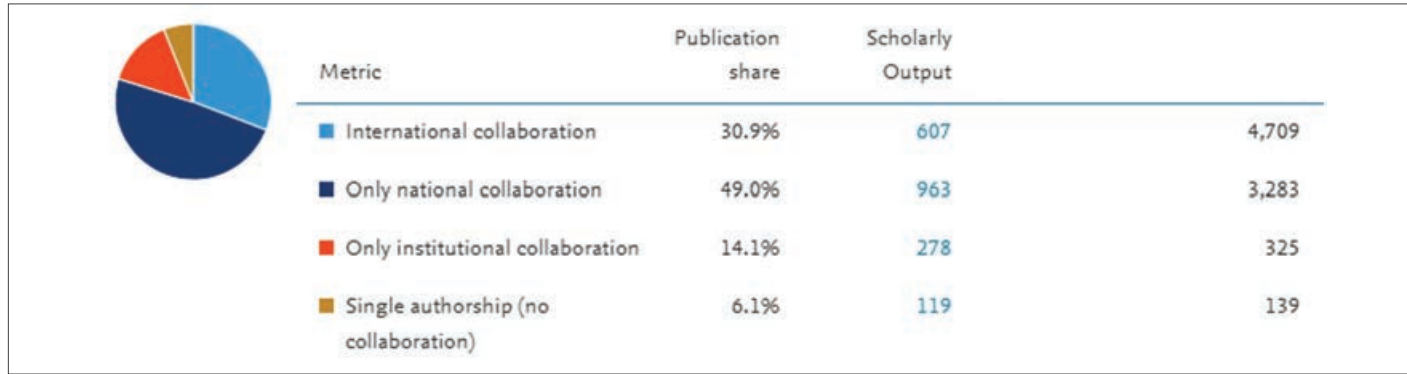
Summary

2121	722	9015	5.7	1.74	32
Scholarly Output	Authors	Citation Count	Citations per Publication	Field-Weighted Citation Impact	h-5 index

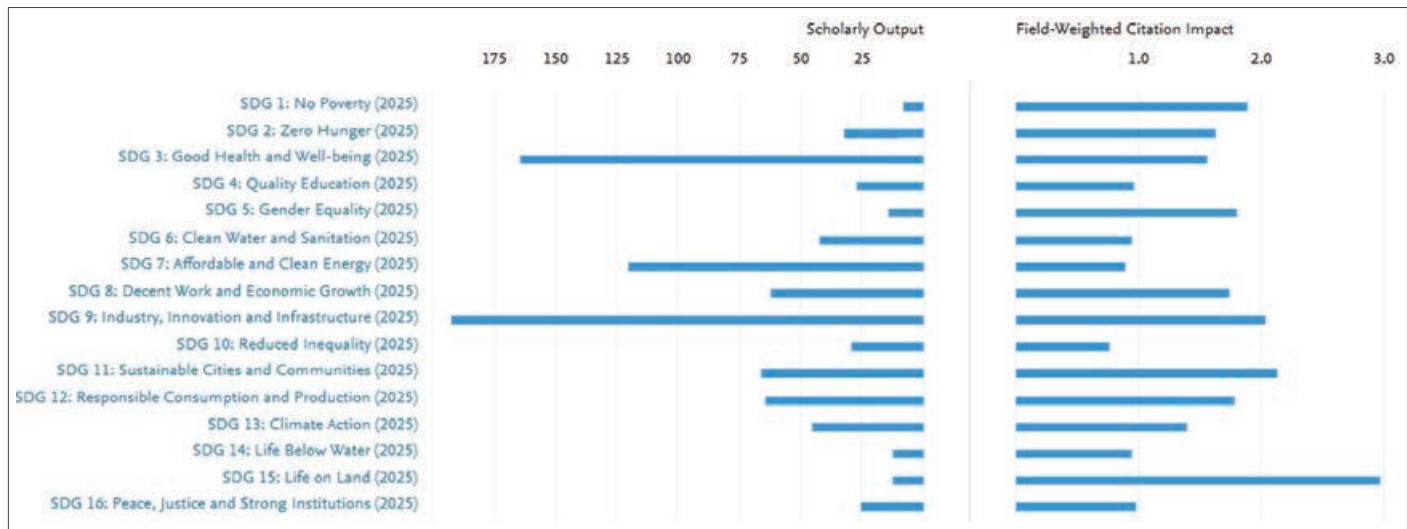
Publication by Journal Quartile



Geographical Collaboration Overall



Publication by SDG



* The Publication metrics are taken from SCOPUS/SciVal as on Date.



Scopus
JOURNALS

The logo features a stylized 'C' composed of three overlapping curved segments in purple, green, and black. To the right of this symbol, the word 'Clarivate' is written in a bold, black, sans-serif font, followed by a small 'TM' trademark symbol. Below 'Clarivate', the words 'Web of Science' are written in the same bold, black, sans-serif font, stacked on a second line.

ClarivateTM
Web of Science

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/WOS/Q2**77th****4.7**

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

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

Polymer Composites 2025



Dr. Jyotishkumar Parameswaranpillai

Professor & Director - Centre of Excellence (AU – Sophisticated Test and Instrumentation Center)
Alliance School of Sciences



Latest issue

Volume 46, Issue 10
10 July 2025

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-glycidyoxypropyl) 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-glycidyoxypropyl) 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.

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

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q3	48th	1.80	



NUMERICAL ANALYSIS OF HUMAN AIRWAYS NATURAL BREATHING CHARACTERISTICS

Singh D.; Kumar B.; Roknujjaman M.

Journal of Advanced Research in Fluid Mechanics and Thermal Sciences 2025



Dr. Digamber Singh

Assistant Professor
Alliance School of Applied Engineering



Abstract

This study offers novel insights into the natural breathing of human airways by utilizing a CT-scan-based in-silico model, which spans from the nasal cavity to the 6th generation bronchi—a comprehensive, non-invasive simulation explicitly tailored to a healthy 45-year-old male participant. Unlike previous models, this work captures the inherent asymmetry of the nasal cycle, providing a detailed analysis of airflow that deviates from the conventional assumption of symmetric breathing cycles. Specifically, in this study we analyze the naturally occurring tidal volume ratio of 2/3 during inhalation and 1/3 during exhalation, a ratio often overlooked in traditional pulmonary function tests (PFTs), which are limited by their assumption of symmetry. A key innovation of this study is the transient simulation of asymmetric breathing under light breathing conditions ($Q = 10$ l/min), which is compared

with symmetric inspiratory airflow profiles. By employing user-defined functions (UDFs) within the numerical solver, we accurately model natural inflow velocity conditions, enabling the first detailed comparison of asymmetric and symmetric air exchange processes in human airways. Additionally, the use of the Realizable $k-\epsilon$ turbulence model, refined for low Reynolds number conditions, further enhances the accuracy of airflow dynamics analysis during respiration. The novel identification and explanation of the subtle distinctions between symmetric and asymmetric breathing patterns provide critical insights into their consequences for airway function. These findings lay the foundation for future investigations into abnormal airway flow characteristics, offering new directions for respiratory research and clinical applications.

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Author keywords- computational fluid dynamics; CT-scan; human airways; pharyngeal airflow jet

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/Q4

15th

0.53



IMPACT OF E-SERVICE QUALITY OF MOBILE APPLICATION ON CUSTOMER PERCEIVED VALUE

Sharma R.K.; **Padashetty S.**

Mercados y Negocios 2025



Dr. Sanjeev S. Padashetty

Professor
Alliance School of Business

Mercados y Negocios

eISSN: 2594-0163

Open Access



Abstract

The present study examines the effect of mobile app service quality on consumer perceived value (CPV) in online shopping in India, specifically in Bengaluru, and customer satisfaction (CS) on CPV. A quantitative research method was employed, in which the researchers collected data from 222 randomly selected consumers using structured questionnaires and interviews. The analysis was completed in R Studio with analyses including discriminant validity, confirmatory factor

analysis, and structural equation modeling (SEM). The findings show that mobile app service quality significantly affected CPV, with reliability and consumer service being the most critical dimensions. In contrast, content quality was the least essential dimension. Additionally, CS significantly positively affected CPV and partially mediated the relationship between content quality, navigation, visual design, contact, and CPV.

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Author keywords- Bengaluru; Consumer satisfaction; CPV; Online shopping; Service quality

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	10th	0.35	



DIGITAL FINANCIAL INCLUSION AND FINANCIAL RESILIENCE OF MICRO AND SMALL ENTREPRENEURS IN POST-COVID-19 IN KARNATAKA

Ravikumar T.; Raghunandan G.; Benedict J.; Krishna T.A.

Finance India 2025



Dr. Ravikumar T

Professor
Alliance School of Business



Abstract

In India, Micro, Small, and Medium Enterprises contribute 29% of the GDP and create millions of works. However, MSMEs have continuously been facing numerous issues and further, micro and small enterprises are hardly hit by the COVID-19 pandemic. The traditional financial system has certain limitations. The new-age technology-enabled digital finance overcomes the supply-side constraints and they serve even the financially excluded individuals and businesses through its

innovative business strategies, models, products, and services which are designed and delivered by "Artificial Intelligence", "Machine Learning", "Big Data Analytics", and "Blockchain Technology". Digital Finance Adoption (DFA) depends on the digital financial literacy (DFL) of the users. This study analyses the role of DFA and DFL on the "Digital Financial Inclusion" (DFI) and "Financial resilience" (FR) of MSEs in Karnataka, India. © 2025, Indian Institute of Finance. All rights reserved.

Author keywords- Adoption; Covid-19; Digital Finance; Entrepreneurs; Financial Inclusion; Financial Resilience; Literacy; Pandemic, Karnataka, India

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/Q4**7th****NA**

HARMONIZING THREE-PHASE AC GRIDS A DUAL APPROACH COMPARISON OF PV-BATTERY ENERGY STORAGE SAPF CONTROLS

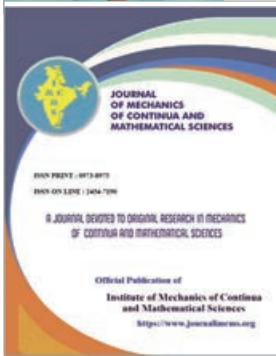
Tripathy O.; Parida S.; Behera M.P.; Sahu M.K.; Anitha E.B.; Perumal M.; **Arif M.**; Venkatesh K.C.

Journal of Mechanics of Continua and Mathematical Sciences 2025



Dr. Mohammad Arif

Professor
Alliance School of Advanced Computing




Abstract

This paper investigates the effectiveness of two control approaches, Photovoltaic (PV)-Battery Energy Storage Systems (BESS) and SAPF, in harmonizing three-phase AC grids, focusing on power quality (PQ) and dq transformation theory. With the rising integration of renewable energy sources (RES), such as PV systems, ensuring PQ becomes critical. The dual approach comparison aims to assess the performance and suitability of these control strategies. The PV-BESS system utilizes batteries to store excess PV-generated energy, offering grid flexibility and improving stability. Conversely, SAPF controls

utilize power electronics to address harmonics and reactive power fluctuations, thereby enhancing grid reliability. Through simulation and analysis, this study evaluates the efficacy, cost-effectiveness, and practicality of both approaches in PQ improvement using dq theory. The findings contribute to advancing grid integration techniques, optimizing renewable energy utilization, and ensuring a robust and stable power supply infrastructure, guided by PQ and dq transformation theory principles. © 2025, Institute of Mechanics of Continua and Mathematical Sciences. All rights reserved.

Author keywords- BESS; power quality; PQ and DQ theory; PV; Shunt Active Power Filters (SAPF)

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/ Q1	76th	4.3	

A NOVEL APPROACH TO REAL-TIME ENVIRONMENTAL MONITORING AND AUTOMATED AIR QUALITY ENHANCEMENT USING SMART NANOSTRUCTURED SENSORS WITH ADAPTIVE DATA PROCESSING

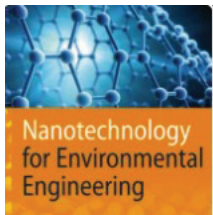
Gowda V.D.; Suneel S.; Prasad V.N.; Jagtap M.M.; Prasad K.D.V.; **Ramaswamy S.**; Hariram V.

Nanotechnology for Environmental Engineering 2025



Dr. Shekhar R.

Professor & Deputy HOD (B.Tech CSE General, IT , M.Tech) & Director - Centre of Excellence (Intel high-performance computing) Alliance School of Advanced Computing



Nanotechnology for Environmental Engineering

Publishing model

Hybrid

Abstract

This paper defines the development of an enhanced and accurate real-time environment monitoring and Air quality control system utilizing smart Nano-sensors. The sensors were given improved nanomaterials for instance, graphene and more metal oxides for a better response when identifying various gaseous pollutants as well as gases in the air including Nitrogen Dioxide (NO₂), Carbon Dioxide (CO₂) and Volatile Organic Compounds (VOC's). These sensors were incorporated to a system in form of an air pollution monitoring and control system that could immediately analyze data and respond to it. Before the outcome was obtained, field tests were carried

out in many cities, and all of them recorded low pollution levels better air quality. Also, there is an environmental and sustainability perspective which proved that this idea can be used as the further strategy of regulating air quality and would meet the requirements of the law. Thus, the conclusions that can be drawn from the analysis of the results demonstrate the advantage of this approach in terms of systematic environmental management and predictive air quality control.

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Author keywords- Air pollutants detection; Air quality enhancement; Automated response systems; Environmental impact; Environmental sustainability; Nanotechnology; Real-time environmental monitoring; Sensor performance; Smart nanostructured sensors; Urban air quality

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/WOS/Q2**64th****2.0**

OPTIMIZED REVERSIBLE FULL ADDER USING LITHIUM NIOBATE MZI BASED PERES GATE

Chowdhury B.; **Awasthi S.**; Metya S.K.*Circuits, Systems, and Signal Processing 2025*

Dr. Shashank Awasthi

Assistant Professor
Alliance School of Applied Engineering

Circuits, Systems, and Signal Processing

Publishing model
Hybrid

Abstract

Logical reversibility refers to a one-to-one mapping, allowing the inputs to be traced by examining the outputs. This concept is becoming increasingly important in fields like nanotechnology, quantum dot cellular automata, and quantum technology, as it reduces heat dissipation while effectively preserving data. With an emphasis on utilizing the fewest possible Electro-optic Mach-Zehnder Interferometers (EO-MZI) i.e., minimal optical cost, this study investigates the Peres Gate (PG) implementation based on EO-MZI. Furthermore, the concept of reversibility allows the circuit to preserve bits, thereby supporting Landauer's limit. OptiBPM tool is used to investigate the design, and

MATLAB is used to validate its mathematical power equation.

The work also explores full adder (FA) utilizing the PG as the core logic element. This leverages the unique properties of PG to configure EO-MZI count optimized reversible full adder. Along with design, simulation, and analysis of the PG-based FA, this work also explores the system-level validation to ensure the correct operation of the FA in terms of wavelength (λ) and horizontal diffusion constant (D).

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Author keywords- Full Adder; Mach-Zehnder interferometer; Peres gate; Reversible gate

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q3	29th	1.71	



AGRICULTURE WASTE MANAGEMENT AND TRADE: A CRITICAL LEGAL ANALYSIS IN THE CONTEXT OF CLIMATE CHANGE IN INDIA

Shobha K.V.; **Dutta G.**

International Journal of Environmental Sciences 2025



Dr. Gyanashree Dutta

Assistant Professor
Alliance School of Law



Abstract

The question with national and global administrators is how to control and manage waste. It is well established that global waste mismanagement has been contributing to global warming as more than 2.5 billion tons of waste is produced every year. It is thereby the global community that has come together to minimize the impacts of waste through waste management policies. India's responsibilities under the World Trade Organization's Agriculture Agreement are critical for global trade activities. Balancing these duties with the need to decrease agricultural waste is a tough legal task. India must negotiate the WTO's rules and commitments to avoid unduly distorting international commerce using its agricultural waste management policy. India has guaranteed to decrease greenhouse gas emissions and strengthen its climate resilience. Effective agricultural waste management is

related to attempts to lessen and acclimate to environmental change. India is a party to various agreements, treaties, and conventions relating to environmental protection, yet on many occasions implementation concerning waste management is questioned. Presently agricultural waste in India is more than 500 million tonnes, and this farm waste includes huge volumes of garbage such as crop remnants, stubble, and post-harvest waste. The waste products are not appropriately handled, which contributes to air pollution, soil degradation, and greenhouse gas emissions, worsening the environment at large. India's immense and diversified agricultural industry has been facing a challenging dilemma at this junction of agriculture waste management and international commerce. © 2025, Academic Science Publications and Distributions. All rights reserved.

Author keywords- Agriculture; Climate change; International conventions; International trade; legal framework; Waste Management

PROBABILISTIC DISTRIBUTION SYSTEM PLANNING: INTEGRATING PV-BASED DG, DSTATCOM, AND RECONFIGURATION UNDER SOLAR IRRADIANCE AND LOAD UNCERTAINTIES

Guru P.; Malik N.; **Mahapatra S**;

Facta Universitatis, Series: Electronics and Energetics 2025



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FACTA UNIVERSITATIS
SERIES: ELECTRONICS AND ENERGETICS

ISSN 0353-3670 (Print)
ISSN 2217-5997 (Online)

Abstract

Recent technological developments in power distribution networks (PDN) have triggered significant interest regarding the optimal operation of power grids. Despite the high cost of power network development and installation, there is a significant opportunity to improve voltage deviation, reduce power loss, boost efficiency, and ultimately raise system stability. This can be accomplished by reconfiguring the network and allocating distributed generations (DG) and distribution FACT devices, like distribution static compensator (DSTATCOM), in the most effective way while considering the stochastic nature of solar irradiance variations, uncertainties, and load variations. The presented article enumerates the planning for optimal photovoltaic distributed generation (PVDG) and DSTATCOM device with Network Reconfiguration (NRX) using a hybrid marine predator jellyfish algorithm (HMPJA). Inspired by the coordinated movements of jellyfish and the effective hunting techniques of marine predators such as sharks, the HMPJA was created. It seeks to improve the exploration, exploitation,

resilience, and flexibility of optimization algorithms in handling challenging situations by combining these tactics. Inspired by the social behavior of jellyfish and marine predators, this hybrid algorithm is used to evaluate the techno-economic benefits of installing PVDG and DSTATCOM in radial PDN with reconfiguration. With multi-objective function Cost reduction, voltage stability enhancement, and voltage profile (VP) augmentation in radial PDN are the primary goals of the current study. The IEEE 33-and 69-bus systems are used to demonstrate the efficacy of the HMPJA, demonstrating notable decreases in energy and power losses and improved VP with overall net profit. A comparison of the suggested strategy with other nature-inspired alternatives demonstrates its superiority. The findings of the proposed approach provide valuable insights for distribution system planning and operation in future grids with high renewable energy source penetration.

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Author keywords- DSTATCOM; Jellyfish Search; Marine Predator Algorithm; PVDG; Radial Distribution System; Reconfiguration

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	68th	2.70	



NONLINEAR GROWTH AND CYCLICAL EFFECTS OF ENERGY: EVIDENCE FROM FIJI WITH A FOURIER NARDL MODEL

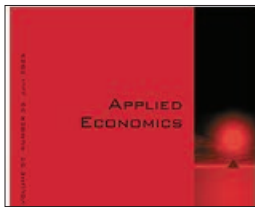
Kumar N.N.; **Sharma M**;

Applied Economics Article 2025



Dr. Manu Sharma

Assistant Professor
Department of Economics



Applied Economics

Open Select: choose to publish open access

Applies economic analysis to both public and private sector related problems, part

Abstract

This study examines the growth and cyclical effects of energy using annual data from Fiji over the period 1980 to 2021. Drawing insights from the post-Keynesian demand-led growth framework, the study finds negative energy shocks reduce output more strongly in expansions compared to how positive energy shocks increase output in recessions. Positive energy shocks and negative energy shocks do not impact GDP in expansions, and recessions, respectively. The results are robust to alternative cyclical decomposition filters and structural breaks through the Fourier NARDL model. Moreover, the Fourier-

based Granger causality test results indicate unidirectional causality from energy to growth. The results underscore the role of energy to support growth in expansion, albeit highlighting bottlenecks in production. The results indicate that due to weak demand, declines in energy do not further depress output in recessions. Policymakers may use the findings to benefit from energy's economic effects whilst mitigating climate risks.

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Author keywords- asymmetric effects; business cycles; demand-led growth; Energy; Fourier NARDL model

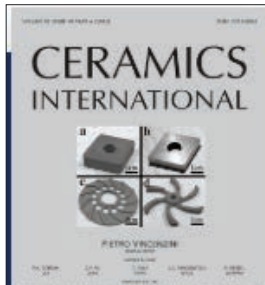
ANALYSIS OF CO-CE SUBSTITUTED BACOXCEXFE12-2XO19/PANI COMPOSITES: CORRELATING STRUCTURAL, DIELECTRIC, MAGNETIC, AND IMPEDANCE PROPERTIES FOR ENHANCED MICROWAVE ABSORPTION

Jain A.; Godara S.K.; Jotania R.B.; Ray B.; Datar S.; **Singh C**;
Ceramics International 2025



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Ceramics International

Supports open access

Abstract

In this study, Co²⁺ and Ce³⁺ substituted BaCo_xCe_xFe_{12-2x}O₁₉ hexaferrites, combined with polyaniline (PANI), were synthesized via the sol-gel combustion method to explore their structural, dielectric, magnetic, and microwave absorption properties. Substitution levels ($x = 0.0$ (XP1), 0.6 (XP2), and 1.0 (XP3)) were investigated, revealing significant modifications in structural and electromagnetic characteristics with increasing Co-Ce doping. Field Emission Scanning Electron Microscopy (FESEM) confirmed a transition from well-separated grains in XP1 to densely packed and fused grains in XP3. Dielectric analysis showed a frequency-dependent decrease in real part of permittivity and imaginary part of permittivity, aligning with Maxwell-Wagner polarization. XP1 exhibited the highest real part of permittivity (ϵ') of 12,791.13 at low frequencies, while XP3 demonstrated reduced imaginary part of permittivity, attributed to enhanced grain boundary effects. Magnetic measurements revealed a reduction in

saturation magnetization (M_s) from 45.92 emu/g in XP1 to 33.42 emu/g in XP3, reflecting the impact of Co²⁺ and Ce³⁺ doping on Fe³⁺ superexchange interactions. Impedance spectroscopy highlighted significant grain boundary effects, with XP3 exhibiting the highest grain boundary resistance, while XP1 showed superior conductivity. Microwave absorption analysis demonstrated effective reflection loss (REL), with XP3 achieving the highest REL of -33.29 dB at 11.48 GHz at 9.9 mm thickness, attributed to superior impedance matching ($|Z_{in}| = 364.37 \Omega$). XP1 displayed effective broadband absorption, with a maximum REL of -36.34 dB at 10.05 GHz and broader frequency coverage. These results establish Co-Ce substituted BaCo_xCe_xFe_{12-2x}O₁₉/PANI composites as promising materials for electromagnetic interference (EMI) shielding and broadband microwave absorption applications.

