ALLIANCE UNIVERSITY
CENTRE for RESEARCH
DSIR RECOGNIZED SIRO
DEPARTMENT OF SCIENTIFIC & INDUSTRIAL RESEARCH GOVT. OF INDIA

ALLIANCE RESEARCH CHRONICLES

NOVEMBER 2025
Volume 11



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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 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.

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.

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 Centres 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 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.

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.



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.

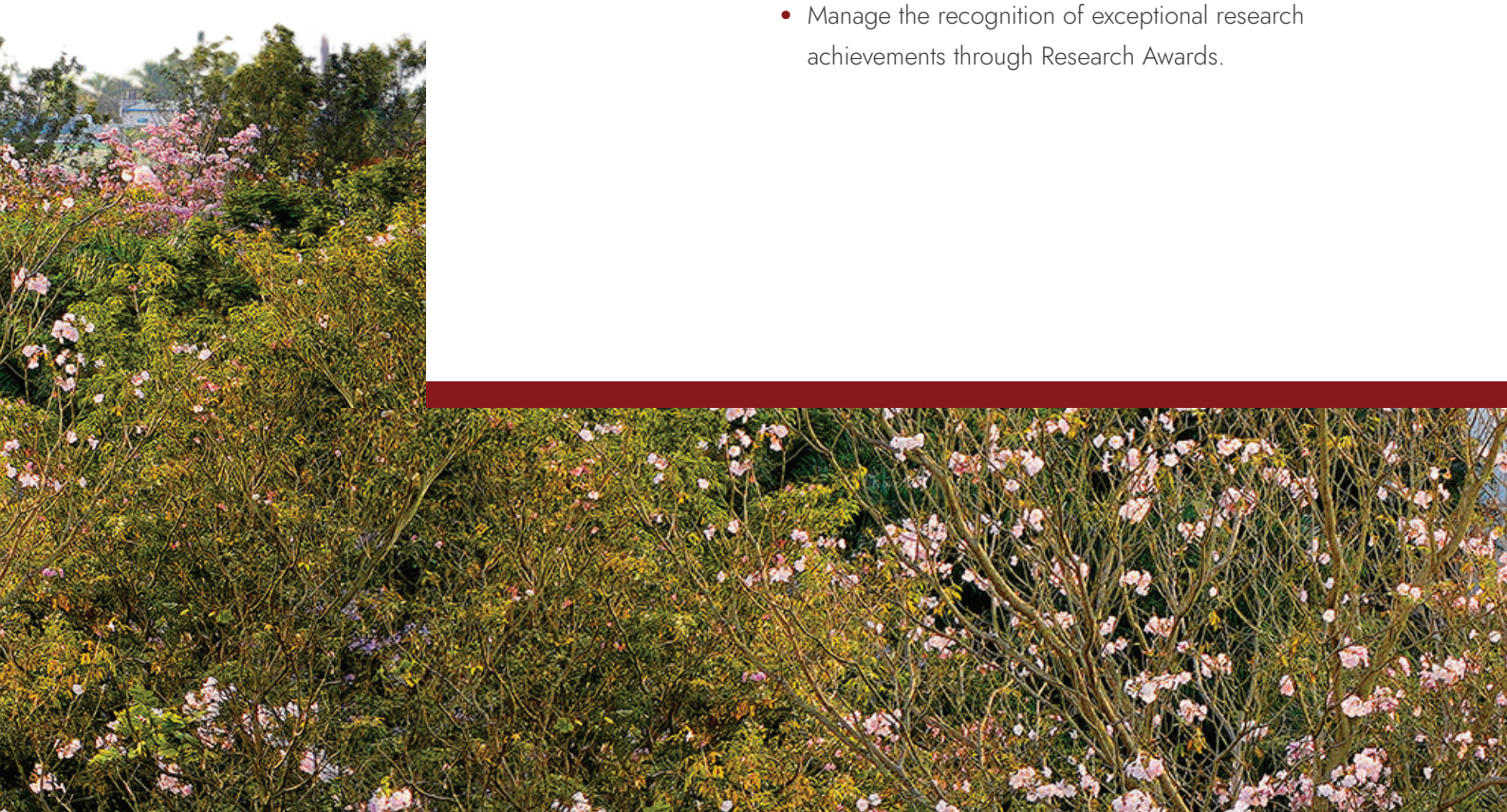
ABOUT CENTRE *for* RESEARCH (Contd.)

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

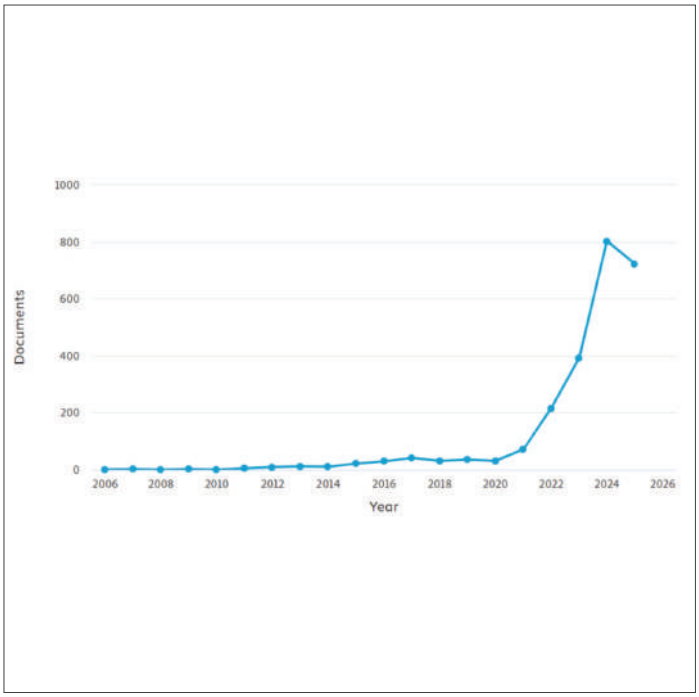
- Support the Ph.D. Admission process and facilitate the Ph.D. Program across all academic units of Alliance University.
- Providing resources and support for faculty, students, and visiting/full-time scholars engaged in research activities.
- Contributing to the advancement of knowledge through publications, 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.



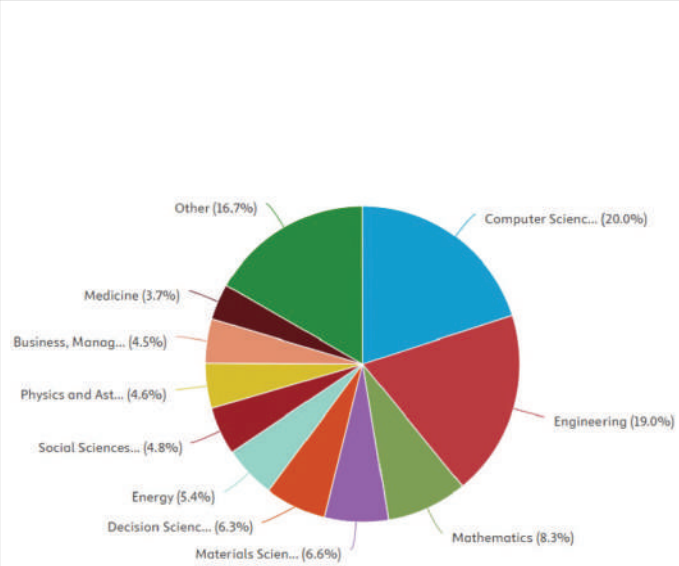


2510	975
Documents	Authors

Documents by Year



Documents by Subject Area



Summary

2510	975	11206	4.4	1.77	45
Scholarly Output	Authors	Citation Count	Citations per Publication	Field-Weighted Citation Impact	H-index

Note: Scholarly output, Authors and Citation Count are Taken from SCOPUS, and other Metrics are taken from SCIVAL.

Publication by Journal Quartile



Quartiles	Publications	Publication share (%)
Q1 (top 25%)	499	41.1
Q2 (26% - 50%)	306	25.2
Q3 (51% - 75%)	181	14.9
Q4 (76% - 100%)	228	18.8

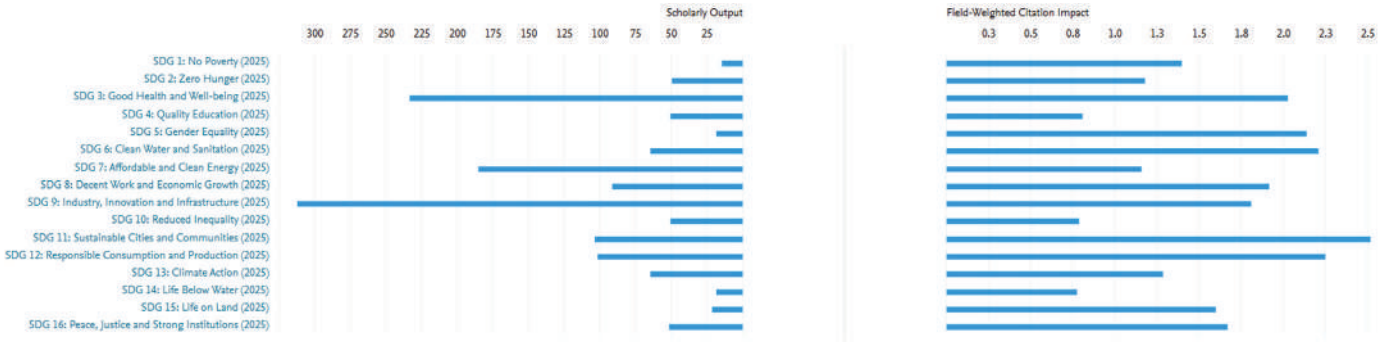
Cumulative shares	Publications	Publication share (%)
Q1 to Q2 (top 50%)	805	66.3
Q1 to Q3 (top 75%)	986	81.2

Geographical Collaboration Overall



Metric	Publication share	Scholarly Output	Citations	Citations per Publication	Field-Weighted Citation Impact
International collaboration	31.5%	744	6,127	8.2	1.90
Only national collaboration	48.3%	1,144	4,278	3.7	1.88
Only institutional collaboration	14.5%	343	439	1.3	0.81
Single authorship (no collaboration)	5.7%	135	188	1.4	0.50

Publication by SDG



* The Publication metrices and the author affiliations are taken from SCOPUS/SciVal as on 15/12/2025


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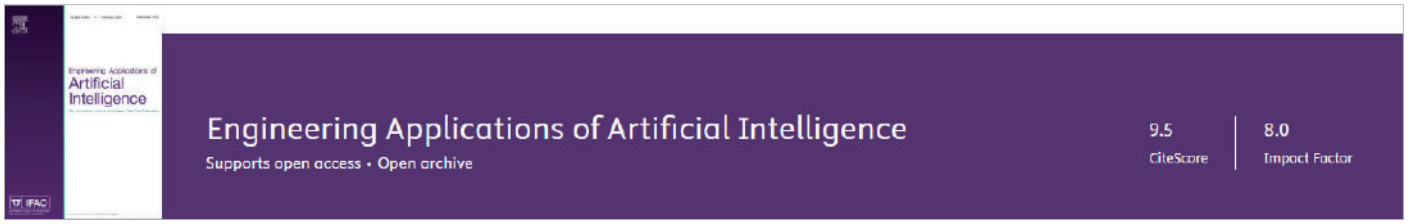
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**88th**	**8.0**	07 AFFORDABLE AND CLEAN ENERGY

NEURO INSPIRED DEEP LEARNING BASED SECURE AND ENERGY EFFICIENT ROUTING WITH AUTONOMOUS INTRUSION PREVENTION IN WIRELESS SENSOR NETWORKS

Babu Karuppiah, A.B.; **Nanjappan, V.**; RajaRaja, R.; Priyan, S.V.

Engineering Applications of Artificial Intelligence

Dr. N. Vijayalakshmi
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Wireless Sensor Networks (WSNs) are crucial in mission-driven domains such as environmental monitoring, industrial control, and military surveillance. However, their open communication medium, constrained resources, and unattended deployment make them prone to routing-layer attacks. Existing security frameworks mostly rely on reactive intrusion detection systems or conventional deep learning models, which incur high computational overhead and fail to adapt effectively under dynamic network conditions. To overcome these limitations, this study proposes a Neuro-Inspired Deep Learning Framework based on Spiking Neural Networks (SNNs) for autonomous intrusion prevention and energy-aware routing. The proposed model leverages latency-based spike encoding of key behavioral metrics (e.g., residual energy, latency, routing frequency, and packet delivery ratio) and utilizes a Leaky Integrate-and-Fire neuron architecture for proactive vulnerability prediction. Implementation using the Network Simulator-3 (NS-3) simulation tool and validation on the Wireless Sensor Network Dataset (WSN-DS), the framework achieves 99.72 % prediction accuracy, 99.98 % precision, 99.33 % recall, and 99.12 % F1-score, outperforming existing studies in attack detection rate. The proposed Secure Energy-Aware Routing Metric (SEARM) protocol achieves an average energy consumption of 0.32 J and a packet delivery ratio of 99.1 % while maintaining performance across varying network sizes (30—150 nodes) and attack intensities (up to 50 %). Additionally, the model features a self-healing mechanism that reintegrates previously blocked nodes based on dynamic trust recovery. This research establishes a proactive, low-power, and intelligent security paradigm for WSNs and sets the foundation for future innovations in biologically inspired and scalable network protection strategies. © 2025 Elsevier Ltd.

Author keywords- Energy-efficient routing; Intrusion prevention; Neuro-inspired deep learning; Spiking neural networks; Trust-aware routing; Wireless sensor networks

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q3	32nd	2.5	05 GENDER EQUALITY

REAL-TIME SIGN LANGUAGE GESTURE RECOGNITION FOR WOMEN'S SAFETY USING DYNAMIC TIME WARPING AND VOTING ALGORITHMS

Tyagi, A.; V.S.; Lunawat, P.; **Ashok, S.**

Franklin Open

Dr. Ashok Sarabu
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Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Advancements in computer vision techniques have spurred the development of sign language recognition systems, benefiting the deaf and mute community. However, the safety of deaf hard-of-hearing women remains a significant concern, particularly in the context of emerging threats. This paper presents a method for real-time recognition of women's safety sign language gestures using Dynamic Time Warping (DTW) and voting algorithms. The proposed approach leverages MediaPipe to extract keypoints from hand, body, and facial movements, representing gestures as feature matrices that encapsulate both spatial and temporal aspects. These matrices are compared using DTW to recognise gestures, with a voting algorithm determining the final gesture label. A novel dataset, WSISL-28, consisting of 28 women's safety-related gestures, was created to evaluate the method. Experimental results demonstrate an impressive accuracy of 98.45 %, affirming the feasibility and effectiveness of the proposed system for real-time sign language gesture recognition, which empowers deaf and mute women, enhancing their safety and security.
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Author keywords- Classification; Computer vision; Deep learning; Recognition; Sign language; Women's safety

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**89th**	**3.9**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

6G -ENABLED QUBIT-BASED CONCEALED COMMUNICATION WITH AI-DRIVEN BREACH DETECTION IN AUTONOMOUS FLEETS

T, V.; **Palanisamy, S.**; Abdelhaq, M.; Sathishkumar, N.

