ALLIANCE UNIVERSITY
CENTRE for RESEARCH

DSIR RECOGNIZED SIRO
DEPARTMENT OF SCIENTIFIC & INDUSTRIAL RESEARCH GOVT. OF INDIA

ALLIANCE RESEARCH CHRONICLES

MARCH 2026

Volume 3



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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.

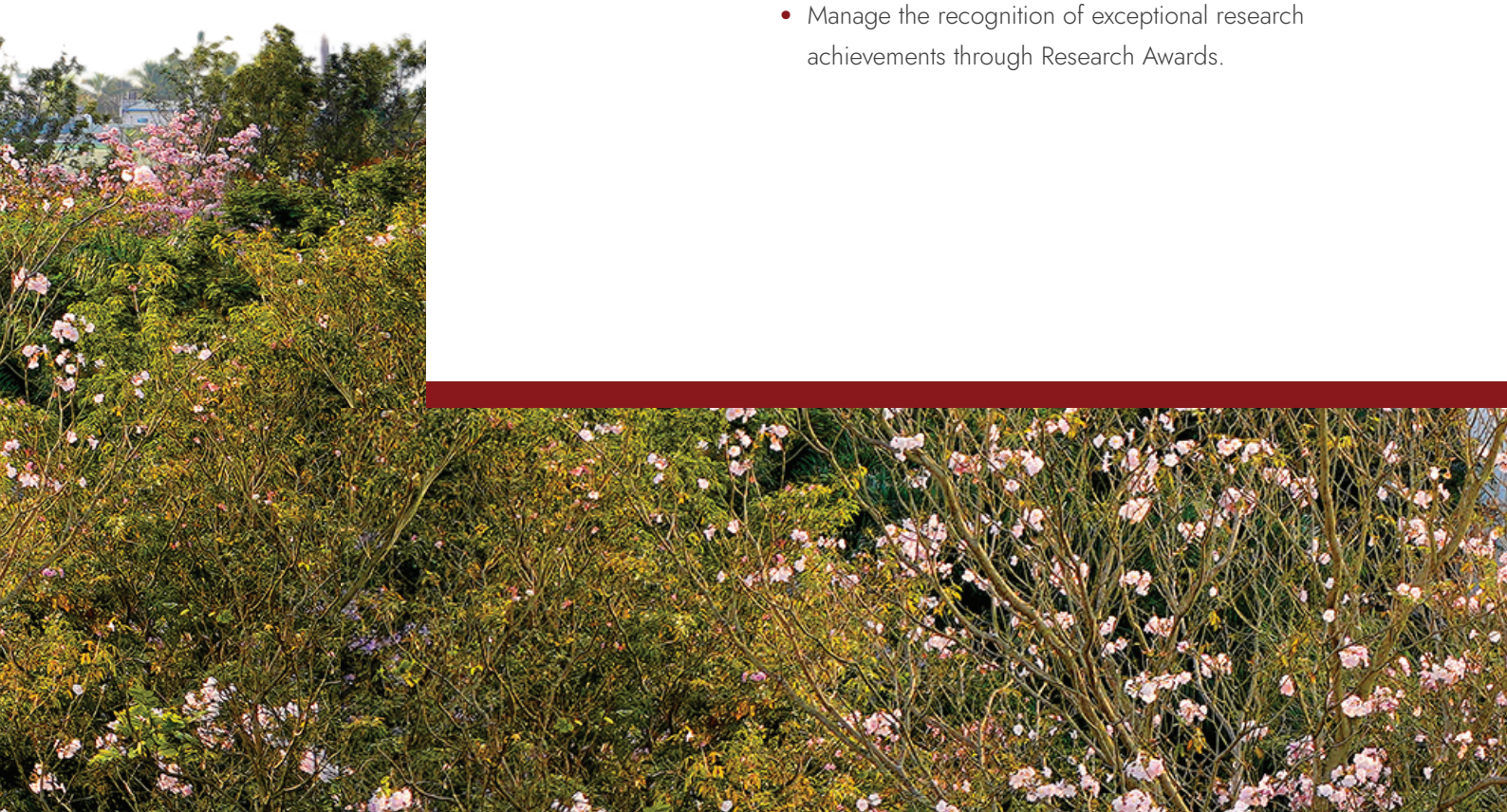
ABOUT CENTRE *for* RESEARCH (Contd.)

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

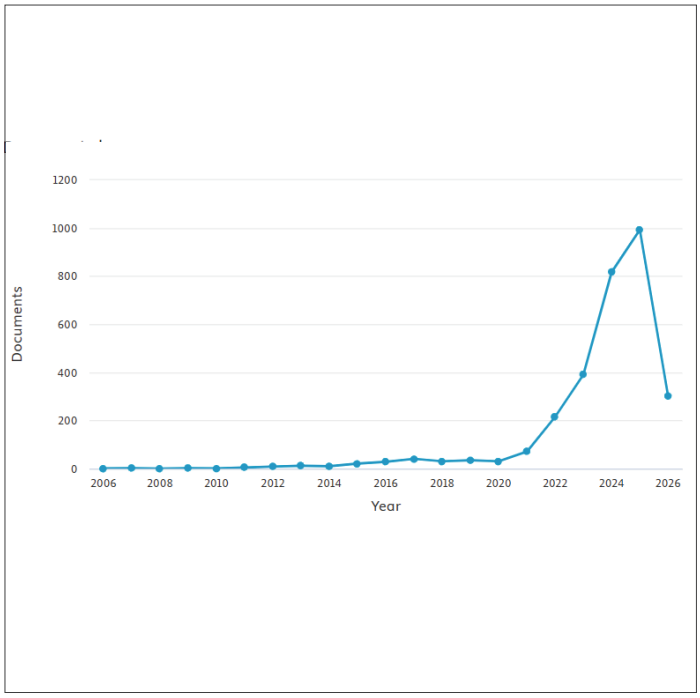
- Support the Ph.D. Admission process and facilitate the Ph.D. Program across all academic units of Alliance University.
- Providing resources and support for faculty, students, and visiting/full-time scholars engaged in research activities.
- Contributing to the advancement of knowledge through publications,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



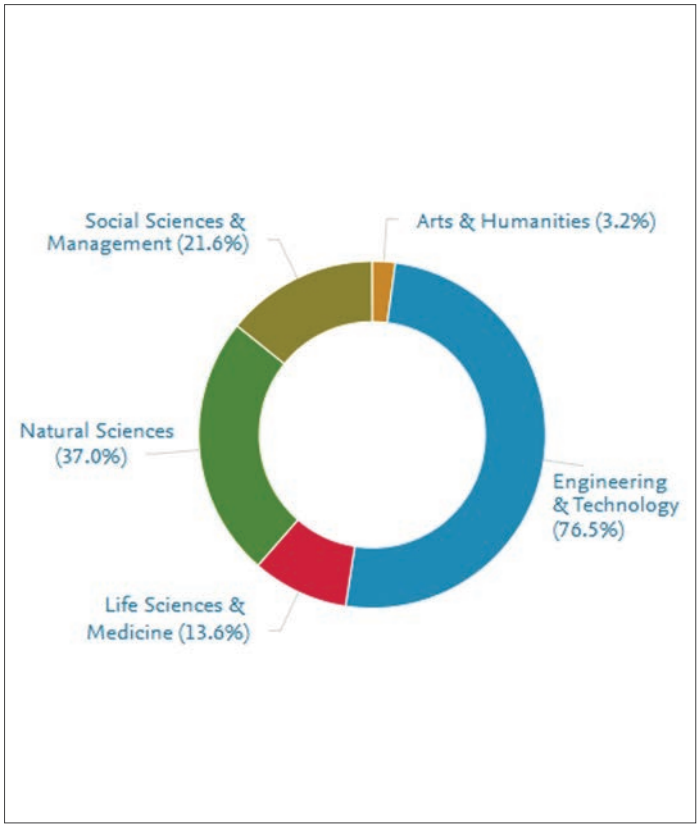


2933	1130
Documents	Authors

Documents by Year



Documents by Subject Area

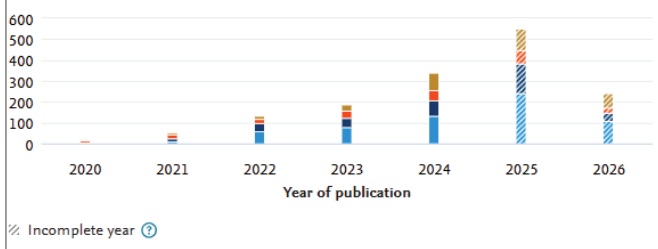


Summary

2933	1130	13622	4.6	1.54	50
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%)	635	41.6
Q2 (26% - 50%)	357	23.4
Q3 (51% - 75%)	214	14.0
Q4 (76% - 100%)	319	20.9

Cumulative shares	Publications	Publication share (%)
Q1 to Q2 (top 50%)	992	65.0
Q1 to Q3 (top 75%)	1,206	79.1

Geographical Collaboration Overall

Geographical collaboration

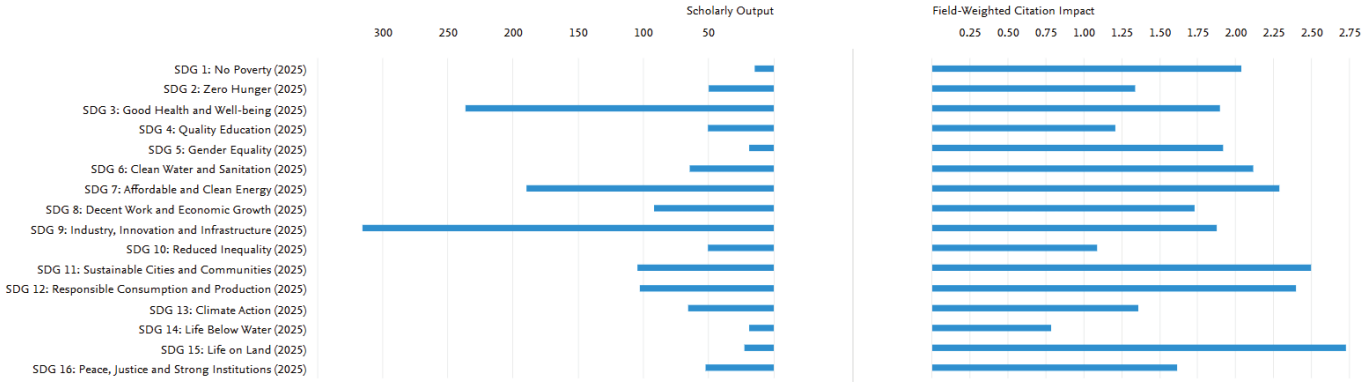
Overall

International, national and institutional collaboration by Alliance University in the selected year range.