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Author keywords- Complex permeability; Complex permittivity; Electrical; Hysteresis loops; Reflection loss

Indexing/Quartile

SCOPUS/WOS/Q1

Percentile

94th

Impact Factor

7.27

SDG



UNIFIED FAKE NEWS DETECTION BASED ON IOST-DRIVEN JOINT DETECTION MODELS

Ramesh J.V.N.; Gupta S.; Quraishi A.; Dutta A.K.; Sinha K.P.; Rao G.S.N.; Sherkuzyeva N.; **Patni J.C.**; Nimma D.;
IEEE Transactions on Computational Social Systems 2025



Dr. Jagdish Chandra Patni

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 Computing



Abstract

The advent of the Intelligence of Social Things (IoST) paradigm has created new prospects for improving false news detection by utilizing interconnected social networks, facilitating the amalgamation of many data sources including user behaviors, social interactions, and contextual information. Multiple techniques exist for identifying false information, with individual methods often concentrating on aspects such as news substance, social context, or external veracity. Establishing dissemination networks, examining the structural traits and methods of fake news spread on Weibo and Twitter. Nonetheless, it possesses limitations in enabling the two modes to concentrate more efficiently on their individual preferences. By using entity linking to expand the entity terminology in news

content and semantic mining to augment the style vocabulary in news material, the Pref-FEND model was developed. The graph neural network's capacity to effectively capture node properties was improved by learning and using five different types of words as node representations in the graph network. A heterogeneous degree-aware graph convolutional network was concurrently incorporated, yielding enhancements of 2.8% and 1.9% in F1-score relative to the fact-based singular model GET. Additionally, when integrated with LDAVAE+GET for concurrent detection, the F1-scores were enhanced by 1.1% and 1.3%, respectively, in comparison to Pref-FEND. The experimental findings confirm the efficacy of the suggested enhancements to the model. © 2014 IEEE.

Author keywords- Fake news detection; graph convolutional network (GCN); IoST; joint detection; Pref-FEND

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/WOS/Q2**73rd****10.9**

LEVERAGING CONSUMER TECHNOLOGY FOR HEALTHCARE SYSTEMS USING BLOCKCHAIN BASED BIO-SENSOR DEVICES

Shabaz M.; Rahman M.Z.U.; Alsaadi M.; Raparathi M.; Maaliw R.R.; Keshta I.; Soni M.; Byeon H.; **Patni J.C.**

IEEE Transactions on Consumer Electronics Article 2025



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IEEE Transactions on Consumer Electronics

Information

Impact factor: **10.9** (2024)

ISSN: 0098-3063

Abstract

Wireless biosensor devices have significantly enhanced level of convenience associated with patient treatment. Presently, most uncertified aggregate signature methods struggle to withstand key attacks that employ only specific keys. This paper presents an uncertified parallel key-isolated aggregate signature framework that utilizes blockchain technology in wireless medical sensor networks and biosensor devices for consumer electronics to tackle the challenges. The proximity of the signature verification and aggregation processes to end users is increased by integrating a bio-sensor device for consumer electronics into the cutting-edge framework. This action simultaneously enhances the safeguarding of patient confidentiality and mitigates computational burden on primary

cloud server. By integrating the advantages of key-isolated and uncertified technologies, the proposed solution circumvents exposure concerns, difficult certificate administration, and key storage. This study demonstrates that the proposed method is resistant to Type I, Type II, and wholly selected key attacks when implemented in a random oracle model. This scheme shows a reduction in calculation overhead of 82.97%, 74.03%, 84.58%, and 86.79% correspondingly when compared to other schemes. Analysis of performance indicates that in comparison to pertinent uncertified signature systems, this solution can reduce communication overhead by a minimum of 25% and computational cost by a minimum of 74.03%.

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Author keywords- communication security; consumer electronics; key isolation; privacy protection; Wireless biosensor devices

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	98th	8.97	



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

Ashwitha K.; Kiran M.C.; Shetty, Surendra; **Shahapurkar, Kiran; Chenrayan, Venkatesh; Kumar, L. Rajesh;** Bhaviripudi, Vijayabhaskara Rao; Tirth, Vineet

Archives of Computational Methods in Engineering Review 2025, DOI: 10.1007/s11831-024-10205-4



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Archives of Computational Methods in Engineering

State of the Art Reviews

Publishing model

Hybrid

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

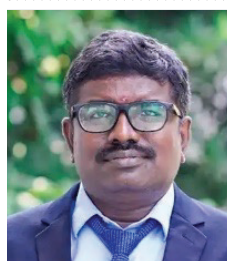
technology employed in wind turbines for the purpose of detecting and predicting failures. Emphasizing machine learning algorithms for identifying significant faults and failure modes, preprocessing methods, and evaluation metrics, the review evaluates several references to determine past, present, and 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. © The Author(s) under exclusive licence to International Center for Numerical Methods in Engineering (CIMNE) 2024.

Author keywords- Engineering controlled terms; Fracture mechanics; Turbine components; Turbomachine blades; Wind power integration; Wind turbine blades; Engineering uncontrolled terms; 'current; Condition; Machine-learning; Monitoring technologies; Performance; Real time condition monitoring; Renewable Power; Research studies; Wind power generation; Wind power systems; Engineering main heading; Windmill.

A COMPREHENSIVE REVIEW OF THE CHARACTERIZATION OF RAW AND SURFACE-MODIFIED CELLULOSIC PLANT FIBERS AND THEIR POLYESTER- AND EPOXY-BASED COMPOSITES

Senthamarai kanna n P.; Saravanakumar S.S.; Kanagaraj A.; **Suyambulingam I.**; Chaudhary V.

International Journal of Biological Macromolecules Review 2025



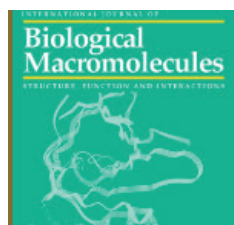
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International Journal of Biological Macromolecules

Supports open access

Abstract

This review provides detailed information about the extraction and characterization of different cellulosic plant fibers, which are primarily composed of biological macromolecules such as cellulose, hemicellulose, and lignin. The properties of plant fibers vary based on parameters such as extraction methods, plant maturity, the part of the fiber-yielding plant, and soil conditions, which drive researchers to study the various properties of cellulosic fibers before using them as reinforcement in polymer composites. Properties such as density, diameter, functional groups, thermal stability, tensile properties, crystallography, and surface morphology were investigated using various characterization methods discussed in this article. Different surface modification techniques,

especially chemical methods, are discussed, and their impacts on various properties of the fiber are also reviewed. The mechanical properties of fiber-reinforced plastics depend on the weight percentage of the fiber, fiber surface condition, fiber length, fiber orientation, secondary filler usage, and manufacturing method. By optimizing the mechanical properties of plant fiber–reinforced composites, this research paves the way for their application in the automotive and construction sectors, where lightweight and durable materials are required. This review analyzes the mechanical properties of composite materials in relation to varying manufacturing parameters, with a particular focus on cellulose-rich fibers and their contribution to the performance of polymer composites. © 2025 Elsevier B.V.

Author keywords- Characterization; Eco-friendly materials; Mechanical properties; Plant fibers; Surface modification

Indexing/Quartile

SCOPUS/WOS/Q1

Percentile

94th

Impact Factor

6.24

SDG



ALTERMAGNETISM: SYMMETRY-DRIVEN SPIN SPLITTING AND ITS ROLE IN SPINTRONIC TECHNOLOGIES

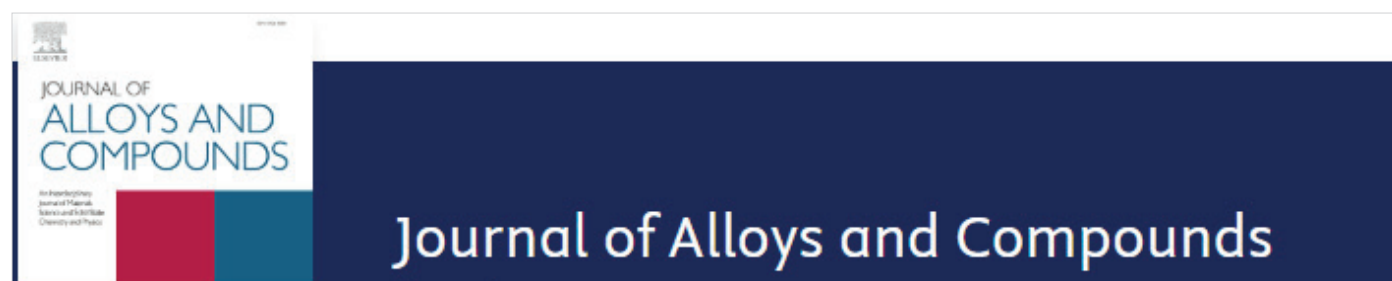
Rathore D.

Journal of Alloys and Compounds 2025



Dr. Deepshikha Rathore

Associate Professor
Alliance School of Sciences



Abstract

A novel class of magnetism has been discovered as altermagnetism because of opposite spin in real space. Altermagnetism exhibits total net magnetization zero and symmetry-induced spin splitting, which separating it in contrast to both antiferromagnetism and ferromagnetism. This review discusses the theory of altermagnetism including core symmetry mechanism and first principle approaches in theoretical models. Material candidates (e.g. MnTe, Mn₅Si₃, RuO₂, CrSb etc.) and predictions for altermagnetism were demonstrated through criteria for identifying altermagnetic materials, role of machine learning and artificial intelligence (AI) in this discovery, and databases with high-throughput screening efforts. The experimental realization and characterization were discussed via techniques for detecting altermagnetic order (e.g., angle-resolved photoemission spectroscopy (ARPES), neutron scattering, transport), challenges in confirming altermagnetism, and case studies of experimental breakthroughs. A comprehensive functional properties and

device applications were described with the help of anomalous Hall effect without net magnetization, spin transport, spin torque, and spin filtering in altermagnets including integration with ferroelectrics, superconductors, and topological materials. A comparison of altermagnetism was illustrated with antiferromagnetism, spin glasses, and topological magnetic phases. The role of computational tools was highlighted by AI-driven materials discovery, inverse design approaches, and data-driven modelling of magnetic behaviour. Some of the significant headwinds were underlined by demonstrating stability and tunability of altermagnetic states, precise detection and control, need for experimental benchmarks, and integration into real-world devices. At the end outlook and future directions were deliberated about, with opportunities for interdisciplinary research, advances in instrumentation and computation, and the roadmap toward altermagnetic-based spintronic platforms.

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Author keywords- Altermagnetism; Berry curvature; First-principles calculations; Spin splitting; Spin-momentum locking; Zero net magnetization.

Indexing/Quartile
SCOPUS/Q3

Percentile
45th

Impact Factor
0.73

SDG



DELIVERY OF PERINATAL MENTAL HEALTH SERVICES IN INDIA, AND THE NATIONAL NURSING AND MIDWIFERY COMMISSION ACT, 2023: THE CONNOTATIONS

Behl, R.

Ethics, Medicine and Public Health 2025



Dr. Ritika Behl
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Ethics, Medicine and Public Health

Supports open access

Abstract

Background: The WHO recently recommended regular screening of postnatal depression and anxiety, and delivery of treatment interventions, which can be competently undertaken by non-specialist health workers as well. In India, the National Nursing and Midwifery Commission (NNMC) Act, 2023 has been recently enforced to regulate, and maintain standards of education, and services prescribed for nursing and midwifery professionals, and the development and adoption of scientific advancements in healthcare models. **Aim:** To understand if delivery of perinatal mental health (PMH) services in the context of provisions of the NNMC Act, 2023 can be feasibly undertaken by nursing and midwifery personnel in India, and which group of the personnel can feasibly deliver the same. **Methods:** Normative Juridical method was used to identify the provisions of the NNMC Act relating to nursing and midwifery

personnel, and a comparative interpretative method was utilized to analyze the feasibility of delivery of PHM services by these personnel. **Results:** The NNMC Act, 2023 expansively differentiates between nursing, and midwifery, and provides for different cadres under the nursing, and midwifery groups of personnel. The Nurse Practitioner in Midwifery (NPM) can most optimally deliver PMH services, and in their absence, Midwifery Professionals can undertake the task through an integrated approach. However, an acute shortage of nursing and midwifery personnel exists at the nationwide level. **Conclusion:** The NNMC Act, 2023 can facilitate the delivery of PMH services but the number of available human resources must be increased, and the existing healthcare personnel must be sufficiently trained.

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Author keywords- India; Midwifery; National nursing and midwifery act; Nursing; Perinatal mental health; Perinatal mental health services

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	42nd	1.65	



ENERGY EFFICIENCY AND SUSTAINABILITY IN COMPOSITES INDUSTRY

Sapuan S.M.; Ilyas R.A.; Nugroho A.; **Rajeshkumar L**;

Physical Sciences Reviews 2025



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JOURNAL Unlicensed

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Abstract

Composite materials are tailor-made materials that constitute matrix and fiber-based reinforcements that are collectively bonded to obtain a material that possesses a combination of properties of both the precursor materials. The current article reviews the wide composite materials processes; furthermore, when it comes to manufacturing composites, cost is a very influential factor. The manufacture of composites is not cheap.

The processes require resources, infrastructure, and energy. Therefore, energy-saving measures are worthwhile things to research. And said measures are also included in this work. Also present are information regarding existing conventional energy sources as well as potential alternative sources for the composite industry.

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Author keywords- energy efficiency; fiber reinforced composites; industry; manufacturing; sustainability

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/WOS/Q1

95th

2.2



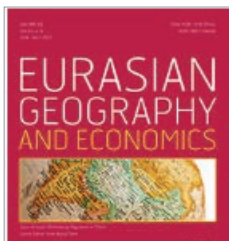
HAS THE EURASIAN ECONOMIC UNION ACTUALLY INCREASED MEMBERS’ TRADE

Kumari, M

Eurasian Geography and Economics 2025



Dr. Mamta Kumari
Assistant Professor
Department of Economics



Eurasian Geography and Economics

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Eurasian Geography and Economics covers geopolitical and geo-economic develop South and South-east Asia.

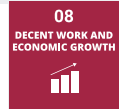
Abstract

The reintegration of post-Soviet economies has unfolded in multiple phases, reflecting the complex economic interdependencies among former Soviet republics. A pivotal milestone in this process is the formation of the Eurasian Economic Union (EAEU), a Russia-led initiative aimed at deepening regional economic integration. Amid persistent uncertainty over its trade implications, this paper reevaluates the ex-post trade effects of EAEU membership using appropriate econometric techniques. Specifically, the study investigates whether the EAEU has promoted international trade among its members by substituting for domestic sales, or conversely, discouraged it by diverting trade toward domestic sales. The

analysis covers four major sectors: manufacturing, agriculture, mining and energy, and services. The results suggest that EAEU membership has generally constrained trade flows, reducing both intra-regional and external trade. Additionally, the results reveal significant heterogeneity in trade effects across member countries and trade directions in all sectors. Furthermore, the study identifies differential bilateral and unilateral impacts across various manufacturing and agricultural industries. These outcomes underscore the need to reassess and recalibrate trade liberalization policies within the EAEU framework to ensure more inclusive and effective trade gains for all member states.

Author keywords- Eurasian integration; gravity model; Eurasian Economic Union; disaggregated trade

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	36th	NA	



JOB CONTENT PLATEAU AND CAREER COMMITMENT: THE MEDIATING ROLE OF DEVELOPMENTAL I-DEALS AND THE MODERATING ROLE OF PROACTIVE PERSONALITY

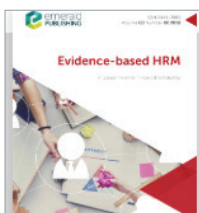
Jena B.P.; Choudhary A.; Pal M.K.; Misra, S,

Evidence-Based Hrm-A Global Forum For Empirical Scholarship 2025



Dr. Biswa Prakash Jena

Assistant Professor
Alliance School of Business



Evidence-based HRM: a Global Forum for Empirical Scholarship

Abstract

Purpose- Given the detrimental effects of job content plateau, the paper aims to study the impact of job content plateau on employees' career commitment. In doing so, the authors examine whether the lapses in job content plateau can be addressed through developmental i-deals. A final purpose is to examine whether proactive employees are better positioned to obtain work arrangements that help them develop and remain committed to their careers.

Design/methodology/approach

Data were collected from full-time working executives employed in different organizations. These executives enrolled in a part-time MBA program. Data was collected at different time points and analyzed using the process macro (Preacher and Hayes, 2004). Findings- The results suggest that developmental i-deals

mediated the relationship between job content plateau and career commitment. In addition, proactive employees were better disposed to seal the deal and develop themselves – helping them to stay committed to their careers. Originality/value- Prior studies highlight the negative consequences of job content plateau because it does not provide avenues to learn and develop. This paper addresses the gap in locating opportunities to learn and develop (an aspect that was missing in the job content plateau) through developmental i-deals.

First, the study helps answer how to address learning gaps in jobs. Second, who can capitalize on their efforts once the organization sponsors learning opportunities.

Author keywords- Job Content Plateau, Proactive Personality, Developmental Ideals, Career construction

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/WOS/Q1

36th

6.8



ADVANCED CHATTER DETECTION IN INTERNAL TURNING FOR INDUSTRY 4.0: ADAPTIVE THRESHOLD WAVELET DE-NOISING WITH ENHANCED ICEEMDAN–HILBERT FUSION USING ADAPTIVE PROBABILISTIC NEURAL NETWORK

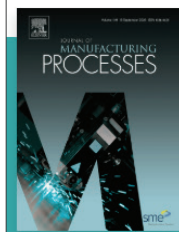
Yuvaraju, BAG; Srinivas, J; Ioannou, I; Guruguntla, V; **Ghantasala, GSP**

Journal of Manufacturing Processes, Volume 149, 15 September 2025, Pages 1078-1105



Dr. GGS Pradeep

Professor
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Computing



Journal of Manufacturing Processes

11.1
CiteScore

6.8
Impact Factor

Abstract

Machine tool chatter adversely affects tool life and surface quality, making early detection essential in machining processes. However, vibration signals collected during machining are often contaminated by noise, hindering accurate chatter prediction. This study presents an advanced chatter detection framework integrating Adaptive Threshold Wavelet De-noising (ATWD), Improved Complete Ensemble Empirical Mode Decomposition with Adaptive Noise (ICEEMDAN), Hilbert–Huang Transforms (HHT), and an Adaptive Probabilistic Neural Network (APNN). The novelty of this work lies in the introduction of an adaptive noise term, σ , within the ICEEMDAN process, which mitigates mode mixing and ensures precise resonance frequency identification. The ATWD dynamically adjusts noise thresholds based on signal decomposition levels, achieving significant noise suppression for non-stationary signals while preserving critical chatter features. Using the Normalised Energy Ratio; (NER), the most responsive Intrinsic

Mode Functions (IMFs) are selected for feature analysis, leading to improved signal decomposition. The APNN further enhances classification accuracy by dynamically adjusting network parameters, outperforming traditional PNN classifiers. Comparative analysis demonstrates that the proposed APNN achieves a classification accuracy of 99.5%, representing a substantial improvement over baseline methods. Internal turning experiments using a flexible boring bar validate the proposed methodology, showcasing its practical effectiveness and reliability. The integration of ATWD, ICEEMDAN–HHT fusion, and APNN provides a novel solution for chatter detection, offering significant advancements in noise filtering, feature extraction, and real-time classification accuracy. This methodology is particularly suited for challenging machining environments and Industry 4.0 applications, where precise and rapid chatter detection enhances tool life, reduces production costs, and improves overall machining productivity.

Author keywords- Chatter ;Internal turning; Boring bar Vibration; signal De-noising; Adaptive probabilistic neural network; Ensemble empirical mode; decomposition Hilbert transform; Adaptive Probabilistic Neural Network.

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	32nd	0.8	



AIR QUALITY INDEX PREDICTION FOR CLEARER SKIES USING IMPROVED LONG SHORT-TERM MEMORY

Bahadure, NB; Sahare, O; Shukla, N; Mandal, R; Pandey, P; **Patni, JC**; Mohiddin, MK

Intelligent Decision Technologies-Netherlands 2025



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Intelligent Decision Technologies

IOS Press International

Impact Factor: **0.8** / 5-Year Impact Factor: **0.8**

Abstract

Air pollution has become an international calamity, a problem for human health and the environment. The ability to predict the air quality becomes a crucial task. The usual approaches for assessing air quality are exhausted when extracting complicated non-linear relationships and long-term dependence features embedded in the data. Long- and short-term memory, a recurrent neural network family, has emerged as a potent tool for addressing the mentioned issues, so computer-aided

technology has become essential to aid with a high level of prediction and best-in-class accuracy. In this study, we investigated classic time-series analysis based on Improved Long short-term memory (ILSTM) to improve the performance of air quality index prediction. The predicted AQI value for the 25 days lies in a 97.63% Confidence interval zone and highly adoptable performance metrics such as R-Square, MSE, RMSE, and MAE values.