Scientific Reports

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scientific reports

Abstract

Autonomous Vehicles (AVs) rely on secure neighbors and proactive infrastructures for robust communications. The heterogeneous communication scenario exploits concealed media for secure information exchange. Concealed communications assist precise navigation, information exchange, object detection, etc. In this process, the end-to-end computations are complex in converting a vehicle communication stream to an encrypted stream. This article introduces a Secure Module for Concealed Navigation Communication (SM-CNC) in AV environments. The information identified is transmitted by attaching volatile authentication that disintegrates if a communication source (vehicle or access point, etc.) is intercepted. Contrarily, the information is dropped in the communication medium if adverse or unauthorized vehicles intercept. This process is monitored during the relaying and end-to-end validation processes. The proposed secure module relies on quantum computing and recurrent learning for multiple recommendations from the information relay points. The information points are modeled as qubits for low-complex processing to administer security and ensure reliable communication. This prevents security breaches in the concealed medium through authentication failures and unauthorized access detection based on vehicle information allocated to individual qubits. The learning paradigm analyzes the qubits for their availability for secure information exchange throughout the navigation. The performance of the proposed module is verified using the metrics of communication failure, complexity, and authentication rate. The proposed secure module improves the authentication rate by 9.29% and reduces the communication failure and computation complexity by 11.87% and 12.13% respectively, for the maximum communication requests/ interval. © The Author(s) 2025.

Author keywords- Autonomous vehicles; Communication authentication; Quantum computing; Recurrent learning; Secure navigation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q4	6th	0.4	05 GENDER EQUALITY

ON RENEWAL PROCESSES-SOME BOUNDS AND CHARACTERISATIONS

Ravi, S.; **Ghosh, S.K.**

Statistics and Applications

Dr. Suman Kalyan Ghosh
Assistant Professor
Alliance School of Business

Abstract

Bounds for the distribution/ survival function and a few other characterisations associated with renewal processes based on ageing properties of the generating inter-arrival times are obtained. A few results are also obtained by comparing renewal processes with respect to some stochastic orderings. © 2025, Society of Statistics, Computer and Applications. All rights reserved.

Author keywords- Ageing classes; Convex transform order; Log-concavity; Renewal process

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**75th**	**6.07**	07 AFFORDABLE AND CLEAN ENERGY

FABRICATION OF TITANIUM DIOXIDE NANOPARTICLE-DOPED POLYMER ELECTROLYTES FOR DYE-SENSITIZED SOLAR CELL MODULES: SELF-POWERED INTERNET OF THINGS APPLICATIONS

Manikandan, K.M.; **Senthamaraikannan, P.**; Balavairavan, B.; **Mahapatra, S.**; Dey, B.

Materials for Renewable and Sustainable Energy

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Mechanical Engineering
Alliance School of Applied Engineering

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



Abstract

This paper explores the integration of Dye-Sensitized Solar Cell modules with Internet of Things applications, emphasizing their potential to provide sustainable, self-powered solutions. This research highlights the potential of nano titanium dioxide infused polymer electrolytes as a promising approach for advancing Dye-Sensitized Solar Cell technology, paving the way for more efficient, durable, and cost-effective solar energy harvesting systems. The prepared electrolytes are systematically investigated for their electrical conductivity, degree of crystallinity, charge transfer resistance, photovoltaic parameters, and surface roughness. The polymer electrolyte with10 wt% nano TiO2 particle shows a maximum electrical conductivity of 0.658 S cm−1 at 313 K. The highest Ea value for the optimised sample (S2) is 0.689 kJ mol−1, indicating enhanced charge carrier transport kinetics. 10 wt % of nano-TiO2 based polymer electrolytes exhibited a smaller Rct1 (3.010 Ω cm2), Rct2 (3.459 Ω cm2) and Rs (4.823 Ω cm2) compared to the other TiO2 doped polymer electrolytes. The Atomic force microscopy analysis revealed that the average roughness value of optimised sample S2 is 22.616 nm. The optimized Dye-Sensitized Solar Cell exhibit an enhanced photo-conversion efficiency of 4.67 ± 0.05% under 100 mW cm−2 illumination, making them suitable for sustainable IoT applications such as autonomous sensors and low-power embedded systems. Additionally, the DSSC module was integrated with an Internet of Things system that measured temperature and moisture. The user received the device's output through an Android Smartphone App within 0.33 s. This work highlights the potential of nano-engineered polymer electrolytes in advancing DSSC technology for next-generation green energy solutions. © The Author(s) 2025.

Author keywords- Charge transfer resistance; Conducting polymer electrolyte; DSSC module; IoT sensor; Nanomaterials; Polypyrene

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q3	32nd	2.5	03 GOOD HEALTH AND WELL-BEING

ADVANCEMENTS IN HEMOTYPE IDENTIFICATION: FINGERPRINT ANALYSIS FOR BLOOD GROUP DETERMINATION

S, P.V.; Tyagi, A.; **S, A.**; G, N.S.; R, M.

Franklin Open

Dr. Ashok Sarabu
Assistant Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Hemotype determination through fingerprint analysis offers a non-invasive, pain free, and efficient alternative for blood group classification, enhancing current diagnostic and forensic methodologies. While traditional ABO and Rh typing methods such as the slide agglutination test are relatively simple and can be performed using a minimally invasive fingertip puncture, they still rely on biological sample handling and reagent availability, which may pose challenges in certain emergency or resource limited scenarios. The proposed approach leverages fingerprint ridge patterns to explore correlations between ridge frequencies and the ABO-Rh blood group system. By extracting and analyzing spatial features, including ridge flow and minutiae points, using advanced computer vision and expert system algorithms, accurate hemotype classification is achieved. The methodology employs Scale Invariant Feature Transform (SIFT) for robust feature extraction and XGBoost for efficient classification. This non-invasive framework enhances the accessibility of blood group determination and holds potential for applications in healthcare, emergency response, and forensic investigations where rapid, reagent-free diagnostics are essential.
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Author keywords- Emergency response; Fingerprint ridge patterns; Healthcare applications; Non-invasive blood group determination

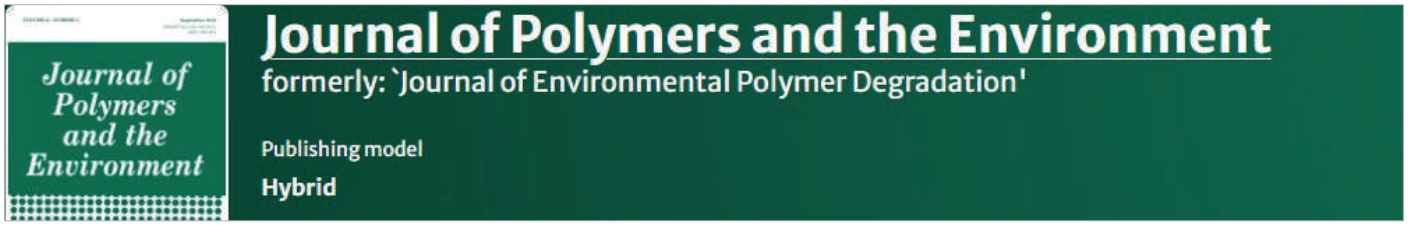
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**87th**	**6.09**	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

LIGNIN BASED ANTIMICROBIAL AND UV BLOCKING BIOPOLYMER FILMS FOR SUSTAINABLE FOOD PACKAGING AND SEED PROTECTION

Kumar, S.S.; Jayan, J.S.; **Parameswaranpillai, J.**; Appukuttan, A.

Journal of Polymers and the Environment

Dr. Jyotishkumar P
Professor & Director - Centre of Excellence
(AU - Sophisticated Test and Instrumentation Center)
Chemistry
Alliance School of Sciences



Abstract

Bio-based composite films offer a sustainable alternative to synthetic packaging materials due to their biodegradability and functional versatility. In this study, a biodegradable film was developed using gelatin (GA), lignin (LG), and tannic acid (TA), for applications in food packaging and seed preservation. Films were prepared by fixing GA and varying LG and TA, on a weight/weight (w/w) basis relative to GA. The optimized formulation (LGT68) exhibited a tensile strength of 7.59 ± 0.58 MPa, and elongation at break (EAB) of 158.54 ± 15.68%. Scanning electron microscopy (SEM) revealed a dense fibrillar matrix with uniformly dispersed spherical agglomerates, attributed to LG–TA interactions within the GA matrix. Fourier-transform infrared spectroscopy (FTIR) confirmed strong hydrogen bonding. The film also demonstrated complete ultraviolet (UV) blocking, improved hydrophobicity with a water contact angle of 89.4 ± 0.7°, and significant antimicrobial activity with a 23 mm zone of inhibition against Staphylococcus aureus (S. aureus). Real-time application trials using raw beef and mushroom for packaging and seeds of Momordica charantia for coating confirmed the film's effectiveness in extending shelf life. These results highlight the potential of LGT films as sustainable and multifunctional materials for active food packaging and seed protection applications.
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Author keywords- Antimicrobial film; Biopolymer film; Food packaging; Gelatin; Lignin; Seed preservation; Tannic acid

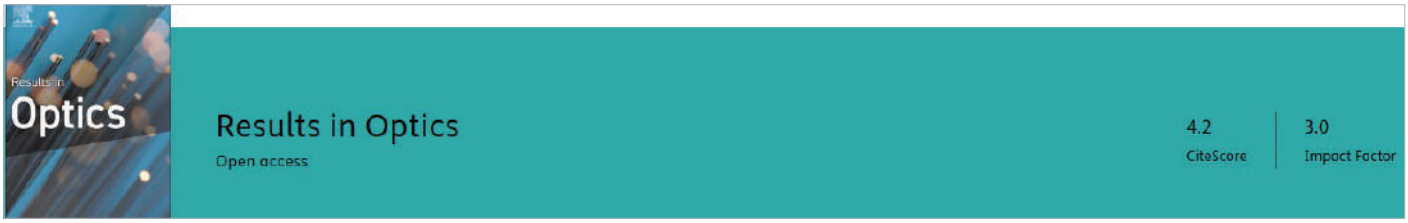
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**55th**	**3.0**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

RECONFIGURABLE PHOTONIC CRYSTAL FILTER WITH HIGH TRANSMISSION COVERING E-L BANDS AND POTENTIAL FOR DWDM APPLICATIONS

Jhirad, S.S.; Priya, S.S.; S, S.; **Itapu, S.**; Borra, V.

Results in Optics

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Abstract

A reconfigurable photonic crystal (PhC) filter is proposed for Dense Wavelength Division Multiplexing (DWDM) applications across the E, C, S, and L bands, offering a high-quality factor (QF) and excellent transmission efficiency. The structure has a point defect resonator whereby changing the radii of coupling and center rods allows tuning over several resonant frequencies. This flexibility supports several wavelengths, so optimizing optical communication networks. The variation in rod radii lets one trade-off between QF and transmission efficiency, so enabling fine-tuning for particular performance requirements. Using a single cavity resonator, the tuned 2D Channel Drop Filter (CDF) guarantees a compact and reconfigurable construction. Its operating wavelengths are resonant ones ranging from 1429 nm to 1594 nm. Under ideal conditions, simulation results show a QF range of 200 to 420 with transmission efficiency reaching 100 %. This small solution provides flexibility while keeping high performance, so meeting the needs of contemporary DWDM systems.
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Author keywords- Channel Drop Filter; Dense Wavelength Division Multiplexing; Filters; Photonic Bandgap; Photonic Crystal

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**89th**	**3.9**	03 GOOD HEALTH AND WELL-BEING

HEMODYNAMIC CHARACTERISTICS AND DRUG DEPOSITION IN CEREBRAL ANEURYSM SAC

Singh, D.; Usmani, A.Y.; Upadhyay, R.K.

Scientific Reports

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scientific reports

Abstract

Patient-specific cerebral aneurysms exhibit complex hemodynamics insights that influence thrombus formation, wall remodeling, and therapeutic delivery. The article presents a high-fidelity, multi-parametric CFD analysis of nine distinct aneurysm cases using 3-D model-resolved meshes, non-Newtonian Casson rheology, and steady-state flow conditions. Further, the Lagrangian particle tracking was employed to assess drug transport and hemodynamic metrics such as WSS and normalized residence time (NRT) were evaluated, along with vortex dynamics, indicators including helicity (H) and Q criterion to characterize rotational flow structures. Results reveal that narrowed neck models (m1, m2, m5, m8) exhibit weak vortex structures and dominant axial washout (velocity magnitude < 0.10 m/s; NRT < 0.2), while sac-expanded geometries (m3, m4, m6, m9) support robust helical vortices (H > 40 m^2/s^2, Q > 0) and elevated residence times. Regions of low WSS (w < 0.5 Pa) spatially co-localize with high NRT and potential thrombogenicity, whereas high WSS (w > 2.5 Pa) associates with jet impingement zones and possible endothelial damage. Notably, sharp WSS gradients are identified as destabilizing hemodynamic factors. Rheological analysis reveals a critical threshold at ˙ ≈ 415 s^{-1} (μ ≈ 6.4 mPa·s), distinguishing thrombosis-prone regions (low ˙, high μ) from stable zones (high ˙, low μ). Particle transport studies show that effective drug retention occurs in high-helicity, wide neck models for Stokes number (St = 0.1–1), while laminar-dominant aneurysmal flows demonstrate poor drug deposition due to axial convection. Overall, the findings underscore that aneurysm stability and therapeutic outcomes are governed by the interplay of aneurysm induced flow structures, WSS heterogeneity, non-Newtonian rheology, and vortex coherence are refining rupture risk assessments and optimizing endovascular drug delivery strategies.
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Author keywords- Drug deposition; Hemodynamics; Microthrombus; Non-Newtonian; Rupture risk; Wall shear stress

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	85th	2.91	07 AFFORDABLE AND CLEAN ENERGY

A COMPREHENSIVE REVIEW OF OPTIMIZATION METHODOLOGIES FOR POWER-SPLIT HYBRID ELECTRIC VEHICLE POWERTRAIN CONFIGURATION AND STRUCTURAL INTEGRITY WITH ECODESIGN AND RELIABILITY CONSIDERATIONS

Mandol, S.; Bhattacharjee, D.; **Kumar, M.H.**

Discover Applied Sciences

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Discover Applied Sciences

Publishing model
Open access

Abstract

This review paper fills an evincing gap related to ecodesign of HEV discussing optimization methods for the power-split device (PSD) powertrain configuration. There is previous literature about control strategies for energy management and powertrain topology, but the important aspects on the integration of PSD durability and reliability into the eco-design process have not been fully addressed. The unique aspect of this paper is the introduction of the use of Computer-aided Engineering utilized in combination with vehicle model-based design for holistic PSD condition evaluation. The main result shows that geometric design features, as the Ring to Sun gear ratio of the PSD, play a significant role in the determination of mass, natural frequency and, most importantly, ecodesign-related metrics of the assembly (i.e., fuel consumption and emissions). The combination of CAE driven structural feasibility with classical configuration screening and selection is demonstrated in this work, and the optimal gear ratio determination features an extremely powerful tool in the field of design support for HEV ecodesign. This adaptive methodology to interpret various PSD configuration modifications is a promising tool for engineering clean systems. This review provides an insightful basis for future HEV powertrain developments, for better performance meanwhile lower emission.
© The Author(s) 2025.