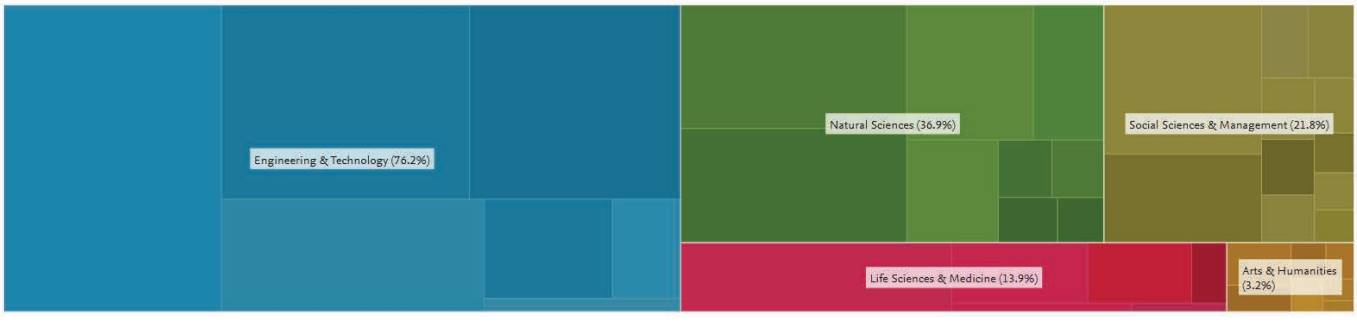


Metric	Publication share	Scholarly Output	Citations	Citations per Publication	Field-Weighted Citation Impact
International collaboration	32.1%	901	7,143	7.9	1.66
Only national collaboration	46.6%	1,307	5,006	3.8	1.70
Only institutional collaboration	15.4%	433	592	1.4	0.87
Single authorship (no collaboration)	5.8%	164	242	1.5	1.38

Publication by SDG



Publication by Subject Areas



* The Publication metrices and the author affiliations are taken from SCOPUS/SciVal as on 23/4/2026


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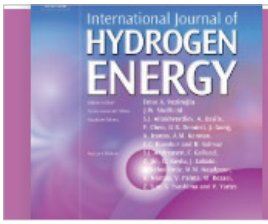
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**94th**	**8.3**	07 AFFORDABLE AND CLEAN ENERGY

PREDICTIVE ANALYTICS FOR HYDROGEN–HONGE OIL DUAL FUEL ENGINE USING MACHINE LEARNING

Sonthalia A.; Renjith E.J.; Js F.J.; M J.S.; **Subramanian T.**; Varuvel E.G.; Kiani F.; Žvirblis T.; Matijošius J.; Kilikevičius A.; Piksrys A.

International Journal of Hydrogen Energy

Dr. Thiyagarajan Subramanian
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering



International Journal of Hydrogen Energy
Supports open access

Abstract

Plant based fuels have been incessantly researched as a substitute of diesel. However, their use in compression ignition engine tends to deteriorate engine performance and increase the engine emissions. Thereby, offsetting the advantage of the fuel being carbon neutral. Hydrogen induction in intake manifold with the direct injection of biofuel enhances the engine performance and simultaneously reduce the emissions. This way diesel can be completely substituted with carbon neutral fuels. In the present study to replace diesel, honge oil was transesterified to its methyl ester and used as the direct injected fuel and the flow rate of hydrogen was varied. The results indicate an improvement in engine performance with higher in-cylinder pressure and heat release rate with 30 L per minute (lpm) flow rate of hydrogen. The brake specific energy consumption (BSEC) of the engine was reduced to 12.2kJ/kWh with the highest flow rate of hydrogen at full load condition. The unburnt hydrocarbon emission, carbon monoxide emission and smoke opacity reduced from 30 ppm, 0.8% & 59% to 19 ppm, 0.48% & 47%, respectively with maximum flow rate of hydrogen. However, due to improvement in combustion, the oxides of nitrogen emission increased from 1224 ppm to 1450 ppm with hydrogen premixing. For the same engine, if fuel is varied then extensive experimental study is required for analysing the engine performance which is costly, time consuming and may itself be a source of pollution. If the exhaust emissions can be accurately predicted with variation in fuels, then the previously mentioned issues can be resolved. In this regard novel features namely percentage of carbon, hydrogen and oxygen present in the fuel were used along with hydrogen flow rate. Various algorithms were compared for predicting the emissions. The results show that the lowest mean absolute percentage error (MAPE) and root mean square error (RMSE) of 0.78, 0.00647, 0.074, 0.00391, 0.155 and 0.013 was observed with support vector regression (SVR) for CO, HC and smoke emissions, respectively. While gradient process regression (GPR) algorithm resulted in lowest error of MAPE (0.22) and RMSE (0.65) for NO emission.
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Author keywords- Emission; Hydrogen; Machine learning; Prediction; Taylor diagram

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	55th	2.6	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

CHARACTERIZATION OF ALPINIA MALACCENSIS FIBERS: A PROMISING GREEN REINFORCEMENT FOR ENGINEERING APPLICATIONS

Nazeer J.; Sasidharan I.; Bindu Kumar K.; Babu S.S.; Thomas V.P.; Thomas B.T.; **Senthamaraikannan P.**; Kumar R.

Journal of Engineered Fibers and Fabrics

Dr. P Senthamaraikannan
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering

Journal of Engineered Fibers and Fabrics

Abstract

This study presents a first-time comprehensive characterization of Alpinia malaccensis (A. malaccensis) fibers extracted from the pseudostems of the Zingiberaceae family to evaluate their suitability as reinforcement in bio-composite applications. The physicochemical composition, thermal stability, crystalline structure, morphology, and tensile properties of the fibers were systematically investigated using FTIR, TGA, XRD, SEM, and single-fiber tensile testing. The fibers exhibited a high cellulose content of 75.94%, resulting in superior tensile strength (1164.99 MPa) and stiffness (28.44 GPa). Moderate hemicellulose (14.27%) and lignin (6.14%) contents contributed to balanced flexibility and good interfacial compatibility with polymer matrices. SEM analysis revealed a fine fiber diameter of 40–50 µm with uniform longitudinal alignment, promoting efficient stress transfer. In addition, the low density (0.53 g/cm^3) and moderate moisture content (10.19%) indicate suitability for lightweight and dimensionally stable composite structures. The results demonstrate that A. malaccensis fibers are a high-performance, sustainable reinforcement material with strong potential to replace synthetic fibers in eco-friendly composite applications.

Author keywords- Alpinia malaccensis; fiber characterization; mechanical performance; natural fiber; Zingiberaceae family

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**73rd**	**3.0**	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

FROM WASTE TO PERFORMANCE – A NOVEL HYBRID COMPOSITE FOR SUSTAINABLE BRAKE FRICTION APPLICATIONS

Nazeer J.; Sasidharan I.; Karthikeyan B.K.; **Senthamaraikannan P.**; Kumar R.

Polymers and Polymer Composites

Dr. P Senthamaraikannan
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering

Polymers and Polymer Composites

Abstract

The growing demand for ecofriendly brake friction materials has accelerated research into green alternatives to conventional hazardous components such as asbestos. This study examines novel hybrid composites with permanganate (KMnO4)-treated Alpinia galanga (A. galanga) stem fibers and Pseudoxytenanthera stocksii (P. stocksii) bamboo rhizomes as reinforcement, combined with Metapenaeus dobsoni (M. dobsoni) shrimp-shell powder as a functional filler. The treated natural fibers enhance structural integrity and thermal stability, while the shrimp-shell powder contributes to controlled abrasiveness and improved surface interaction, together tailoring the composite's frictional and wear performance for brake applications. Three composite variants were evaluated, with AGSSC (A. galanga-P. stocksii-Shrimp shell composite) exhibiting superior density (1.52 g/cm3), lower void content (2.56%), higher hardness (89 HRL) (measured by Hardness Rockwell L-scale), coefficient of friction (0.39–0.38), and 26% lower wear rate. The study directly supports SDG 12: Responsible Consumption and Production by upcycling multiple waste resources, including M. dobsoni shrimp shells as bio-fillers, P. stocksii Bamboo rhizome residues, and discarded A. galanga stems from medicinal plant processing, into high-performance friction composites. This approach promotes circular resource use, reduces dependence on non-renewable and non-recyclable materials, and demonstrates a sustainable pathway for developing eco-friendly brake friction materials

Author keywords- Alpinia galanga; bamboo rhizomes; friction composite; shrimp shell; tribology

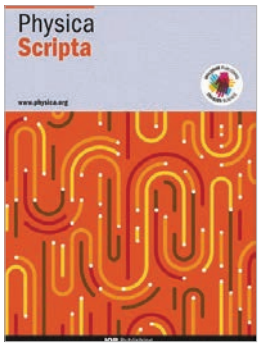
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	72nd	2.6	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

DEEP LEARNING-BASED SPECTRUM SENSING FOR COGNITIVE WIRELESS SENSOR NETWORKS USING MMA BLIND EQUALIZATION WITH CNN-TRANSFORMER ARCHITECTURE

Vijay E.V.; Aparna K.; **Kumar K.M.V.M.**

Physica Scripta

Dr. M V Madan Kumar Kukunuri
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Spectrum sensing is one of the prominent mechanisms used in Dynamic Spectrum Access (DSA) systems to exploit available free spectrum bands while not causing interference to primary users and for efficient utilization of scarce radio spectrum for wireless services. In the context of cognitive radio sensor networks, channel distortions and noise uncertainty, especially at low signal-to-noise ratio (SNR) levels reduce the reliability of spectrum sensing. To overcome these issues, in the proposed work, a deep learning-based blind equalization-aided spectrum sensing model is proposed, which leverages the Multi-Modulus Algorithm (MMA) in a CNN-Transformer network for spectrum sensing. The MMA blind equalization method is used as a preprocessing stage to mitigate channel-induced distortions under Rayleigh Fading Channel and AWGN noise. The goal of blind equalization is to refine the received signal samples to mitigate the distortions caused by the channel so that the following deep learning architecture can be able to classify the presence or absence of a primary user signal to identify available free channels of the spectrum. The resulting equalized samples are passed to a CNN-Transformer hybrid model that leverages convolutional layers to capture relevant local features, while the Transformer network supports the spectral occupancy classification task by focusing on long-range dependencies. The approach was tested with SNRs from −20 to +18 dB, measuring detection probability, false alarm probability, and sensing error probability. Experimental results show that the proposed approach outperforms existing models by achieving better performance at low-SNR conditions in terms of high detection probability and false alarm and sensing error reductions.
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Author keywords- CNN-transformer; cognitive radio; deep learning; Multi-Modulus Algorithm (MMA); spectrum sensing