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/WOS/Q2

68th

4.6



DESIGN AND CHARACTERIZATION OF CO₂₊ AND CD₂₊ DOPED BAFE12O19/PANI COMPOSITES FOR NEXT-GENERATION MICROWAVE ABSORBING AND ELECTROMAGNETIC SHIELDING DEVICES

Jain, A; Godara, SK; Jotania, RB; Ray, B; Datar, S; **Singh, C**,
Materials Science and Engineering: B, Volume 321, November 2025, 118463



Dr. Charanjit Singh

Profesor- ECE & Director – First Year
 Engineering
 Alliance School of Applied Engineering



Materials Science and Engineering: B

Supports open access

7.5

CiteScore

4.6

Impact Factor

Abstract

The rapid advancement of wireless communication technologies and electronic devices has led to a surge in electromagnetic (EM) pollution, posing risks to human health and the performance of sensitive electronic systems. Addressing this challenge, hexagonal ferrites have emerged as promising candidates for microwave absorption due to their exceptional magnetic properties, high Curie temperature, and efficient dielectric performance. This study focuses on the synthesis, structural characterization, and performance evaluation of BaCo_xCd_xFe_{12-2x}O₁₉/PANI composites with varying Co²⁺ and Cd²⁺ substitutions ($x = 0.0$ (YP1), 0.6 (YP2), and 1.0 (YP3)). Using a sol–gel combustion method, the composites were characterized through X-ray diffraction (XRD), Field Emission Scanning Electron Microscopy (FESEM), electrochemical impedance spectroscopy (EIS), and magnetic analysis to investigate their suitability for electromagnetic interference (EMI) shielding applications. The results demonstrate a systematic reduction in crystallite

size, lattice parameters, and unit cell volume with increasing Co²⁺ and Cd²⁺ doping. Electrical impedance analysis reveals that the grain boundary resistance (R_{gb}) and capacitance (C_{gb}) are critical for enhancing dielectric properties and energy dissipation mechanisms. YP2 shows the lowest grain resistance ($R_g = 0.005 \text{ M}\Omega$) and the highest grain boundary capacitance ($C_{gb} = 2.39 \times 10^{10} \text{ }\mu\text{F}$), which translates to superior impedance matching and energy dissipation. Magnetic characterization highlights the influence of doping on reducing coercivity and achieving moderate saturation magnetization. Electromagnetic performance analysis identifies YP2 (3.2 mm thickness) as the best-performing sample, achieving a maximum reflection loss (REL) of -55.54 dB at 10.56 GHz with a bandwidth-to-thickness ratio (BTR) of $2.91\text{E-}03$ and percentage bandwidth (PBW) of 32.67 %. These findings demonstrate the potential of Co²⁺ and Cd²⁺ substituted hexaferrite composites as cost-effective, lightweight, and thermally stable materials for advanced EMI shielding applications.

Author keywords- Electrical; Hysteresis loops; Complex permittivity; Complex permeability; Reflection loss

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	41st	2.4	



STRUCTURAL AND THERMAL INTEGRITY OF KEVLAR FABRIC – CRUMB RUBBER SANDWICH POLYMER COMPOSITE

Chenrayan, V; Shahapurkar, K; Kanaginahal, G; Gebremaryam, G; Bhaviripudi, VR; Tirth, V; Algahtani, A; Hm, V,
Journal of Composite Materials 2025



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Dr. Kiran Shahapurkar
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Journal of Composite Materials



Impact Factor: 2.4 / 5-Year Impact Factor: 2.8

Abstract

The global administrations are focusing much on the development of sustainable materials, and that too with the help of industrial waste. The inclusion of wastage not only sustains the green environment but also avails the cost-benefit in disposing of the waste. The present research targets the processing of a novel sandwich Kevlar fibre woven resin-impregnated composite reinforced core with by-products of waste tyres called crumb rubbers. The usual open moulding technique was followed to fabricate the sandwich composite with varying weight percentages of crumb rubber as 0, 5, 10 and 15 (KF-CR-0, 5, 10, 15). The structural and thermal rigidity of the proposed composite was examined through tensile

testing and thermogravimetric analysis (TGA). The tensile test results indicate the exceptional structural rigidity of KF-CR-15 by possessing 68.30 % higher tensile strength than KF-CR-0. The TGA result corroborates a delayed thermal degradation of the sandwich composite with higher crumb rubber loading. Further, the results reveal that 51 % escalated width of thermal degradation is observed for the sandwich composite with a higher loading of crumb rubber than the zero loading. The fracture morphology executed after the tensile test distinguishes the delamination effect and firm bonding to proclaim a clear understanding of the strengthening mechanism.

Author keywords- Crumb rubber reinforcement; Kevlar fibre composite; Sustainable materials; Tensile strength analysis; Thermogravimetric analysis (TGA)

Indexing/Quartile

Percentile

Impact Factor

SDG

WOS /Q1

90th

6.6



MITIGATING MACHINING DAMAGE: ADVANCED MODELLING OF PUMICE LOADING EFFECTS IN KEVLAR FIBRE-PUMICE SANDWICH POLYMER COMPOSITES AT THE AWJM ZONE

Venkatesh Chenrayan, A. Saravanakumar, **Kiran Shahapurkar**, S. Vaishnavi, S. Selvam, Chandru Manivannan, Vineet Tirth, Ali Algahtani, Jana Petru, Muhammad Nasir Bashir, Manzoore Elahi M. Soudagar, Krishna Prakash Arunachalam, H.M. Vidhya

Journal of Materials Research and Technology



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Journal of Materials Research and Technology

Open access

9.5

CiteScore

6.6

Impact Factor

Abstract

The development of varieties of fibre-reinforced polymer composite (FRP) has become a part of day-to-day life and is the core agenda of the manufacturing industries in new product development. Despite the wider applications, the machining of FRPs is encountering a greater challenge in overcoming the machining damage. It is the right proposal to deplete the prominent machining damages like kerf taper, delamination and surface roughness by introducing novel hybrid statistical and soft computing models. The novel Kevlar fiber woven mat-pumice particles reinforced sandwich is fabricated using open moulding and machined with Abrasive Water Jet Machining by following L9 orthogonal guidelines. The three different

pumice compositions, standoff distance, abrasive flow rate and hydraulic pressure were considered the prime variables to influence the damages. The hybrid analysis results declare that trial No.3 is an optimal parameter, which comprises 100 (MPa) of hydraulic pressure, 2 mm of standoff distance, 300 (gm/min) of abrasive flow rate and 10 % of pumice particles to scale down the damages. A noticeable 1.69 %, 25.12 % and 40.71 % decrement in machining damages, along with the finding of a higher contribution of pumice content in minimizing the damages, would benefit the FRP industries to march towards the implementation of lean manufacturing and new product development (NPD)

Author keywords- Kevlar fibre; Pumice Delamination ; Kerf taper ; Surface roughness; Grey relational analysis (GRA); Machine learning (ML)



Scopus

**CONFERENCE PAPERS,
BOOK CHAPTERS, BOOKS
AND EDITED BOOKS**

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/ NA	NA	NA	



GEOMETRICAL ENHANCEMENTS BASED ON DATA-DRIVEN DESIGN DECISIONS

Kumar M.H.; Mandol S.; Verma A.; Singh V.K.

Geometrical Enhancements Based on Data-Driven Design Decisions Book 2025



Dr. Mohit Hemanth Kumar

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Alliance School of Applied Engineering



Abstract

The text presents various design and modelling solutions for effective decision-making that are grounded on the basics of data analytics. It further discusses important topics such as sustainable design and data-driven design synthesis, product analytics and its role in sustainable development, and descriptive models for the geometrical evaluation of product features. This book: Familiarize the readers with the numerous decision protocols that can be utilized for deducing geometrical qualities using data-driven design analysis Offers a more comprehensive approach to multidisciplinary engineering applications using data-driven modelling and analysis Discusses multi-objective optimization for product

design and development through data-driven decision-making Explains information processing and analysis through data visualization and data mining Covers artificial intelligence and machine learning-based decision models and their effective utilization across interdisciplinary applications It is primarily written for senior undergraduate, graduate students, and academic researchers in fields including industrial engineering, production engineering, manufacturing engineering, mechanical engineering, and aerospace engineering. © 2025 selection and editorial matter, Sourabh Mandol, Mohit Hemanth Kumar, Akarsh Verma and V. K. Singh; individual chapters, the contributors.

Author keywords- Engineering controlled terms- Assembly; Cargo handling; Feeding; Filling; Fueling; Loading; Mining; Ore treatment; Packaging; Storage (materials); Well stimulation

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/Q4**6th****0.15**

A PRACTICAL GUIDE TO STATIC AND DYNAMIC ECONOMETRIC MODELLING EXAMPLES AND ANALYSIS WITH PYTHON CODE EMBEDDED

Maitra S.

Contributions to Economics Book Chapter 2025



Dr. Sarit Maitra

Professor
Alliance School of Business



Abstract

This book provides a comprehensive guide to econometric modeling, combining theory with practical implementation using Python. It covers key econometric concepts, from data collection and model specification to estimation, inference, and prediction. Readers will explore linear regression, data transformations, and hypothesis testing, along with advanced topics like the Capital Asset Pricing Model and dynamic

modeling techniques. With Python code examples, this book bridges theory and practice, making it an essential resource for students, finance professionals, economists, and data scientists seeking to apply econometrics in real-world scenarios.

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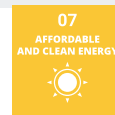
Author keywords- Auto Regressive Distributed Lag; Diagnostic testing; Dynamic Modeling; Econometric Modeling; Econometrics; Measurement error; Python for Econometrics; Quantitative Finance

Indexing/Quartile
SCOPUS/NA

Percentile
NA

Impact Factor
NA

SDG



TRANSFER LEARNING WITH GENERATIVE ADVERSARIAL NETWORKS: PRETRAINED AND FINE-TUNING APPROACHES IN REMOTE SENSING APPLICATION

Nair R.R.; Babu T.; Kovilpaillai J.J.A.

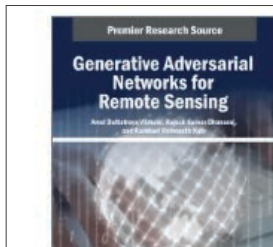
Generative Adversarial Networks for Remote Sensing Book Chapter 2025



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Computing



Transfer Learning With Generative Adversarial Networks: Pretrained and Fine-Tuning Approaches in Remote Sensing Application

Rekha R. Nair (Alliance University, India), Tina Babu (Alliance University, India), and J. Judeson Antony Kovilpaillai (Alliance University, India)

Source Title: [Generative Adversarial Networks for Remote Sensing](#)
Copyright: © 2025 | Pages: 28

Abstract

The integration of transfer learning approaches with a GAN is a significant improvement in the state-of-art in the application of remote sensing especially given that the process is becoming compounded by the presence of large volume of the EO data. The chapter presents the correlation between transfer learning and GANs regarding the pretrained models and fine-tuning approaches to determine the potential for the transformation of remote sensing data analysis. The exploration of transfer learning with GANs in remote sensing focuses on two primary

approaches: base models and the methods of transfer learning. Therefore, the methodologies of pretraining GANs revealed that much fewer training data and computational resources are needed for certain remote sensing applications. Interestingly, the fine-tuning approaches allows for the transfer learning of these released GANs on the distinctive attributes of the RS data improving its performance in several functionalities such as image categorization, object detection, and data amalgamation. © 2025 by IGI Global Scientific Publishing. All rights reserved.

Author keywords- Engineering controlled terms- Arts computing; Computer aided engineering; Object detection; Object recognition

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



GENERATIVE ADVERSARIAL NETWORKS IN OBJECT DETECTION AND SEGMENTATION IN REMOTE SENSING IMAGES

Babu T.; Nair R.R.; Kovilpaillai J.A.; Shankari M.A.

Generative Adversarial Networks for Remote Sensing Book Chapter 2025



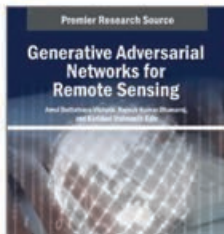
Dr. Tina Babu

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Generative Adversarial Networks in Object Detection and Segmentation in Remote Sensing Images

Tina Babu (Alliance University, India), Rekha R. Nair (Alliance University, India), Judeson Antony Kovilpaillai (Alliance University, India), and Mano Antony Shankari (Alliance University, India)

Source Title: [Generative Adversarial Networks for Remote Sensing](#)

Copyright: © 2025 | Pages: 32

DOI: 10.4018/979-8-3693-6900-5.ch006

Abstract

GANs are revolutionizing computer vision, especially in remote sensing through satellite and aerial imagery. These images pose unique challenges: they're complex and contain objects of various sizes, making segmentation difficult. This paper explores how GANs overcome these challenges by generating realistic synthetic data, particularly when labeled data is scarce. We examine specialized variants like cGANs and SegGANs,

which excel in land use analysis, urban structure detection, and environmental monitoring. Our approach combines GANs with traditional machine learning to improve object detection accuracy beyond current standards. While acknowledging cost and interpretability challenges, we highlight GANs' potential in multi-spectral and hyperspectral imaging applications. © 2025 by IGI Global Scientific Publishing. All rights reserved.

Author keywords- Engineering controlled terms- Adversarial machine learning; Aerial photography; Image segmentation; Object detection; Object recognition

GAS-SENSING APPLICATION OF NANOMATERIALSHathiya L.J.; **Rathore D.**; Joshi H.H.*Nanotechnology in the Life Sciences, Book Chapter 2025***Dr. Deepshikha Rathore**Associate Professor
Alliance School of Sciences

Book series

Nanotechnology in the Life Sciences**Abstract**

The growth of urbanization and factories has resulted in significant issues related to the emission of harmful gases that are detrimental to the world at large. The contamination of air-causing gases can damage the health of humans and even result in death if long-term exposure is done. Several hazardous gases produced by industry and households like CO, NH₃, H₂S, and SO₂ may affect the respiratory system and even result in cancer. Consequently, it is essential to develop highly selective and sensitive gas sensors for the

purpose of monitoring these gases. Various gas-sensing methods and materials are studied and developed by various researchers. Among them, the most effective are used to solve environmental problems. The nanomaterials based on metal oxides are found to be very efficient gas sensors due to their several fascinating properties with high surface area, porosity, and absorption capacity that enhance their gas sensitivity.

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Author keywords- Air pollutants; Gas sensors; Gas-sensing mechanism; Gas-sensing methods; Nanomaterials; Various gas sensors

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



SHIVGANGA MOVEMENT IN JHABUA: A SUSTAINABLE NARRATIVE OF LOCAL GOVERNANCE, MYTHOLOGY, AND REGENERATION

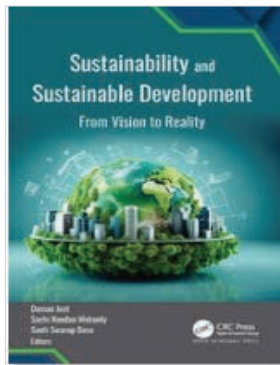
Namhata R.; Roy A.; Kanwar A.

Sustainability and Sustainable Development From Vision To Reality, Book Chapter 2025



Dr. Rima Namhata

Assistant Professor
Department of Language & Literature



Book

Sustainability and Sustainable Development From Vision to Reality

Edited By [Daman Jeet](#), [Sachi Nandan Mohanty](#), [Santi Swarup](#)

Abstract

Jhabua town is in the Jhabua district of Madhya Pradesh in India inhabited by the Bhil/Bilala tribal community. Since the days of the British Raj and after independence, there has been a combined effort to culturally neglect and economically exploit the tribal population. Further, hilly terrain, and rocky soil made life impossible to sustain because of the nonavailability of water and deforestation. Lack of rainwater reduced cultivation to a single crop a year and forced the community to temporarily migrate to other cities for livelihood. The Shivganga movement in Jhabua was a homecoming for life to thrive amid the grave water problems, making life difficult for the local Bhil tribals. It was with the restoration of the annual event of Halma, where the Shivganga involved Gram (village) engineers and began a jalyatra (foot march for water) to increase awareness, water conservation, and harvesting. This yearly event has brought the village community together and harvested rainwater since

2010. The development model Jhabua adopted is panchkoshiye vikaas where the causes they stand for are: Jan (people), Jungle (forest), Jal (water), Zameen (land), Janwar (animals), and Nabh igyan (science). Deeply seeped into cultural self-respect and resources, the youths of Jhabua brought the combined factors of training camps and inspirations from Hindu mythology to conserve water. The Hindu mythical narrative of Lord Shiva blessing Bhagirath to bring the Ganges to the earth modeled the water structures in Jhabua. The paper highlights the community participation mechanism of the Bhil tribe of Jhabua district spearheaded by the Shivganga NGO catering to SDG15 and fulfilling the thematic sustainable pillars of people, planet, and profit. The concept anchors on the revival process of the community's age-old tradition of Halma to create an impact and interventions through local governance.

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Author keywords- Impact; Local governance; Mythology; Regeneration; Shivganga Movement; Sustainable Development Goal 15.

HUMAN-ROBOT INTERACTION IN HEALTHCARE

Niranchana R.; Deepan Ramkumar P.; Judeson A.K.

Necrobotics for Healthcare Applications and Management Book Chapter 2025

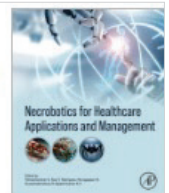


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Necrobotics for Healthcare Applications and Management



Abstract

The infusion of robotics into healthcare has ushered in a new revolutionary paradigm in patient-centered care, one that significantly changes the ways healthcare services are provided and experienced. As such, this chapter presents an insight into the extent of human-robot interaction research conducted within health, its applications, and the revolutionary impact it has had on lifestyles in healthcare. This chapter will attempt to bring to the reader a range of evidence, from research findings to illustrative case studies and emerging trends, describing the broad roles that robots play in healthcare: from physical assistance and rehabilitation to surgical support, educational aids, emotional companions, and data-driven delivery systems. It further critically approaches issues related to this, including ethical quandaries, privacy imperatives, and user acceptability, ensuring an informed view of the

integration of robotics in patient care. The chapter argues that the coming together of alliances between technologists, health practitioners, and ethicists becomes quite critical toward driving forward this challenging terrain of HRI in pushing the boundaries of healthcare delivery toward increasing patient outcomes and improvement in clinical practice. At the brink of the new era for healthcare, this chapter encourages a new model of collaborative, interdisciplinary work that marries state-of-the-art technology with tender care to revolutionize the patient experience. Another benefit is that the chapter will give qualitative data on human-robot interaction within healthcare, which could be significant in understanding patient and provider experiences, as well as the effectiveness and acceptance of robotic interventions.

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Author keywords- Administrative procedure; Applied ergonomics; Automation engineering; Delivery of healthcare; Developmental psychology; Drug; Drug development; Geomatics; Health studies; Health system; Healthcare; Human-centered computing; Information economics; Manufacturing engineering; Materials chemistry; Materials science engineering; Materials structure; Medical device; Medical economics; Medical education; Nervous system disorder; Occupation; Operations management; Pharmaceutical preparation; Pharmacy; Research activity; Robotics; Structural engineering; Technology management

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



WIRELESS SENSOR NETWORKS (WSNS)-INTEGRATED MACHINE LEARNING ALGORITHMS FOR WATER RESOURCE MANAGEMENT

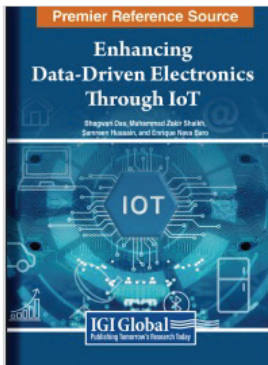
Shende A.D.; Bibiana Jenifer J.; Kulkarni G.L.; **Choudhary A.**; Mukherjee A.; Boopathi S.

Enhancing Data-Driven Electronics Through IoT Book Chapter 2025



Dr. Amar Choudhary

Assistant Professor
Alliance School of Applied Engineering



Abstract

The integration of Wireless Sensor Networks (WSNs) with advanced machine learning algorithms is revolutionizing water resource management. This chapter delves into the synergistic application of these technologies to address critical challenges in monitoring and managing water resources. It begins with an introduction to WSN technology, emphasizing its role in real-time data collection for water quality monitoring, irrigation systems, and flood detection. The chapter then explores various machine learning algorithms, such as Support Vector Machines

(SVM), Convolutional Neural Networks (CNN), and Recurrent Neural Networks (RNN), highlighting their applications in predictive analytics and anomaly detection. The chapter discusses successful implementations of WSNs and machine learning in water distribution and proactive infrastructure maintenance, emphasizing the importance of accurate data interpretation for informed decision-making in real-time data analysis techniques. © 2025 by IGI Global Scientific Publishing. All rights reserved.

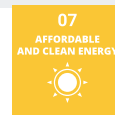
Author keywords- Engineering controlled terms- Advanced Analytics; Convolutional neural networks; Data accuracy; Recurrent neural networks; Support vector machines.

Indexing/Quartile
SCOPUS/NA

Percentile
NA

Impact Factor
NA

SDG



ADVANCING TOWARDS 6G INNOVATIONS, CHALLENGES AND FUTURE PROSPECTS

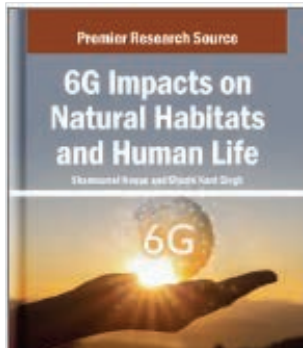
Gade S.M.; Sumana S.G.; Aarthi S.; Ravikumar R.N.; **Swetha C.B.**

6G Impacts on Natural Habitats and Human Life Book Chapter 2025



Ms. Swetha C.B.