Author keywords- Computer-Aided engineering; Fuel consumption and emissions; Hybrid electric vehicle; Model-Based design; Power-Split device

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**58th**	**3.2**	03 GOOD HEALTH AND WELL-BEING

OPTIMIZED TRIPLEX NANOMATERIAL ALL-AROUND GATE TUNNEL FIELD-EFFECT TRANSISTORS FOR HIGH-PRECISION BIOMOLECULE DETECTION

Srinivasan, P.; **Nanjappan, V.**; Varghese, S.

Zeitschrift fur Physikalische Chemie

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Abstract

In this present work, a biosensor built upon the triplex nanomaterial all-around gate tunnel field-effect transistor (TFET) is proposed concerning biomolecule detection. This design leverages an advanced all-around gate structure, enhancing sensitivity and selectivity in biosensing applications. Field-effect transistor (FET) biosensors offer portability and rapid, high-throughput screening capabilities, which make them particularly suitable for detecting biomarkers. The proposed 3MAG TFET biosensor includes precisely engineered nanocavities over a 1 nm gate oxide, designed to capture and detect target biomolecules efficiently. To investigate its performance, a two-dimensional simulation is conducted using technology computer-aided design (TCAD) software, enabling thorough parameter exploration. The triplex material composition contributes to low power consumption and high device sensitivity, making the biosensor a promising candidate for various biomolecular detection applications. Analytical insights were derived and validated through Sentaurus TCAD simulation results. The proposed device exhibits distinct electrical responses to biomolecules of different dielectric constants and charge states, such as DNA and proteins. Selective detection can be realized through receptor functionalization of the nanocavity surface.
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Author keywords- biosensor; cancer detection; sensitivity; triplex material all around gate; tunnel field effect transistor

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	89th	3.9	03 GOOD HEALTH AND WELL-BEING

DUAL ROLE OF ROS-DEPENDENT ANTI-CANCER ACTIVITY AND PHOTOCATALYTIC DEGRADATION OF GRAPHENE OXIDE AGAINST MCF-7 BREAST CANCER CELLS AND ORGANIC DYE

Chelliah, C.K.; Govindan, G.; Maruthupandy, M.; Chackaravarthi, G.; Ramachandran, G.; Liu, Y.-H.; Mohamad, O.A.A.; Li, S.; Li, W.-J.; Bhaviripudi, V.R.; Sathik Basha, S.; **Shahapurkar, K.**; Gebremaryam, G.

Scientific Reports

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scientific reports

Abstract

Graphene oxide (GO), a two-dimensional nanomaterial, was synthesized using a modified Hummers' method and evaluated for its dual biomedical and environmental applications. Structural characterization confirmed the successful formation of GO, as evidenced by XRD (d-spacing of 10.23 Å), FTIR (hydroxyl, epoxy, carboxyl, and carbonyl functional groups), TGA (distinct weight loss patterns), and microscopic analyses (FE-SEM, EDX, and HR-TEM) revealing spherical and rod-like morphologies. Biologically, GO exhibited potent cytotoxicity against MCF-7 breast cancer cells in a concentration-dependent manner. The IC50 concentration of the GO induced more apoptosis, nuclear membrane damage, mitochondrial dysfunction, and cytochrome c release through intracellular ROS generation, ultimately activating caspase-3 and caspase-9 pathways. These mechanistic findings were validated by fluorescence staining assays (AO/EB, DAPI, DCFH-DA, and rhodamine 123). In parallel, photocatalytic studies demonstrated that GO achieved 46.9% degradation of Rhodamine-B dye under visible light within 120 min, attributed to reduced electron–hole recombination and enhanced ROS generation. Collectively, these results highlight the multifunctionality of GO as both a promising anticancer nanomaterial targeting breast cancer and an efficient photocatalyst for environmental remediation of toxic dyes. © The Author(s) 2025.

Author keywords- Anti-cancer properties; Apoptotic cell death and mitochondrial damage; Graphene oxide; In vitro inhibition

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**89th**	**3.9**	03 GOOD HEALTH AND WELL-BEING

MULTIMODAL FUSION OF ULTRASOUND IMAGES USING HXM NET FOR BREAST CANCER DIAGNOSIS

Pradeep Ghantasala, G.S.; Akhil, M.; Vidyullatha, P.; Guruguntla, V.; Bhaskara Rao, T.S.S.B.; Yuvaraju, B.A.G.

Scientific Reports

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scientific reports

Abstract

Breast cancer is a major global health issue in women, where diagnosis at an early stage is decisive for enhancing the effectiveness of treatment and survival. Despite the advances in imaging using medical technologies, maintaining uniformly good diagnostic accuracy is challenging due to the difficulty of lesion characterization and limitations of single-modality imaging. This work presents HXM-Net, a deep learning model specifically tailored to improve breast cancer detection through the synergistic benefit of multi-modal ultrasound imaging. HXM-Net combines Convolutional Neural Networks (CNNs) for spatial feature extraction and Transformer-based fusion for optimal concatenation of information from the B-mode and Doppler ultrasound images. The dual modality-based method captures morphological and vascular features of breast lesions and produces a more informative and discriminative feature representation. The model embeds multi-scale feature learning and data augmentation to guarantee generalizability to different lesion types and patient populations. In the tests conducted on a class-balanced breast ultrasound database, the HXM-Net achieved accuracies of 94.20%, sensitivity (recall), 92.80%, specificity, 95.70%, an F1 score of 91.00%, and AUC-ROC of 0.97, thereby establishing the superiority of HXM-Net over conventional models like ResNet-50 and U-Net, especially in distinguishing benign tumours from malignant ones. The strong diagnostic ability and versatility of the model make it a good contender for integration with clinical decision support systems that can facilitate more assured diagnostics and enhanced patient care. © The Author(s) 2025.

Author keywords- Breast cancer detection; Deep learning; HXM-Net; Multi-modal fusion; ResNet-50; Transformer networks; U-Net; Ultrasound imaging

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	80th	2.3	08 DECENT WORK AND ECONOMIC GROWTH

A NOVEL STOCK MARKET DATA PREDICTION USING HYBRID LSTM-RBFN MODEL

Selvan, C.; Sasikala, S.; Swamidason, **Ivin T J**; Arulkumar, V.; Devi, S.R.

SN Computer Science

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Abstract

The interconnectivity of global stock markets is flourishing, entailing the potential for vehemently intertwined stock price oscillations as a result of external disturbances, collaborative efforts, and competitive forces.Predicting the fluctuations of the stock market has been an age-old pursuit, where pioneers have employed conventional techniques to scrutinize the underlying principles and intricate technical elements.The market price of the shares varies indeterminately and is very hard to predict its final state at the end of the day. This creates havoc among the investors and creates a confusion state of taking decisions on the stocks of the companies. Occasionally, some erroneous prediction by the investors creates a huge loss to them by investing on wrong shares due to the wrong prediction. To overcome this concern and to predict the stock market status, this manuscript proposes a novel Ensemble Deep Learning Framework (EDLF), which employs deep learning algorithm for the high precision prediction of stock market data. The Deep Learning (DL) algorithm employs the hybrid Long Short Term Memory (LSTM) and Radial Basis Function Networks (RBFN) method for the prediction of stock market data. The proposed work exhibits a better performance with accuracy of 83.65%, 82.54% of precision, 83.94% of recall and a F1 score with 83.46%. © The Author(s), under exclusive licence to Springer Nature Singapore Pte Ltd. 2025.

Author keywords- Deep Learning; Ensemble Deep Learning Framework; Long Short Term Memory; Prediction; Radial Basis Function Networks (RBFN); Stock market data

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	**70th**	**0.3**	

ADOPTION OF ECO-FRIENDLY TRANSPORT IN INDIA: AN EMPIRICAL ANALYSIS OF CONSUMER ATTITUDES AND BEHAVIOUR

Varadaraj, A.; Bataineh, M.J.; Mohanasundaram, K.; Sengodan, A.

Journal of Cultural Analysis and Social Change

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Abstract

The intensifying environmental concerns and global commitments to reduce carbon emissions have positioned green transportation technologies as pivotal solutions for sustainable mobility. The transition toward green transportation not only contributes to environmental preservation but also supports economic growth, public health, and energy security. This empirical study investigates the behavioural, economic, environmental, and social determinants influencing consumer adoption of green transportation solutions, such as electric vehicles (EVs) and hybrid mobility platforms. Grounded in three key theoretical frameworks—the Theory of Planned Behaviour (TPB), the Technology Adoption Model (TAM), and the Diffusion of Innovation (DOI) theory—this research seeks to assess the complex interplay between consumer attitudes, intentions, social norms, and actual adoption behaviours. Data were collected through structured questionnaires from a sample of 103 respondents across five major Indian metropolitan cities: Chennai, Bengaluru, Hyderabad, Mumbai, and Kolkata. The study employed a quantitative methodology using descriptive analysis, correlation, and multiple regression through IBM SPSS. Variables measured included economic incentives, environmental awareness, social norms and values, attitudes toward adoption, perceived behavioural control, intention to adopt, and actual adoption behaviour. The regression analysis revealed that attitude towards green transportation emerged as the only statistically significant predictor of actual adoption behaviour (p = 0.025), indicating that a favourable consumer mindset plays a pivotal role in the transition to sustainable mobility. Interestingly, economic and environmental factors—though often emphasized in public discourse—were not found to be significant drivers in isolation. Social factors showed marginal influence (p = 0.090), suggesting a cultural dimension where peer influence and social validation may shape behavioural outcomes. Additionally, the study identified a considerable gap between intention, perceived behavioural control, and actual adoption behaviour, as evidenced by paired t-test results. These findings underscore the importance of bridging the cognitive-perceptual gap to translate intention into action. The conceptual framework tested within this research offers a practical model for stakeholders, including policymakers, marketers, and transportation authorities, to design targeted interventions. Policy recommendations emerging from this study emphasize the need for consumer education campaigns, improved green transport infrastructure, and community-based marketing to enhance attitudinal shifts and trust in emerging technologies. By providing empirical insights into consumer preferences and barriers, this research contributes to the broader literature on sustainable transportation in emerging economies. It advocates for a behavioural-centric approach to green mobility that complements financial and policy mechanisms. Ultimately, fostering a culture of pro-environmental behaviour is essential for advancing India's sustainable urban development goals.
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Author keywords- Adoption; Consumer Behaviour; Electric Vehicles; Environmental Awareness; Green Transportation; India; Social Norms; Sustainability; Technology Adoption Model; Theory of Planned Behaviour

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q3	29th	0.24	10 REDUCED INEQUALITIES

SHARED WORSHIP TO SEGREGATED RITUALS BOYCOTT OF DALITS BY CASTE PANCHAYAT IN ANTHRAVALLI, KARNATAKA

Sivamanithan, S.; Abraham, M.S.

Economic and Political Weekly

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Economic & Political WEEKLY
ISSN (Print) - 0012-9976 | ISSN (Online) - 2349-8846

Abstract

Once known for its communal harmony and joint participation, the Pattaladamma deity festival has become a site of caste-based exclusion orchestrated by the caste panchayat in a village in Karnataka. The field observations show how informal caste governance, through structures like the nyaya panchayat, overrides constitutional values and fosters structural untouchability under the guise of tradition. This article argues that ritual exclusion is not an isolated cultural aberration but a deliberate assertion of caste hierarchy that demands urgent legal and constitutional interventions.
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Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**54th**	**1.29**	07 AFFORDABLE AND CLEAN ENERGY

EXPERIMENTAL INVESTIGATION OF METHYL-ESTER SOYBEAN BIODIESEL: PERFORMANCE AND EMISSION CHARACTERISTICS AS AN ALTERNATIVE DIESEL FUEL

Kumar, B.; **Singh, D.**; Rathore, S.S.; Kumar, S.; Pathak, P.K.; Sharma, N.

Journal of Thermal Engineering

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Abstract

Due to the higher demand for renewable and sustainable energy sources, it is very important to investigate fuels such as soybean biodiesel. This study focuses on a compression ignition diesel engine's performance characteristics and emissions when running on soybean biodiesel (B100 with 5% ethanol) in comparison to normal diesel fuel. The hypothesis is based on soybean being a biodiesel that can perform reasonably close to normal diesel engine with low emissions. Key performance variables such as indicated power, brake horse power, frictional power, thermal efficiencies, mechanical efficiency and specific fuel consumption were obtained during the experimental analysis as depicted in the research methodology. Emissions of CO, HC, CO2, O2, and NOx for the diesel fuel and for various biodiesel blends (B25, B50, B75) were also studied. Findings indicated that soybean biodiesel had comparative fuel economy and power generation as diesel, and CO emission was reduced by 40, while NOx emissions increased by 48 percent at full load condition. This studies clearly show that it is easy to use soybean oil based biodiesel as a renewable eco-friendly alternative biodiesel for compression ignition engines with much more improvement opportunities in terms of emissions performance. The originality of this work resides in the broader scope to evaluate the performance, emissions and trade-offs of soybean biodiesel blends and prospects that the literature on the sustainability of biodiesel is expanding by bringing in such new perspectives on it. Through the integration of experimental results, relevant performance as well as environmental assessments, this study extends previous endeavors and provides concrete recommendations for researchers, industry players and policy-makers willing to contribute to the advancement of alternative fuels. © Yıldız Technical University. This is an open access article under the CC BY-NC license (http://creativecommons.org/licenses/by-nc/4.0/).

Author keywords- Compression Ignition Engine; Engine Efficiency; Performance Profile; Soybean Biodiesel

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	88th	6.6	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

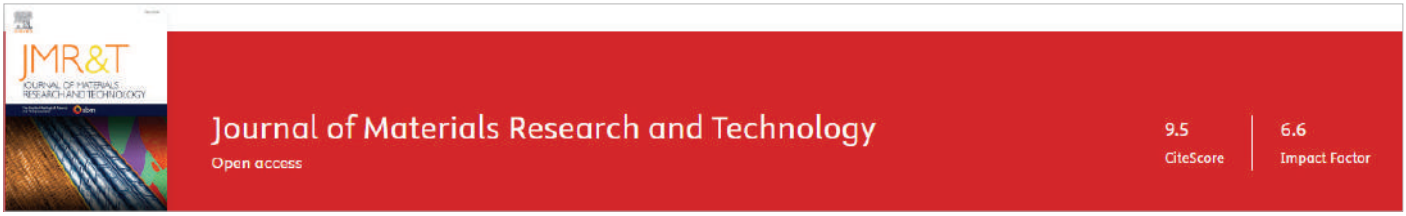
A COMPREHENSIVE REVIEW OF TWIN-WIRE DIRECT ENERGY DEPOSITION FOR FUNCTIONALLY GRADED MATERIALS: MICROSTRUCTURES, PROPERTIES AND DEFECTS

Nm, A.; **Venkatesh, C.**; Saravanakumar, A.; **Shahapurkar, K.**; Petrů, J.; Bashir, M.N.; Elahi, M.