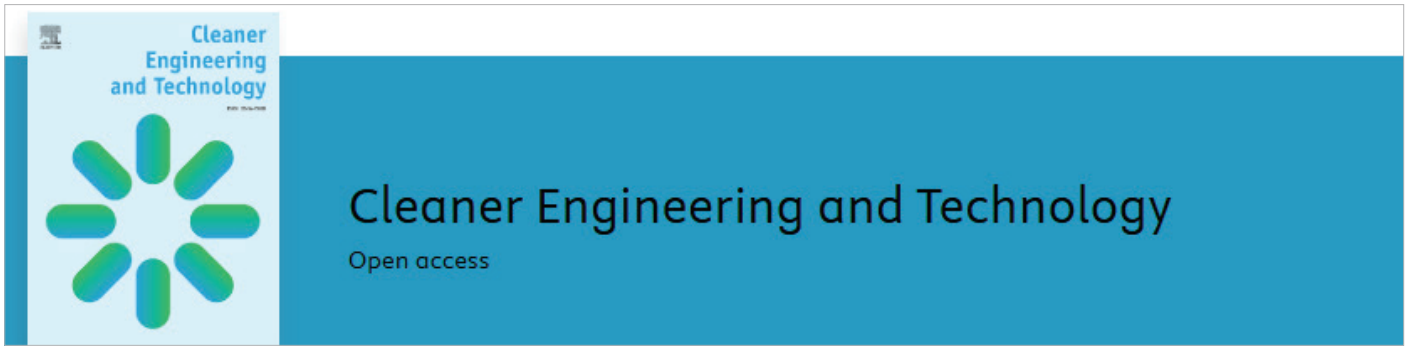
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**95th**	**6.5**	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

DEVELOPMENT AND EXPERIMENTAL ANALYSIS OF SUSTAINABLE HYBRID SANDWICH COMPOSITES FROM WASTE GARLIC PEEL AND KAPOK BIO-FILLERS

Arivazhagan S.; Muthukumaran N.; Ganapathy T.; Dhayaneethi S.; Balaji D.; **Rajeshkumar L.**; Sathishkumar M.

Cleaner Engineering and Technology

Dr. Rajeshkumar L
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

Utilization of animal and agricultural waste and valorization of those wastes to develop sustainable composites for multifunctional applications is a prevalent research topic. Current research investigates the microstructural, mechanical, and tribological properties of epoxy sandwich composites reinforced with waste garlic peel and kapok powder biofillers reinforced in hemp, glass, and carbon fabrics individually. Compression molding and hand lay-up techniques were used to fabricate composites, and the developed sandwich composites were tested for its mechanical and tribological properties. The carbon fabric sandwich composite outperformed other composites in terms of tensile and flexural strengths, with values of 48.3 MPa and 21.2 MPa, respectively while the hemp fabric sandwich composites exhibited highest impact toughness of 9.44 J/cm2. The tribological analysis, revealed that the carbon fabric sandwich composite exhibited better wear resistance with lowest wear rate and coefficient of friction. The composite with garlic and kapok biofillers exhibited matrix fractures and voids, but microstructural analysis revealed uniform filler distribution and strong interfacial adhesion in high-strength composites. These composites find their applications in non-structural components in automotive and aviation industries such as lightweight interior panels and in packaging applications such as storage containers.

Author keywords- Mechanical properties; Sandwich composites; Tribological properties; Waste biofillers

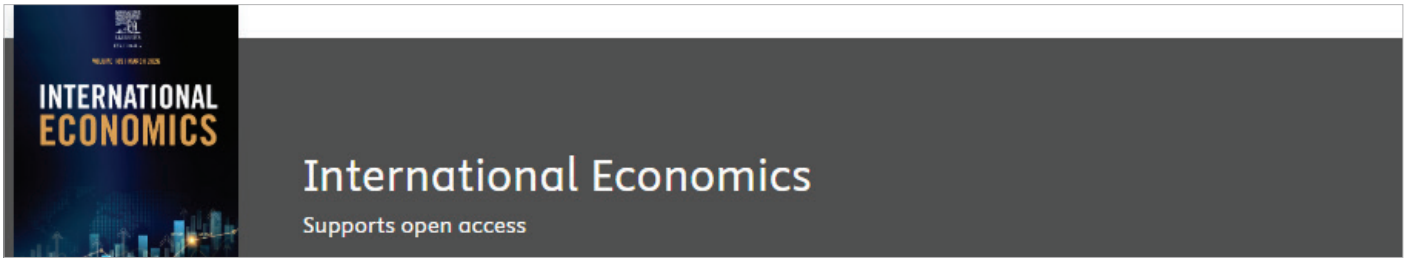
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	52nd	1.3	08 DECENT WORK AND ECONOMIC GROWTH

DO FDI RESTRICTIONS IMPAIR OUTWARD FDI? EVIDENCE FROM INDIAN FIRMS

Saikia M.

International Economic Journal

Dr. Munmi Saikia
Assistant Professor
Department of Economics
Alliance School of Economics



Abstract

Driven by persistent scepticism about FDI, many countries adopt protectionist measures—regulatory restrictions being a key tool. This study argues that such restrictions hinder FDI, raising the key question: do FDI regulatory restrictions impede the flow of outward FDI (OFDI)? Building on Melitz-type heterogeneous firm models [Melitz, M. J. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. Econometrica, 71(6), 1695–1725; Helpman, E., Melitz, M. J., & Yeaple, S. R. (2004). Export versus FDI with heterogeneous firms. American economic review, 94(1), 300–316], the study examines how regulatory restriction influences Indian OFDI. Using firm-level bilateral data on Indian OFDI and the OECD's FDI regulatory restrictiveness index, the analysis reveals that OFDI does not respond uniformly to restrictions—equity limits, screening requirements, and personnel rules have varying effects. Additionally, a battery of heterogeneity checks is conducted to examine how foreign ownership decisions, sector-specific and cross-sectoral restrictions, and the North–South divide interact with regulatory barriers to influence OFDI. Results show that service-sector restrictions are particularly deterrent. The findings confirm strong sectoral complementarity and a pronounced North–South divide in regulatory sensitivity.
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Author keywords- FDI regulatory restriction; OFDI; protectionism

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**64th**	**1.6**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

WLMMF- WIRELESS MULTIMODAL FUSION OF MM-WAVE RADAR AND VISION FOR REAL-TIME HUMAN ACTION RECOGNITION (RT-HAR) IN MOBILE ROBOTICS (MR)

Tripathi N.; Thyluru Ramakrishna M.; Bhatia Khan S.; Tabrez Quasim M.; Almusharraf A.; Sarwar N.

International Journal of Humanoid Robotics

Dr. Nishant Tripathi
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

International Journal of Humanoid Robotics

ISSN (print): 0219-8436 | ISSN (online): 1793-6942

Supports Open Access

Abstract

Human Action Recognition (HAR) is essential for enabling mobile robots to interact intelligently and safely in human-centric environments. This study introduces a wireless-aware multimodal fusion framework that integrates millimeter-wave (mm-Wave) radar with vision sensing for real-time HAR, ensuring robustness even under fluctuating wireless and environmental conditions. Unlike prior multimodal HAR frameworks that assume stable connectivity, our design explicitly embeds wireless channel-state feedback into the fusion process, ensuring real-time adaptability under dynamic communication conditions. The radar modality captures motion kinematics via range-Doppler and point-cloud signatures, while the camera provides spatial and appearance cues. Latency on the prototype has been kept below 50ms, and the proper integration of these heterogeneous features is additionally safeguarded through a lightweight deep-learning pipeline using adaptive fusion weighting. All the experiment simulation Outcome results showed that the proposed system obtains recognition accuracy values of up to 92% and an F1-score of 0.91, which actually outperforms both vision-only having 84% accuracy along with radar-only with 86% accuracy baselines. The results prove that wireless-vision fusion is possible for deploying real-world mobile robots in which robustness to environmental uncertainty becomes very important. The work also establishes the framework of wireless sensing in supporting context-aware human–robot interaction.
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Author keywords- human–robot interaction; mm-Wave radar; Mobile robots; real-time human action recognition; vision fusion; wireless sensing

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	80th	3.6	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

EFFECT OF SUGARCANE/AL2O3/TIO2 REINFORCEMENT ON THERMAL CONDUCTIVITY OF EPOXY HYBRID COMPOSITES USING PARALLEL GA-PSO MODELING EVALUATION

Hemanth Kumar M.; Mandol S.; Hemanth Kumar B.V.; Vamsi Krishna V.V.; **Girish B.M.**; Mavinkere Rangappa S.; Siengchin S.; Vijay Kumar V.

Journal of Natural Fibers

Dr. Mohit Hemanth Kumar
Assistant Professor
Mechanical Engineering
Alliance School of Applied Engineering

Dr. B. M. Girish
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

The present investigation studies the thermal conductivity of epoxy hybrid composites incorporating sugarcane, alumina (Al2O3), and titania (TiO2) with a parallel Genetic Algorithm-Particle Swarm Optimization (parallel GA-PSO) modeling technique. The generated MATLAB code enables statistical and systematic parametric evaluation of thermal conductivity for these epoxy laminates, employing GA and PSO for fine-tuning and extensive solution exploration. The model predicts enhanced thermal conductivity of hybrid composites by optimizing crucial factors such as particulate loading and fiber volume proportion. The optimization frameworks, with adjustable factors including mutation rate, crossover rate, and population size, facilitate comprehensive experimentation to determine thermal conductivity improvements. This investigation determines the effectiveness of the approach in optimizing the accurate configuration of reinforcement, with findings validated through residual and regression analysis. The research develops an effective optimization approach to enhance polymer composite thermal conductivity for engineering applications using lightweight structures. However, the current findings are based entirely on computational modeling and require experimental validation to confirm practical applicability.
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Author keywords- Composite material optimization; epoxy hybrid composite; GA-PSO; natural fiber; sugarcane fiber reinforcement; thermal conductivity

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**78th**	**1.9**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

EFFICIENT DATA REPLICATION IN DISTRIBUTED CLOUDS VIA QUANTUM ENTANGLEMENT ALGORITHMS

B P.S.; **N R.**; Ravi J.; **C V.**; J G.; I G.; K D.K.; Muthusamy E.