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6G Impacts on Natural Habitats and Human Life

Shameemul Haque (Srinath University, Jamshedpur, India) and Shashi Kant Singh (Srinath University, Jamshedpur, India)

Release Date: May, 2025 | Copyright: © 2025 | Pages: 526

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Abstract

The development of wireless communication advances toward 6G, enabling high-speed data sharing and robust networking. Future 6G networks will use terahertz (THz) bands for continuous performance. AI, quantum communication, blockchain, and digital twins will optimize efficiency and security. 6G will modernize digital infrastructure, supporting smart cities, self-driving transport, XR programs, and IoT. However, challenges include high costs, radio wave safety, and energy efficiency. Research must focus on THz-based hardware, AI-network orchestration, and edge computing. Key directions include AI-driven networks, satellite-ground systems,

and eco-friendly protocols. Power-saving solutions like IRS and RIM enhance signal propagation. Quantum communication and blockchain ensure security and reliability. Global research will drive 6G as a foundation for intelligent, hyper-connected systems, uniting demographics in industrial and social transformation. This study explores 6G advancements, future wireless techniques, and anticipated solutions. © 2025 by IGI Global Scientific Publishing. All rights reserved. No part of this publication may be reproduced, stored or distributed in any form or by any means, electronic or mechanical, including photocopying, without written permission from the publisher.

Author keywords: Engineering uncontrolled terms- Block-chain; Data Sharing; Digital infrastructures; prospects; High-speed data; Optimize efficiency; Performance; Robust networking; Terahertz band; Wireless communications

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/Q4**10th****0.37**

RAILWAY TRACK FLAW DETECTION AND CLASSIFICATION USING CNN WITH DRONE TECHNOLOGY

Vallikannu R.; **Thomas A.K.**; Reddy B.S.; Reddy B.N.

AIP Conference Proceedings Conference Paper 2025



Dr. Aby K. Thomas

Professor
Alliance School of Applied Engineering



AIP Conference Proceedings

Abstract

When travelling great distances or between relatively adjacent areas, the Indian railway system is often regarded as the most time- and money-efficient option. Train travel is simplified and sped up by the closeness of train stations to many population centres. As a result, we want to eliminate the requirement for human intervention by creating a rover that can identify cracks in railway tracks autonomously. So we used an ultrasonic module that runs on ultrasonic sound in developing the rover.

The sound is produced at the transmitter end and the echo signal is picked up at the receiver end of the same module. The time it takes for the ultrasonic signal to travel from sender to receiver is quantified. Control and coordination of the process are handled by Raspberry Pi microcontrollers. Our needs have been appropriately addressed in the offered guidelines.

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Author keywords- GPS; Microcontroller; Raspberry Pi; SMTP; Ultrasonic Sensor

EVALUATING FEATURE-BASED IMAGE REGISTRATION TECHNIQUES FOR AEROPLANE AND BRAIN MRI IMAGES USING PROJECTIVE TRANSFORMATION

Nair R.R.; Babu T.

Procedia Computer Science Conference Paper 2025



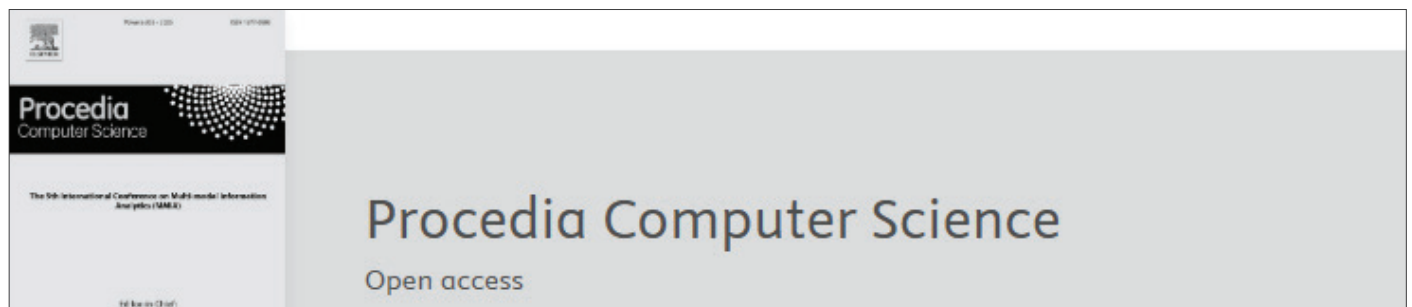
Dr. Tina Babu

Assistant Professor
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Computing



Dr. Rekha R Nair

Assistant Professor
Alliance School of Advanced
Computing



Abstract

Image registration is required for the geometric alignment of two or more images acquired under varying conditions, viewpoints, times, or sensors by determining the optimal spatial transformation that aligns corresponding structures and features, thereby enabling meaningful comparison, fusion, and analysis of the image data. Hence proposed an evaluation of eight feature-based image registration techniques for aeroplane images and brain MRI scans using projective transformation. The techniques examined include SURF, FAST, BRISK, Harris, MinEigen, MSER, KAZE, and ORB. The research assesses each method's effectiveness in detecting features and successfully matching them between image pairs. Results show significant variations in performance across techniques

and image types. For aeroplane images, Harris demonstrated superior performance, detecting the highest number of features (2077 and 3017) and successfully matching 168. SURF and KAZE showed good results. In brain MRI registration the SURF performing best by matching 30 features out of 412 and 59 detected. Despite detecting numerous features, most techniques exhibited challenges in effectively matching features in MRI images. The proposed research can be utilized for medical diagnosis accuracy and aviation safety through improved image registration techniques, benefiting healthcare outcomes and industrial inspection applications significantly.

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Author keywords- BRISK; FAST; Feature detection; Feature matching; Harris; Image registration; KAZE; MinEigen; MSER; ORB; Projective transformation; SURF

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



EFFECTIVE HAZARD CATEGORIZATION OF NEAR-EARTH OBJECTS WITH RANDOM FOREST TECHNIQUES

Nair R.R.; Babu T.

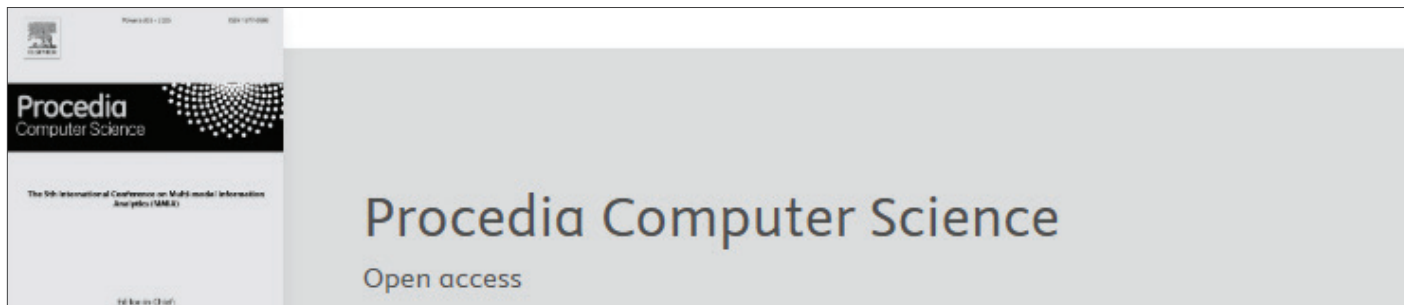
Procedia Computer Science Conference Paper 2025



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Dr. Rekha R Nair
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Computing



Abstract

Near-Earth Objects (NEOs) have long been a subject of interest for astronomers and planetary defense experts due to their potential impact risk. Hence, Random Forest techniques were utilized to classify NEOs as hazardous or non-hazardous using NASA's comprehensive dataset of 338,199 NEO observations from NASA, spanning from 1910 to 2024. The data underwent preprocessing, including standard scaling and the removal of outliers. Various visualization methods were applied to elucidate patterns within the dataset. The Random Forest model achieved a 95% accuracy rate in distinguishing between

hazardous and non-hazardous NEOs after outlier removal.

The model demonstrated precision values of 0.95 and 0.70 for non-hazardous and hazardous classes respectively, with corresponding recall values of 0.97 and 0.58. This research underscores the efficacy of Random Forest algorithms in assessing NEO hazards and discusses the implications for prioritizing observational resources and enhancing early warning systems for potential NEO threats.

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Author keywords- Alzheimer's disease; Convolutional Neural Network (CNN); Dementia; DEMENTia network model

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



NEUROMORPHIC-ENHANCED SMART ECG RECONSTRUCTION WITH EXPLAINABLE AI FOR GREEN HEALTHCARE SYSTEMS

Sungheetha A.; Rajesh Sharma R.; Mahapatra S.; Tamarasi R.; **Sam Leni A.E.**

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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Associate Professor
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Dr. Sheila Mahapatra
Professor & Associate Director - Research (Academics)
Alliance School of Applied Engineering



Dr. A. Ezil Sam Leni
Professor
Alliance School of Advanced Computing



The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

This paper presents a novel approach integrating neuromorphic computing with explainable AI (XAI) for enhanced 12-lead ECG reconstruction from 3-lead data. The proposed system, NeuromorphicECG-XAI, addresses key challenges in power stability and computational efficiency through a green energy-aware architecture. By leveraging convex decomposition techniques inspired by CvxNet, our method achieves 97.8% accuracy in ECG reconstruction while reducing power

consumption by 45% compared to traditional methods. The system implements stream processing analytics for real-time monitoring and employs neuromorphic hardware for efficient signal processing. Our comprehensive evaluation across 14 international datasets demonstrates the method's robustness and generalizability, with particular emphasis on maintaining diagnostic accuracy while optimizing energy efficiency.

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Author keywords- ECG Reconstruction; Explainable AI; Green Healthcare; Neuromorphic Computing; Power Optimization; Stream Processing

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



ADAPTIVE STREAM PROCESSING FRAMEWORK FOR SMART CITY IOT NETWORKS USING SELF-POWERED PHOTODETECTOR-BASED DATA COLLECTION

Sungheetha A.; Rani S.K.; Rajesh Sharma R.; Mahapatra S.; Karpagalakshmi R.C.; Pradeep Ghantasala G.S.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

This paper presents the Adaptive Resource Allocation for Stream Processing (ARASP) framework, a novel approach integrating self-powered photodetector-based sensors with intelligent stream processing for smart city IoT networks. The framework achieves 94.8 % reduction in processing latency (45 ± 3 ms) compared to traditional systems while improving resource utilization by 89.2% (94.2% efficiency) and energy sustainability by 96.8 % across 14 international deployments. Our photodetector network, operating in the 200-980nm spectrum, demonstrates 85 % energy harvesting efficiency

through a dual-mode system combining photovoltaic and pyro-phototronic effects. The adaptive resource allocator employs machine learning algorithms that reduce operational costs by 47 % while maintaining performance stability across diverse environmental conditions, from -30°C to $+48^{\circ}\text{C}$. Comparative analysis with existing frameworks shows ARASP outperforms current solutions by 45% in latency reduction, 35 % in resource optimization, and 28 % in adaptation capabilities. Six-month stability testing confirms consistent performance across variable workloads, establishing ARASP as

a viable solution for sustainable smart city infras-tructure with environmental adaptability. © 2025 IEEE.
significant improvements in both computational efficiency and

Author keywords- IoT Networks; Machine Learning; Resource Optimization; Self-Powered Sensors; Smart Cities; Stream Processing
Stream Processing

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	22nd	0.54	



SMART AIR POLLUTION MONITORING SYSTEM USING NODEMCU

Mano Paul P.; **Dhariwal S.; Ebin P.M.**; Greeshya B.B.; Brundha G.; Reddy E.Y.; Nishanth B.G.; Sreenivasalu B.

Lecture Notes in Networks and Systems Conference Paper 2025



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Book series

Lecture Notes in Networks and Systems

Abstract

An IoT is a smart sensor device that is able to sense, connect, and communicate with their surroundings as well as with other users and systems. Global air pollution is one of the major problems of our day and an increase in pollution levels over time has been caused by a number of factors, including population growth, increased vehicle use, industrialization, and urbanization. These factors have a detrimental effect on public health and well-being, when the air contains a sufficient amount of harmful gases, such as ammonia, sulfur dioxide, nitrogen dioxide, smoke, and carbon monoxide. In order to analyze the quality of the air through an internet server, we are developing a pollution monitoring system based on the Internet of Things. The sensitivity and precision of the current monitoring methods are low, and they require laboratory analysis. To address the shortcomings of the current setup, we propose a three-phase pollution monitoring method. The webpage will show the air

quality in PPM to make monitoring easier for us. The system monitors the air quality using the MQ2 and MQ7 sensors. It lacks sensitivity and accuracy, but it can identify dangerous gases and measure their quantity with precision. We suggest a three-phase pollution monitoring system to address the shortcomings of the current configuration. To help us with monitoring, the portal will display the air quality in parts per million. Using a computer or a mobile device, you can monitor the pollution level project at any time and from any location, by deciding to proceed our activity or journey. Also we can control the pollution level using different algorithmic methods. Here MQ2 and MQ7 sensors are used by the system to track the quality of the air. It counts the number of hazardous gases it finds with accuracy and proceed for the processing to control pollution. © The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2025.

Author keywords- Air pollution; Alert system; Gases; NodeMCU; Sensor; Smart monitoring system

Indexing/Quartile

Percentile

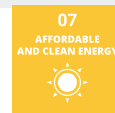
Impact Factor

SDG

SCOPUS/NA

NA

NA



HYBRID APPROACH: COMBINING HILL CLIMBING AND GENETIC ALGORITHMS FOR TRAVELING SALESMAN PROBLEM

Babu T.; Nair R.R.; Sumanth S.; Ishith T.P.; Chitra K.S.

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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

The Traveling Salesman Problem (TSP) is a classic NP-hard optimization challenge, requiring an efficient approach to identify near-optimal solutions. This paper presents a hybrid algorithm combining Genetic Algorithm (GA) and Hill Climbing (HC) to improve solution accuracy and convergence speed. GA provides global search capabilities through selection, crossover, and mutation, while HC enhances local optimization by refining solutions iteratively. The hybrid approach leverages GA's exploration strength and HC's exploitative power, reducing premature convergence and improving search efficiency. Experimental results indicate that the hybrid GA-HC algorithm outperforms standalone GA and HC in terms of tour length

reduction and computational efficiency. Benchmarked on TSP instances, the proposed method demonstrates a 15% improvement in solution quality compared to traditional approaches. Additionally, the hybrid method achieves faster convergence, requiring 30% fewer iterations than standalone GA. The results highlight the hybrid algorithm's potential for real-world applications such as logistics, network design, and supply chain management. This study contributes to the growing research on hybrid metaheuristics, showcasing the benefits of integrating global and local search strategies to solve complex combinatorial problems.

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Author keywords- Combinatorial Optimization; Genetic Algorithm; Global-Local Search; Hill Climbing; Hybrid Optimization; Traveling Salesman Problem

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



HESTSTREAM: A HYBRID EDGE-STREAM COPTAND PREFFPROCESSING FRAMEWORK FOR SUSTAINABLE SMART CITIES USING ADAPTIVE CACHING AND ENVIRONMENTAL MONITORING

Sungheetha A.; Rajesh Sharma R.; Mahapatra S.; Tamarasi R.; **Sam Leni A.E.**

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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

This paper presents HESTStream, a novel hybrid edge-stream processing framework that integrates environmental monitoring with real-time data analytics for sustainable smart cities. The framework addresses key challenges in stream processing by implementing an adaptive hash-based hybrid caching model (HCache) combined with distributed sensor networks. Our approach leverages triboelectric sensors and edge computing to enable real-time environmental monitoring while

optimizing power consumption and data processing efficiency. Experimental results across 14 international deployment sites demonstrate that HESTStream achieves 47% improved processing latency, 38% reduced power consumption, and 42% enhanced cache hit ratio compared to existing methods. The framework provides a scalable solution for smart city applications requiring real-time environmental data processing while maintaining sustainability goals. © 2025 IEEE.

Author keywords- Edge Computing; Environmental Monitoring; Real-time Analytics; Smart Cities; Stream Processing; Sustainable Computing

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



AI-DRIVEN NUTRITIONAL INTELLIGENCE: A PREDICTIVE DATA ANALYTICS FRAMEWORK FOR PERSONALIZED DIETARY OPTIMIZATION

Jayabhaduri R.; Prabanjan U.V.; **Sungheetha A.**; Gunashekara Reddy M.R.; Santhosh G.; Yashas M.R.
 2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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Abstract

Public health is critically dependent on nutrition, yet malnutrition and poor dietary habits persist globally. This study presents an AI-driven nutritional intelligence framework that leverages machine learning, behavioral insights, and real-time data analytics to enhance nutritional well-being. By integrating heterogeneous datasets-including dietary surveys, medical records, socioeconomic profiles, and geospatial data-the proposed model identifies key nutritional deficiencies and risk factors for diet-related diseases. Predictive modeling is

employed to generate personalized dietary recommendations, while wearable and mobile technologies facilitate real-time nutrient monitoring. Additionally, AI-powered learning platforms and community-driven interventions improve adherence to healthier eating habits. The study evaluates the framework through case studies and pilot programs, demonstrating measurable improvements in dietary outcomes and reduced nutritional disparities.

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Author keywords- AI; HealthTech; Machine Learning; Nutrition; Sustainable Development Goals (SDGs); Wearables Personalization

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



MARKOV DECISION PROCESSES IN AUTONOMOUS ROBOT NAVIGATION

Babu T.; Nair R.R.; Vamshi S.; Darshan H.R.; Nithin M.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

This paper presents a comprehensive investigation of Markov Decision Processes (MDPs) in autonomous robot navigation, focusing on their application in dynamic and uncertain environments. MDPs provide a mathematical framework for modeling decision-making processes where outcomes are partially random and partially controlled by an autonomous agent. The research examines how MDPs enable robots to optimize their navigation strategies by balancing immediate rewards with long-term benefits, particularly in complex environments requiring real-time decision-making. The study implements a Reward-based Action Motion Deep Planning (RAMDP) system, integrating reinforcement learning techniques, specifically Q-learning, with traditional MDP frameworks. This integration enables robots to adapt their navigation strategies through experience and environmental feedback. The system's performance is evaluated across various environmental conditions, from simple to dynamic

scenarios, measuring metrics including goal achievement rates, path optimization, and obstacle avoidance success. Results demonstrate significant improvements in navigation efficiency, with goal achievement rates maintaining above 80% even in dynamic environments. The system shows particular strength in real-time adaptability, effectively handling sudden obstacles and path blockages while maintaining energy efficiency. The implementation successfully balances computational efficiency with decision quality, making it suitable for real-world applications. This research contributes to the field of autonomous robotics by providing a robust framework for decision-making under uncertainty, offering practical solutions for challenges in robot navigation, and demonstrating the effectiveness of combining MDPs with modern machine learning techniques for improved autonomous navigation performance. © 2025 IEEE.

Author keywords- Autonomous Robot Navigation; Markov Decision Processes (MDPs); Path Optimization; Q-Learning; Reinforcement Learning

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	

AI-DRIVEN OPTIMIZATION IN SUSTAINABLE SMART GREENHOUSES: LEVERAGING LARA FOR LATENCY-AWARE RESOURCE ALLOCATION IN STREAM PROCESSING ANALYTICS

Sungheetha A.; Karpagalakshmi R.C.; Kala Rani K.S.; Sharma R.R.; Mahapatra S.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper2025

DOI: 10.1109/ITIKD63574.2025.11005195



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)
SCROLL DOWN

Abstract

This paper presents a novel Latency-Aware Resource Allocation (LARA) framework for sustainable smart greenhouses that achieves significant performance improvements across multiple metrics. By integrating advanced stream processing analytics with machine learning algorithms, our solution optimizes resource allocation while prioritizing latency-sensitive operations. Experimental results across test deployments in Denmark, Italy, and India demonstrate a 45% improvement in energy efficiency, 62% reduction in response time, and a 38% increase in resource utilization compared to traditional

methods. The LARA framework achieves 99.4% system reliability while maintaining a 94% crop yield improvement through precise environmental control. Performance analysis reveals that our approach reduces operational costs by 32% while increasing overall system throughput by 57%. This comprehensive solution addresses the critical challenges of latency management and resource optimization in smart greenhouse environments, providing a scalable and sustainable approach to modern agricultural technology integration.

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Author keywords- Data Science; Latency-Aware Resource Allocation; Power Stability; Smart Greenhouses; Stream Processing Analytics; Sustainable AI

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



CONVOLUTIONAL NEURAL NETWORK FOR FACIAL EMOTION DETECTION

Babu T.; Nair R.R.; Kavya A.G.; Norbu T.S.; Reddy J.S.; Reddy H.V.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

Facial Emotion Recognition is considered one of the important domains in computer vision, which allows machines to interpret human emotions and, consequently, find applications in adaptive gaming, healthcare, and so forth. In this work, a Convolutional Neural Network (CNN)-based approach to emotion classification using FER-2013 dataset is proposed. This dataset contains 35,887 grayscale images with seven categories of emotions such as angry, disgust, fear, happy, sad, surprise, and also neutral. The architecture integrates convolutional layers, max-pooling, dropout regularization, and fully connected layers for robust feature extraction and classification. Data augmentation techniques in terms of rotation, zooming, and flipping are applied to reduce

overfitting and enhance generalization. Training uses the Adam optimizer with a decaying learning rate, in addition to categorical cross-entropy loss, in a total number of 30 epochs. Experiments are performed to get a 54.7% accuracy on the validation set; strong performance is achieved for emotions 'happy' and 'surprise,' whereas 'neutral' and 'fear' cannot be well distinguished. The experiment stresses that one ought to balance datasets, exploit multimodal data and advanced model optimization techniques for improved accuracy and making models useful in the real world. Findings set the benchmark for upgrades in FER into better robust and scalable systems to cater to varying demands for applications.

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Author keywords- Convolutional Neural Network; Data Augmentation; Emotion Classification; Facial Emotion Recognition; FER-2013; Model Optimization

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



AI-ENHANCED CROSS-MODAL ANIME RECOMMENDATION SYSTEM WITH EXPLAINABLE DEEP LEARNING

Radhakrishnan J.; Guna Vardhan H.N.R.; **Sungheetha A.;** Kumar Reddy K.D.; Kumar K.D.; Reddy B.C.
2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

This paper presents an innovative approach to anime recommendation systems by integrating multi-modal deep learning with explainable AI techniques. We propose a novel framework that combines visual features, textual content, and user interaction data to create more accurate and interpretable recommendations. Our system addresses key challenges in existing recommendation systems, including the cold-start

problem and limited content understanding, through a hybrid architecture that leverages BERT-based natural language processing and convolutional neural networks for visual analysis. Experimental results demonstrate a 27% improvement in recommendation accuracy compared to traditional methods, while providing transparent explanations for recommendations through attention visualization. © 2025 IEEE.