Journal of Materials Research and Technology

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Abstract

Modern industrial manufacturing sectors are experiencing a great challenge in consistent product development, which requires high-performance material manufacturing with minimal lead time. The conventional monolithic materials are slowly becoming obsolete since the performance of the in-situ alloy, composite, and high-entropy alloys is phenomenal. Besides, the metal additive manufacturing (AM) is a versatile one, which minimises the lead time with near-net-shape manufacturing. However, the absence of material flexibility restricts this technique to limited applications. The advancement in Wire Direct Energy Deposition (WDED) by melting and depositing the two wires simultaneously, either called Twin-Wire Direct Energy Deposition (T-WDED) or Twin-Wire Arc Additive Manufacturing (T-WAAM), upholds the higher deposition rate and in-situ alloying to tailor the component. This study overviews the novel implementation of T-WDED in the development of various in-situ alloys, their microstructure induced, properties enhanced, and the probable defects encountered. Apart from this, the study overviews the evolution of functionally graded materials (FGM) and tailor-made components by mitigating the wire feed rate. Further exploration and scientific discussion on the performance enhancement of the T-WDED materials in connection with the microstructure and defects are of prominent interest to the product development industries and researchers. Hence, the study proves its significance in rapid manufacturing with customised materials.
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Author keywords- Defects; Dual-wire direct energy deposition; Functionally graded; Hardness; Microstructure; Tensile strength

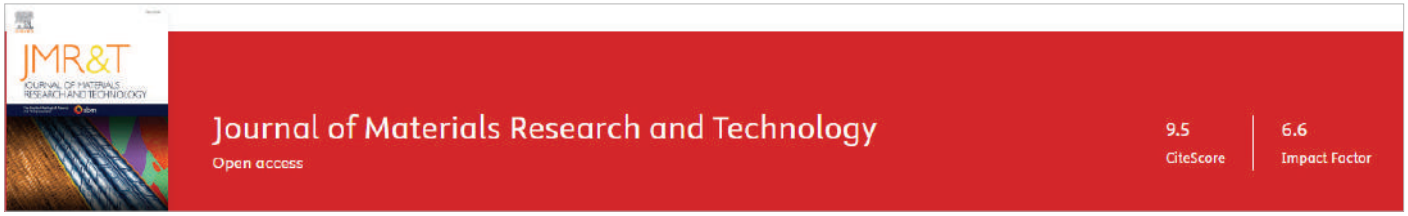
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**88th**	**6.6**	07 AFFORDABLE AND CLEAN ENERGY

EXPERIMENTAL INVESTIGATION OF 3D PRINTED BIO-RESIN FUNCTIONALIZED HEMP-PLA BIOCOMPOSITES FOR MECHANICAL, TRIBOLOGICAL AND THERMAL BEHAVIOUR

Balaji, D.; Arulmurugan, B.; Rajakannu, A.; **Rajeshkumar, L.**

Journal of Materials Research and Technology

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Abstract

Bio-composites are gaining a lot of attention lately because of its eco-friendly nature. To improve the strength of the biocomposites, many pretreatments are carried out. In this work, a novel natural binder (mesquite tree resin and drumstick tree resin) coating over the hemp fiber was made and converted it into a particulate to mix with the polylactic acid (PLA). Mechanical, thermal, with tribological characteristics of a bio-composite material surface-capped with mesquite tree resin comprising 92.5 % PLA with 7.5 % coated hemp fiber were examined in this study. With a tensile strength of 17.56 MPa and a mean compressive strength of 176.69 MPa, the composite proved to be capable of bearing enough load for moderate structural uses. But the average impact strength was as low as 3.43 J/cm2, which portrayed the ineffective energy absorption of the composites. The shear strength varied widely, with an average of 50 MPa while the Shore D hardness values averaged 73.87. The tribological behaviour showed a height loss varying from 59 to 252 μm while frictional forces varied between 2.1 and 14.5 N. The thermal stability was evaluated by TGA/DSC analysis where the degradation temperature was 360 °C. Despite relatively good fiber-matrix adhesion, scanning electron microscopy confirmed the existence of localized micro-defects. Despite the composite's potential in eco-friendly applications that call for moderate strength along with thermal stability, the findings show that it might not serve for structurally demanding or high-impact applications without additional processing or material improvements. These biocomposites find their applications in under-hood covers in automobiles, sliders, reusable packaging containers, and support structures in construction. © 2025 The Authors.

Author keywords- Additive manufacturing; Characterization; Mechanical properties; PLA hemp fiber composite; Tribological properties

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	88th	6.6	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

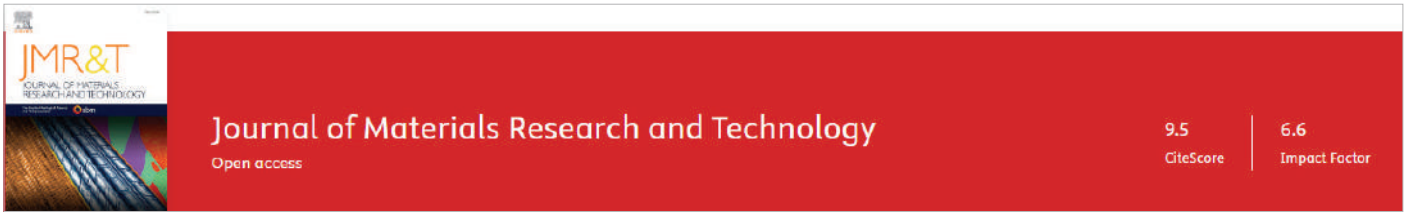
THE IMPACT OF EQUIATOMIC HIGH-ENTROPY ALLOY PARTICLES ON THE MICROSTRUCTURE AND MECHANICAL PROPERTIES OF MAGNESIUM COMPOSITE

Venkatesh, C.; Saravanakumar, A.; **Shahapurkar, K.**; Manivannan, C.; Bashir, M.N.; Ali, M.M.; Soudagar, M.E.M.; *Arunachalam, K.P.; Tirth, V.; Algahtani, A.; Boochani, A.; Vidhya, H.M.*

Journal of Materials Research and Technology

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Abstract

The present research focuses on the development and performance evaluation of magnesium composite reinforced with TiCrZrFeNi high-entropy alloy (HEA) particles. The significance of the attempt is to elevate the contribution of magnesium in the automobile and aerospace industries by overcoming the inherent difficulties of the modern magnesium composite. Tailoring the properties of the HEA-Mg composite was done by the appropriate selection of the particles. The squeeze-assisted stir casting processing route was followed to fabricate the HEA-Mg composite. The microstructure investigation proclaims the existence of the secondary intermetallic phases Mg2Ni and Mg2Zr, along with the fine-grain dendritic structure. The tensile, hardness and impact test results reveal a 48.43 %, 39.61 %, and 40.4 % improvement in tensile strength, hardness and impact resistance of HEA-Mg composite than the pristine magnesium. The exclusive double shear test manifests a substantial increment of 57.19 % of shear strength, higher than the pristine magnesium. The post-fracture analysis conducted after the tensile and shear fracture acknowledges the evidence of plastic deformation before failure, which warrants the load-sustaining ability with improved ductility at both tensile and shear loads. © 2025 The Authors.

Author keywords- Equiatomic; Hardness; High entropy alloy particles; Impact resilience; Shear strength; Tensile strength

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	92nd	2.3	04 QUALITY EDUCATION

APPLICATIONS OF BERNOULLI POLYNOMIALS AND Q2-SRIVASTAVA–ATTIYA OPERATOR IN THE STUDY OF BI-UNIVALENT FUNCTION CLASSES

Frasin, B.A.; Swamy, S.R.; Aldawish, I.; **Mamatha**, P.K.

Journal of Mathematics

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Journal of Mathematics

Abstract

The central focus of this study is the development and investigation of a generalized subclass of bi-univalent functions, defined using the (Formula presented.) -Srivastava–Attiya operator in conjunction with Bernoulli polynomials. We derive initial coefficient estimates for functions in the newly proposed class and also provide bounds for the Fekete–Szegö functional. In addition to presenting several new findings, we also explore meaningful connections with previously established results in the theory of bi-univalent and subordinate functions, thereby extending and unifying the existing literature in a novel direction.

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Author keywords- Bernoulli polynomials; bi-univalent functions; holomorphic functions; q2-Srivastava–Attiya operator; subordination

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	64th	4.36	15 LIFE ON LAND

ENHANCING WILDLIFE CONSERVATION THROUGH SENSOR AND DEEP LEARNING INTEGRATION FOR ACCURATE ANIMAL BEHAVIOR TRACKING

Chitra Kiran, N.; Boregowda, V.K.S.; Vaishnav, J.; Singh, S.; Singh, M.; Seth, K.

Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications

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Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications

Abstract

Protection of wildlife is one of the important strategies for maintaining the ecological balance of the Earth and for sustainable development of our biodiversity. Understanding the effects of such activities on animal behavior can be crucial to managing them to protect or rehabilitate local wildlife — but to do that, you need to know where, when, how, and how much animals are active. Conventional tracking is based on visual observation of animal movements, but it is a manual operation with limitations in observing certain motion patterns and behaviors. To address these problems, sensors integrated with deep learning have emerged as the 'save grace' for the wildlife conservation sector. Lastly, it is possible to attach sensors (such as GPS and accelerometers) to wildlife to capture their behaviors and demeanor in situ. The produced data is large and complex and may be tedious to analyze by hand. Such sensors can provide incredibly detailed and accurate data on animal behavior using deep learning algorithms, a type of computer program that learns and makes predictions from large datasets. Sensors and deep learning combined enable models to observe and forecast animal behavior with ease. We can use them to sense and classify various behaviors (such as feeding, mating, and migration) precisely in real time. They can discriminate different movement paths by their indication of changes in habitat quality or anthropogenic disturbance. Thanks to this, the data can help 'conservationists make the right decisions and strategies for saving animal populations.
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Author keywords- Computer Programs; Deep Learning; Ecological Balance; Monitoring Animal; Sensor Technology

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**99th**	**6.17**	11 SUSTAINABLE CITIES AND COMMUNITIES

VERIFIABLE PRIVATE DATA ACCESS CONTROL IN CONSUMER ELECTRONICS FOR SMART CITIES

Sheng, X.; Wang, C.; Shen, J.; Hemalatha, H.; **Radhakrishnan, N.**

IEEE Consumer Electronics Magazine

Dr. R Niranchana
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Alliance School of Advanced Computing

IEEE Consumer Electronics Magazine

Abstract

With the development of mobile and smart sensing technologies, the use of consumer electronics in smart cities has garnered widespread attention from academic researchers and industry professionals due to data security issues. However, specific issues, including privacy concerns regarding unauthorized access and data sharing, require resolution. In this article, a blockchain-based verifiable private data access control scheme is proposed to protect user-shared information for data sharing in consumer electronic systems for smart cities. The scheme develops a hybrid on-chain access control system using attribute-based encryption, establishes an authorization model for access control, and prevents sensitive information leakage during data sharing. The simulation results demonstrate that the proposed scheme effectively achieves access control and ensures the secure sharing of sensitive data. © 2012 IEEE.

Indexed keywords:

Engineering controlled terms

Data centers; Information leakage

Engineering uncontrolled terms

Block-chain; Data access control; Data Sharing; Industry professionals; Mobile sensing; Privacy concerns; Private data; Security issues; Smart-sensing technology; Unauthorized access

Engineering main heading

Data assimilation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	80th	4.38	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

X-RAY DIFFRACTION STUDIES OF THE MICROSTRUCTURE OF FIBERS AND PROPERTIES OF HOT STRETCH MERCERIZED AND STRAIN HARDENED RING AND COMPACT COTTON YARNS

Sukumar, N.; Poongodi, G.R.; Kalaiarasi, H.; **Senthamaraikannan, P.**; Kumar, R.

Journal of Natural Fibers

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Abstract

The mercerization of cotton fibers, a widely used natural fiber in textiles, is an important method for enhancing their structural and dyeing properties. The present work studies the characteristics of conventional and compact yarns subjected to hot stretch mercerization. Traditional and compact yarns of 30 Ne were subjected to hot mercerization at three levels of stretch, temperature, and concentration of sodium hydroxide. A three-variable factorial experimental design proposed by Box and Behnken has been used to study the interaction effects of the variables on the characteristics of the ring and compact yarns. The influences of these variables on the structural, physical, and dye uptake were studied, the response surface equations for all these properties have been derived at each level, and the process parameters were also optimized for various aspects of yarn characteristics during process. From the study, it is found that the strain-hardened yarns have improved strength, structure, better inter-fiber cohesion, and excellent dye uptake properties. Compact yarns have gained more power than conventional ring yarns by this hot stretch mercerization treatment. Increased crystallite size is also observed in X-ray diffraction studies that indicates improved crystallinity. © 2025 The Author(s). Published with license by Taylor & Francis Group, LLC.

Author keywords- box and Behnken design; concentration of sodium hydroxide; conventional and compact yarns; dye uptake; Hot stretch mercerization; Inter-fiber cohesion; X-ray diffraction

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**99th**	**6.17**	03 GOOD HEALTH AND WELL-BEING

AI-DRIVEN EDGE CLOUD COLLABORATION FRAMEWORK WITH AUTONOMOUS RESOURCE ALLOCATION FOR STANDARDIZED 6G HEALTHCARE NETWORKS

Balakrishnan, S.; **Senbagavalli, M.**; Manikandan, M.; Sumathi, D.; Ravi, N.; Shabaz, M.

IEEE Communications Standards Magazine

Dr. M Senbagavalli
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Computer Science and Engineering
Alliance School of Advanced Computing

IEEE Consumer Electronics Magazine

Abstract

6G networks are booming, and they will transform healthcare; ultra-low latency, massive connections, and intelligent services will finally reach critical applications. Real-time performance, standardization, and scalability of healthcare networks are impacted by having various categories of devices, changing workloads, and changing resource requirements. This paper suggests a new AI-based method for standardized 6G healthcare systems, referred to as the Cognitive Autonomous Resource and Edge Collaboration Framework (CARE-6G). The use of cognitive AI agents together with edge-cloud cooperation in CARE-6G enables automated prediction, allocation, and optimization of computing, storage, and networking resources. The framework is constructed hierarchically such that edge nodes perform low-latency processing, while cloud infrastructure performs big-scale analytics. AI-based predictive orchestration ensures that the needs for workloads and healthcare services can shift. The experiments indicated that CARE-6G is 35% quicker, 30% more resource-efficient, and 27% more reliable than the existing practices. When compared to the best methods available, CARE-6G was 39% faster, 30% better at using resources, 27% more reliable, 25% less power-hungry, and 15% better at getting things done. © 2017 IEEE.

Indexed keywords:

Engineering controlled terms

Cloud analytics; Edge computing; Health care

Engineering uncontrolled terms

Changing workload; Collaboration framework; Critical applications; Edge clouds; Healthcare systems; Intelligent Services; Low latency; Real time performance; Resource requirements; Resources allocation

Engineering main heading

Cognitive systems

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	35th	1.6	16 PEACE, JUSTICE AND STRONG INSTITUTIONS

SPECTROSCOPIC ANALYSIS OF DYES-SILICA NANOCOMPOSITE FOR WHITE LIGHT APPLICATIONS

Rashmi, n.; Dikshit, A.K.; Dwivedi, Y.