MethodsX

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

Dr. C. Viji
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

In cloud computing, it remains difficult to make data available in a cloud service such that the data is replicated and maintained consistently across various data centers. Traditional replication systems are sufficient, even though they take too long to process, cause significant data transfers, and face problems with final data consistency. This work presents a new method named Quantum Entanglement-Based Replication Algorithm (QERA), which makes use of quantum entanglement to ensure quick and high-performance synchronization of cloud data across all nodes. In this proposed work, the QERA approach encodes data changes in the primary cloud node onto quantum states and entangled qubit pairs to the related replica nodes. As a result, any change is quickly shown on all replicas without the usual overhead and delay of message broadcasts. It simulates how QERA is designed to decrease latency, promote consistency, and make better use of resources in cloud environments. This paper creates a theoretical framework using IBM Qiskit and Microsoft Quantum Development Kit simulators to compare classical and quantum baseline algorithms. The results show that QERA may greatly enhance the way updates and replications are managed across many cloud systems. It demonstrates how QERA can ensure a very synchronized replication among the remote cloud nodes.Employs a qubit pair entangled to minimize latency and decrease bandwidth expenses as it goes through updates.Combines the idea of quantum teleportation with methods of non-invasive verification made to maintain the integrity of the state without altering the quantum system

Author keywords- Cloud computing; Data replication; Distributed Systems; Quantum computing; Quantum entanglement; Quantum Networking

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	40th	1.9	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

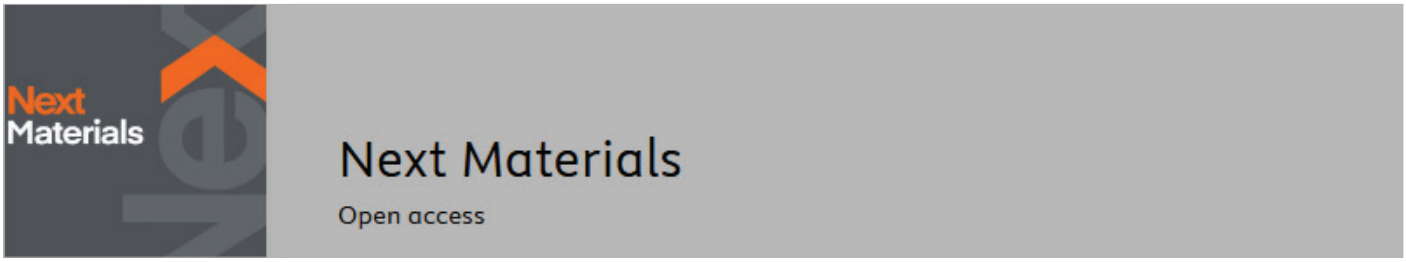
VALORIZATION OF BORASSUS FLABELLIFER FLOWER WASTE INTO HYDROXYPROPYL METHYL CELLULOSE: EXTRACTION, CHARACTERIZATION, AND SUSTAINABILITY ASSESSMENT

Vinod B.; Surya Prakash Rao G.; Raghavulu K.V.; Vadivel T.S.; **Suyambulingam I.; Jagadeesan R.**; Divakaran D.; Narayanaperumal S.; Subramonian S.; Avudaiappan S.

Next Materials

Dr. Indran S
Professor
Mechanical Engineering
Alliance School of Applied Engineering

Dr. Rantheesh J
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

A novel approach to the development of hydroxypropyl methyl cellulose (HPMC) from Borassus flabellifer flower waste is presented in this study, demonstrating an effective waste-to-wealth valorization process. The HPMC yield was determined to be 69.2 ± 1.5%, indicating efficient biomass use. Fourier transform infrared spectroscopy analysis confirm the successful etherification through the emergence of typical –OH, –CH3, and C–O–C stretching vibrations. UV–visible spectroscopy indicated significant absorption in the UV range (below 300 nm) and low absorbance in the visible spectrum, which indicated high optical purity and removal of chromophore impurities. Deconvolution of X-ray diffraction peaks showed a low crystallinity index value of approximately 28%. Dynamic light scattering analysis revealed the presence of hydrated polymer coils and a polydispersity index ranging between 0.4 and 0.7. Scanning electron microscopy (SEM) and ImageJ-based analyses showed a hierarchical structure consisting of lamellar, rough, agglomerated, and flocculated textures whereas surface roughness parameters (Ra = 24.83, Rq = 17.15) proved a surface consisting of peaks and a highly textured structure. Elemental composition was determined using energy-dispersive X-ray spectroscopy coupled with SEM to evaluate the elemental distribution of the synthesized HPMC. Elemental analysis revealed its organic nature through higher carbon and oxygen content. These key findings highlight the potential of B. flabellifer flower waste as a sustainable lignocellulosic resource for the production of value-added cellulose derivatives that can be used in pharmaceuticals, coatings, and biodegradable products.

Author keywords- Agro-waste; Borassus flabelliferflower; Hydroxypropyl methyl cellulose; SDG 1: Sustainable

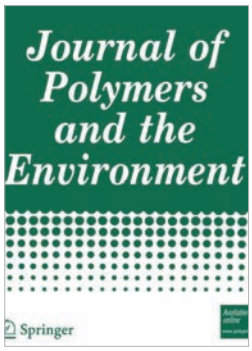
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**87th**	**5.0**	03 GOOD HEALTH AND WELL-BEING

SIALIC ACID-RECEPTOR TARGETED EPIRUBICIN AND NARINGIN-LOADED SIALIC ACID-CONJUGATED SILK FIBROIN NANOPARTICLES FOR ENHANCED LUNG CANCER TREATMENT

Kunjiappan S.; Sankaranarayanan M.; Parasuraman P.

Journal of Polymers and the Environment

Dr. Selvaraj Kunjiappan
Associate Professor
Biotechnology
Alliance School of Applied Engineering



Abstract

Lack of specificity, high toxicity, and low bioavailability are significant hurdles for conventional chemotherapies. Upregulated sialic acid receptors on the plasma membrane of lung cancer cells could be a promising target for effective drug delivery in the treatment of lung cancer. In this context, the present study aimed to fabricate sialic acid (SA)-conjugated epirubicin (Epi) and naringin (NA)-loaded silk fibroin (SF) nanoparticles (SA-Epi-NA-SF-NPs) for the selective delivery and enhanced treatment of lung cancer. SF protein was initially extracted from silk cocoons, and the SA-conjugated SF was synthesized using simple EDC-conjugation chemistry. Later, the desolvation cross-linking technique was used to fabricate SA-Epi-NA-SF-NPs by encapsulating Epi and NA into an SA-conjugated SF. The fabricated SA-Epi-NA-SF-NPs was nanosized, spherical, crystalline particles. Epi and NA had encapsulation efficiencies and loading capacities of 83 ± 1.5% and 80 ± 12%, respectively, and 8.34 ± 0.9% and 8.16 ± 0.3%, respectively, into SA-conjugated SF. Drug release was substantially higher at pH 5.4 (84.46 ± 1.29% Epi and 70.99 ± 1.56% NA) than at pH 7.4. The cytotoxic potential of SA-Epi-NA-SF-NPs against A549 cells was assessed by measuring viable cell number after 24 h of treatment, with an IC50 of 13.16 μg×mL− 1. This effect is attributed to the SA-conjugated NPs, which target A549 cells. The higher intracellular accumulation of Epi and NA in A549 cells targets both mitochondria and the nucleus, leading to apoptosis. Based on these outcomes, SA-Epi-NA-SF-NPs could be a beneficial approach for targeting and treating lung cancer cells, and may also open up research possibilities for targeting other tumor cells

Author keywords- A549 cells; Apoptosis; Drug delivery; Sialic acid receptor; Silk fibroin

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	90th	3.6	08 DECENT WORK AND ECONOMIC GROWTH

ADAPTIVE FRACTIONAL DIFFERENCING FOR LEARNING-OPTIMAL LONG-MEMORY PRESERVATION

Maitra S.

IEEE Access

Dr. Sarit Maitra
Professor
Business Analytics & Artificial Intelligence
Alliance School of Business



Abstract

Forecasting and prediction in financial time series are fundamentally challenging due to non-stationarity and long-range dependence (LRD) nature of such series. This study presents an Adaptive Fractional Differencing (AFD) framework, which addresses three critical gaps in financial time-series preprocessing: 1) finite-sample bias through wavelet-based estimation with proven consistency; 2) non-adaptive truncation via joint (d,) optimization with oracle equivalence; and 3) decoupling from learning through regularized empirical risk minimization. The framework establishes statistical guarantees including consistency, asymptotic normality, and decision-theoretic optimality under formal regularity conditions. Empirical findings reveal that AFD outperforms benchmark FD pipelines based on Geweke-Porter-Hudak (GPH), Local Whittle (LW), and fixed-threshold methods. By reframing FD as a representation-learning problem under structural constraints, AFD provides a principled and practically viable foundation for learning optimal transformations in long-memory time-series environments.

Author keywords- Adaptive fractional differencing; fractional integration; long memory; long-range dependence; machine learning integration; time series estimation

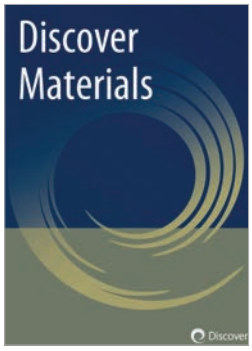
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**68th**	**5.1**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

EXAMINING THERMAL, STRUCTURAL, AND MORPHOLOGICAL PROPERTIES OF ALUMINIUM/TPU COMPOSITE FILAMENTS

Krishnasamy S.; Swaminathan G.; Ramachandran S.; Parthasarathy V.; **Parameswaranpillai J.**; Chandrasekar M.; Muthu Kumar T.S.; Dilip A.A.

Discover Materials

Dr. Jyotishkumar P
Professor
Chemistry
Alliance School of Sciences



Abstract

In this study, thermoplastic polyurethane (TPU)/0.25 wt% of aluminium filler was successfully fabricated using single screw extruder machine. The fabricated filaments were examined for differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy with energy-dispersive X-ray spectroscopy (SEM-EDS), and X-ray diffraction (XRD). During filament fabrication, the parameters for pure TPU, such as die temperature (160–190 °C), screw speed (400 to 450 rpm), extruder current (2.1 to 2.2 A), were chosen. Similarly, for TPU/aluminium filaments, die temperature (190 –160 °C), screw speed (60 rpm), and extruder current (2.9 A) were chosen. Regarding the experimental results, the TGA of TPU/aluminium samples showed higher degradation than pure TPU samples at 850 °C. DSC results showed a minor effect from adding aluminium fillers in the first cycle. However, there was a significant change observed in the melting behavior in the subsequent cycles, which showed enhanced thermal stability and dimensional control at elevated temperatures. FTIR results confirmed interactions between aluminum fillers and TPU, as evidenced by the reduction in the intensity of C = O and N–H stretching bands, which indicated disrupted hydrogen bonds. SEM images showed that aluminium fillers were well embedded in the TPU matrix without any voids, which help in effective load transfer across the matrix. EDS results confirmed the presence of aluminium and oxygen and indicated the formation of Al2O3 during filament extrusion. Besides, XRD results exhibited a sharp crystalline peak and indicated improved structural stability due to adding aluminium fillers into TPU matrix.