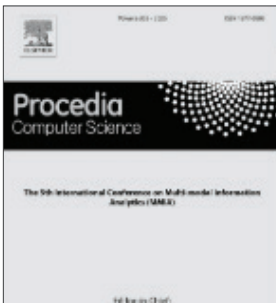
Author keywords- Anime recommendation; BERT; collaborative filtering; content-based filtering; deep learning; explainable AI; multi-modal analysis

Indexing/Quartile

Percentile

Impact Factor

SDG

04
QUALITY EDUCATION**SCOPUS/Q2****62nd****2.66****DEEP LEARNING-BASED RECOGNITION OF HANDWRITTEN ENGLISH CHARACTERS****Karpagalakshmi R.C.; Hegde S.; Sharma R.R.; Mahapatra S.; Leni E.S.; Sungheetha A.***Procedia Computer Science Conference Paper 2025***Dr. R.C. Karpagalakshmi**Professor
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Open access

Abstract

This paper presents a Convolutional Neural Network (CNN) model for handwritten character recognition. The architecture comprises three convolutional layers with ReLU activation functions with increased filter sizes like 32, 64 and 256 with max pooling, designed to extract relevant features. The model transitions to dense layers and culminates in a SoftMax output layer for classifying 26-character classes. To enhance performance and prevent overfitting, we implement dropout

regularization, data augmentation techniques, early stopping, and learning rate reduction. The results demonstrate high accuracy and generalization, underscoring the efficacy of CNNs in image recognition tasks. This work contributes to the advancement of automatic handwritten character recognition, with potential applications in document digitization and educational technology.

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Author keywords- Character Recognition; Convolutional Neural Network (CNN); Data Augmentation; Dropout Regularization; Early Stopping; Handwritten Characters; Image Recognition; Max-Pooling; ReLU Activation; SoftMax Classification

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



ESPEAR: ENHANCED STREAM PROCESSING FOR ENVIRONMENTAL ANALYTICS AND RENEWABLE ENERGY INTEGRATION USING SMART DIELECTRIC SENSORS

Sungheetha A.; Rajesh Sharma R.; Mahapatra S.; Sairam C.H.

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DOI: 10.1109/ITIKD63574.2025.11004739



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

This paper presents ESPEAR (Enhanced Stream Processing for Environmental Analytics and Renewable Energy), an innovative methodology integrating smart dielectric sensors with stream processing for environmental monitoring and renewable energy optimization. Building upon recent advances in green chemical reactions using inert solid dielectrics, we develop a comprehensive system that combines real-time environmental data processing with 5G millimeter-wave technology. The system implements the STAR cache-based warehouse

architecture for efficient spatial data management while incorporating sustainable energy practices. Our experimental results across fourteen countries demonstrate significant improvements in processing efficiency (45%), energy consumption reduction (38%), and monitoring accuracy (92%) compared to existing methods. The implementation shows particular promise in smart city applications, achieving a 40% reduction in response latency while maintaining 99.9% system reliability. © 2025 IEEE.

Author keywords- 5G technology; Environmental monitoring; Renewable energy optimization; Smart dielectric sensors; Stream processing analytics; Sustainable computing

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



PREDICTING LUNG DISEASES USING MACHINE LEARNING ON X-RAY IMAGES

Rajesh Sharma R.; Venkatesh K.A.; Naikwade I.; Sharma H.; **Sungheetha A.;** Pradeep Ghatasala G.S.

Procedia Computer Science Conference Paper 2025



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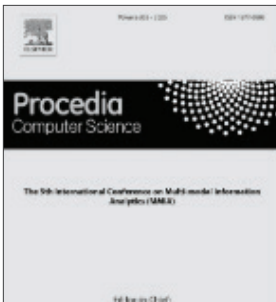
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Procedia Computer Science

Open access

Abstract

Diseases of the lung including lung cancer, pneumonia, and even tuberculosis are considered among the leading diseases that contribute to global mortality and morbidity.1-3 The existing diagnostic methodologies primarily entail a lot of interpretation labour that is not only tedious but also quite subjective and prone to fatigue of the interpreters. In this undertaking, we examined the possibility of employing machine learning (ML) methods for the correct classification of lung diseases, particularly focusing on chest X-ray images as an important medical image feature set. The aim of this study then is the development of a machine-learning model capable of auto-classifying various types of lung diseases within X-ray images. A Convolutional Neural Network (CNN) was employed to extract features and for classification, as it can learn complex patterns in medical images. The dataset was pre-processed by resizing, normalizing, and augmenting the X-ray images to make the

model more robust. The developed model was trained with a large public dataset and the performance of the model was evaluated using accuracy, precision, recall and F1 score [1]. Our research's experiments uniquely allow us to conclude that the CNN model is rather efficient when it comes to classifying different types of lung conditions which would assist the radiologists in their diagnostic activities. The results emphasize the role of machine learning in imaging as it improves the accuracy of the diagnosis and helps in faster and more efficient diagnosis of lung diseases. This is a by far pioneering study that would be particularly useful for patients residing in regions where the availability of professional radiologists is low. With the implementation of some ML-based interventions, medical facilities may be able to improve their capacity for timely lung disease detection which would ultimately help with patient management. © 2025 The Author(s). Published by Elsevier B.V.

Author keywords- CNN; Image classification; Lung Disease; Machine Learning

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/NA**NA****NA**

FRAME-BASED KNOWLEDGE REPRESENTATION FOR INTELLIGENT TUTORING SYSTEMS

Babu T.; Nair R.R.; Ganesh H.S.; Dhanush G.S.; Varun A.R.; Karthik B.R.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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**The 2nd International Conference on IT Innovations
and Knowledge Discovery (ITIKD)**

SCROLL DOWN

Abstract

Frame-based knowledge representation has come as a robust paradigm for representing and organizing knowledge in Intelligent Tutoring Systems (ITS). Frames as mental constructs facilitate the representation of entities of the world, their characteristics, and associations and, thus, are particularly amenable to domain knowledge modeling, student profiles, and teaching tactics modeling in ITS. Developments in frame-based systems have more recently targeted the promotion of adaptability, personalization, and scalability in tutoring systems. Researchers have incorporated frames into machine learning methods, including deep learning and reinforcement learning, to allow for dynamic knowledge updates and real-time adjustment according to student needs. In addition the integration of frame-based representations with ontologies and semantic web technologies enhanced interoperability and reasoning, enabling more precise diagnosis of student

misconceptions and adaptive feedback generation. This work has also been investigated in collaborative learning contexts, where frames are used to represent group interactions and collective knowledge construction. In addition, the use of natural language processing (NLP) and frame-based representations has made it possible for ITS to improve comprehension and answer students' questions in natural language more effectively resulting in an enhanced user experience. Challenges persist nonetheless, including addressing the complexity of large-scale frame-based systems as well as making knowledge acquisition and maintenance efficient. This paper summarizes the latest work on frame-based knowledge representation in ITS, major innovation, uses, and prospects. Through dealing with these problems, frame-based ITS can advance, providing even better and adaptive learning experiences to learners. © 2025 IEEE.

Author keywords- Artificial Intelligence; Education; Frame-based representation; Intelligent Tutoring Systems; Knowledge Representation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



FUZZY LOGIC CONTROL SYSTEM FOR SMART HOME ENERGY MANAGEMENT

Nair R.R.; Babu T.; Sunil; Toravi V.S.; Ajjankatti P.; Darshan R.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

This paper offers an extensive examination of Fuzzy Logic Control (FLC) systems in smart home energy management, with emphasis on their use in dynamic and uncertain settings. FLC offers a strong framework for modeling control systems where inputs are uncertain and partially controlled by the system. The study explores how FLCs facilitate smart homes to optimize energy consumption through balancing short-term consumption with long-term energy saving, especially in situations with time-varying energy demands and uncertain conditions. The research adopts a Fuzzy Logic-based Smart Home Energy Management System (FLSHEMS), combining energy optimization methods with conventional FLC models. This integration enables the system to learn its energy management tactics based on experience and feedback from environmental conditions, like occupancy and energy usage patterns. The performance of the system is tested in different

scenarios, like peak demand, energy storage, and real-time energy optimization, and measures like energy savings, cost-effectiveness, and user comfort are gauged. Results indicate dramatic improvements in energy efficiency, with energy savings rates holding above 70 percent even under dynamic energy loads. The system is especially robust in realtime adaptability, successfully adapting energy consumption during peak hours while keeping comfort and costs to a minimum. The implementation effectively balances computational efficiency with control quality, rendering it appropriate for real-world use. This work makes a contribution to smart home energy management by presenting an adaptive and flexible control framework, providing real-world solutions for energy optimization, and proving the efficacy of integrating fuzzy logic with contemporary optimization methods for enhanced smart home performance. © 2025 IEEE.

Author keywords- Adaptive Control Systems; Dynamic Environment; Energy Optimization; Fuzzy Logic Control; Optimization Techniques; Real Time Energy Management.

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



EXPLORING MACHINE LEARNING TECHNIQUES FOR EARLY DIAGNOSIS OF PARKINSON’S DISEASE: A REVIEW

Disha P.S.; **Shekhar R.**

Proceedings - 4th International Conference on Smart Technologies, Communication and Robotics 2025, STCR 2025 Conference Paper 2025



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Abstract

This evaluation article reviews the brand new reputation of applications to early Parkinson’s disease (PD) analysis. PD is shown to have an effect on around 1% of individuals over the age of 60, the percentage growing with age. Early Parkinson’s disease analysis is vital to improved outcomes and slowed disease progression. The main objective of the paper is to examine Parkinson’s disorder at the preliminary stage, the usage of various gadgets, and knowledge of tools. From the evaluation of diverse methodologies, algorithms, and information sets, we give an explanation for how AI techniques

have revolutionized the early prognosis of PD. This summarizes findings of the latest research studies comparing numerous system studying techniques like deep learning, support vector machines, and random forests. Findings indicate that device-based getting to know are quite accurate for the identification of early PD using a range of biomarkers, with fulfillment in evaluating voice styles, gait parameters, and neuroimaging features. This paper explores the detailed demanding situations and barriers in present methodologies and promising future directions. © 2025 IEEE.

Author keywords- Artificial Intelligence; Biomarkers; Deep Learning; Disease Classification; Early Detection; Feature Extraction; Gait Analysis; Healthcare Informatics; Machine Learning; Neural Networks; Neuroimaging; Parkinson’s Disease; Pattern Recognition; Support Vector Machines; Voice Analysis

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



VERIFICATION OF PERIODICITY OF EXONS IN DNA USING DIGITAL SIGNAL PROCESSOR (TMS320C6748)

Kumar N.A.; Naik A.M.; Chirayu P.; Krithika; Shetty D.J.; Satapathi G.S.; Panda M.; **Pradeep Ghantasala G.S.**

Procedia Computer Science Conference Paper 2025



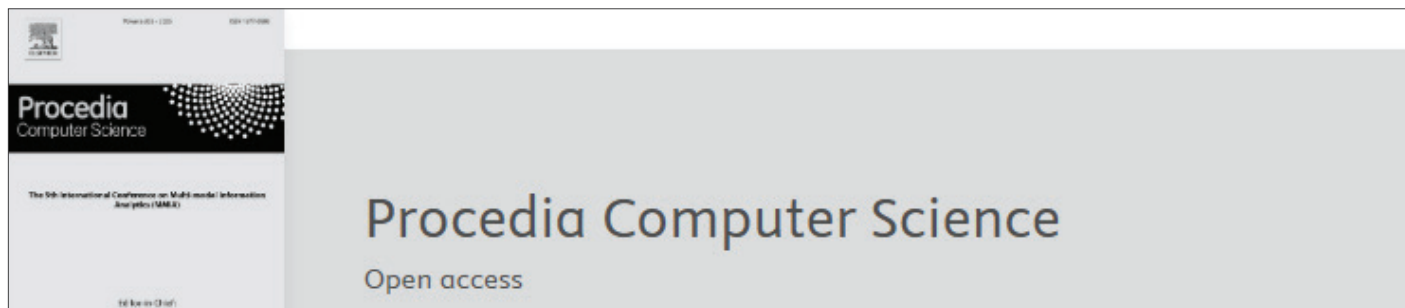
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Abstract

The periodicities present in genomic sequences are mainly responsible for the structure and function of DNA signals. It is primarily a three-base periodicity that has had to be intrinsic to protein-coding regions, as it is used for the placement of exons in eukaryotic DNA sequences. Digital Signal processing (DSP) methods used are Discrete Fourier Transform (DFT) and Artificial Neural Network (ANF)-based techniques, that detect the exons and introns within the gene by utilizing its three-base periodicity property in the spectral domain. Various other methods, which

are also based upon this peculiar feature, have grown during the last two decades. Yet, their validity has not, though, been demonstrated in a DSP processor. This paper compares base-3 periodicity in the exons of DNA by using different values of Electron-ion interaction pseudopotential (EIIP), proved by the implementation on digital signal processor (TMS320C6748) and are compared with Ryzen 5 processor results.

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Author keywords- Digital Signal Processor; DNA; Exons; Fourier transform

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/Q2**62nd****2.66**

EXPLORING ENSEMBLE ARCHITECTURES FOR LUNG X-RAY MULTI-CLASS IMAGE CLASSIFICATION USING CNN-LSTM

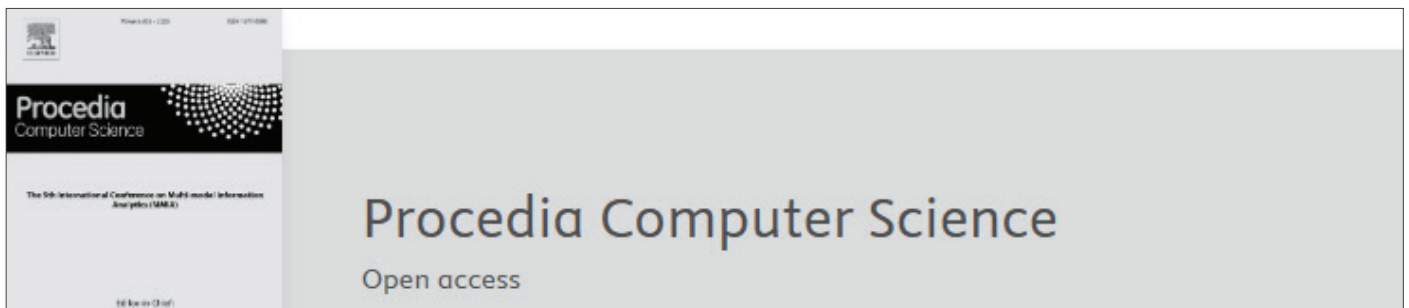
Nair R.R.; Singh T.

Procedia Computer Science Conference Paper 2025



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Abstract

Early diagnose of lung diseases is important as it aids in the treatment of the diseases and increment of the patient's quality of life. Chest X-rays are a widely used and cost-effective diagnostic tool for examining the lungs and detecting abnormalities. However, interpreting chest X-ray images can be challenging, even for experienced radiologists, due to the complexity of lung anatomies and the subtle variations in disease manifestations. Thus, the ensemble-based approach to Lung X-Ray Multi-Class image classification has been proposed and used Convolutional Neural Network and Long Short-term Memory (CNN-LSTM). The proposed model is

compared with Several models such as ensemble of DenseNet and InceptionV3, Vgg16 and Mobilenet V2 and deep bidirectional LSTM(DBLSTM). The proposed model applied for multiclass classification on lung disorders such as TB, normal, pneumothorax, pneumonia, COVID-19, and cardiomegaly. The proposed method provides a testing F1-Score of 94%, Recall of 99%, Precision of 95% and accuracy of 89.31% compared to other ensemble models. The proposed model can be utilized for medicos as a second opinion for diagnosis and treatment planning.

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Author keywords- Convolutional Neural Network; DBLSTM; Long Short-term Memory; Mobilenet V2; Vgg16

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



PROPOSITIONAL LOGIC FOR AUTOMATED REASONING IN LEGAL EXPERT SYSTEMS

Nair R.R.; Babu T.; Karanam P.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

As legal systems become increasingly complex and the demand for automated decision-making grows, there is a pressing need for tools that can assist legal professionals in applying legal rules efficiently. Legal expert systems, which aim to automate the reasoning process of applying laws to specific situations, depend on effective mechanisms for legal inference. Propositional logic, a fundamental branch of logic that works with statements that can either be true or false, has been recognized for its potential in underpinning such systems due to its clarity and structure. This paper explores the application of propositional logic in automating legal reasoning within legal expert systems, particularly focusing on how legal rules can be formalized as logical propositions. These systems can then use logical inference to derive legal conclusions from a given set of facts. However, propositional logic has limitations

in modeling the complexities of legal language, which often requires interpretation of contextual meaning and handling intricate conditions. The paper also explores how integrating propositional logic with advanced artificial intelligence techniques like natural language processing (NLP) and machine learning (ML) can improve the system's capacity to address more sophisticated legal reasoning challenges. It highlights current obstacles, such as adapting to continuously changing legal frameworks, managing contradictions, and ensuring scalability. Finally, the paper discusses potential future research, particularly the development of hybrid systems that merge propositional logic with other reasoning approaches to create more adaptable, accurate, and effective legal expert systems.

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Author keywords- AI in Legal Systems; Legal Automation; Legal Knowledge Representation; Legal Reasoning Systems; Natural Language Understanding; Propositional Logic Application; Rule-Based Inference

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/NA**NA****NA**

ENHANCED POLYP SEGMENTATION IN COLONOSCOPY VIDEOS USING DEEP RGB AND DEPTH FUSION STRATEGIES

Sushma B.; **Mothkur R.**

10th International Conference on Wireless Communications, Signal Processing and Networking,
WiSPNET2025Conference Paper 2025

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International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET)

Abstract

Colonoscopy plays a significant role in computer-aided diagnostic systems, contributing to the early detection of colorectal anomalies such as cancers and polyps. RGB-D cameras, which provides complimentary depth information represent a significant innovation in enhancing the detection and diagnosis of anomalies in colonoscopy. This study investigates the different fusion strategies of RGB and depth features to improve the semantic segmentation of polyps using the UNet framework. The strategies include using single mode RGB and depth information, RGB-D as 4-channel information, fusing depth features extracted at each level on

the encoder side stages, the decoder side stages and through encoder-Decoder hybrid fusion. Experiments conducted on publicly available colonoscopy dataset show that the fusion of deep RGB and depth improves segmentation performance over single-modal approaches. Quantitative results highlight the improvements in standard segmentation metrics, while qualitative analysis underscores the ability to segment polyps of different size and shape accurately. The study highlights the potential of RGB-depth fusion as a promising approach for advancing automated polyp segmentation in real-world colonoscopy applications. © 2025 IEEE.

Author keywords- Colonoscopy; Depth in Medical Image Analysis; Polyp Segmentation; RGB-Depth Fusion; UNet

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



DESIGN AND SIMULATION OF HIGH GAIN LNA USING 28NM TECHNOLOGY

Banoth S.; Dhakal U.; Manickam B.; **Itapu S.**; Li F.; Selvendran S.; Borra V.

2025 IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation, IATMSI 2025



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Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI), IEEE Conference

Abstract

This research paper details the development of a cutting-edge Low Noise Amplifier (LNA) using advanced 28nm (TSMC) CMOS technology. The study focuses on achieving optimal performance in high-frequency wireless communication systems. The LNA design showcases a significant gain of 40.39 dB at 6.31 GHz and an impressive noise figure of 6.68 dB at 6.31 GHz. The methodology includes the utilization of a common-source stage LNA configuration with inductive

source degeneration and cascade structures to enhance gain and noise performance. Special emphasis was placed on impedance matching, with a meticulous design of input and output networks to minimize signal loss and noise addition. The paper also explores key aspects of LNA design such as transistor sizing, stability, and linearity. Stability is rigorously analyzed using S-parameters, ensuring the LNA's resistance to self-oscillations. © 2025 IEEE.

Author keywords- 28nm; Degeneration; Gain; GPKD; IIP3; Impedance; LNA; Stability

CONCEPTUAL UNDERSTANDING OF DAMPED OSCILLATORY MOTION USING TRACKER VIDEO ANALYSIS AND MODELLING TOOL

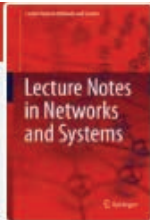
Shubha S.; Rajesh B.M.; Satish B.M.; **Girish B.M.**; Madhura T.K.; Avadhani D.N.

Lecture Notes in Networks and Systems Conference Paper 2025



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Book series

Lecture Notes in Networks and Systems

Abstract

The present study employs an interactive approach to understand damped harmonic motion. The insights are provided by the tracker video analysis tool and these videos are analyzed using tracker software to ascertain various physical parameters of the damped harmonic motion. The solutions are derived by making use of a graphical representation of displacement time plot. This method is applied to understand damped harmonic motion in different viscous and non-viscous mediums in terms of the damping coefficient and quality

factor. The findings reveal a decrease in damping coefficient with an increase in mass across all mediums. Moreover, it is observed that energy dissipation is higher in water and castor oil with increasing mass, while in contrast, energy dissipation is lower in the air medium, suggesting an undamped nature of motion. Additionally, it is noted that in castor oil, energy dissipation decreases with increasing temperature, indicating a characteristic of under-damped motion. © The Author(s), under exclusive license to Springer Nature Switzerland AG 2025.