Spectroscopy Letters

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Abstract

This article investigates the white light emission characteristics of a composite material made from Coumarin 102 and Rhodamine 6 G, encapsulated in a porous nano-silica matrix enhanced by a hydrophobic coating and polymer layer. The composite exhibits complementary blue and yellow emissions, resulting in bright white light production. Electron microscopy indicates 70 nm particle formation with a surface area of 112 m2/g. Upon excitation with a 405 nm LED, chromaticity coordinates were measured at (0.35, 0.33). Time-resolved emission spectroscopy revealed radiative decay times of 4.3 ns for C102 and 4.8 ns for Rh6G, dependent on concentration. Thermal stability was assessed from 273 K to 325 K. The synthesized materials were also tested as coatings on blue LEDs for white light emission and latent fingerprint detection. Detailed photophysics and analyses are discussed in the article.
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Author keywords- composite; Coumarin 102; Luminescence; nanosilica; optical material; Rhodamine 6G

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**78th**	**4.99**	04 QUALITY EDUCATION

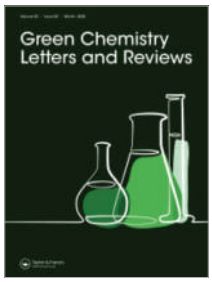
EXPLORING AGRO WASTE AS A SUSTAINABLE REINFORCEMENT IN BIOPOLYMER COMPOSITES–A REVIEW

Durai, P.N.; Prasath, K.; Divakaran, D.; Kumar, R.; **Senthamaraikannan, P.; Suyambulingam, I.**; Viswalingam, K.

Green Chemistry Letters and Reviews

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Abstract

Composite materials have become indispensable across a wide array of sectors, ranging from aerospace and automotive to energy, marine engineering, infrastructure, and architecture, thanks to their exceptional strength-to-weight ratios. In the automotive and marine industry, high-performance composites are replacing conventional materials with enhanced durability and corrosion resistance. As demand for lighter, stronger, and more durable materials grows, composites continue to outpace traditional metals and ceramics. Despite this rapid expansion, the global supply of natural fibers cannot keep pace with burgeoning demand, which is increasing at an estimated rate of 60% per year. To harness their full potential, fibers must undergo a comprehensive process. Physico-chemical, thermal, mechanical, and morphological characterization; surface treatments may be necessary to remove impurities or enhance interfacial adhesion when fibers exhibit insufficient roughness. To address both material scarcity and environmental concerns, this study identifies and characterizes a novel lignocellulosic fiber source derived from agricultural waste. By transforming residual biomass into high-value reinforcement materials, we not only expand the palette of natural fibers available for composite manufacturing but also contribute to waste reduction and promote a circular 'waste-to-materials' economy. This approach promises significant environmental benefits, paving the way for greener using an agricultural waste for sustainable applications.
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Author keywords- agricultural wastes; characterization; composite fabrication and characterization; modifications; Natural fibers

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	80th	3.66	04 QUALITY EDUCATION

ADAPTIVE FRACTIONAL DIFFERENCING: THEORY AND METHODOLOGY

Maitra, S.

IEEE Access

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Abstract

This study develops a theoretical framework for forecasting financial time series exhibiting both non-stationarity and long-range dependence (LRD). While existing fractional differencing (FD) methods aim to preserve long-memory structure, they are hindered by estimation bias, ad-hoc truncation of the infinite FD expansion, and limited integration with contemporary machine learning (ML) workflows. To address these limitations, we introduce an Adaptive Fractional Differencing (AFD) methodology featuring three core innovations: 1) a hybrid two-stage estimation scheme that combines wavelet-based Hurst exponent analysis with ridge-regularized optimization to obtain stable, low-bias estimates of the FD parameter; 2) a data-driven truncation mechanism that replaces heuristic cutoffs with cross-validated selection rules, thereby preserving LRD while controlling truncation error; and 3) an architecture that enables joint tuning of differencing parameters and predictive models within ML pipelines, facilitating fully end-to-end optimization in high-dimensional environments. Although empirical evaluation is reserved for future research, the theoretical foundations established here provide a scalable and principled framework for modeling complex financial time series. By integrating classical time-series theory with modern ML practice, AFD lays the groundwork for more accurate, robust, and operationally coherent forecasting systems in data-rich financial settings.
© 2013 IEEE.

Author keywords- Fractional difference; long range dependence; mathematical model; time series

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**80th**	**6.10**	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

OPTIMIZATION OF TENSILE PROPERTIES OF MELT-PROCESSED POLYLACTIC ACID/CISSUS QUADRANGULARIS FIBER COMPOSITES

Senthamaraikannan, P.; Vignesh, P.; Avudaiappan, S.; Saravanan, A.; Divakaran, D.; Rameshkannan, G.

Polymer Composites

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Abstract

The limited load-bearing capability of polylactic acid (PLA) restricts its use in biomedical applications such as orthopedic scaffolds, where mechanical robustness is essential. Reinforcing PLA with biofunctional natural fibers offers a sustainable route to overcome these limitations. In this study, Cissus quadrangularis (CQ), a fiber with high cellulose content and osteogenic potential, was employed as reinforcement for PLA to develop biodegradable composites. The composites were fabricated through melt extrusion followed by injection molding, and the effect of fiber content, extrusion temperature, and molding pressure on ultimate tensile strength (UTS) was systematically evaluated using a Taguchi L9 orthogonal design. Regression modeling revealed molding pressure as the most influential factor, and a Genetic Algorithm (GA) was integrated with the regression model to achieve global optimization of processing conditions. The optimized combination of 14.98 wt.% fiber, 160.9°C extrusion temperature, and 29.76 MPa molding pressure yielded a UTS of 43.05 MPa, closely matching experimental validation with < 1% error. Fractographic analysis confirmed effective fiber–matrix interaction under optimized conditions. This integrated Taguchi–GA framework highlights the significance of combining statistical design with metaheuristic optimization to enhance the performance of natural fiber composites and provides a pathway for designing mechanically robust PLA-based biomaterials.
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Author keywords- Cissus quadrangularis; genetic algorithm optimization; injection molding; orthopedic fixture; PLA; sustainable composites

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	77th	1.24	16 PEACE, JUSTICE AND STRONG INSTITUTIONS

CRICKET, CASH, AND CRIME: THE IPL BETTING CRISIS AND THE NEED FOR A ROBUST SPORTS INTEGRITY FRAMEWORK

Mansoor, S.I.U.; **Wani, S.A.**

International Sports Law Journal

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Abstract

This paper critically examines the requirement for a holistic framework for sports integrity in India with special reference to the legal/legal challenges of illegal betting and match fixing in high stakes events like the Indian Premier League. It examines the shortcomings in the existing legislative instruments like the Public Gambling Act, 1867 and the Information Technology Act, 2000 in possessing the potential to proscribe different forms of corruption that appear in the field of sports. Based on the approach adopted by courts of law in other jurisdictions like the United Kingdom and Australia, the study argues that there needs to be a focus on a central governing authority and strong compliance mechanisms as well as multithreaded collaboration. The research urges for codification of anti-corruption, harmonized regulation of the state, technological surveillance of betting irregularities and player incentivisation to engender the rule of law in the sporting domain. This study further contributes to the discourse on reforming India's legal architecture to enhance sports governance against the transnational and domestic illicit influences with the help of jurisprudential insights along with policy prescription.
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Author keywords- Betting; Gambling; Governance; Integrity; Matchfixing; Regulation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q1	**83rd**	**4.1**	16 PEACE, JUSTICE AND STRONG INSTITUTIONS

HARM PRINCIPLE IN GREEN CRIMINOLOGY: ENVIRONMENTAL HARM AND HUMAN RISK MATRIX

Shetty, A.J.; **Saxena, M.**

Frontiers in Climate

Dr. Mukul Saxena

Professor & Director - Center for PG and Legal Studies & Director
Center of Excellence in Public Policy, Sustainability and ESG Research
& Program Director - Ph.D
Alliance School of Law



Abstract

This paper proposes to bridge the gap between traditional criminal law and environmental jurisprudence by redefining the harm principle proposed by Mill through the Environmental Harm and Human Risk Matrix. The Matrix classifies environmental harm and human risk as low, medium, and high impact, creating nine intersectional approaches to assess environmental harm based on its severity and irreversibility, the risk to human and non-human wellbeing, its intergenerational impact, and the ability to mitigate the impact. Through the Matrix, the paper identifies activities that should be assessed as violations with no criminal liability, harms that should have criminal liability and harms that are subject to interpretation by the executive and the judiciary thereby helping to understand environmental harm within the socioeconomic realities of the situation. The approach not only challenges anthropocentric legal paradigms but also the interpretation of the harm principle while treating the environment as a resource. The challenge to the anthropocentric legal paradigms integrates the socioeconomic realities, environmental harm to human and non-human beings and offers guidelines to differentiate violations requiring restorative approaches from crimes necessitating punitive action. The paper further argues that if environmental harm is purely perceived from the lens of the harm principle apportioning blameworthiness based on liability, culpability and accountability, then the entire human population commits environmental harm since the environment is a resource which is used/misused by all. The paper integrates both approaches while contextualizing the use/misuse of the environment as a resource and examines liability and culpability from the profit motive, wherein environmental harm is intergenerational, pervasive, long-term, and irreversible. However, social manifestations (order, disorder and strain in the society), behavior, culture and socioeconomic vulnerabilities on the utilization of the environment as a resource are imperative to understand environmental harm before affixing accountability. The paper develops a theoretical framework examining the relevant legal and criminological theories (deterrence, rational choice, etc.) and proposes a differential approach to assess environmental harm committed for profits and those committed by the marginalized and least advantaged members of society who invariably utilize environmental resources for survival and/or out of necessity. The paper further argues that sweeping punitive actions risk creating a 'paradox of poverty'. The Matrix contributes to the current scholarship from the legal and sociological standpoint, arguing for a just, fair and equitable utilization of resources while ensuring an inclusive and sustainable policy to combat environmental violations and thus harm. The work contributes to global green criminology discourse urging transformative legal reforms to mitigate ecological violence and advance planetary justice.

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Author keywords- criminal liability; environmental harm; environmental law; green criminology; human risk matrix; socioeconomic disparities

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	88th	2.9	07 AFFORDABLE AND CLEAN ENERGY

ENHANCED DURABILITY AND PERFORMANCE OF FORM-STABLE POLYAMIDE PCMS WITH NITRILE BUTADIENE RUBBER COATINGS

Al-Mahmodi, A.F.; Saii, P.; Munusamy, Y.; Atta, M.R.; **Suyambulingam, I.**

Arabian Journal for Science and Engineering

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Abstract

Polyamide (PA) is a promising phase change material (PCM) owing to its excellent thermal storage capacity; however, leakage issues limit its applicability in high-stability systems. This study introduces the use of nitrile butadiene rubber (NBR) latex coatings to enhance the structural integrity and performance of PA-PCMs. The influence of sulphur loading, coating layers, and curing temperature on the mechanical, thermal, and morphological properties was systematically evaluated. Morphological analysis, thermal cycling tests, and thermal conductivity measurements revealed that higher sulphur content and elevated curing temperatures increase cross-link density, resulting in smoother surface morphologies and improved coating cohesion. The optimized configuration: 2 phr sulphur, two coating layers, and curing at 150°, achieved outstanding performance, including a thermal conductivity of 0.217 W/m·K, gel fraction of 87.73%, and tensile strength of 4.42 MPa, with minimal weight loss (~ 2.4%) after 100 thermal cycles. However, this optimum also comes with a trade-off, due to increased cross-link density at higher sulphur and temperature levels, which reduces material flexibility, as evidenced by decreased elongation at break. These findings confirm that the NBR latex coating forms a robust, defect-free protective layer, significantly enhancing both thermal reliability and mechanical durability. This scalable method demonstrates a practical solution for improving the stability of PA-PCMs. It is particularly suitable for thermal management in electronics, energy-efficient building materials, and solar thermal storage systems, where performance and structural integrity are crucial.
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Author keywords- Coatings; Energy storage; NBR; Polyamide phase change materials; Thermal stability

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	30th	1.09	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

DUAL-MODE MORPHING PROPELLER SYSTEM FOR ENHANCED UAV PERFORMANCE AND ENERGY HARVESTING

Munusamy, R.; Venkatesh, H.; Kumar, P.; Prakash, V.; Kumar, K.; D'Souza, P.

Journal of Aeronautics, Astronautics and Aviation

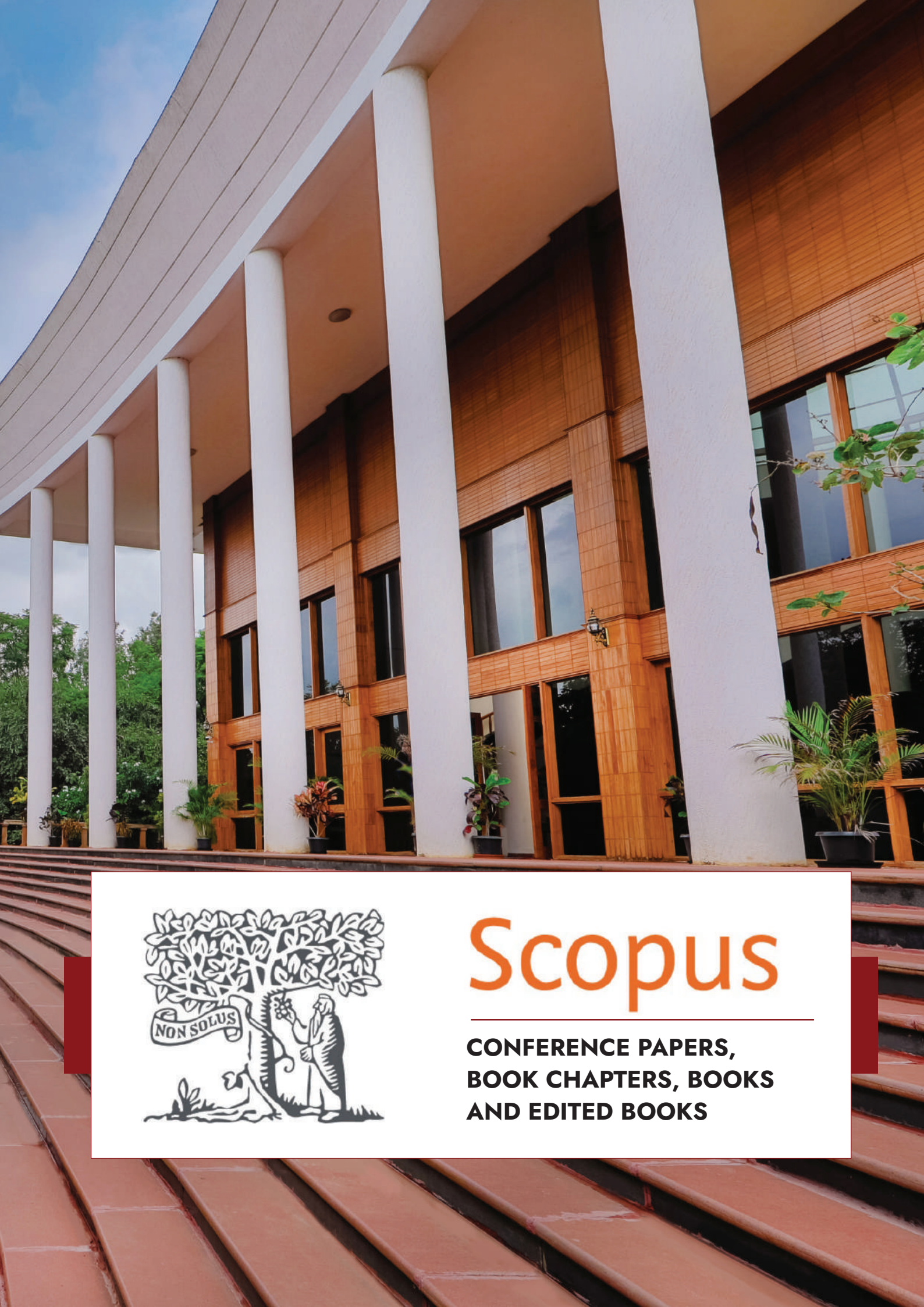
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Abstract