Author keywords- Aluminium filler; Single screw extruder; Thermal stability; Thermoplastic polyurethane

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	92nd	0.6	03 GOOD HEALTH AND WELL-BEING

THE PHARMACEUTICAL INDUSTRY IN SOUTH AFRICA AND NIGERIA: A STRATEGIC ANALYSIS OF INDUSTRY AND REGULATORY FRAMEWORKS

Shede S.

Africa Review

Dr. Sandeep Shede
Assistant Professor
Marketing
Alliance School of Business



Abstract

In 2025, the pharmaceutical sector in South Africa and Nigeria was still a net importer of finished dosage drug products and active pharmaceutical ingredients, primarily from multinational corporations in the European Union, India and China. Both countries have local manufacturing capabilities for finished dosage drugs and active pharmaceutical ingredients, but the local companies lack generic off-patent research and development innovation, new-molecule discovery capability, innovative differentiated product portfolio growth, allied local support industries, sales and marketing innovation, established local and international distribution, and supply chain networks. This article explores the South Africa and Nigeria pharmaceutical industry's adoption of government policy frameworks (such as patent Acts, foreign direct investment policy and pricing policy) and the additional support that is needed to improve local manufacturing and international export. It examines the weaknesses that hinder the growth of the pharmaceutical industry in these two countries in effective medicine manufacture, and how streamlining the supply chain could improve drug affordability, accessibility and quality.

Author keywords- local manufacture; manufacturing; Nigeria; patents; pharmaceuticals; South Africa

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	**41st**	**2.7**	03 GOOD HEALTH AND WELL-BEING

A UNIFIED MULTIMODAL LEARNING FRAMEWORK FOR SENTIMENT ANALYSIS AND MENTAL HEALTH INDICATORS FROM YOUTUBE VIDEOS

Satapathy P.; Chauhan O.; Kumar D.; Sharma P.; **Banshal S.K.**; Geman O.; Morosan-Danila L.; Hemanth J.D.

Discover Mental Health

Dr. Sumit Kumar Banshal
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

This study presents a multimodal deep learning framework designed to analyze sentiment patterns in YouTube videos and explore their association with early indicators of mental well-being. The approach integrates textual transcripts, vocal characteristics, and facial expressions into a unified representation to capture the emotional depth that individual modalities often miss. The model was trained and evaluated on a curated dataset of diverse YouTube content, and the results consistently showed that the fused architecture performed better than unimodal baselines. Compared with text-only or audio-only systems, the multimodal model achieved higher accuracy and fewer misclassifications, particularly in cases where speakers displayed subtle or mixed emotions. The integration of vocal cues such as pitch variation, speaking rate, and stress patterns helped clarify emotional ambiguity, while visual features such as micro-expressions, gaze direction, and facial tension added further clarity to the sentiment shifts within the videos. Transformer-based fusion delivered the most stable performance, demonstrating strong generalization across varied communication styles and recording conditions. In addition to reporting classification outcomes, the study examined how specific multimodal patterns correlate with non-clinical markers of mental health. Consistent associations were observed between fluctuating sentiment trajectories and indicators such as emotional instability, sustained negative tone, and reduced expressive variability. Instances where facial expressions contradicted verbal sentiment also showed relevance for identifying mild distress signals. These findings suggest that multimodal emotional cues can offer valuable insights into the affective state of content creators and may support research on digital well-being. The analysis also revealed challenges related to background noise, varying video quality, and inconsistent facial visibility, which influenced the reliability of certain features. Despite these limitations, the study demonstrates that combining audio, visual, and textual information provides a more complete and reliable picture of sentiment expression on social media platforms. The proposed framework offers a foundation for future systems aimed at understanding online emotional behavior and contributes to ongoing discussions on the responsible use of machine learning in mental-health-oriented applications.

Author keywords- Deep learning; Extreme learning machine (ELM); Machine learning; Multimodal fusion; Multimodal sentiment analysis; Natural language processing; Tokenization

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	89th	2.6	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

UNVEILING THE THEMATIC LANDSCAPE OF GENERATIVE AI: A BIBLIOMETRIC ANALYSIS OF EMERGING RESEARCH TRENDS

M P A.; Kumar M. D.; Sharma V.; Tripathi R.; **Badjatia A.**

Information Discovery and Delivery

Dr. Astha Badjatia
Assistant Professor
Finance
Alliance School of Business

Information Discovery and Delivery

Abstract

Purpose – This study aims to explore the evolving research landscape of generative artificial intelligence (Gen-AI) by conducting a comprehensive bibliometric analysis. It seeks to identify prevailing themes, influential contributors and underexplored areas within the Gen-AI domain. Design/methodology/approach – A bibliometric approach was adopted using data extracted from the Scopus database, focusing on publications from 2019–2024. The study used the Bibliometrix R package to analyze keyword trends, publication output, citation impact, country-wise productivity and thematic evolution. Findings – The results reveal a significant rise in academic interest in Gen-AI, particularly since the release of models like ChatGPT. Key research areas include natural language processing, AI ethics, chatbots and education. However, several gaps persist – particularly in ethical use, bias mitigation and governance frameworks – suggesting the need for more focused and interdisciplinary research. Research limitations/implications – The study is limited to publications indexed in the Scopus database and written in English. Valuable insights from other databases or non-English literature may have been excluded. The rapidly evolving nature of the field may also outpace the analysis over time. Originality/value – This research provides a timely and data-driven overview of Gen-AI scholarship, offering actionable insights for researchers, practitioners and policymakers. It also highlights critical areas requiring further inquiry, contributing to a more balanced and ethically grounded advancement of generative technologies.

Author keywords- Artificial intelligence; Bibliometric analysis; Chatbots; ChatGPT; Generative AI; Natural language processing

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**95th**	**5.8**	07 AFFORDABLE AND CLEAN ENERGY

CHARACTERIZATION AND APPLICATION OF AN ALUM SLUDGE-BLENDED CLAY MEMBRANE IN A CONTINUOUS-FLOW 5L STACKED MICROBIAL FUEL CELL

Ajit K.; Krishnan H.

Biomass and Bioenergy

Dr. Karnapa Ajit
Assistant Professor
Civil Engineering
Alliance School of Applied Engineering

BIOMASS & BIOENERGY

Biomass and Bioenergy

Supports open access

Abstract

Microbial fuel cells (MFCs) present a promising approach to energy-neutral wastewater treatment, but their practical scale-up demands affordable materials and systematic studies in stacked configurations. Natural clay membranes offer a cost-effective alternative to proton exchange membranes due to the presence of hygroscopic oxides of Al and Si, as well as interlayer cations that support proton conduction. Studies have enhanced their proton conductivity using pore-forming agents and water-retaining additives. In this study, alum sludge—a byproduct of wastewater treatment rich in organic carbon and hygroscopic metal oxides—was valorized as an additive to natural clay, producing carbon-incorporated clay membranes through a simple co-firing process. At the optimal sludge content of 20%, the membrane's ionic conductivity increased from 0.0997 mS/cm to 0.2077 mS/cm, and the proton mass transfer coefficient increased from 3 × 10–5 cm/s to 17 × 10–5 cm/s, indicating improved water retention. The BET surface area increased from 3.98 to 24.68 m2/g due to micropore formation from residual organic matter decomposition during calcination. Modified membrane enabled a 1.54-fold enhancement in MFC power density compared to unmodified membranes. A 5L MFC stack using the membrane demonstrated consistent power output ranging from 14.32 to 17.27 mW across various hydraulic retention times (HRTs). Normalised energy recovery varied significantly with HRT, increasing from 0.0096 kWh/m3 at 3 h HRT to 0.1833 kWh/m3 at 64 h, indicating the critical role of operational parameters in defining energy recovery metrics. This study demonstrates that waste valorization through membrane modification offers an effective route to improve MFC performance and energy recovery.

Author keywords- Alum sludge; Energy recovery; MFC stack; Natural clay membrane; Proton conductivity

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	50th	0.9	04 QUALITY EDUCATION

MA-MINDA CONVEXITY AND STARLIKENESS FOR CERTAIN SUBCLASSES OF THE CLOSE-TO-STARLIKE FUNCTIONS

Janani B.B.; Ravichandran V.; Sebastian A.

Filomat

Dr. Janani B B
Assistant Professor
Department of Pure and Applied Mathematics
Alliance School of Sciences

FILOMAT

Abstract

An analytic function f (z) = z + a2 z2 + · · · defined on the unit disc D is close-to-starlike if there exists a starlike function g: D C satisfying the inequality Re(f (z)/g(z)) > 0 for all z D. We are particularly interested in the starlikeness of the class W, which consists of all functions that satisfy the close-to-starlike condition with g(z) z and the subclass Wn of W, which contains all those functions of the form f (z) = z + an+1 zn+1 + · · ·. The usual starlikeness of an analytic function f requires that the range of z f (z)/ f (z) is contained in the right half-plane. More generally, a normalized analytic function f: D C is Ma-Minda starlike if the function z f / f is subordinate to the function and Ma-Minda convex if the function 1 + z f / f is subordinate to the function . We have determined the sharp radius of Ma-Minda convexity/starlikeness of the class W and Wn when the range of is a nephroid, lune, lemniscate of Bernoulli, cardioid, or, a particular rational function.
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Author keywords- close to starlike functions; radius of starlikeness; starlike functions; subordination; Univalent functions

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q1	77th	1.39	08 DECENT WORK AND ECONOMIC GROWTH

REVISITING THE GOVERNANCE–DIVIDEND NEXUS: THE MEDIATING ROLE OF CORPORATE SOCIAL RESPONSIBILITY

Shaheen R.; Bala H.; Haruna Abubakar A.; **Lamba Sahdev S.**; Alhaji Sani A.; Khatoon G.; Zahid U.