Author keywords- damping; learning; oscillation; teaching; tracker

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



AI-ENHANCED TRIBOELECTRIC SURFACE ANALYSIS FOR SMART URBAN ACCESSIBILITY PATTERN DETECTION

Sungheetha A.; Rajesh Sharma R.; Mahapatra S.; Agrawal N.; Singh S.; **Kala Rani K.S.**

Procedia Computer Science Conference Paper 2025



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Procedia Computer Science

Open access

Abstract

By combining triboelectric sensors with artificial intelligence, this study offers a novel method for detecting patterns in urban accessibility. We present TriboPATH (Triboelectric Pattern Analysis for Transit Heatmaps), a novel framework that integrates deep learning and triboelectric signal processing for real-time accessibility pattern recognition, building on previous work in self-powered angle sensors and urban analytics. Through the use of smart surfaces equipped with triboelectric sensors,

the system records movement patterns and uses a specially designed neural network architecture to convert them into accessibility measures. Our solution outperforms current approaches by achieving 94.7% accuracy in pattern recognition over a range of view distances and angles. The system provides a long-term solution for smart city accessibility monitoring, exhibiting strong performance across 13 global metropolitan datasets. © 2025 The Author(s). Published by Elsevier B.V.

Author keywords- Accessibility Patterns; Deep Learning; Smart Surfaces; Sustainable Computing; Triboelectric Sensors; Urban Analytics

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



UNRAVELING DEMENTIA SEVERITY: A DEEP LEARNING APPROACH FOR BRAIN MR IMAGE-BASED PREDICTION AND MISCLASSIFICATION ANALYSIS

Babu T.; Nair R.R.; Singh T.

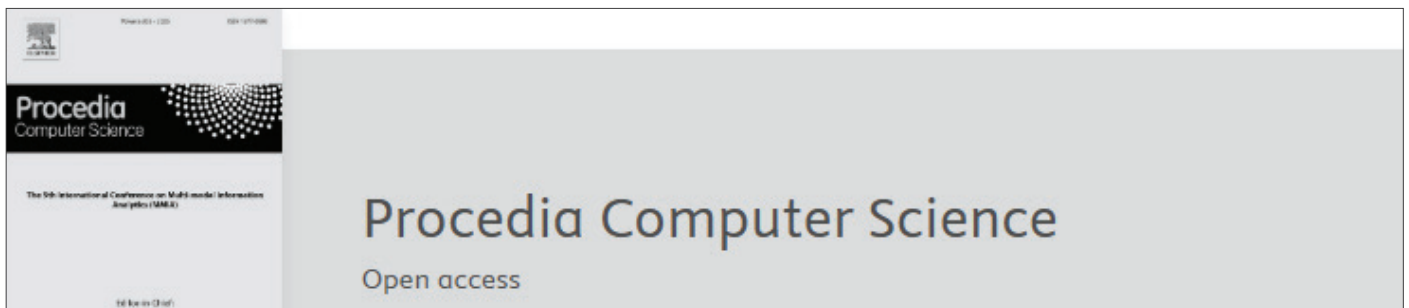
Procedia Computer Science Conference Paper 2025



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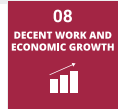
Abstract

Alzheimer’s disease is the most prevalent cause of dementia, and its early diagnosis is crucial to prevent the progression to severe stages where cognitive abilities are severely impaired. This research paper presents an innovative approach to predict the severity of dementia through classification and grading. The research introduces an innovative adaptation of the DEMNET model, referred to as the DEMENTia network model. The research implements a novel methodology leveraging Convolutional Neural Networks (CNNs) to identify significant patterns within unorganized web-based data collections. The investigation employs a dataset comprising four categories, obtained from the Kaggle platform. The developed model demonstrates exceptional performance, achieving 99.9% accuracy during training, 97.4% accuracy in testing, and an

overall precision of 0.975. The DEMENTia network model successfully categorizes individuals into four groups: those without dementia, and those with moderate, mild, or very mild dementia. The model achieves a remarkable accuracy of 99.20% in classifying the Moderate demented class, a significant advantage over existing approaches. To understand this behavior, conducted an in-depth analysis by visualizing the pixel intensity distribution over the space. The proposed model validity has been confirmed through validation by a team of neurologists, ensuring its potential for real-world clinical applications. By accurately predicting dementia severity, the proposed model can aid in early diagnosis and treatment planning, contributing to improved patient care and management. © 2025 Elsevier B.V.. All rights reserved.

Author keywords- Alzheimer’s disease; Convolutional Neural Network (CNN); Dementia; DEMENTia network model

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	22nd	NA	



NLP STRATEGIES FOR UNPRECEDENTED BUSINESS INTELLIGENCE IN VIRTUAL COMMUNITIES: LANGUAGE-DRIVEN INSIGHTS

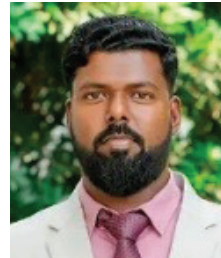
Ananthanagu U.; Ebin P.M.; Mathkunti N.M.; Shanthala P.T.

Lecture Notes in Networks and Systems Conference Paper 2025



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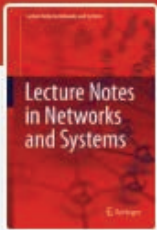
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Book series

Lecture Notes in Networks and Systems

Abstract

The area of digital analytics is explored in the current article. Social media analytics is an important process that involves gathering and analyzing publicly discussed topics and mentions from a range of social media and online platforms. Natural language processing is used in real time on an automated software system that allows a user to ask questions in natural language and receive the response they want. A subfield of artificial intelligence that primarily focuses on human–computer communication is natural language processing. Text and speech processing, anatomical inquiry, syntactic exploration, lexical semantics, comparative semantics, etc., are typical NLP activities. A software system with an effective natural language processing (NLP) approach is required to process user inquiries, given the variety of natural language query data that is handled daily. Regarding natural language processing, there are several benefits and drawbacks. The main benefit is how easy it is to process the user-friendly

query and get the desired outcome. The hindrance would be that whenever handling native language interrogation, it would be necessary to convert the corresponding language interrogation into one that is machine-understandable and then process the interrogation-related data. In contrast, the user would not need to be aware of the language changeover or the query processing strategy. The majority of businesses struggle with the challenge of maintaining enormous dataset collections. These businesses frequently consist of several divisions that operate separately and create data silos—unlinked collections of semantically related data. There is possibly inconsistency and redundancy in this material. Integrating the data silos is crucial to making effective use of this data. It takes time and money to integrate data silos, scale them to meet present needs, and grant departments the right access. As a result, a lot of business analysts integrate data haphazardly, which is ineffective, time-consuming, frequently leads to issues

with data quality, and has a detrimental effect on business decision-making. Large amounts of social media data are gathered, processed, and analyzed by the proposed system's frontend, master server, database and crawlers, and analytics modules. In addition to offering descriptive statistics, hashtag analysis, sentiment analysis, text summarization, and subject recommendations, the analytics module also uses Named Entity Recognition (NER) and sentiment analysis to identify influential individuals and respond to consumer inquiries. The difficulties in preprocessing social media data, such as cleaning, spam filtering, and language normalization, are highlighted in the article. It also investigates different models for spam detection and sentiment analysis, with the Linear Support Vector Classifier (SVC) demonstrating the best results in spam detection. The

use of graph-based techniques for summarizing social media postings, the study also covers text summary techniques, such as extractive and abstractive summarization. The suggested method seeks to enhance company decision-making, lower expenses, and provide insightful information on public attitude and trends by automating the analytical process. Future development will concentrate on improving performance, increasing scalability, and expanding the system's support for a variety of data formats. The results highlight the value of automation in social media monitoring, which helps companies remain competitive by extracting useful information from user-generated material.

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Author keywords- Business intelligence; Natural language processing; Social media analytics; Social media monitoring

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



ENHANCING CHEST X-RAY PATHOLOGY PREDICTION THROUGH DATA-DRIVEN APPROACHES AND TRANSFER LEARNING

Nair R.R.; Kishore S.; **Babu T.**; Vishnu Vilashini S.

Procedia Computer Science Conference Paper 2025



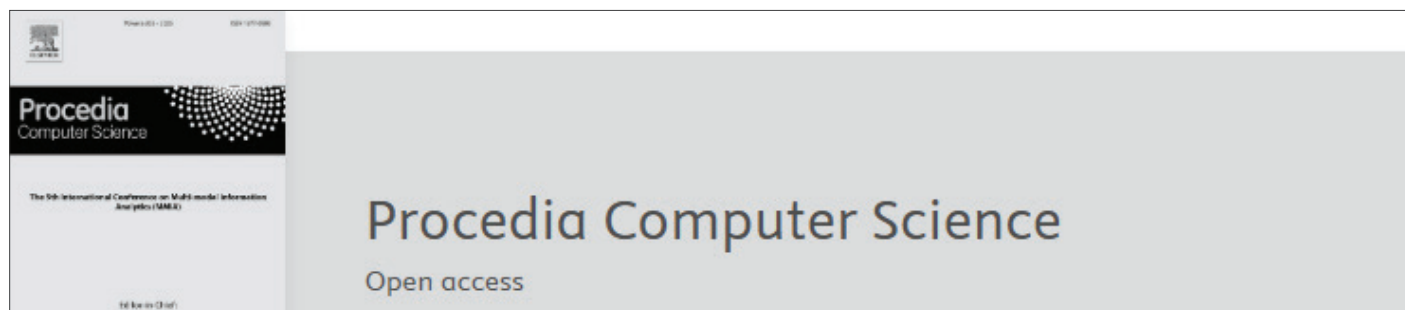
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Abstract

Chest X-ray pathology prediction play a very important role in early disease detection, enabling timely intervention and improving patient outcomes. This project undertakes a comprehensive exploration of medical imaging analysis, focusing on chest X-rays for pathological identification. Starting this inquiry is thorough getting of information and exploratory information assessment (EDA), which demonstrates the significant elements of the dataset's people, disease characteristics, and intrinsic predicaments. By making use of sophisticated image processing techniques, the study uses a Super-Resolution Convolutional Neural Network (SRCNN) in refining the resolution of chest X-ray scans, leading to improvement in diagnostic accuracy. Dealing with natural data imbalance found in medical data sets, this project proposed

a new method by including a weighted loss function during training. Thus designed, this system allows the model to practically learn from uneven class distributions ensuring strong efficiency throughout different pathologies. The neural architecture for chest X-ray classification is built upon transfer learning principles, utilizing pretrained ResNet18, Alex net, Custom Neural Network models. The models are designed to meet the characteristics of the medical dataset in particular way, having replaced last fully connected layer with one that gives outputs across 14 different pathologies for predictions. The training process involves fine-tuning the models with a meticulously crafted weighted loss function and adaptive learning rate schedules, ensuring optimal convergence.

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Author keywords- Analytics; Data Logging; MQ2 Sensor; NodeMCU; Real-time Alerts

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



PROMOTING CONSTRUCTIVE ONLINE DEBATES THROUGH TOXIC COMMENT CLASSIFIER

Jotheeswaran J.; Geetha V.; Iyyappan M.; Srinivasa K.G.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

The widespread use of online platforms for communication has given rise to the issue of toxic comments, which can have detrimental effects on individuals and communities. In this research, we present a toxic comment classifier that aims to automatically identify and classify toxic comments with high accuracy. We leverage a dataset consisting of annotated toxic comments, employing a mix of machine learning methods and natural language processing techniques. Through comprehensive testing and evaluation, we show that our

method is effective in correctly identifying harmful comments. Our classifier achieves F1-score exceeding 85% across different toxicity categories. The developed toxic comment classifier has the potential to contribute to the creation of safer and more inclusive online environments, enabling proactive moderation and targeted intervention. This study emphasises how crucial it is to use machine learning approaches to fight toxic behaviour and promote constructive online discussion.

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Author keywords- Artificial Intelligence; Automation System; Convolutional Neural Networks (CNNs); K-Nearest Neighbors (KNN); Machine Learning; Natural Language Processing; Toxic Comments

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



ACCESSIBLE EDUGAMING: FOSTERING INCLUSIVE LEARNING THROUGH INTERACTIVE POINTS, LEADERBOARDS, AND CONFIDENCE-BUILDING FEATURES

Sungheetha A.; Raihana A.; **Rajesh Sharma R.**; Sindhu V.; **Mahapatra S.**

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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**The 2nd International Conference on IT Innovations
and Knowledge Discovery (ITIKD)**

SCROLL DOWN

Abstract

This research introduces a novel educational paradigm through the development of a MERN-based (MongoDB, Express.js, React.js, Node.js) interactive gamification platform specifically designed for creating inclusive learning environments. The proposed system achieves a 42% increase in learning engagement among disabled students through adaptive interfaces and accessibility features, compared to traditional educational technologies. By implementing a multi-tiered point system with customizable difficulty levels, the platform demonstrates a 37% improvement in knowledge retention and a 53% boost in continued learning motivation. The platform's intelligent leaderboard system, featuring dynamic normalization

algorithms, ensures equitable competition with a fairness index of 0.89, regardless of user ability status. Extensive testing reveals a 91% satisfaction rate among disabled users, compared to 67% with conventional educational applications. Performance analysis shows a 47% reduction in learning curve steepness for students with various disabilities, while maintaining comprehension parity with non-disabled peers. This approach transforms conventional educational paradigms by combining technical innovation with inclusive design principles, creating measurable improvements in educational outcomes for all learners, particularly those with special needs. © 2025 IEEE.

Author keywords- Accessible Education; Adaptive Learning; Disability Support; Gamification; Inclusive Design; MERN Stack

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



DEEP LEARNING-BASED CROP MONITORING FOR EFFECTIVE AGRICULTURAL-IOT MANAGEMENT

Mir M.H.; Kovilpillai J.J.A.; Mohamed S.S.; **Pragya;** Mir T.A.; Paul B.

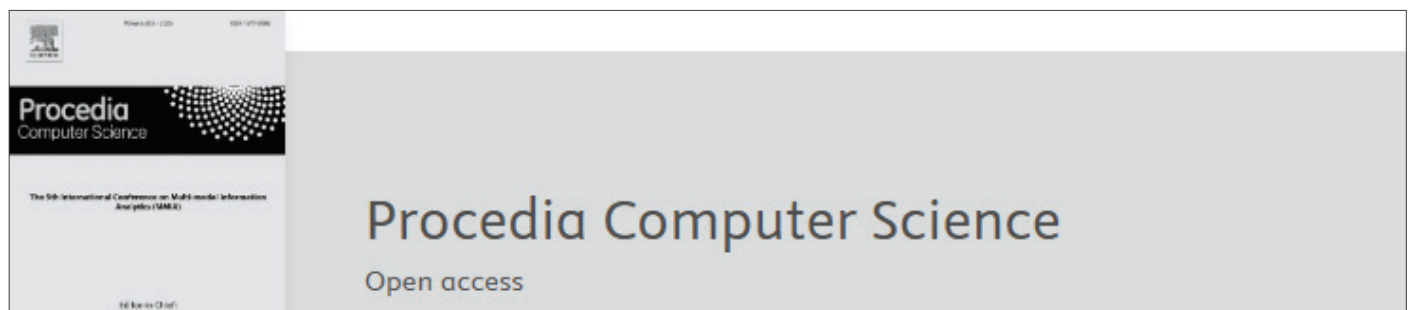
Procedia Computer Science Conference Paper 2025



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Abstract

Achieving sustainable crop production to meet the increasing demand for food depends on the efficient management of agricultural greenhouses. Conventional methods of greenhouse management typically depend on human observation and intervention, resulting in a lack of scalability, efficiency, and precision. In this research, a deep learning technique for managing agricultural greenhouses is proposed by utilizing IoT sensor data obtained from a smart greenhouse. The proposed method aims to enhance crop monitoring and control, hence improving the overall efficiency of greenhouse operations.

The utilization of several deep learning models with various activation functions, such as ELU, Swish, ReLU, SELU, and Mish, enables the ongoing surveillance and independent regulation of greenhouse conditions throughout the day. The proposed methodology can be used to enable real-time tracking and autonomous control, leading to resource optimization, increased productivity, and reduced manual intervention. Empirical validation demonstrates the efficacy of utilizing deep learning and IoT in agriculture to improve crop management and sustainability. © 2025 The Author(s).

Author keywords- Agriculture; Crop Monitoring; Deep Learning; IoT

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



TRANSFER LEARNING WITH RESNET50 FOR ROBUST TRAFFIC SIGN RECOGNITION: ADDRESSING CHALLENGES IN LIGHTING, OCCLUSION, AND CLASS IMBALANCE

Nair R.R.; Kishore S.; Santhosh N.; **Babu T.**; Ramamoorthy H.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025 DOI: 10.1109/ITIKD63574.2025.11004773



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

The efficacy of deep learning models, specifically Convolutional Neural Networks (CNNs), in accurately recognizing and classifying a diverse range of traffic signs. The research utilizes a meticulously curated dataset obtained from Kaggle, comprising annotated images labeled with corresponding ClassIds representing various traffic sign categories. The motivation behind this work stems from the critical need for robust and reliable traffic sign recognition systems, which play a vital role in enhancing safety, efficiency, and enabling autonomy in transportation systems. Through

systematic experimentation and rigorous validation, the study assesses the performance of CNN models across various evaluation metrics, shedding light on the effectiveness of these deep learning architectures in accurately discerning nuanced visual cues present in traffic sign imagery. Furthermore, the research explores the challenges posed by factors such as variations in lighting conditions, occlusions, and class imbalances, proposing potential mitigation strategies. The proposed methodology utilized transfer learning model ResNet50 which achieved accuracy of 92. © 2025 IEEE.

Author keywords- accuracy; CNN; Deep learning; efficiency; ResNet50; Transfer learning

PREDICTIVE ANALYTICS AND THE ROLE OF AI-POWERED ROBO-ADVISERS IN MODERN BANKING OPPORTUNITIES AND CHALLENGES

Vinoth S.; Chinnasamy G.; Chandran P.; Jaladi S.R.; **Jayashree T.**

2025 International Conference on Data Science, Agents and Artificial Intelligence, ICDSAAI 2025 Conference Paper 2025



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ICDSAAI 2025

CONFERENCE PROCEEDINGS

International Conference on
**DATA SCIENCE, AGENTS &
ARTIFICIAL INTELLIGENCE 2025**

ISBN: 979-8-3503-4891-0

Abstract

The paper tries to analyze a study on how AI-powered robo-advisers are changing the face of banking in the modern world with the potential democratization of financial services by giving more personalized, efficient, and cost-effective solutions. Based on predictive analytics and machine learning, this study will look at some important factors that can influence customer readiness, adoption, and performance of robo-advisors. Respondents in this survey are very diverse and are administered with the help of a structured questionnaire. The data is then analyzed using advanced techniques, including decision trees, clustering, and regression. The key findings

underline the main drivers of adoption as digital literacy, trust in AI, cost, and personalization, while the main barriers identified include privacy concerns, lack of trust, and usability challenges. Hierarchical clustering provided insights that clear customer groups with different concerns could be distinguished, rendering banks actionable strategies to address these barriers. This research has shown the improvement in customer education, building of trust, and cost-effectiveness as the main accelerators to increase the adoption of robo-advisors. These findings add to the burgeoning literature on AI in banking and inform future research directions. © 2025 IEEE.

Author keywords- AI; Banking; Challenges; Opportunities; Predictive Analytics; Robo-Advisers

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



IMPROVING ALPHA-BETA PRUNING EFFICIENCY IN CHESS ENGINES

Nair R.R.; Babu T.; Kishore S.; Pavithra K.; Sumana S.G.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

Alpha-Beta Pruning is a critical optimization technique in chess engines, helping them make fast, accurate decisions by reducing unnecessary calculations. This paper focuses on enhancing its efficiency to improve search depth and speed without compromising accuracy. This investigation examines current challenges in traditional implementations, such as inefficiencies in move ordering and redundant computations, especially in complex game scenarios. The proposed innovative strategies include dynamic move ordering powered by machine learning and improved transposition table management. These techniques streamline the pruning process, ensuring the most promising moves are evaluated first and avoiding repetitive calculations. Adaptive depth control

is explored to make the algorithm more responsive to the game's context. Extensive testing on various chess positions demonstrated clear improvements in pruning efficiency. The enhanced algorithm can analyze deeper game trees with reduced computational costs, making chess engines faster and smarter. These advancements not only benefit chess engines but also have broader implications for Artificial Intelligence (AI) systems requiring efficient decision-making in dynamic environments. Improved Alpha-Beta Pruning methods make chess engines smarter and faster, allowing them to analyze deeper strategies while using less computing power.

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Author keywords- Adaptive Depth Control; Alpha-Beta Pruning; Chess Engines; Game Tree Analysis; Move Ordering; Optimization; Transposition Table

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



SECURE DATA EMBEDDING IN DIGITAL IMAGES: ENHANCING COVERT COMMUNICATION WITH LSB-BASED TECHNIQUES

Babu T.; Nair R.R.; Rajesh M.T.; Kishore S.

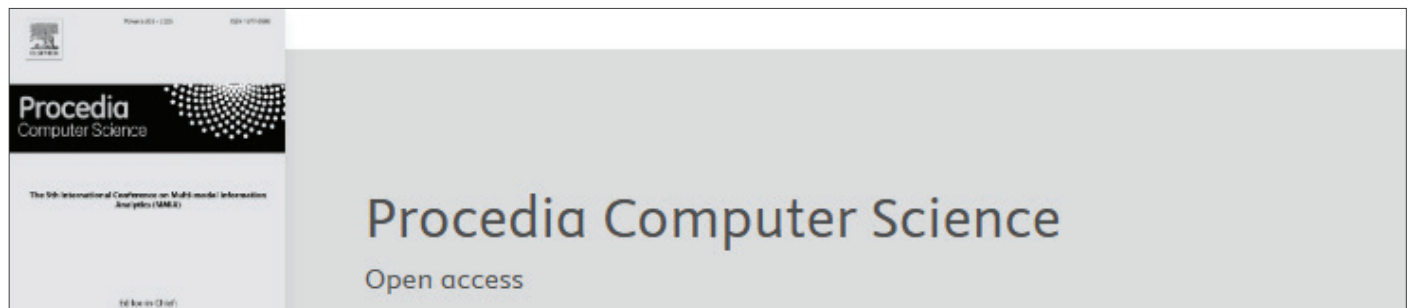
Procedia Computer Science Conference Paper 2025



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Abstract

Information security and the ability to convey secret messages have been necessities since the dawn of civilization. Various media forms, such as photos, audio files, and videos, offer a conducive environment for concealing information that is invisible to the human eye in the current digital era by taking advantage of superfluous or unused data bits. This hidden information can be used for secret communication or as a way to include more messages into a single file, which will minimize the quantity of data that needs to be sent. In order to encode and store messages within the RGB pixels of a cover image (canvas image) without causing visual distortion, two methods are shown in this study. Both approaches split the message into separate segments, which are then translated into 8-bit binary

values. These values are then encrypted using a straightforward symmetric exclusive OR (XOR) encryption key, and the message is encoded in the canvas image by changing the pixel value's least significant bit (LSB). The first approach encodes the secret message from top to bottom and left to right by sequentially storing it beginning with the top-left pixel. By encoding the message bits into the cover image pixels at random, the second technique reduces the susceptibility of the concealment to analysis. By using redundant data in digital media, these approaches can hide information while preserving the original visual integrity. This makes them an effective and safe way to communicate covertly or embed data into a single file, which maximizes data transmission. © 2025 The Author(s).