Unmanned Aerial Vehicles (UAVs) play an essential role in applications ranging from surveillance to logistics; however, their operational endurance remains constrained by limited onboard energy storage. To address this challenge, this study proposes a dual-mode morphing propeller system that can switch between propeller mode for thrust generation and turbine mode for in-flight energy harvesting. Three airfoils—NACA 4412, Eppler 193, and S1210—were evaluated through Computational Fluid Dynamics (CFD) simulations to identify optimal aerodynamic performance in each mode, while Finite Element Analysis (FEA) validated structural integrity under dynamic loads. The results demonstrate that the Eppler 193 airfoil achieves efficient thrust production, generating 22.89 N of thrust at 10, 000 RPM, whereas the S1210 airfoil is more effective in turbine mode, enabling an electrical output of 565.58 W at 6000 RPM. These findings confirm the feasibility of integrating propulsion and energy recovery into a single adaptive system. The proposed design has the potential to extend UAV flight endurance, expand operational range, and enhance sustainability. Beyond aerospace applications, this morphing technology also offers opportunities in renewable energy and autonomous systems. Future work will focus on refining the morphing mechanism and scaling the concept for larger UAV platforms.
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Author keywords- Dual-Mode Propeller; Energy Harvesting Turbine; Morphing Blade; Sustainable UAV Design; UAV Propulsion



Scopus

CONFERENCE PAPERS, BOOK CHAPTERS, BOOKS AND EDITED BOOKS

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	07 AFFORDABLE AND CLEAN ENERGY

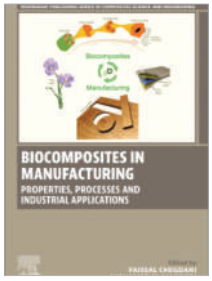
RECENT ADVANCES IN THE PROCESSING AND TREATMENT OF PLANT FIBERS AS REINFORCEMENT FOR BIOCOMPOSITES

A.G.; Parameswaranpillai, J.

Biocomposites in Manufacturing: Properties, Processes and Industrial Applications Book Chapter 2025

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Dr. Jyotishkumar P
Professor & Director - Centre of Excellence
(AU - Sophisticated Test and Instrumentation Center)
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Alliance School of Sciences



Abstract

Plant fiber–reinforced biocomposites have emerged as sustainable alternatives to synthetic fiber reinforced composites due to their biodegradability, nontoxic nature, less environmental impact, and comparable technical performances. This chapter presents an overview of recent advances in the field of processing and treatment of plant fibers to be used as reinforcement in biocomposites. This chapter explores various extraction methods from various plant sources and the characteristics of the plant fibers obtained from these extraction methods. This chapter also discusses the role of both physical and chemical surface modification of plant fibers on the interfacial adhesion between fibers and polymer matrices and their impact on the properties of the composites.
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Author keywords- Biocomposites; Extraction; Natural resources; Plant fibers; Surface treatment

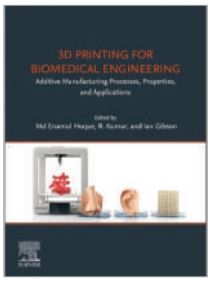
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

MECHANICAL PROPERTIES OF 3D-PRINTED BIOMEDICAL PROTOTYPES

Palaniappan, S.K.; S.; Paulraj, J.; Joseph Chandran, A.; **Rajeshkumar L**; Mavinkere Rangappa, S.; Siengchin, S.

3D Printing for Biomedical Engineering: Additive Manufacturing Processes, Properties, and Applications Book Chapter 2025

Dr. Rajeshkumar L
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Abstract

Biomaterials refer to a distinctive substance that possesses the capability to construct biomedical components within the human body for the purpose of treating, repairing, or replacing any type of tissue. Biomaterials are defined as materials that are designed to interact with living organisms for a specific purpose, without eliciting any harmful or toxic reactions (Sandeep, 2021). Biomaterials have the potential to serve as substitutes or replicas of organs or tissues in the realm of biomedical engineering, while also preserving their ability to interact with living tissue. A significant limitation encountered in biomaterial research is the deficiency in mechanical robustness (Billiet et al., 2012). According to the literature, it has been proposed that the limitation may be mitigated through the utilization of suitable materials and manufacturing methodologies for processing scaffolds, thereby augmenting the mechanical robustness of the produced components.
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Author keywords- 3D-printed biomedical prototypes; Additive manufacturing; Biomaterials; Bioprinting; Organs; Tissue engineering

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

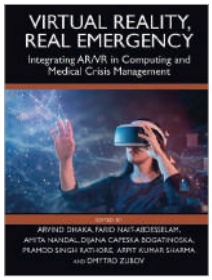
THE ADOPTION OF AR AND VR EMERGENCY ROOM PROCEDURES

Swetha, N.; Madhavi, K.; Kalebar, R.U.; Nallasivam, A.; Selvaraj, C.

Virtual Reality, Real Emergency: Integrating AR/VR in Computing and Medical Crisis Management Book Chapter 2025

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Indexed keywords

Engineering main heading- Emergency rooms

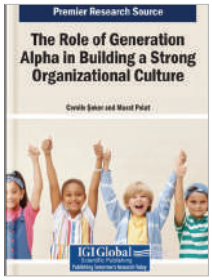
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	08 DECENT WORK AND ECONOMIC GROWTH

SOCIAL INTELLIGENCE AND AI IN GEN Z ENTREPRENEURSHIP: A NEW ERA HAS BEGUN

Sharma, A.; **Kumar, S.**; Sharma, R.; Singh, A.

The Role of Generation Alpha in Building a Strong Organizational Culture Book Chapter 2025

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Abstract

The emergence of Generation Z as a dominant entrepreneurial force marks a distinct shift in how technology and human capabilities interact within the startup ecosystem. This review investigates the interplay between social intelligence and artificial intelligence (AI) in Gen Z-led ventures, emphasizing how these young founders leverage soft skills to extract greater value from AI tools. Synthesizing global peer-reviewed literature, the paper outlines how social intelligence encompassing empathy, networking, and cultural awarenesss complements AI-driven efficiency in areas such as opportunity identification, venture performance, customer engagement, and stakeholder alignment. Empirical evidence from diverse cultural settings illustrates that, while technologically adept, Gen Z entrepreneurs rely on their interpersonal skills to build trust, interpret AI-generated insights in context, and effectively lead diverse teams. The review further explores case studies showcasing how AI and social intelligence jointly enhance startups' innovation, communication, and operational resilience.
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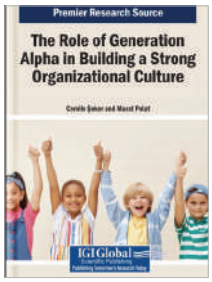
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	04 QUALITY EDUCATION

AGILE METHODOLOGIES AS A CULTURAL FIT FOR GENERATION ALPHA

Sahu, S.K.; **Ranganathan, S.**

The Role of Generation Alpha in Building a Strong Organizational Culture Book Chapter 2025

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Alliance School of Business



Abstract

As Generation Alpha, the first to have grown up wholly in the digital world, enters the job market, organizations need to adjust their operating models and cultures to meet this generation's expectations of technology integration, inclusiveness, ethical purpose, and collaborative work. Hierarchical and command-and-control leadership styles are less and less compatible with Gen Alpha's values. Agile methodology, with its focus on adaptive planning, iterative improvement, self-organizing teams, and speedy feedback, provides a cultural approach well-positioned to engage and empower this new generation. This chapter discusses the cultural fit between Agile and Generation Alpha and contends that Agile's fundamental values of transparency, collaboration, empowerment, and iterative learning strongly resonate with Gen Alpha's values for dynamic, connected, and meaningful workspaces. It presents a real-world implementation framework across five phases: cultural diagnostics, codesign, piloting, scaling, and sustainability. Every phase includes detailed steps, resource guidelines, and strategies for integrating Agile as both a workflow and a cultural foundation for future-proof organizations. Empirical evidence is offered in two case studies: Case Study I: Agile in a Youth Innovation Lab explores how a Northern European innovation initiative employs Agile and design thinking to involve teenagers in resolving everyday problems; Case Study 2: Agile in a Youth-Founded Startup offers a hypothetical illustrative example of Gen Alpha entrepreneurs implementing Agile tools to strengthen innovation, autonomy, and accountability. As a whole, these examples show how Agile can engage participation, imagination, and passion from young contributors. In framing Agile as both a method and a culture fit for Generation Alpha, this chapter provides organizations with a blueprint to develop dynamic, flexible, and resilient workplaces prepared for the upcoming generational transition.
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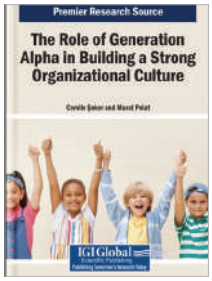
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	13 CLIMATE ACTION

WHY THE WORLD FAILS TO ACT? THE SILENT COLLAPSE OF INTERNATIONAL CLIMATE GOVERNANCE

Misra, A.; Keerthiraj, n.

Cross-Border Cooperation in the Age of Climate Change Book Chapter 2025

Dr. Apoorva Misra
Assistant Professor
Alliance School of Law



Abstract

This chapter is not a critique of failures; it is a reflection on why those failures persist despite repeated attempts. International climate governance has not lacked diplomacy, nor has it suffered from ignorance of science or absence of public concern. What it lacks, we argue, is intelligibility across worlds. The frameworks imposed in the name of global cooperation presume a world populated by rational actors, seeking utility, governed by secular institutions, and pursuing infinite growth. But such assumptions do not travel well. They do not describe most human communities; they describe a particular cultural experience made universal. Drawing on comparative insights and case studies, we show how this epistemological imposition produces alienation, not alignment; mistrust, not participation. Compliance becomes performative. To move beyond this impasse, climate governance must be reimagined-not as a global consensus on Western terms, but as a dialogue between diverse lifeworlds. Without plural epistemologies, transformation remains a metaphor.
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Indexed keywords:
Engineering uncontrolled terms
Case-studies; Global cooperation; Human communities; Public concern
Engineering main heading
International cooperation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

SMART HEALTHCARE REVOLUTIONIZING WELLNESS THROUGH TECHNOLOGY

Rajkumar, N.; Viji, C.; Nachiappan, B.; Mohanraj, A.

Robotics and IoT Synergy in Next-Generation Healthcare Book Chapter 2025

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Dr. C.Viji
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Robotics and IoT Synergy in Next-Generation Healthcare

Abstract

Smart healthcare programs represent a technological evolution within the healthcare area, using superior computing and digital solutions to enhance the overall performance and exceptional scientific offerings. Those packages encompass various functionalities, which include remote patient tracking through associated devices, telehealth offerings for digital consultations, and health records control systems for streamlined facts handling with. Predictive analytics is employed to analyze notable datasets, helping predict ailment outbreaks, affected person conditions, and treatment responses. This allows proactive interventions and resource optimization. Furthermore, equipment that specializes in medicine adherence contributes to higher treatment effects, whilst fitness and well-being applications sell preventive care and not usual well-being. Wearable gadgets, including smartwatches and fitness trackers, play a pivotal role in monitoring bodily activities, sleep styles, and important symptoms, supplying real-time insights for customers.

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Indexed keywords:

Engineering controlled terms

Digital devices; Electronic health record; Health care; Medical computing; Medicine; Wearable computers

Engineering uncontrolled terms

Computing solutions; Digital solutions; Health records; Healthcare projects; Patient tracking; Performance; Records control system; Technological evolution; Telehealth; Well being

Engineering main heading

Predictive analytics

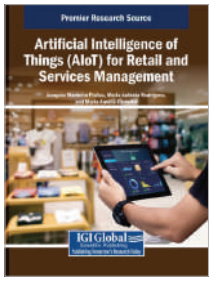
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	08 DECENT WORK AND ECONOMIC GROWTH

DIRECT TO CONSUMER BRANDS (D2C): BUSINESS MODEL INNOVATION USING ARTIFICIAL INTELLIGENCE

Gupta, R.; **Rupesh Kumar, M.R.**; Gopal, B.S.

Artificial Intelligence of Things (AIoT) for Retail and Services Management Book Chapter 2025

Dr. Rupesh Kumar M
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Marketing
Alliance Ascent College



Abstract

The convergence of evolving consumer profiles, digital access, and ease of online product discovery in the mid-2010s created a virtuous cycle. This gave rise to firstgeneration entrepreneurs who launched D2C brands with minimal capital, relying on consumer insights and identifying gaps in a competitive market. D2C websites acted as consumer labs, offering insights into consumer behavior. As these brands faced distribution bottlenecks, they began diversifying their channels. Savings from streamlined inventory and distribution were reinvested into customer acquisition via aggressive search engine and social media campaigns. D2C brands adopted various technologies-such as voice search, AI-driven conversations, augmented reality, recommender systems, image recognition, and blockchain-to enhance customer experiences. These technologies not only simplified website navigation but also boosted engagement and conversions. The future of D2C brands lies in vertical integration and the digital transformation of offline businesses.
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Indexed keywords:

Engineering controlled terms

Augmented reality; Consumer behavior; Recommender systems; Search engines; Websites

Engineering uncontrolled terms

Business model innovation; Competitive markets; Consumer insights; Customer acquisition; Digital access; Media campaigns; Online products; Social media; Various technologies; Voice searchesPredictive analytics

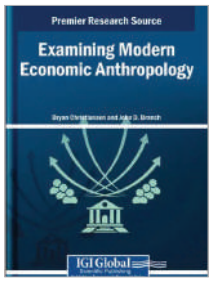
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	10 REDUCED INEQUALITIES

RETHINKING SCARCITY: POLITICAL IMAGINATION AND THE MYTH OF ECONOMIC MAN

Keerthiraj, N.; **Misra, A.**; Nizar, K.