F1000Research

Dr Supriya Lamba Sahdev
Associate Professor
Alliance School of Business

Taylor & Francis Group
an informa business
F1000Research

Abstract

Background: Despite plentiful research on the link between corporate governance (CG) and dividend policy, the mediating impact of corporate social responsibility (CSR) on the CG – dividend policy link remains unexplored. This study investigates the mediating impact of CSR on the CG –dividend policy link, and explores the mechanism through which CSR mediates this relationship. Methods: Firms listed on the Shanghai and Shenzhen stock exchanges are considered as a study sample. The data collection period ranged from 2012 to 2021. The final sample included 15,800 firm-year observations. Results: The results findings indicate that firms with strong CG tend to pay low dividends, consistent with the substitution hypothesis, in which dividends and CG act as substitutes for each other. In addition to establishing a direct link between CG and dividend policy, our study significantly contributes to the extant literature by presenting both theoretical proposition and empirical evidence on the mediation effect of CSR in the above-mentioned relationship. We find that CSR mediates the corporate governance- dividend policy relationship, which implies that in comparison to corporate governance, CSR has a more dominating impact on firms' dividend policy decisions, and better-governed firms are more likely to engage in CSR activities to protect their stakeholders; consequently, they prefer to hold or invest cash instead of paying dividends because CSR engagements lower the cost of equity capital. These findings were corroborated by a set of robustness tests. Conclusions: Our results have several implications for firms, regulators, and investors. Firms can use high dividend payouts to compensate for poor investor protection and to maintain good relationships with investors. When making investment decisions, investors are advised to consider socially responsible firms because of their strong CG structure. Finally, policy makers should give special consideration to CSR in order to reduce environmental and social problems and to enhance the related standards to ensure the safety and security of all stakeholders and hence reduce global accusation and pressure.
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Author keywords- China; Corporate governance; Corporate social responsibility; Dividend policy

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	65th	2.9	07 AFFORDABLE AND CLEAN ENERGY

THERMAL PERFORMANCE OPTIMIZATION OF AIR-COOLED BATTERY PACKS IN ELECTRIC VEHICLES: AN INTEGRATED CFD AND MACHINE-LEARNING APPROACH

Subramani M.K.; Mohan S.; **Subramanian T.**; Sathishkumar A.; Kim S.C.

International Journal of Thermophysics

Dr. Thiyagarajan Subramanian
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering

International Journal of Thermophysics
Journal of Thermophysical Properties and Thermophysics and Its Applications

Publishing model
Hybrid

Abstract

The present study compares different battery thermal management system (BTMS) designs for lithium-ion batteries using computational fluid dynamics (CFD) simulations, with battery packs modeled in SolidWorks considering realistic heat dissipation characteristics and flow behavior. Effective thermal regulation of lithium-ion batteries (LIBs) is essential to ensure the performance, reliability, and safety of electric vehicles (EVs). Radiator-based BTMS, which operates without a compressor, has recently gained prominence due to its lower energy consumption and efficient temperature control. LIB performance is highly sensitive to temperature-dependent parameters such as state of charge (SOC), self-discharge rate, and state of health (SOH), necessitating the maintenance of an optimal thermal window to enhance overall battery longevity. Three BTMS configurations were evaluated: Design 1, a basic flow arrangement; Design 2, an improved airflow design with enhanced vent placement; and Design 3, an optimized gradient cooling-channel configuration. All three designs successfully reduced the battery temperature from an initial 60 , with Design 3 exhibiting the highest temperature drop of approximately 45.27 and maintaining a low spatial temperature variation (< 2) across the pack. Its balanced airflow distribution and improved thermal uniformity make it particularly suitable for high-ambient-temperature environments. To further evaluate predictive capabilities, machine-learning models including MLP-NN, XGBoost, SVR, Random Forest, Gradient Boosting, and a Stacked Hybrid model were developed. The Stacked Hybrid model achieved the highest accuracy with an R2 of 0.96 and the lowest mean square error, while XGBoost and Gradient Boosting showed stable convergence. In contrast, SVR and Random Forest models underperformed due to their reduced sensitivity to nonlinear thermal variations.

Author keywords- Battery thermal management system; Heat transfer; Lithium-ion battery; Machine learning

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	10th	0.38	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ENHANCING SENTENCE PREDICTION THROUGH BIDIRECTIONAL LONG SHORT-TERM MEMORY NETWORKS

Kanmani M.; Shreenidhi H.S.; Mergin A.; Iwin T.J.S.; Vivek V.

SSRG International Journal of Electronics and Communication Engineering

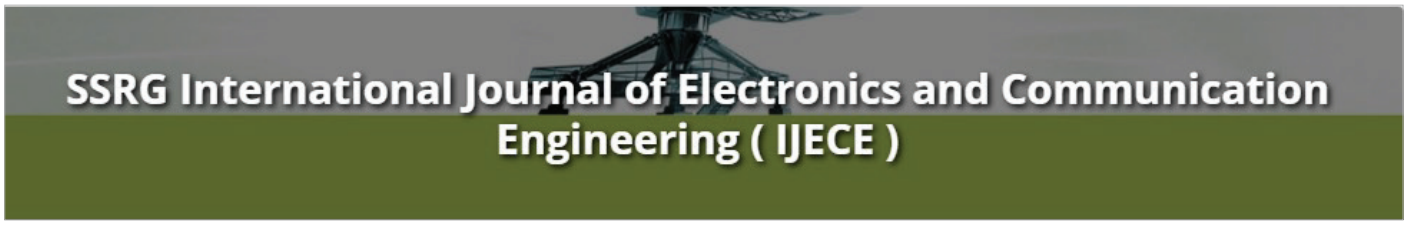
Dr. K.Madheswari
Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Shreenidhi H S
Assistant Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Ancy Mergin
Assistant Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Iwin Thanakumar Joseph
Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Vullikanti Vivek
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Autocompletion of sentences is a very essential aspect of an intelligent writing system, but most n-gram models and unidirectional recurrent neural networks are unable to capture long-range and bidirectional contextual dependencies, leading to loss of semantic coherence and contextual accuracy. This paper presents a Bidirectional Long Short-Term Memory (BiLSTM)-based model as an improvement of contextual complete sentences, especially when dealing with medium-sized text sequences. A text cleaning, tokenization, and structured n-gram sequence generation of medium-length article titles preprocessing generates training samples. The suggested architecture will include an embedding layer that represents dense words, a BiLSTM layer to learn forward and backward word contextual relations, and a Softmax output layer to predict the next word with probability. Mechanisms used to enhance generalization and avoid overfitting include early stopping and checkpoints, whereas mechanisms used towards inference include temperature-controlled sampling to ensure a balance between prediction coherence and lexical diversity. The new features of this publication are an architecture of context-optimized BiLSTM designs that are specific to the medium-length title datasets, as well as adaptive temperature-based inference as part of a lightweight training pipeline. The effectiveness of bidirectional recurrent models in the use of intelligent text suggestion systems is proven by experimental results on better fluency and contextual relevance.

Author keywords- Embedding layer; N-Gram sequence; Natural Language Processing (NLP); Next-word prediction; Temporal sampling; Tokenization

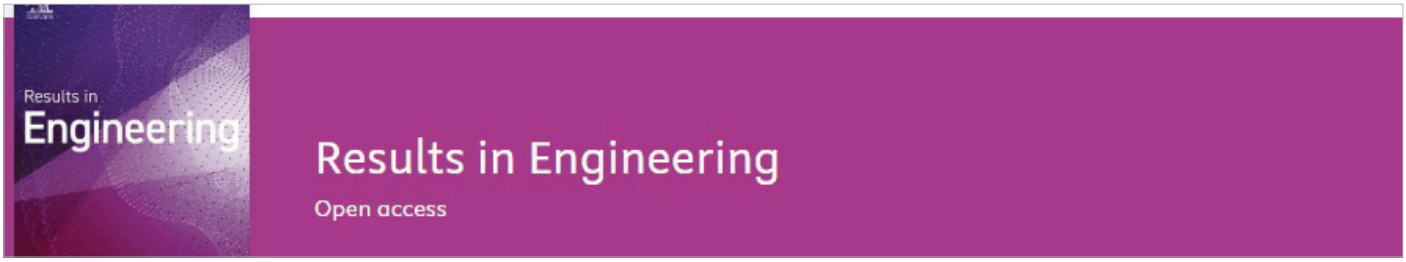
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**86th**	**7.9**	07 AFFORDABLE AND CLEAN ENERGY

ENHANCED REACTIVE POWER CONTROL AND STABILITY ANALYSIS OF HYBRID POWER SYSTEM USING LYAPUNOV AND SNAKE ALGORITHM-BASED SVC STRATEGIES

Agrawal N.; **Mahapatra S.**; Dey B.

Results in Engineering

Dr. Sheila Mahapatra
Professor
Electrical & Electronics Engineering
Alliance School of Applied Engineering



Abstract

Static Var Compensator (SVC) is a key FACTS device for enhancing the stability of Wind–Diesel Hybrid Power System (HPS) by dynamically managing reactive power, regulating voltage, and reducing stress on Diesel Generator (DG). The study introduces an advanced control approach involving Lyapunov theory and the Snake Optimization Algorithm (SOA) to optimize SVC performance. The proposed framework is evaluated on three distinct HPS configurations comprising a wind-driven Induction Generator (IG) and a (DG)-driven Synchronous Generator (SG). SVC meets the IG's reactive power demand and compensates for load fluctuations. Type 1 and Type 2 SVCs are tuned via Lyapunov-based Integral Square Error minimization. SVC Type 3 is tuned via SOA-based Integral Time Absolute Error minimization. The transient stability of HPS under step changes in reactive load is assessed with comprehensive simulations, supported by Eigenvalue (EGV) and Damping Ratio (DR) analyses. SVC Type 3 (SOA-tuned PI) consistently outperforms others, achieving the fastest settling times (0.015 sec in HPS3) and highest DR (0.211) for the dominant oscillatory mode. It ensures rapid oscillation damping and stability enhancement. SVC Type 2 delivers the best voltage and exciter control, recording minimal deviations in terminal and exciter voltage, making it suitable for voltage-sensitive applications. SVC Type 1 maintains stability but exhibits slower response and higher deviations, particularly in HPS1. The study demonstrates that metaheuristic-tuned SVCs significantly improve both dynamic and stability metrics in HPS. The methodology offers scalability to other renewable configurations, such as solar–micro hydro, paving the way for robust, efficient, and sustainable HPS operation.

Author keywords- Capacitor; Compensator; Induction generator; Isolated system; Reactive power; Stability; Synchronous generator; Transient

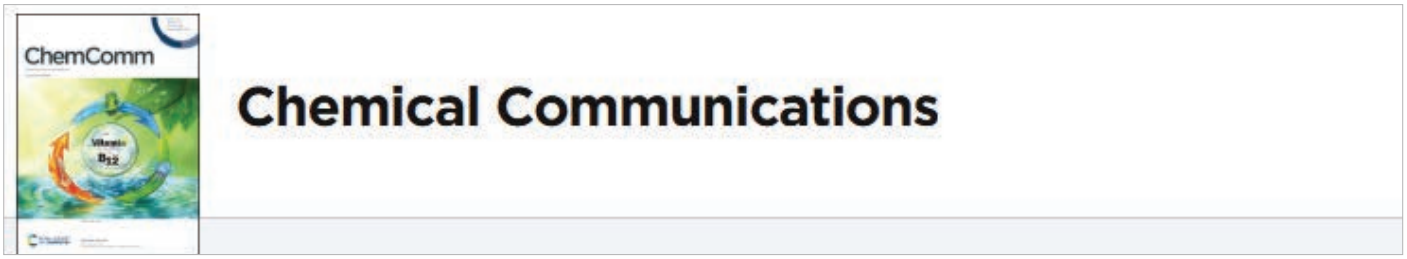
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**82nd**	**4.2**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

MORPHOLOGICAL COALESCENCE IN SILVER SULFATE MICROPARTICLES MODULATED USING A SHOCK TUBE

Sakthivel S.; Amalapushpam M.B.D.S.; **Hedge C.**; Kim I.