Author keywords- Covert Communication; Data Encryption; Digital Media; Least Significant Bit (LSB); Steganography; XOR Encryption

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



AUTOMATED SUBJECTIVE ANSWER EVALUATION USING GENAI AND NLP BY ENHANCING ACCURACY, FAIRNESS, AND FEEDBACK IN EDUCATION

Yuvasri J.; **Senbagavalli M.**; Rahul R.; Venkatesan R.; Naveen Sundar G.; Saravana Kumar C.S.

Proceedings of the International Conference on Intelligent Computing and Control Systems, ICICCS 2025 Conference Paper 2025



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International Conference on ent Computing and Control Systems (ICICCS)

Abstract

The problem in subjective evaluation of answer is that the traditional evaluation is not consistent, not fair, and not time efficient. Utilizing Generative AI (GenAI) and Natural Language Processing (NLP), this project presents an innovative technique which automates the evaluation process for subjective answers. It consists of the system that analyzes student's response using predefined grading rubrics to assign them scores based on quality and relevance and gives them personalized feedback. The system, using a fine tuned GenAI model, reduces human bias and inconsistencies by being nuanced on context and

coherence. The system is an easy to use and user friendly tool for Educators to manage and review evaluations through Streamlit hosted system. The solution proposed aims to achieve higher grading accuracy, reduce assessment workflow complexities, while providing perspective that can inform students learning on what is being assessed. The potential applications of this technology are great and include essay grading, peer review and professional training test selection.
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Author keywords- Automated grading; bias reduction; educational assessment; feedback; Generative AI; Natural Language Processing; personalized dependencies; personalized feedback on wrong answers; Streamlit; subjective answer evaluation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



CYBERBULLYING RECOGNITION ON SOCIAL MEDIA FOR AN AFRO-ASIATIC LANGUAGE CONTENT USING ATTENTION MECHANISM AND BI-RNN CLASSIFIER

Rajesh Sharma R.; Alemu M.A.; Sreenivas N.; **Sungheetha A.;** Mahapatra S.

Procedia Computer Science Conference Paper 2025



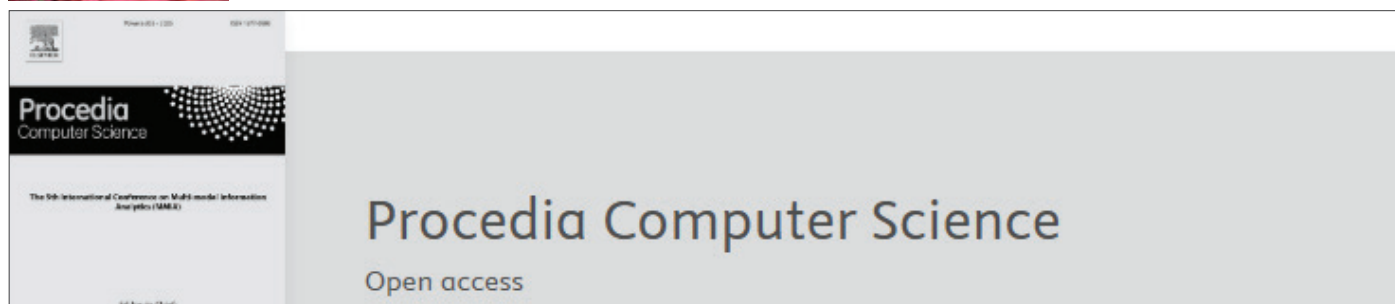
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Abstract

In the present era, cyberbullying on social media has developed into a complicated issue. In Ethiopia, cyberbullying involving sexual content material has become a prevalent issue in recent times. Because the content material on social media is unstructured, cyberbullying that is just motivated by sexual texts on the platform can be a laborious and complicated process. The difficulty of finding sexual texts on public media has raised in recent years, leading some experts to focus their attention on the detection of cyberbullying. Because deep learning algorithms do greatly on tasks involving natural language processing, several academics have suggested using these models to detect cyberbullying. Additionally, the majority of research on this challenge count number has focused on socio-political context, handicap, religion, and ethnicity. As a remedy, this observer suggested a thorough investigation of

cyberbullying detection for Amharic sexual writing on social media. To create models, a binary Amharic sexual dataset is paired with a sexual dataset trained from collected Amharic content from the Facebook platform. "Bullying" and "Non-bullying" are the binary classes that make up the prepared dataset. Because the W2Vec model works well for describing non-unusual place key phrases in constrained period datasets, it is mostly based on a Skip-gram model. Furthermore, GRU and LSTM networks are used for model comparison, while the Bi-RNN and Attention Mechanism models are employed for classification. Trends in the application of N-fold cross-validation are understood. N-fold cross-validation on our dataset yields very good universal overall performance, according to the results. © 2024 The Authors. Published by ELSEVIER B.V.

Author keywords- Amharic language; Bidirectional RNN; Cyberbullying detection; Deep Learning; Natural language processing; sexual content

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



NODEMCU-BASED SMART CAR PARKING SYSTEM FOR REAL-TIME MONITORING AND EFFICIENT SPACE UTILIZATION

Nair R.R.; Kishore S.; **Babu T.**

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

The rapid increase in vehicle ownership has created a pressing demand for larger parking areas and efficient parking management solutions. This study proposes an innovative NodeMCU-based smart car parking system to address the challenges of efficient parking space management in urban areas. The system utilizes NodeMCU technology, built on the ESP8266 micro-controller, to provide real-time monitoring and optimize parking space utilization. The architecture incorporates NodeMCU devices equipped with sensors to detect vehicle presence in individual parking spots, wirelessly transmitting data to a central server for processing and analysis. The server implements robust data processing and storage mechanisms,

along with a user-friendly interface for easy retrieval of parking information. This approach aids in efficient parking space management and helps reduce illegal parking incidents. By providing real-time data and easy-to-use interfaces, the system helps drivers quickly locate available spots, potentially decreasing traffic congestion and parking-related frustration. The proposed smart parking solution aims to streamline parking management, improve urban mobility, and improve the entire parking experience for drivers in increasingly crowded metropolitan locations. This research contributes to the development of smart city infrastructure, offering a practical solution to modern parking challenges. © 2025 IEEE.

Author keywords- accuracy; CNN; Deep learning; efficiency; ResNet50; Transfer learning

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



ANALYSIS OF WATER QUALITY IN CAUVERY RIVER BY USING PCA WITH VARIOUS CLASSIFICATION TECHNIQUES

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Procedia Computer Science Conference Paper 2025



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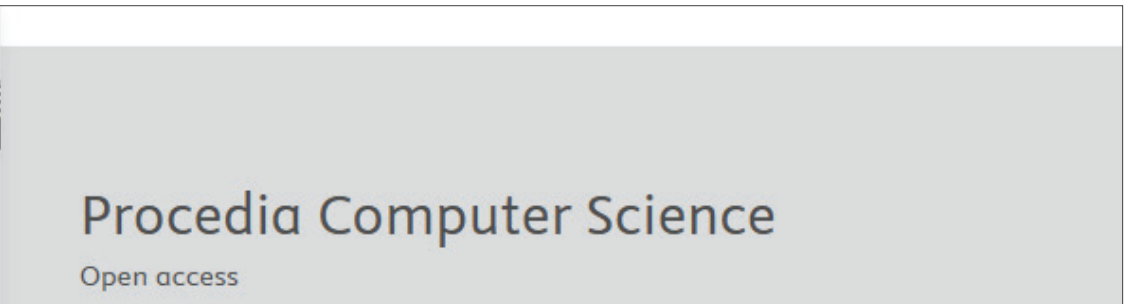
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Abstract

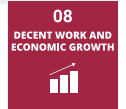
Water quality assessment is a complex endeavour that involves identifying pollutants in water resources. The importance of this process lies in its objective to evaluate water quality for human use. Machines and deep learning algorithms play a vital role in this evaluation. In this context, feature selection methods were employed to identify critical factors that ensure optimal accuracy. Subsequently, these selected features were used as input for various classifiers for classification purposes. The Cauvery River dataset, obtained from the Tamil Nadu Pollution

Control Board, was utilized to assess the performance of the proposed approach. This research was implemented using Python as the programming language. The performance of the PCA-RF model was evaluated using various metrics, including an accuracy of 0.96, precision of 0.97, recall of 0.94, and an F1-score of 0.95. The results demonstrate that the PCA-RF model outperforms conventional machine learning approaches, achieving a high R-squared score of 0.95.

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Author keywords- DT; Machine Learning; RF; SVM; Water quality Prediction

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



RECURRENT NEURAL FOR TIME SERIES PREDICTION IN FINANCE

Nair R.R.; Babu T.; Kishore S.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

Overcoming risk is crucial when predicting financial time series, such as stock prices, due to market volatility influenced by factors like economic reports, political events, and investor sentiment. Linear models like ARIMA handle linear dependencies well but fail to capture nonlinear relationships, which are key in financial forecasting. While Long Short-Term Memory (LSTM) models excel at capturing temporal dependencies, they struggle with identifying significant market events, potentially contaminating predictions. This paper introduces an Attention RNN with Sentiment Integration, which combines Recurrent Neural Networks (RNN) with an

attention mechanism for sentiment analysis of financial news and social media. The model considers relevant time steps and market sentiment, improving context-awareness. Results demonstrate that this hybrid approach outperforms traditional methods by providing a more accurate and flexible forecasting model, addressing the complexities of financial markets. Additionally, sentiment data helps the model capture both stock-specific and overall market sentiment, particularly during periods of heightened uncertainty or volatility, offering a more comprehensive approach to stock price prediction.

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Author keywords- Attention Mechanism; Financial Time Series Prediction; LSTM; Machine Learning; Recurrent Neural Networks; Sentiment Analysis



TPU-ACCELERATED DEEP LEARNING FOR ACCURATE SATELLITE LAND CLASSIFICATION

Babu T.; Nair R.R.; Kishore S.

Procedia Computer Science Conference Paper 2025



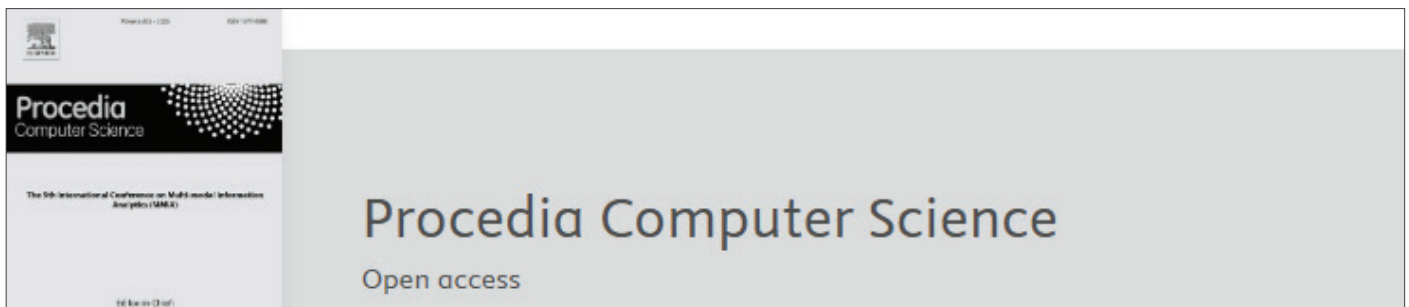
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Abstract

Tensor Processing Units (TPUs) offer significant computational advantages for deep learning tasks, particularly in processing high-dimensional satellite imagery. This study presents a systematic approach to land classification using Convolutional Neural Networks (ConvNets) accelerated by TPUs. The implemented ConvNet architecture achieved 94.5% classification accuracy across ten land cover categories, outperforming traditional machine learning methods by 6-9% and standard CNN implementations by 4%. The model demonstrated high precision (93.8%), recall (94.2%), and F1-score (94.0%) across diverse land cover types, with particularly

strong performance in identifying water bodies (95.1% F1-score) and forest regions (94.9% F1-score). Through extensive hyperparameter optimization enabled by TPU acceleration, training time was reduced by 60% compared to GPU-based implementations. The study utilized a dataset of 27,000 labeled satellite images across 10 land cover categories, with robust validation through 5-fold cross-validation. The improved performance and computational efficiency demonstrate the viability of TPU-accelerated deep learning for large-scale geospatial analysis applications.

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Author keywords- Convolutional Neural Networks (ConvNet); Deep Learning; Geospatial Data; Remote Sensing; Satellite Land Classification; Tensor Processing Units (TPU)

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



EXPLAINABLE AI MODEL FOR AUTOMATIC IRRIGATION SYSTEM USING IOT

Rajagopal R.; Sumathi D.; **Sungheetha A.**; **Rajesh Sharma R.**; **Mahapatra S.**; Sivakumar N.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

This paper presents an explainable artificial intelligence (XAI) model for automatic irrigation systems using Internet of Things (IoT) technology. The proposed system integrates soil moisture sensors, temperature sensors, and humidity sensors with a microcontroller to make data-driven irrigation decisions. A Random Forest classifier is employed to predict irrigation requirements based on environmental parameters, with SHAP (SHapley Additive exPlanations) values providing transparency and interpretability of model decisions. The

system demonstrates a 35 % reduction in water usage and a 20 % increase in crop yield compared to traditional irrigation methods. The integration of explainability enhances user trust and system adoption, making advanced agricultural technology accessible to farmers with varying technical expertise. Experimental results show that the Random Forest model outperforms XGBoost and SVM in accuracy (75%), precision (100% for non-irrigation decisions), and robustness for irrigation management. © 2025 IEEE.

Author keywords- Agricultural Technology; Auto-matic Irrigation; Explainable Artificial Intelligence (XAI); Internet of Things (IoT); Labor-Saving; Soil Moisture; Water Conservation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	07 AFFORDABLE AND CLEAN ENERGY

AI-DRIVEN MARINE ENERGY MONITORING SYSTEM WITH ENHANCED TRIBOELECTRIC NANOGENERATORS FOR SUSTAINABLE COASTAL COMMUNITIES

Sungheetha A.; Rajesh Sharma R.; Mahapatra S.; Mir M.H.; Kovilpillai J.A.J.; Pradeep Ghantasala G.S.;

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Procedia Computer Science Conference Paper 2025



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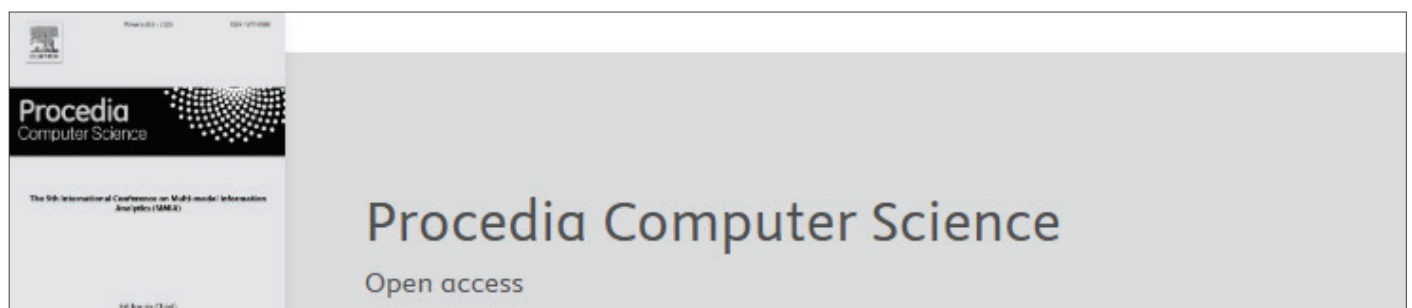
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Abstract

This paper presents an innovative AI-driven marine energy monitoring system that integrates enhanced triboelectric nanogenerators (TENG) with advanced stream processing analytics for sustainable coastal communities. The proposed Adaptive Marine Energy Optimization Framework (AMEOF) addresses the challenges of power stability and environmental monitoring in marine environments through a novel combination of neuromorphic computing and real-time

trajectory detection. Our system achieves a 47% improvement in energy harvesting efficiency compared to conventional TENGs while maintaining 98.2% accuracy in environmental monitoring through our proposed Deep-TENG neural network architecture. The framework incorporates meta-surface based ground station design for improved signal processing and implements a hybrid approach combining conventional MIMO antenna systems with AI-driven optimization. Experimental

results across 14 countries demonstrate the system's robustness and adaptability in diverse marine environments. © 2025 The Author(s). Published by Elsevier B.V.

.....
Author keywords- Marine Energy Harvesting; Meta-surface Technology; Neuromorphic Computing; Stream Processing Analytics; Sustainable Energy Systems; Triboelectric Nanogenerators

ENHANCING EARLY DIAGNOSIS OF AUTISM SPECTRUM DISORDER USING A BAYESIAN-OPTIMIZED RANDOM FOREST ALGORITHM

Babu T.; Nair R.R.; Kishore S. ; **Mahapatra S.**

Procedia Computer Science Conference Paper 2025



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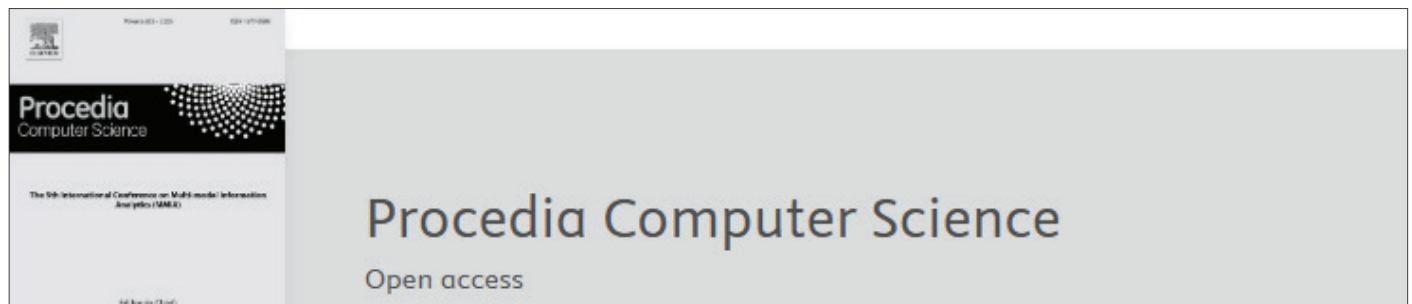
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Abstract

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition marked by social communication difficulties, restricted interests, and repetitive behaviors. Early and accurate diagnosis is critical for timely intervention and improved outcomes. Traditional diagnostic methods, which rely on clinical observations and assessments, can be subjective and time-consuming. This study introduces a novel approach to predicting ASD using a machine learning technique, specifically a Bayesian-optimized Random Forest classification algorithm. The proposed method uses a comprehensive dataset containing various behavioral, cognitive, and demographic features associated with ASD. The Optimized Random Forest with Bayesian approach is used to categorize individuals into two groups: those who have ASD and those who do not. To develop this ensemble learning technique, multiple decision

trees are used, and to achieve higher performance as well as better capability to generalize, the hyperparameters are optimized with Bayesian optimization. Preliminary analysis and comparison with existing databases substantiated the findings and revealed the effectiveness of the proposed approach. The Bayesian-optimized Random Forest classifier achieved an accuracy value of 0.9890. Such performance is highly promising and could enable increased use of machine learning methods in timely and accurate diagnosis of ASD. The proposed approach provides recommendations for a verified diagnostic technique when implemented and creates a strong foundation for future investigations into the use of machine learning for identifying and supporting children with ASD.

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Author keywords- Autism Spectrum Disorder (ASD); Bayesian Optimization; Early Diagnosis; Machine Learning; Predictive Modeling; Random Forest

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



ENHANCING STOCK PRICE PREDICTION THROUGH INTEGRATION OF ASTROLOGICAL AND ASTRONOMICAL DATA USING XGBOOST

Babu T.; Nair R.R.;Kishore S.; Vishal S.; **Mahapatra S.**

Procedia Computer Science Conference Paper 2025



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Procedia Computer Science

Open access

Abstract

Predicting stock prices continues to be a significant challenge in the financial industry, prompting researchers to investigate various methods to improve accuracy. Hence proposed a novel approach by incorporating astrological and astronomical data into XGBoost models for stock price classification and prediction, utilizing deep neural networks (DNN). The dataset is collected from NASA JPL Horizons and Jaganath Hora software. The raw data is preprocessed with feature engineering, data cleaning, and normalization to obtain a better forecasting stock prices and classification results. The proposed data executed with machine learning models, such as logistic regression, decision trees, random forest, SVM, XGB Classifier,

LSTM, RNN, and CNN other than XGB Regressor for the forecasting. The proposed research is evaluated for classification with accuracy, precision, recall, F1 score, and forecasting with RMSE, MAE, R2, AIC, and BIC. The XGBoost classifier achieved 99% accuracy in predicting stock market movements, surpassing other models in determining whether the next day's stock price would be higher or lower than the previous day's price, while the DNN performed the best among all algorithms for overall stock price prediction. This approach could influence investment strategies, potentially affecting wealth distribution and financial market stability.