Examining Modern Economic Anthropology Book Chapter 2025

Dr. Apoorva Misra
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Alliance School of Law



Abstract

This chapter interrogates the modern myth of scarcity-not as a universal economic truth, but as a theological residue of Western thought, repackaged as scientific reason. The figure of the "economic man, " descended from Protestant notions of sin, salvation, and moral failing, now masquerades as a neutral model of rationality. This fiction, universalized through colonial expansion, has shaped development discourse in societies like India, often by displacing indigenous modes of knowing. Rather than reforming this model, we argue for its provincialization. Drawing on Indian traditions of dharma, relationality, and experiential action-knowledge, the chapter invites a rethinking-not of how we fit into global economic theory, but of whether that theory ever understood us. It is not "scarcity" that defines the human condition, but the colonial will describe others as lacking.
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Indexed keywords:

Engineering uncontrolled terms

Economic theories; Global economics; Human conditions; Neutral modelling

Engineering main heading

Economics

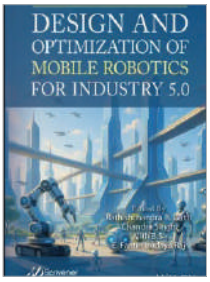
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ADVANCING DESIGN PRINCIPLES FOR INDUSTRY 5.0 WITH A FOCUS ON HUMAN-CENTERED INNOVATION

V.; Poornima, G.; Kottala, K.S.; Jagtap, M.M.; **Shekhar R**

Design and Optimization of Mobile Robotics for Industry 5.0 Book Chapter 2025

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Professor & HOD (Department of Information Technology & M.Tech Programs)
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Industry 5.0 brings a radical change in conventional industry practices, focusing on the effective interplay of innovative technologies that help improve manufacturing methodologies from human-centric approach. At the heart of this change is an idea known as Digital twins that simulate physical systems in real time for continuously monitoring, analyzing and optimizing it. We discuss the different use cases of digital twins in areas ranging from machining optimization, predictive maintenance to warehouse management and product development. It also tackles the huge hurdles digital twins can bring with them, from data management and interoperability to security issues and a lack of skilled workers. This chapter presents an extensive literature survey on digital twins as well as empirical case studies demonstrating how they can transform next-generation industrial systems and the challenges that need to be addressed. The results demonstrate that solving those difficulties is crucial to unlock digital twins full capacities and maximize their advantages related Industry 5.0.
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Author keywords: Advanced industrial systems; Data management; Digital twins; Industry 5.0; Interoperability; Manufacturing optimization; Predictive maintenance; Supply chain management

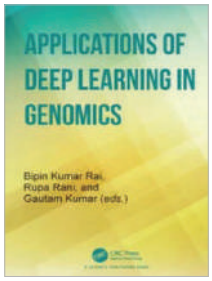
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

REVOLUTIONIZING DNA FRAGMENT ASSEMBLY: A DEEP LEARNING PERSPECTIVE

Kumar, K.; **Pradeep Ghantasala, G.S.P.**; Saini, D.K.J.; Rai, B.K.; Nixon, J.S.

Applications of Deep Learning in Genomics Book Chapter 2025

Dr. Ghantasala Gnana Sudha Pradeep
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

A fundamental problem in computational genomics is DNA fragment assembly, which includes assembling collectively the unique DNA collection from a wide variety of short, overlapping reads produced via sequencing technology. Managing large statistics quantities, sequencing errors, and repetitive genomic regions are a number of the problems that classical strategies for DNA meeting confront due to the increasing quantity of genomic statistics and enhancements in high-throughput sequencing. Deep learning is a game-converting approach that has simply surfaced to deal with those problems. With an emphasis on how deep learning models can assist with mistake correction, overlap identification, fragment merging, and post-meeting refining, this work investigates the usage of those models to decorate the DNA fragment assembling process. Convolutional neural networks (CNNs), recurrent neural networks (RNNs), transformers, and graph neural networks (GNNs) are some of the deep learning designs which have proven outstanding promise in coping with the complexity of genome construction. This article highlights destiny potentialities for studies and improvement inside the subject of DNA fragment assembling and demonstrates the efficacy of deep learning models in overcoming the drawbacks of traditional processes via case research and experimental data. © 2026 Bipin Kumar Rai, Rupa Rani, and Gautam Kumar

Indexed keywords:

Engineering controlled terms

Bioinformatics; Convolutional neural networks; Deep neural networks; Error statistics; Gene encoding; Learning systems

Engineering uncontrolled terms

Assembling process; Convolutional neural network; DNA fragment; DNA fragment assemblies; Genomic regions; Genomics; High-throughput sequencing; Learning models; Neural-networks; Sequencing errors

Engineering main heading

DNA

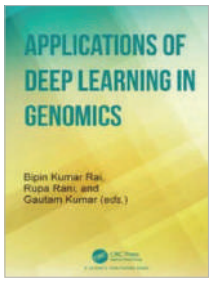
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

ACCELERATING DNA FRAGMENTS ASSEMBLY WITH QUANTUM COMPUTING

Kumar, K.; Rai, B.K.; **Pradeep Ghantasala,** G.S.P.

Applications of Deep Learning in Genomics Book Chapter 2025

Dr. Ghantasala Gnana Sudha Pradeep
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Computer Science and Engineering
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Abstract

Rapid advances in DNA sequencing have converted genomics and made large strides in our expertise in genetic records and the way it pertain to evolution, health, and illness. DNA fragment meeting is the method of reassembling the small, fragmented reads that might be produced by using DNA sequencing to rebuild the authentic genome. DNA fragment meeting is a primary computational issue, especially for huge genomes, due to the full-size extent of statistics and the intrinsic complexity of correctly assembling genomes. The want for innovative solutions is highlighted by using the truth that traditional computational techniques, such as graph-primarily based totally and heuristic approaches, are resource-intensive, have scaling problems, and can be erroneous in complex genome regions. Because of its exquisite capability to do positive computations at formerly unheard-of quotes and efficiently manipulate hard optimization issues, quantum computing has simply come to mild as a likely road for overcoming those computational barriers. In computationally annoying responsibilities like combinatorial optimization and large-scale statistics processing, quantum algorithms just like the Quantum Approximate Optimization Algorithm (QAOA) and Grover`s set of rules for search optimization have verified the capacity to carry out higher than classical approaches. DNA fragments meeting with quantum computing have the potential to boost accuracy and performance even as additionally develop new possibilities for large-scale genomic study. The essential thoughts of quantum computing, current tendencies in quantum-primarily based totally algorithms and their relevance to the meeting system are all included in this chapter, which investigates the capability of quantum computing as an innovative device for DNA fragment assembly. This chapter intends to explore on how quantum strategies would possibly enhance the precision and effectiveness of DNA assembly, starting the door for brand new tendencies inside the subject of genomics with the aid of using reading the capability and constraints of quantum computing for genomics.
© 2026 Bipin Kumar Rai, Rupa Rani, and Gautam Kumar

Indexed keywords:

Engineering controlled terms

Bioinformatics; DNA; Gene encoding; Genome; Heuristic methods; Proteomics; Quantum computers

Engineering uncontrolled terms

AS graph; Computational issues; Computational technique; DNA fragment; DNA fragment assemblies; DNA Sequencing; Genomics; Innovative solutions; Optimisations; Quantum Computing

Engineering main heading

Combinatorial optimization

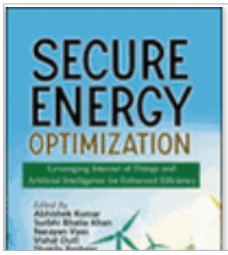
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	07 AFFORDABLE AND CLEAN ENERGY

DATA COLLECTION AND ANALYSIS FOR REAL-TIME SECURE ENERGY MONITORING AND OPTIMIZATION

Dankan Gowda, V.D.; Kumar, P.S.V.V.S.R.; Jagtap, M.M.; **Shekhar, R.**; Vadisetty, R.

Secure Energy Optimization: Leveraging Internet of Things and Artificial Intelligence for Enhanced Efficiency Book Chapter 2025

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Secure Energy Optimization: Leveraging Internet of Things and Artificial Intelligence for Enhanced Efficiency

Abstract

The chapter focuses on the features of real-time data acquisition and analysis as the key to improving the security and effectiveness of energy control and management systems. Given the fact that new energy networks are becoming more complicated and the share of renewable power sources is growing, constant monitoring is inevitable to enhance operational characteristics, dependability, and economy. These and other methods of data acquisition, data processing, and analysis are discussed in the chapter; special attention is paid to the protection of these processes from cyber threats. These relationships are explained and illustrated through the detailed cases in smart grids, industrial facilities, and renewable energy systems in the chapter. Lastly, the future trends and challenges that are expected to surface in the near future in the course of secure energy monitoring and optimization are also highlighted in the chapter as a way of helping the reader appreciate the modern trend in energy management.
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Author keywords- Data analysis; Energy monitoring; Energy optimization; IoT in energy; Predictive maintenance; Real-time data collection; Secure energy systems; Smart grids

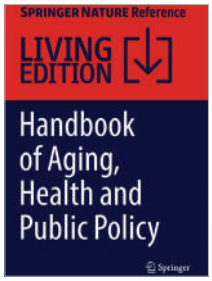
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

RISE OF ELDER ABUSE DURING COVID-19 PANDEMIC IN INDIA

Kumar, S.

Handbook of Aging, Health and Public Policy: Perspectives from Asia Book Chapter 2025

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Department of Social Sciences (Political Science)
Alliance School of Liberal Arts



Abstract

Agewell Foundation, an NGO, revealed in 2019 survey that 71% of elder abuse cases are from family members, relatives, or children. During Covid-19 pandemic, it is expected that elderly people will receive more respect and care from their family members. Because, several restrictions were imposed by the government during the lockdown in India. Lockdown especially affected life or elderly people due to restriction to access their daily activity such as exercise, morning-evening walk, medical checkup, social gathering, etc. Restrictions not only made on elderly people to go outside but to meet with their family members too. In place of social distancing, they were socially isolated which increased physical and mental illness among elder people. This chapter is based on collected data through content analysis published in various national and international newspaper, journals, and magazines. The main idea of this chapter is to highlight elder abuse that has increased during Covid-19 in Indian society. Level of analysis in this chapter is both theoretical and conceptual. Analysis of this chapter has included social bond theory, labeling theory, and stigma to relate elder abuse incidents during Covid-19 pandemic in India.
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Author keywords- Abuse; Covid-19; Isolation; Mistreatment; Restrictions

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	**62nd**	**2.66**	11 SUSTAINABLE CITIES AND COMMUNITIES

HYBRID TRANSFORMER-BASED FRAMEWORK FOR BUILDING DETECTION IN HIGH-RESOLUTION SATELLITE IMAGERY: INTEGRATING SAM, PVT, AND MASK2FORMER

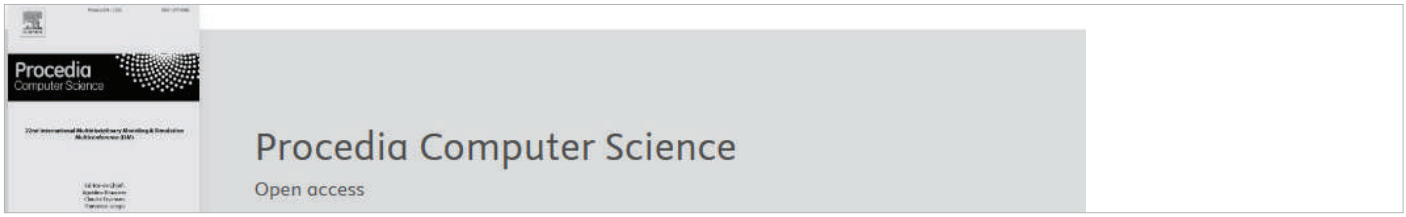
E.S.; Revathi, T.; Niranchana, R.

Procedia Computer Science

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Professor
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Dr. Revathi Theerthagiri
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Dr. R Niranchana
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Abstract

Building extraction from high-resolution satellite imagery is important for urban planning, infrastructure monitoring, disaster management, and other applications. In this paper, we perform a comparative and integrative study of these transformer-based architectures for automated building segmentation on the challenging INRIA Aerial Image Labeling Dataset and WHU Building Change Detection Dataset. The effectiveness of three state-of-the-art models, the Segment Anything Model (SAM), the Pyramid Vision Transformer (PVT), and Mask2Former, are evaluated individually and in integrated settings. Segment Anything Model (SAM), a model based on Vision Transformer (ViT) architecture, is a unified model for zero-shot, prompt-based segmentation capable of generalizing well to the different visual domains. PVT introduces a hybrid architecture for multi-scale feature extraction, so it is the better option for dense prediction of high-resolution images. Mask2Former, as a unified segmentation model, constructs high-referring context-aware detail segmentation masks by refining object queries through masked cross-attention. In CPU-restrained environments, we tested four configurations: SAM with CNN, SAM with PVT, Mask2Former with PVT, and hybrid integration of SAM, PVT, and Mask2Former. In terms of standard metrics, including precision, recall, F1-score, and mIoU, hybrid configuration significantly outperforms the other configurations, yielding an overall F1-score of 0.885 and exhibiting greater robustness in complex urban scenes containing occlusions, architectural diversity, and building scale variability. Although the hybrid model adds a bit of computational overhead, it benefits from these aspects: first, prompt generalization of SAM; second, spatial feature extraction from PVT; and third, mask refinements from Mask2Former. This approach can be especially useful for applications that prioritize segmentation accuracy over processing speed. The results of this study encourage the adaptation of multi-transformer hybrid architectures for scalable and accurate building detection in remote sensing applications with a mission-oriented focus on processing speed. The results of this study encourage the adaptation of multi-transformer hybrid architectures for scalable and accurate building detection in remote sensing applications with a mission-oriented focus. The ablation studies inferred the promising performance of the proposed integrated approach.
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Author keywords- Building Detection; Mask2Former; Pyramid Vision Transformer (PVT); Satellite Imagery; Segment Anything Model (SAM); Segmentation; Transformers

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q2	62nd	2.66	03 GOOD HEALTH AND WELL-BEING

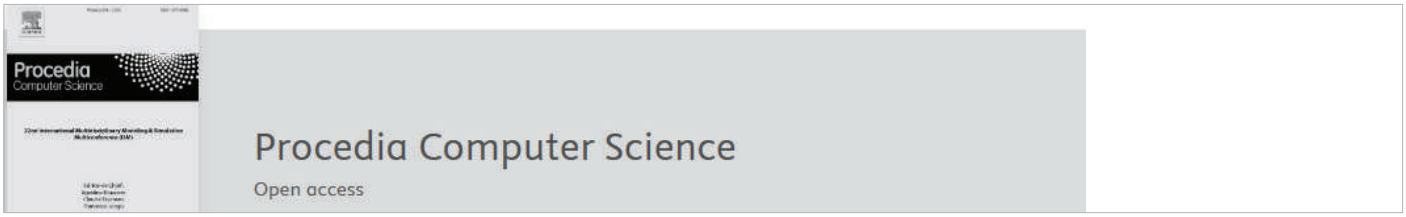
HYBRID TRANSFORMER-BASED FRAMEWORK FOR MULTI-TYPE LUNG CANCER DETECTION USING ATTENTION-GUIDED FEATURE FUSION

Revathi, T.; Ezil Sam Leni, A.