Chemical Communications

Dr. Chitrakara Hegde
Professor
Chemistry
Alliance School of Sciences



Abstract

Silver sulfate samples were dynamically shock-loaded in a semi-automatic shock tube. XRD confirmed retention of the orthorhombic Fddd phase, despite lattice expansion, defects, and partial crystallinity recovery at higher pulses. FESEM showed progressive fusion and agglomeration, while UV-DRS revealed band gap shifts from 3.8 eV (pristine) to 4.0 eV (100 shocks), recovering to 3.8 eV (300 shocks). Shock waves thus offer a non-thermal route to tune morphology and optical properties without altering crystal symmetry. This journal is
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Author keywords- Coalescence; Crystal symmetry; Crystallinity; Energy gap; Morphology; Optical properties; Silver compounds; Sulfur compounds

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	75th	3.3	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

GENETIC ALGORITHM-BASED OPTIMIZATION OF COLD-SPRAYED AA2024/YSZ COMPOSITE COATING ON AZ31 MAGNESIUM ALLOY

Mohankumar A.; Thirugnanasambandam A.; **Sampathkumar D.**; Thilaharaj A.S.

Journal of Thermal Spray Technology

Dr. Deepak Sampathkumar
Assistant Professor
Aerospace Engineering
Alliance School of Applied Engineering

Journal of Thermal Spray Technology

Publishing model
Hybrid

Abstract

Cold spray (CS) parameter optimization is necessary to minimize corrosion and enhance the protective properties of composite coatings on lightweight alloys. In the present work, an evolutionary genetic algorithm (GA) was used to identify the optimum combination of CS parameters and further guarantee good corrosion rate minimization and sufficient coating reliability. Yttria-stabilized zirconia (YSZ)-reinforced AA2024 aluminum alloy was cold-sprayed onto AZ31 magnesium alloy substrates. A three-factor, five-level central composite design (CCD) with response surface methodology (RSM) was used to develop a quadratic regression model between corrosion rate and working gas temperature (WGT), nozzle spray distance (NSD), and feedstock flow rate (FFR). Analysis of variance (ANOVA) validated the high statistical significance of the model ($F = 193.50$, $p < 0.0001$), high determination coefficients ($R2 = 0.9792$, adjusted $R2 = 0.9643$, predicted $R2 = 0.9596$), and a low coefficient of variation (7.55%). Regression diagnostics were used to test the adequacy of the model, resulting in bounded residuals within ± 4.15 and errors normally distributed. The desirability function showed a composite desirability value of 0.9625, where all three components were desired by 1.0, validating the robustness of the optimization window. Sensitivity analysis derived the parameter influence ordering as WGT > NSD > > FFR, where WGT had the highest control. GA optimization set the optimum global at WGT = 504.44 °C, NSD = 17.17 mm, and FFR = 22.16 g/min, and the corrosion rate was 1.0267 mm/year. Microstructural analysis of the best coating exhibited a compact morphology, avoiding electrolyte permeability and providing enhanced corrosion protection. The results prove the verified GA–RSM approach to design CS process parameters that offer improved corrosion protection of lightweight Mg alloys.

Author keywords- AA2024/YSZ composite; cold spray; corrosion behavior; genetic algorithm; Mg alloy

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	70th	1.4	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

VIBRATION SIGNATURE ANALYSIS AND STRUCTURAL DYNAMIC RESPONSE OF ROTATING EQUIPMENT UNDER DIFFERENT OPERATING SPEEDS TO PREDICT THE ROOT CAUSE OF THE FAILURES

Basavanakattimath M.S.; Talapati R.J.

International Journal of System Assurance Engineering and Management

Dr. Murgayya Basavankattimath
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

The work carried out in this paper is part of the research work in vibration signature analysis lab at KLS VDIT, Haliyal funded by VGST, KSTePS, Govt. of Karnataka. The study clearly emphasizes on vibration monitoring of rotating machines. With time, the forces in the rotating machine increases that leads to disturbance and failures. For any rotating machines, understanding possible failures is very critical factor that can be achieved by proper diagnosis and prognosis tool i.e., Advanced Vibration Analysers play a crucial role. In this paper, the work is concentrated towards resonances, vibration responses and structure response that leads to failures. The impact test is carried out on structure to record the natural frequencies and responses are generated at non-drive and drive end to know its health. The study clearly shows the importance of Advanced Vibration Analyzer and its ease of use to carry out the analysis for complex rotating machines. © The Author(s) under exclusive licence to The Society for Reliability Engineering, Quality and Operations Management (SREQOM), India and The Division of Operation and Maintenance, Lulea University of Technology, Sweden 2026.

Author keywords- Advanced vibration analyzer; Rotating machines; Vibration monitoring

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	72nd	2.8	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

A COMPREHENSIVE ASSESSMENT OF THE EFFECTS OF SIC PARTICLES ON THE PHYSICAL AND MECHANICAL ATTRIBUTES OF BASALT FIBER POLYMER SANDWICH COMPOSITES

Saravanakumar A.; **Chenrayan V.**; Jesupadam J.G.S.; **Shahapurkar K.**

Journal of Applied Polymer Science

Dr. C Venkatesh
Professor
Mechanical Engineering
Alliance School of Applied Engineering

Dr. Kiran Shahapurkar
Assistant Professor
Mechanical Engineering
Alliance School of Applied Engineering

JOURNAL OF Applied Polymer SCIENCE

Online ISSN: 1097-4628
Print ISSN: 0021-8995
Editor-in-Chief: Stefan Spiegel, Deputy Editor: Joseph Krumpfer
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Abstract

Lightweight materials with advanced properties are of prominent interest in the automobile and aerospace manufacturing sectors. Responding to the industrial needs, the different varieties of polymer composites have been developed and put into practice. This research focuses on the development of resin-impregnated basalt fiber woven sandwich composite reinforced with SiC-enriched core. The usual open molding was followed to fabricate the test coupons by following the SiC inclusions of 0, 3, 6, and 9 wt%. The microscopic study reveals not only the uniform dispersion of SiC particles within the core for 6 wt% but also noticeable porosity for 9 wt%. The density analysis manifests the increased density with the increased SiC content along with a meager porosity. The tensile, flexural, shear, and hardness evaluation results explore the 80.6%, 86.4%, 92.27%, and 29.48% increment for 6 wt% of SiC inclusion, that of the neat epoxy core, respectively. It is observed that the pores induced due to agglomeration of higher inclusion (9%) of particles dent the properties. Further, the fracture morphology of tensile, flexural and shear fracture ensures the particle strengthening by crack deflection and extended plastic deformation.

Author keywords- basalt fiber woven mat; crack deflection; interfacial bonding; sandwich structure; SiC

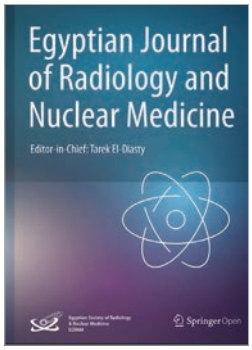
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	**30th**	**0.5**	03 GOOD HEALTH AND WELL-BEING

A NOVEL HYBRID APPROACH FOR BRAIN TUMOR SUB-REGION SEGMENTATION

Dogra J.; **Thakur P.**; Singh G.; Ahamed S.R.

Egyptian Journal of Radiology and Nuclear Medicine

Dr. Prabhat Thakur
Associate Professor
Electronics and Communication Engineering
Alliance School of Applied Engineering



Abstract

Glioma sub-region segmentation plays a critical role in providing tumor information such as appearance and location that is essential for better prognosis and treatment. Several factors limits to create an automatic glioma segmentation technique like intensity ambiguity, data scarcity, class imbalance, etc. For developing such a technique, we have proposed a stage 3 hybrid glioma sub-region segmentation method that modifies traditional techniques in this paper. Our technique develops a system that can select a) the best modality, and b) seed values at stage 1 and stage 2. A hybrid segmentation technique is introduced at stage 3 that includes graph cut (GC) and a novel Location Based Region Growing (LBRG) method. The complete system can extract intricate small and disjoint regions of brain glioma tumors. Our work is evaluated on publically accessible datasets BRATS 2017, BRATS 2019, BRATS 2020, and BRATS 2021, and a competitive performance comparison is provided with state-of-the-art methods. Some of these methods have competed in the BRATS MICCAI challenge and got the best results. The dice score values evaluated for BRATS 2017 dataset are 0.874 and 0.891 for Enhancing Tumor (ET) and Tumor Core (TC), respectively. Similarly, Dice Score for BRATS 2020 dataset is 0.868 and 0.873 for ET and TC regions, respectively. Sensitivity of 0.93 and 0.99 is obtained for ET and TC regions for BRATS 2017. For similar region, 0.98 and 0.99 values are obtained on BRATS 2020 dataset. Specificity of 0.906 and 0.873 is obtained for ET and TC regions for BRATS 2017. For similar region, 0.912 and 0.8744 values are obtained on BRATS 2020 dataset. An improvement percentage of 9%, 7.2% in comparison to state-of-the-art method for TC and, an improvement of 19%, 18.4% for ET region as well is observed.
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Author keywords- Glioma; Graph cut; Region growing; Tumor segmentation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	88th	3.4	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

MACHINE LEARNING ENABLED CRITIC-COCOSO OPTIMIZATION OF PVA/CSP/AGNPS FILMS FOR MULTIFUNCTIONAL PACKAGING APPLICATIONS

Parrthipan B.K.; Balasubramanian B.; Noor Mohamed M.R.; Krishnankutty P.; **Palanisamy S.**; Subramonian S.; Manakavala perumal S.