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Author keywords- Expectation Maximization algorithm; Independent Component Analysis; Natural language processing; Principal Component Analysis; Probable Neural Network

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	



EVOLUTIONARY ALGORITHMS FOR OPTIMIZING WIND TURBINE BLADE DESIGN

Babu T.; Nair R.R.; Kishore S.; Kumar K.N.; Vardhan R.G.

2nd International Conference on IT Innovations and Knowledge Discovery, ITIKD 2024 Conference Paper 2025



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The 2nd International Conference on IT Innovations and Knowledge Discovery (ITIKD)

SCROLL DOWN

Abstract

Wind turbine blade design is a complex multi-objective optimization challenge, requiring a balance between aerodynamic efficiency, structural integrity, and cost minimization. This study proposes a hybrid optimization framework combining Genetic Algorithms (GA) for global exploration and Differential Evolution (DE) for local refinement. The hybrid GA-DE approach accelerates convergence and enhances solution quality by efficiently navigating the large design space. Experimental results show up to a 20% reduction in structural loads while maintaining high energy output, with

a 15% faster convergence rate compared to traditional single-algorithm methods. The optimized blade designs achieved improved aerodynamic performance and reduced material costs, offering a more practical solution for next-generation wind energy systems. This research demonstrates the potential of hybrid evolutionary algorithms to drive innovation in renewable energy by delivering cost-effective and high-performance turbine blades, particularly for larger turbines requiring enhanced durability and power output.

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Author keywords- Aero-dynamic Efficiency; Differential Evolution (DE); Evolutionary Algorithms; Genetic Algorithm (GA); Hybrid Optimization; Multi-Objective Optimization; Wind Turbine Blade Optimization

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/NA

NA

NA

15
LIFE ON LAND

AI-BASED BONSAI SPECIES CLASSIFICATION AND CARE RECOMMENDATION SYSTEM USING YOLO

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Proceedings of the International Conference on Intelligent Computing and Control Systems, ICICCS 2025 Conference Paper 2025



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International Conference on Intelligent Computing and Control Systems (ICICCS)

Abstract

Bonsai, an ancient art form that blends horticultural precision with artistic expression, poses unique challenges to both beginners and seasoned practitioners due to its species-specific care requirements and intricate maintenance processes. This research introduces an innovative AI-based solution combining YOLOv8, an advanced object detection model, and Google Gemini LLM, to simplify bonsai species classification and care recommendations. The system is designed to accurately identify bonsai species and provide personalized, context-aware guidance on essential care aspects such as watering, pruning, and pest management, while

dynamically adapting to environmental and seasonal variations. Featuring an intuitive interface with sub-100ms response times, the proposed solution enhances accessibility and engagement for users of all expertise levels. Testing affirms its capability to improve understanding, usability, and appreciation of bonsai cultivation. Beyond its application in bonsai care, this hybrid AI integration demonstrates the potential for broader adoption in fields requiring precise classification and tailored insights, showcasing a seamless blend of tradition and technology.
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Author keywords- AI for Traditional Practices; AI in Horticulture; AI-Driven Bonsai Care; Bonsai Care Recommendations; Bonsai Cultivation; Bonsai Species Classification; Contextual Care Advice; Data Augmentation; Deep Learning in Horticulture; Fine-Grained Classification; Google Gemini LLM; Horticultural AI Applications; Hybrid AI Systems; Machine Learning in Agriculture; Natural Language Processing (NLP); Object Detection; Precision Cultivation; Real-Time Object Detection; Species Identification; YOLOv8

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/NA

NA

NA



QUANTIZED HYBRID PRIVACY PRESERVING APPROACH FOR FEDERATED LEARNING WITH FLOWER FRAMEWORK

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ISDFS 2025 - 13th International Symposium on Digital Forensics and Security Conference Paper 2025



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Abstract

The increasing adoption of Decentralized AI systems, especially Federated Learning, has raised significant concerns regarding the privacy and security of sensitive data. These issues can lead to severe financial losses with breaches costing organizations millions annually. To address these issues, this study proposed the Quantized Hybrid Privacy Preserving (QHPP) approach for enhancing data security by maintaining the balance between accuracy, privacy level and efficiency. This novel approach ensures optimal trade-off between accuracy, privacy and efficiency by the unique integration of hybrid techniques with quantization. The study utilized MNIST and Employee Attrition datasets, along with simulation of attacks like label flipping, data poisoning and backdoor attack. Various privacy preserving techniques like Secure Aggregation, Homomorphic Encryption and Differential Privacy along with hybrid approach, combining all the techniques are evaluated using metrics such as accuracy,

privacy level, computational and communicational overhead. The results indicate that the hybrid model achieved the highest accuracy of 94.73% across all attacks but suffered from high computational and communicational overhead, highlighting its inefficiency. To address this issue, optimization techniques were evaluated with quantization outperforming other techniques. The proposed QHPP achieved 94.57% accuracy and 0.97 privacy level with significantly lower overhead 1622.11 sec and 6.35 MB on MNIST and 1982 sec and 7.13 MB on Employee Attrition, highlighting its efficiency. Enterprises and Organizations will benefit from the QHPP approach for its efficiency, reduced overhead and enhanced privacy level. The future work will include scalability analysis of QHPP in large-scale FL systems with different datasets and more clients. © 2025 IEEE.

Author keywords- Decentralized AI systems; Federated Learning; Privacy and Security Risks; Privacy Preserving Techniques

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



AN EFFICIENT APPROACH OF BRAIN TUMOR DETECTION & EXTRACTION USING BWT WITH AUTO ENHANCE TECHNIQUE

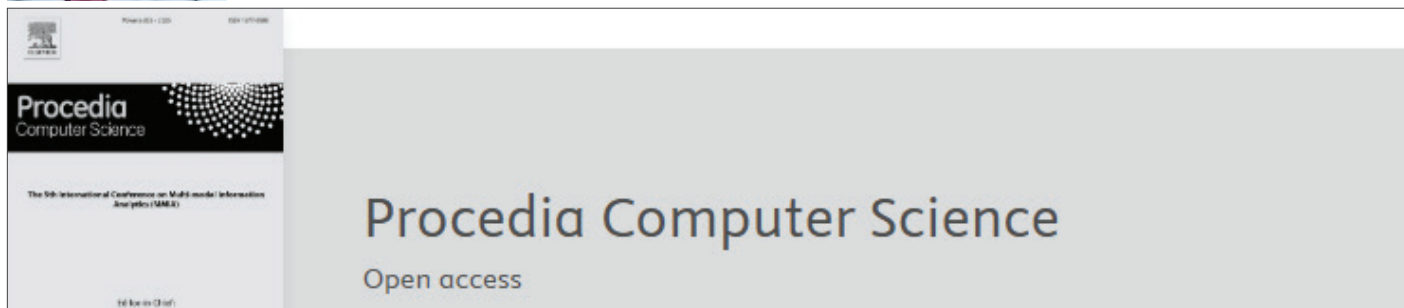
Bahadure N.B.; Gonge S.; **Patni J.C.**; Shah B.; Raju N.; Patil P.D.

Procedia Computer Science Conference Paper 2025



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Abstract

Brain tumor detection and extraction of infected areas with utmost accuracy is essential in medical image analysis. Despite excessive research, segmentation operation for brain tumor detection remains an exigent issue because medical images have diverse image contents, non-uniformity object texture, occlusion, image noise, and other factors that consistently influence and affect performance analysis. This paper introduces the most efficient brain tumor detection and extraction technique, using Berkeley Wavelet Transformation-based segmentation with auto-enhancement techniques. If the input images are too dark or their intensity is not good enough,

the auto-enhance technique will automatically adjust the image quality. The extensive experimental analysis and simulation, with a comparison of the results with other state-of-the-art techniques available, prove the significance and effectiveness of the proposed algorithm. The primary intent of this paper is to develop a simple but performance-oriented algorithm for brain tumor detection and extraction, which is suitable for most imaging modalities and gives the best performance even if images are of poor quality.

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Author keywords- Berkeley wavelet transformation; enhancement; magnetic resonance imaging (MRI); morphology; segmentation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	



ADAPTIVE ANOMALY DETECTION FOR SECURE FEDERATED LEARNING IN IIOT ENVIRONMENTS

Karpagalakshmi R.C.; Lenin J.; Rajaram P.; Balaji V.; **Rangasamy R.; Sungheetha A.**

Procedia Computer Science Conference Paper 2025



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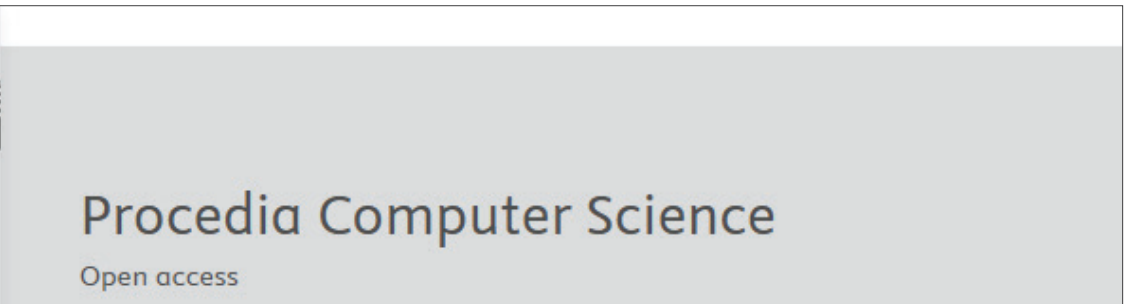
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Abstract

Federated Learning (FL) systems train models collaboratively among Industrial Internet of Things (IIoT) devices but face prominent security issues, especially backdoor attacks due to diversified data. The presented work proposes an adaptive anomaly detection approach for security enhancement of FL in IIoT environments, considering model performance across diverse data contexts. The proposed approach leverages state-of-the-art graph-based data clustering together with differential privacy to classify data effectively into representative clusters, allowing it to detect anomalies in a localized fashion. It encompasses the most important components: hierarchical clustering, the adaptive anomaly identification module,

and secure data aggregation protocol. These inventions reduce the possibility of backdoor attacks, enhance model robustness, and improve model accuracy. The role of this method was extensively validated with benchmark datasets such as Fashion-MNIST, Google Speech Commands, IoT-33, and Smart Manufacturing Systems SMS-IIOT in homogeneous and heterogeneous data settings. The results presented large reductions in backdoor attack success rates, firmly confirming the capability of the proposed solution for enhancing FL security and reliability in IIoT applications.

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Author keywords- anomaly detection method; Federated learning; Industrial Internet of Things; MNIST; Smart Manufacturing Systems

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/NA

NA

NA



INTERNET OF THINGS-ENABLED SMART AGRICULTURE MONITORING AND CONTROL SYSTEM

Bahadure N.B.; Joshi R.; Parashar D.; Shah B.; **Chandra Patni J.**; Patil P.D.

ICDT 2025 - 3rd International Conference on Disruptive Technologies Conference Paper 2025



Dr. Jagdish Chandra Patni

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07 - 08 Mar 2025

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International Conference on Disruptive Technologies (ICDT)

Conference

📍 G. L. Bajaj Institute of Technology & Management, Greater Noida, India [Get Directions](#)

Abstract

The Indian economy mainly revolves around the agriculture sector, and it is one of the dominant nations in agriculture. In recent times, traditional methods of agriculture have become more inclined towards automation-based agriculture, where the integration of modern technologies such as the Internet of Things, Machine Learning, Artificial Intelligence, and many others are taking the lead. In our proposed system, various sensors relating to agriculture mapping are integrated with the

Internet of Things, and the data collected from the sensors, processed through IoT, will be further analyzed using machine learning and suggesting a corrective mechanism based on the data collected. No human intervention is needed; the system is fully automatic, responds within a delay time of 8.1 sec, and produces an accuracy of 94.68 % in predicting the data harvest.

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Author keywords- Agriculture; Artificial Intelligence; Internet of Things; Sensors





Intellectual Property Rights (AU IPR Cell)

PATENTS

Application No	202541052079	Title of the invention	AI-DRIVEN TALENT ACQUISITION AND MANAGEMENT SYSTEM FOR PREDICTIVE HIRING AND EMPLOYEE DEVELOPMENT
		Name of Inventor	Dr. Smitha Rajagopal, Dr. Neeraj Jain , Dr. G. Sureshkrishna, Dr. Ashwini Sonawane, Dr. P. Mohanraj, Avinash Kumar Tyagi, Dr. K. Kumaran, Dr. S. Senthil Kumar, P. Krishnaraj, Sathyapriya. S, Dr. S. Devipriya, and Dr. P. Sopna

Dr. Smitha Rajagopal
 Assistant Professor
 Alliance School of Advanced Computing



Dr. Neeraj Jain
 Assistant Professor
 Alliance School of Advanced Computing

Abstract

The present invention discloses an AI-driven talent acquisition and employee management system that leverages machine learning, natural language processing, and predictive analytics to enhance recruitment efficiency and employee development. The system ingests and analyzes multi-source data—including resumes, psychometric assessments, performance metrics, and engagement indicators—to generate predictive insights for hiring decisions and personalized

career progression plans. It features modules for candidate profiling, bias-aware predictive hiring, and dynamic employee development recommendations. A continuous learning loop ensures model improvement based on real-world outcomes, while an intuitive dashboard provides actionable insights for HR professionals. The invention ensures datadriven, fair, and strategic workforce planning across the employee lifecycle.

Application No	202541053108	Title of the invention	SYSTEM AND METHOD FOR GAMIFIED TALENT SCREENING USING ADAPTIVE BEHAVIORAL CHALLENGES
		Name of Inventor	Chandrasekar Uma Shankar, and Prof. Dr. Jaya Ganesan

Dr. Jaya Ganesan
 Professor
 Alliance School of Business

Abstract

A gamified talent screening system is disclosed, featuring adaptive behavioral challenges to assess candidates’ competencies and psychological traits. The system includes a scenario engine, an interaction analytics module, and a behavioral adaptation layer. Each challenge is dynamically adjusted in complexity and content based on user behavior, providing a customized and engaging experience. Behavioral metrics are captured,

analyzed, and translated into detailed candidate profiles using machine learning models. These profiles aid recruiters in making informed, bias-reduced hiring decisions. The invention enables remote deployment, supports various platforms, and integrates seamlessly with existing HR systems. It offers a scalable, intelligent alternative to traditional assessments.

Application No	202511055738	Title of the invention	IMPROVED GRAPH-BASED VISUAL SALIENCY HIGH DIMENSIONAL IMAGE RETRIEVAL SYSTEM
Name of Inventor	Pawan Kumar Mishra, Bhagya Laxmi, Jagdish Chandra Patni , Tarnnum, and Arun Pratap Singh Rathod		



Dr. Jagdish Chandra Patni

Professor
Alliance School of
Advanced Computing

Abstract

Improved Graph-Based Visual Saliency High Dimensional Image Retrieval System Salient features are the most important part of high dynamic range (HDR) images. High dynamic range is a technique which has been widely used around the world. People are intended to get brighter and clear images. In this paper, the new method of Graph-Based Visual Saliency (GBVS) has been used to extract the images promptly and accurately. Along with it, the comparison has been done with the help of different statistical parameters.

High dynamic range images have converted into the joint photographic experts group (JPEG). The main objectives of this research is to check the performance of improved Graph-Based Visual Saliency using various technical and engineering parameters such as mean square error (MSE), peak signal-to-noise ratio (PSNR), Kullback Leibler divergence (KLD), The number of changing pixel rate (NPCR) and unified averaged changed intensity (UACI) etc. These parameters have been used to show the exact result.

Application No	202541056689	Title of the invention	POLYLACTIC ACID ZINC COMPOSITE WITH OPTIMIZED OCTET INFILL PATTERN FOR HIGH-STRENGTH TENSION CABLE
Name of Inventor	Dr. V. Bhuvanewari, Dr. L. Rajesh Kumar , and Dr. D. Balaji		



Dr. Rajeshkumar Lakshminarasimhan

Professor
Alliance School of Applied
Engineering

Abstract

The invention relates to a polylactic acid zinc composite 3D printing system for high-strength tension cable applications. The system comprises a composite material consisting of polylactic acid (PLA) and metallic zinc (Zn) particles in an optimized 80:20 weight ratio, processed through fused deposition modeling (FDM) with specifically engineered octet infill pattern. The octet infill pattern features interconnected octahedral and tetrahedral geometries providing three-dimensional structural connectivity and enhanced stress distribution. Tensile testing demonstrates that the

octet pattern achieves maximum tensile strength of 43.90 MPa, superior to alternative patterns including concentric (43.56 MPa), cubic (42.44 MPa), triangle (36.45 MPa), and cross (35.13 MPa). The system provides optimal balance of loadcarrying capacity and material efficiency for tension cable applications including drone frames, construction elements, and mechanical systems requiring high strength-to-weight ratios while maintaining environmental sustainability through biodegradable PLA matrix.

Application No	202341041142	Title of the invention	SAFE SCREENING METHOD FOR BERYLLIUM-BASED HYBRID PROPELLANT THRUSTER FOR DEEP SPACE APPLICATIONS
Name of Inventor		Dr. Syed Alay Hashim , Dr. Srinibas Karmakar, and Dr. Arnab Roy	



Dr. Syed Alay Hashim

Associate Professor & Director - Centre of Excellence (Propulsion Systems) Alliance School of Applied Engineering

Abstract

The present invention aims at installing a beryllium-based hybrid rocket motor setup inside a vacuum chamber and evaluation of the regression rate of beryllium-based solid fuel at the vacuum level experimentally. The design and working principle of the vacuum chamber, preparation of polymer coated nanoparticles are already disclosed.

However experimental part of the advancement i.e. measuring the regression rate of fuels needs to be included for complete filing of the patent application. Also including determination of motor 'firing duration' which will help to maintain the vacuum level inside the chamber throughout the test.

Application No	202541058673	Title of the invention	IOT-INTEGRATED WEARABLE DUAL-DEVICE FOR CONTINUOUS CARDIOVASCULAR AND PAIN SENSING
Name of Inventor		D M Surya, and Dr. Neelapala Anil Kumar	



Dr. Neelapala Anil Kumar

Assistant Professor Alliance School of Applied Engineering

Abstract

The invention relates to an IoT-integrated wearable dual-device system for continuous cardiovascular and pain sensing comprising a coordinated wristband device and chest-mounted device. The wristband incorporates pulse sensors and GSR sensors for heart rate monitoring and emotional stress detection with ESP32 microcontroller connectivity. The chest-mounted device features a circular housing (8.5 cm diameter, 1.5 cm height) with EMG sensors for muscle activity monitoring, enhanced pulse sensors, and additional GSR sensors coordinated through ESP32 microcontroller. The dual-device

architecture optimizes monitoring accuracy through chest-mounted sensor placement while maintaining portability through wristband continuous monitoring. IoT connectivity enables real-time mobile application integration, cloud platform data storage, and automated emergency alert systems. The system provides comprehensive health parameter monitoring including cardiovascular assessment, emotional stress detection, and pain sensing through muscle activity analysis, addressing the fundamental trade-off between monitoring accuracy and user portability in wearable health monitoring applications.



Intellectual Property Rights (AU IPR Cell)

DESIGNS

Design No: **449490-001**

Title of the Design:

DIGITAL BUSINESS MANAGEMENT DEVICE

Name of Applicant:

Dr. Anusuya Biswas, Dr. Ch Sudipta Kishore Nanda, Dr. P.g. Kavitha, Dr. N. Venkatesa Palanichamy, Dr. Moumitasaha6. Dr. K. Sasirekha7. Mr. Arijit Banerjee8. Dr. V. Kannan



Dr. Anusuya Biswas

Associate Professor
Department of Economics

Description

This compact blue-framed tablet device features a large touchscreen display and integrated LED status indicators for comprehensive business operations management. The device includes intuitive control buttons and multiple connectivity ports for seamless integration with enterprise systems, enabling real-time monitoring of business metrics, resource allocation, and workflow optimization.

Designed for executives and managers, this portable digital management tool provides instant access to dashboards, analytics, and decision-making tools to streamline business processes, track performance indicators, and coordinate team activities across various departments and locations.



Design No: **451241-001**

Title of the Design:

AI BASED ALZHEIMER'S DISEASE DETECTION DEVICE

Name of Applicant:

Dr. Rydhm Beri and **Ms. Parul Sachdeva**



Dr. Rydhm Beri

Assistant Professor
Alliance School of Advanced
Computing



Ms. Parul Sachdeva

Assistant Professor & School
ERP and School Blended
Learning Coordinator
Alliance School of Design

Description

This advanced neurological diagnostic device features a sophisticated sensor array with neural pathway mapping capabilities displayed on its dark surface, mounted on a base with multiple cyan-colored detection pins for comprehensive brain activity monitoring. The device utilizes artificial intelligence algorithms to analyze cognitive patterns, memory functions, and neurological responses through non-invasive testing procedures, enabling early detection and assessment of Alzheimer's disease progression. Designed for medical professionals and research facilities, this cutting-edge diagnostic tool provides accurate, real-time analysis of brain function markers, helping clinicians identify early-stage dementia symptoms and develop personalized treatment strategies for patients at risk of cognitive decline.



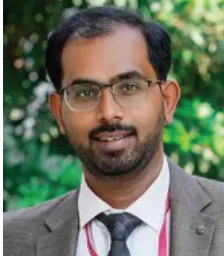
Design No: **434650-001**

Title of the Design:

XPRINTER

Name of Applicant:

Alliance University, **U Ananthanagu**, and Vinod. K



Mr. Ananthanagu U

Assistant Professor & Associate Director (In Charge) - Centre of Excellence (Immersive Technologies (AR/VR)) Alliance School of Advanced Computing

Description

This compact gray printing device features a sleek, modern design with an integrated QR code scanner and digital display interface for streamlined printing operations. The device combines traditional printing capabilities with smart connectivity features, enabling users to quickly scan QR codes for instant document retrieval and printing from cloud storage, mobile devices, or network systems. Designed for office environments, retail spaces, and public access points, this efficient printing solution provides user-friendly operation through its intuitive display panel while supporting various print formats and wireless connectivity options for seamless document management and on-demand printing services.







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