Procedia Computer Science

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Dr. Revathi Theerthagiri
Assistant Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Lung cancer is among the deadliest cancers worldwide, and early, accurate diagnosis can vastly improve survival. To address this work, we present a bool solution based on a transformer-based integrated framework for lung cancer detection on multi-type chest X-rays. The model combines two state-of-the-art Transformer-based architectures, the Swin-Transformer and the Vision Transformer (ViT), to mine local and global visual features in the images. The Swin Transformer uses a shifted window mechanism to capture hierarchical spatial features, while the ViT helps bring more contextual understanding to the whole image. These complementary features are then merged intelligently at the Attention Fusion Layer, which adaptively learns to weigh those extracted features, enriching the most representative parts while suppressing redundancy. The MLP classifier receives the cleaned feature vector for multi-class classification of lung conditions such as adenocarcinoma, large cell carcinoma, squamous cell carcinoma, and normal. We have performed a series of wide-ranging experiments on the publicly accessible Figshare Lung Cancer dataset, consisting of expert-labelled, variegated chest X-ray images, to demonstrate the potential of our method. Experimental results indicate that the proposed hybrid framework outperforms the UperNet and Swin-Unet models, yielding superior accuracy, precision, and F1-score across all classes. Overall, our findings suggest that hierarchical and global feature extractors fused in an attention-based way and classified using an MLP offer a strong and accurate approach to lung cancer detection. An ablation study evaluates the contributions of the proposed transformer architecture, UperNet and Swin-Unet. Simulated results show ViT-Swin-AGFF achieves superior classification performance over UperNet and Swin-Unet, highlighting the efficacy of AGFF in combining global and local features. For segmentation, the ViT-Swin-AGFF model outperforms the state-of-the-art UperNet and Swin-Unet. These findings suggest that hybrid transformer architectures with attention-based fusion enhance diagnostic accuracy, offering a promising approach for lung cancer classification in clinical settings. Future work will validate results with real-world datasets and explore segmentation mask integration. This approach has great potential as a computer-aided diagnostic tool to assist radiologists in making clinical decisions.

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Author keywords- Attention-Guided Feature Fusion (AGFF); Chest X-ray; Deep Learning; Lung Cancer Classification; Medical Imaging; Swin Transformer; Vision Transformer (ViT)

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**23rd**	**0.36**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

AN AI-ENHANCED FRAMEWORK FOR MENTAL HEALTH MANAGEMENT

Shetti, A.S.; **Kurian, A.**

Lecture Notes in Electrical Engineering

Dr. Asha Kurian
Assistant Professor,
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Alliance School of Advanced Computing



Abstract

Mental health disorders affect millions of people all around the world posing a significant threat to mental health. The effects of these disorders impact an individual's total well-being and quality of health. This work explores the potential of machine learning frameworks to predict treatment-seeking behavior of an individual by assessing various environmental factors. The paper explores the efficacy of ensemble modeling for its potential to predict the risk of mental health issues. It also analyzes the relationship between the primary factors causing the disorder. When evaluating risk, the decision tree model demonstrated an accuracy of 83%, indicating the potential of machine learning models in identifying people who might benefit from early detection and support. Considering the steep rise in the number of individuals affected by depression and mental illnesses, identification and intervention at the right time are of paramount importance. This study emphasizes the role of machine learning frameworks to identify individuals at risk of mental disorders and provide transformative healthcare.
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Author keywords- Classification; Machine learning; Mental health prediction; Predictive modeling

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

A COMPARATIVE ANALYSIS OF DEEP LEARNING MODELS FOR HEART DISEASE PREDICTION USING ECG IMAGE DATA

Bindu, G.; **Iwin T J**; Selvakumar, M.; Kiruthika, M.; Sarveshwaran, V.; Selvam, R.

Proceedings of the 6th International Conference on Electronics and Sustainable Communication Systems, ICESC 2025
Conference Paper 2025

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Abstract

CVDs) are the important reason of international mortality, highlighting the life-threatening need for timely heart disease recognition. Electrocardiogram (ECG) signals have long been utilized for diagnosing cardiac abnormalities, but the application of deep learning models. This study systematically evaluates various deep learning architectures, including VGG-16, MobileNet, Custom CNN, and Vision Transformer (ViT), for heart disease prediction using ECG image data. Models were trained on a labeled dataset containing ECG images. The performance of each method was assessed. Among the models, the Vision Transformer outperformed others, achieving the highest accuracy ($94.6%) and consistently high precision ($94.1%) and recall ($93.8%). The results highlight the efficiency of the ViT in capturing both local and global patterns in ECG images, offering a promising tool for scalable heart disease prediction. Additionally, a cloud-based deployment framework was developed to facilitate real-time diagnostic support in clinical settings. © 2025 IEEE

Author keywords: Cardiovascular Disease; Convolutional Neural Networks; Deep Learning; ECG Image Classification; Heart Disease Prediction; Vision Transformer

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ANGLE-BASED ROUTING AND PATH-AWARE CLUSTERING FOR ENERGY EFFICIENCY IN CLUSTER-BASED WSN

Aby K Thomas, A.K.; Sharma, R.; Swati; Seva, B.; Tanna, P.; Swathi, M.

World Skills Conference on Universal Data Analytics and Sciences, WorldSUAS 2025 Conference Paper 2025

Dr. Aby K Thomas
Professor
Electronics and Communication Engineering
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Abstract

For cluster-based routing, choosing an effective CH and GW node is the main obstacle. In directive to strategically choose the CH & GW node, (REAS) Residual Energy Aware Angle-based routing protocol for Cluster-based Wireless Sensor Networks takes into account parameters as well as the node's residuals energy, angles, and distances to the sink. The two main steps of REAS, which are setup and steady-state, are used to efficiently route data from node sources to sinks. During the setting up stage, the most efficient route path is identified and clustered emerge utilizing nodes that include CMs, CHs, and GWs. When everything is steady, data is transferred to the sink via the CMs. Considerations such as residue energy, lifespan, effectiveness of PDR, and are used to study the effectiveness of REAS. The networking protocol used to implement REAS is version 2.34 of Network Simulator 2 (NS2). By adjusting the number of rounds, the REAS method is in comparison with ARPEES and SEECH, two other algorithms for adapting routing systems with low power consumption and events clusters for wireless sensor networks. When compared to ARPEES and SEECH, simulator outcomes show that REAS achieves better residue energy, longevity, packet delivery ratio, cost effectiveness. When comparing to the existing approaches, the proposed methodology has the highest accuracy at 96 percent.
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Author keywords: ARPEES; CH; GW; REAS; SEECH; WSNs

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

MODEL PREDICTIVE CONTROL BASED MODELING FOR MAGNETIC RESONANCE GUIDED HIGH-INTENSITY FOCUSED ULTRASOUND TREATMENT

Whitin, P.; Jeba Singh, O.; Jebarose Juliyana, S.J.; Anish Pon Yamini, K.A.P.; **Sungheetha, A.**

Proceedings of International Conference on Modern Sustainable Systems, CMSS 2025 Conference Paper 2025

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Modern Sustainable Systems (CMSS), International Conference

Abstract

Magnetic resonance-guided high-intensity focused ultrasound (MR-HIFU) has shown clinical success in palliative pain management for patients with skeletal metastases. A key challenge in this treatment is accurately controlling cortical bone temperatures, as MR-based thermometry for bone is not commercially available. Current methods rely on temperature measurements in adjacent soft tissues, though these are highly dependent on the specific sonication strategy. In this study, we present a computational model to predict temperature evolution in bone and surrounding tissue prior to sonication. Heat deposition is first calculated using ray tracing, which serves as the source term for solving Pennes' bio-heat equation. This model uniquely incorporates the effects of shear waves generated at the bone interface, along with the geometric considerations of the transducer and bone structure. Results demonstrate that shear waves significantly impact heat generation and temperature distribution, and our predictions align closely with experimental data and far-field approximations. This model offers a valuable tool for simulating HIFU therapies and can be adapted for pre-treatment planning in MR-HIFU procedures.
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Author keywords: HIFU; Model Predictive control; shear waves; thermometry

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

MULTIMODAL MACHINE LEARNING APPROACHES FOR EARLY DETECTION AND CLASSIFICATION OF BREAST CANCER USING IMAGING AND GENOMIC DATA

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International Conference on Biomedical Engineering and Sustainable Healthcare, ICBMESH 2025 – Proceedings Conference Paper 2025

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Abstract

This research presents an innovative multimodal machine learning approach for breast cancer detection, integrating imaging, genomic, and clinical data to enhance diagnostic precision and reliability. Addressing the critical challenges of traditional single-modality diagnostic methods, the study develops a sophisticated neural network framework capable of comprehensive cancer assessment. The proposed system employs a pre-trained DenseNet121 convolutional neural network for processing mammogram images, complemented by specialized neural network branches dedicated to genomic and clinical data analysis. By strategically fusing features from these diverse data sources, the model generates a more nuanced and comprehensive diagnostic prediction. Rigorous preprocessing techniques were applied to standardize and optimize input data across imaging, genomic, and clinical domains. The neural network architecture incorporates advanced feature extraction and fusion mechanisms, enabling complex inter-modal relationship learning. A binary classification approach determines tumor malignancy based on the integrated multimodal input. Performance evaluation demonstrated exceptional results, with the model achieving 94.3% overall accuracy, 92.7% precision, and 95.1% recall. The Area Under the Receiver Operating Characteristic Curve (ROC-AUC) registered at 0.964, significantly outperforming traditional diagnostic approaches. Comparative analysis highlighted the substantial improvements offered by the multimodal methodology. The research contributes significantly to precision medicine, offering a promising framework for more accurate, personalized breast cancer diagnostics. By leveraging complementary data sources and advanced machine learning techniques, the study provides a transformative approach to early cancer detection and potentially improves patient outcomes.
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Author keywords: Breast Cancer Detection; Cancer Classification; Deep Learning; Imaging Genomics; Multimodal Machine Learning; Neural Network

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**23rd**	**0.36**	04 QUALITY EDUCATION

HANDWRITING RECOGNITION USING CRNNs

Kumar, A.; Zabiulla, S.; Janhavi, P.G.; Raj, A.; **Babu, T.**

Lecture Notes in Electrical Engineering

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Abstract

The transformation of handwritten notes into digital text is a valuable tool across various industries such as education, healthcare, and business. Our research aims to develop a system that utilizes Convolutional Recurrent Neural Networks (CRNNs) for effective and precise handwriting recognition. The system's objective is to accurately convert handwritten content from images into digital, editable text. To achieve this, a deep learning model powered by CNN is employed to interpret handwritten text, identifying key features and structures within the images. Convolutional Recurrent Neural Networks (CRNNs) are preferred for their ability to identify complex patterns within visual data, making them well-suited for tasks such as recognizing various handwriting styles. The system strives to provide a high level of accuracy in text conversion, ensuring minimal errors and enhanced user experience. The findings from this project illustrate the potential of CNN-based models to streamline the process of digitizing handwritten materials, minimizing the need for manual intervention and enhancing overall efficiency. This paper provides an overview of the techniques used, the challenges faced, and the results achieved highlighting the effectiveness of modern deep learning methods in solving practical problems in handwriting recognition. © The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2025.

Author keywords- CNN; CRNNs; Handwriting recognition; Image-to-text conversion

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**23rd**	**0.36**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

MUSIC RECOMMENDATION BASED ON USER'S EMOTION DETECTED FROM FACIAL EXPRESSIONS

Mandal, L.; Akshitha, M.; Gowtham Reddy, P.; Govardhan, K.; Reddy, G.S.R.; Reddy, A.R. Dr. Lopa Mandal, Professor, Computer Science and Engineering, Alliance School of Advanced Computing

Lecture Notes in Electrical Engineering

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Abstract

In our daily lives, music plays a vital role in soothing the emotions of its listeners. They can experience a distinct emotional reaction. We can tell someone's emotion just by looking at their face. By directly identifying the user's facial emotions, the current work aims to create an automated system that creates playlists and plays music based on the user's mood. This eliminates the tiresome and repetitive process of physically compiling songs and assists the users to get automatically generated music playlists that suits their present state of mind. To achieve this, the open-source computer vision library (OpenCV) has been used to identify the user's emotion. This model needs a camera to record the user's face. Based on the user's identified "emotion" from the face, the playlist is suggested to them. The overall accuracy of the system is found to be 92%. © The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2025.

Author keywords- Deep learning; Emotion detection; Facial expressing; Music recommendation; OpenCV

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**23rd**	**0.36**	07 AFFORDABLE AND CLEAN ENERGY

ANALYSIS OF GRID LOAD REQUIREMENT USING NUMERIC PREDICTION MODELS

Rajeswari, R.; **Selvam, M.**

Lecture Notes in Electrical Engineering

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Abstract

Load balancing is a challenging aspect on the increase in the performance and improvement of the utilization in the grid environment. Prediction of future load is a prime factor in balancing of load. Many attempts were made in the past on prediction of load with simple classifier approaches. There are many mathematical and machine learning models available on the numeric predictions of the parameters on the available data. The objective is to anticipate the demand of the load in the grid using numeric prediction methods with machine learning models. In this research, linear regression, Gaussian process and generalized linear model are suggested among many mathematical and machine learning models on the prediction of the load against the standard data set with respect to the suitability and close association of the parameters of load. A comparison is made on the performance of the prediction of the load among these selected models.
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Author keywords- Grid environment; Load balancing; Load prediction; Machine learning models; Numeric prediction method; Quality of service

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**23rd**	**0.36**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SMART AGRICULTURE: REAL-TIME PLANT DISEASE CLASSIFICATION WITH CNN AND RESNET

Kumari Singh, M.; Varun, A.R.; Sunil; Srinivas; **Babu, T.**

Lecture Notes in Electrical Engineering

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Abstract

This paper combines a holistic approach with advanced deep learning techniques and Optical Character Recognition (OCR) to recognize symptoms from images of plants, thereby achieving the prospects of embracing plant diseases. It is undeniable that plant diseases are an important threat to agricultural productivity and require early detection and proper management practice. This article uses Convolutional Neural Networks and the ResNet architecture to diagnose plant diseases. The CNN model provides a multi-layer setup that does convolution, pooling, and finally makes it fully connected to categorize the images belonging to plants under specific categories of plant diseases using a dataset of plant photographs. A lightweight version of Inception-ResNet is also a combination of the power of residual learning along with CNNs in order to achieve enhanced classification performance. Each of the images contains information regarding the type of plant and its corresponding health or disease condition. Two models were well trained and tested on a comprehensive dataset that covered various plant species.Results have been found with high accuracy in classification, thereby The performance evaluation involves predicting diseases like tomato leaf mold, potato blight, black rot, and apple scab. With advanced deep learning architectures and preprocessing techniques, the models provide significantly high accuracy for real-time disease prediction in this approach. This can lead to better crop protection and agriculturally developed quality by possibly significantly contributing to fighting crop diseases for proper productivity development with precise and timely disease identification. © The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2025.

Author keywords- Agricultural productivity; Optical character recognition; Real-time prediction; Residual learning; ResNet





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