Journal of Thermoplastic Composite Materials

Dr. P Senthamaraikannan
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering

Journal of Thermoplastic Composite Materials

Abstract

The current research has proposed an innovative methodology to enhance PVA/CSP/AgNPs hybrid biocomposite films by integrating the CRITIC and CoCoSo multi-criteria decision-making (MCDM) frameworks with machine learning techniques. Bio composite films can be used in medicine, packaging, and environmental applications. The biocomposite films were developed by mixing polyvinyl alcohol (PVA), coconut shell powder (CSP), and silver nanoparticles (AgNPs) to attain better mechanical, thermal, and antibacterial properties. The experimental design comprises 25 distinct trials to assess the tensile strength (TS), Young's Modulus (YM), percentage elongation (%E), and maximum degradation temperature (T) of the fabricated composite films. CRITIC method was adopted to evaluate the weights of the criteria in an unbiased way, and CoCoSo technique ranked the alternatives. The results were analyzed using supervised machine learning algorithms, including Random Forest, Neural Network, Linear Regression, and AdaBoost. AdaBoost algorithm demonstrated superior performance with an R2 value greater than 0.98 for all output responses. Decision tree analysis revealed that the composition of silver nitrate significantly influences tensile strength, while coconut shell powder affects Young's modulus. The optimized film, composed of PVA/20%CSP/4 mM AgNPs, exhibited improved UV-shielding, reduced water absorption (26.2%), and decreased soil weight loss (41.4%). SEM images confirmed the uniform dispersion of AgNPs within the PVA matrix. The integration of CRITIC-CoCoSo with machine learning provides a scalable approach for designing multifunctional bio-composites with enhanced properties for sustainable applications.

Author keywords- AgNPs; coconut shell powder; CRITIC-CoCoSo; Hybrid composite films; machine learning algorithms

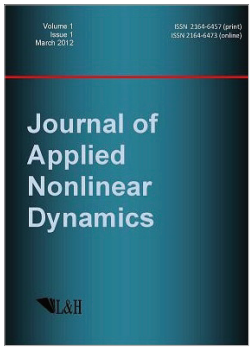
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	**29th**	**0.98**	02 ZERO HUNGER

DOUBLE ALLEE EFFECT-INDUCED EXTINCTION AND BIFURCATION IN A DISCRETE-TIME PREDATOR-PREY MODEL

Patra R.R.; Maitra S.; Sarkar S.

Journal of Applied Nonlinear Dynamics

Dr. Rajesh Ranjan Patra
Assistant Professor
Department of Pure and Applied Mathematics
Alliance School of Sciences



Abstract

The importance of the Allee effect in studying extinction vulnerability is widely recognized by researchers, and neglecting it could adversely impact the management of threatened or exploited populations [1]. In this article, we examine a discrete predator-prey model where the prey population is associated with two component Allee effects. We derive sufficient conditions for the existence and local stability nature of the fixed points of the system. The occurrence of Neimark-Sacker bifurcation is established, and sufficient conditions are obtained along with the normal form. Numerically, we demonstrate that the system exhibits Neimark-Sacker bifurcation for various system parameters. Additionally, the numerical simulations indicate that certain system parameters have threshold values, above or below which the populations are driven to extinction due to the impact of the double Allee effect.

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Author keywords- Center manifold theory; Double Allee effect; Extinction; Holling type II; Neimark-Sacker bifurcation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	6th	0.5	03 GOOD HEALTH AND WELL-BEING

ELI LILLY'S MOUNJARO IN INDIA: THE RACE TO SHAPE A NEW MARKET FOR OBESITY CARE

Rajan T.; John J.R.

CASE

Dr. Thomason Rajan Kolath
Associate Professor
Marketing
Alliance School of Business



Abstract

Research methodology — This case was developed using secondary data sources, including reputable journalism (Reuters, Economic Times, NDTV, Business Standard, India Today, Hindustan Times), industry reports, clinical trial summaries, publicly available company statements and regulatory documentation. All numerical information, quotes and performance metrics are drawn from authenticated public sources. No primary interviews, confidential corporate information or proprietary data sets were used. No material was disguised. As the case uses publicly available secondary information and does not involve human subjects or proprietary data, ethics review board approval was not required. Case overview/synopsis — This compact case examines Eli Lilly India's 2025 launch of Mounjaro (tirzepatide) in the rapidly expanding obesity and metabolic care market. Under the leadership of Winselow Tucker, President and general manager of Eli Lilly India, the company introduced Mounjaro using a vial-first strategy aimed at improving trialability and affordability in an out-of-pocket market. The launch created strong early momentum ahead of Novo Nordisk's Wegovy and was reinforced by a national awareness campaign and a distribution partnership with Cipla. By late 2025, Mounjaro emerged as India's highest-selling drug by value. However, competitive pressures, including Novo Nordisk's price cuts, rising affordability expectations and impending semaglutide generics, created new uncertainties for Lilly. Tucker faced a strategic dilemma: whether to defend Mounjaro's premium positioning, adjust pricing architecture, leverage partnerships for scale or accelerate the development of oral glucagon-like peptide-1 (GLP-1) therapies to secure long-term leadership in India's evolving obesity-care market. Complexity academic level — This case is designed for MBA, executive MBA and upper-level undergraduate courses in: marketing strategy; competitive strategy; pharmaceutical and health-care management; innovation management; and emerging markets strategy. The case is suitable for in-seat, hybrid and online synchronous discussion formats.

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Author keywords- Competitive strategy; Global marketing strategy; International business strategy; International market entry; Marketing strategy; Patents; Pricing; Product differentiation

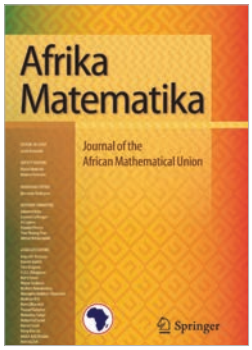
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**50th**	**0.7**	04 QUALITY EDUCATION

SUPERDERIVATION ALGEBRA AND SUPERCENTROIDS OF HOM-LIE SUPERTRIPLE SYSTEMS

Nandi N.

Afrika Matematika

Dr. Nupur Nandi
Assistant Professor
Department of Pure and Applied Mathematics
Alliance School of Sciences



Abstract

A Hom-Lie supertriple system L is -graded generalization of a Hom-Lie triple system. The purpose of this paper is to investigate the superderivation algebra Der(L), the generalized superderivation algebra GDer(L), the quasisuperderivation algebra QDer(L), the central superderivation algebra ZDer(L), and the supercentroid C(L) of a Hom-Lie supertriple system. We give some useful properties and connections between these superderivations. Furthermore, we show that the quasisuperderivation of L can be embedded as a superderivation in a larger Hom-Lie supertriple system and has a direct sum decomposition when the center of L is equal to zero where and t is an indeterminate. Later, we obtain some structural results on supercentroids of Hom-Lie supertriple systems. © African Mathematical Union and Springer-Verlag GmbH Deutschland, ein Teil von Springer Nature 2026.

Author keywords- Generalized superderivations; Hom-Lie supertriple systems; Quasisuperderivations; Supercentroids; Superderivations

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	89th	3.9	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

DEVELOPMENT AND OPTIMIZATION OF A FEMALE-SPECIFIC BIOMECHANICAL MODEL FOR BIODYNAMIC RESPONSE ANALYSIS: A COMPARISON WITH MALE BIOMECHANICAL MODELS

Guruguntla V.; Yuvaraju B.A.G.; Rao T.S.S.B.; **Ghantasala G.S.P.**; Vidyullatha P.; Pydi H.P.

Scientific Reports

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

scientific reports

Abstract

Whole-body vibration exposure is a critical factor affecting human health and comfort, particularly for individuals operating on/off-road vehicles. Prior studies have focused on male biomechanical models. This study intentions to develop a new female-specific biomechanical model to analyze and optimize biodynamic responses under vertical vibration conditions. The objective is to introduce a ten degrees-of-freedom (dofs) biomechanical model tailored for the female body, considering the average weight of human beings. The new model has compared against existing male-oriented models to evaluate its effectiveness. The female body is divided into ten key segments: head, pelvis thorax, abdomen, left upper arm, left hand, left forearm, right upper arm, right forearm, and right hand. Mechanical properties are adjusted based on female-specific mass distribution, stiffness, and damping characteristics. The Firefly Algorithm is used for parameter optimization. The biodynamic responses, including seat-to-head transmissibility, apparent mass, and driving point mechanical impedance, are evaluated and compared with previous male models. The optimized female model exhibits distinct biodynamic response characteristics due to anatomical and biomechanical differences. The goodness of fit analysis indicates improved predictive accuracy for female subjects, suggesting the necessity for gender-specific modelling in vibration analysis.
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Author keywords- Biodynamic responses; Experimental verification; Firefly algorithm; Human body modelling; Optimization; Sensitivity analysis; Whole body vibration

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**83rd**	**4.7**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

EFFECT OF HALLOYSITE NANOTUBE ADDITION ON MECHANICAL AND THERMAL PERFORMANCE OF BANANA/COTTON HYBRID NATURAL FIBER-REINFORCED POLYMER NANOCOMPOSITES

Umachitra G.; Sampath P.S.; Karthik A.; Senthilkumar M.S.; Ramachandran K.; **Rajeshkumar L**.; Sathishkumar M.

Materials Advances

Dr. Rajeshkumar L
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Materials Advances

Abstract

Natural fibre composite materials can replace conventional and synthetic materials in real-world applications where energy and weight conservation are necessary. This research investigates the effects of halloysite nanotubes (HNTs) and alkali treatment on banana/cotton hybrid woven fabric reinforced with epoxy composites. The mechanical and thermal properties and morphological aspects of cotton/banana fabric-reinforced epoxy composites-filled with HNTs and also the unfilled composites were evaluated. The cotton/banana hybrid epoxy composites were enhanced with halloysite nanotubes in 1, 2, 3, and 5 wt%. The chemical structure, and surface morphology of composite materials were analysed by using SEM and FTIR. The mechanical properties such as tensile, flexural, compression, and impact strengths were assessed according to ASTM standards. The results demonstrate that composites with 2 wt% HNTs possess optimal tensile (62 MPa) and flexural strength (102 MPa), whereas greater filler loadings caused agglomeration, and decreasing characteristics. Furthermore, thermal studies revealed that the composites with 2 wt% HNTs exhibited higher thermal stability, with degradation occurring between 357 °C and 452 °C. Morphology portrayed that the superior bonding and surface homogeneity in the 2 wt% HNT nanocomposite. This study highlights the importance of nanofillers and surface treatment in addressing the constraints of natural fibre composites, permitting their application across several industries, including automotive, aerospace, and construction. This journal is © The Royal Society of Chemistry, 2026

Author keywords- ASTM standards; Cotton; Epoxy composites; Fiber reinforced plastics; Glass ceramics; Impact strength; Morphology; Nanotubes; Natural fibers; Surface morphology; Surface treatment; Tensile strength; Yarn

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	88th	4.7	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

UPCYCLING USED LOTTERY TICKETS: EXTRACTION, CHARACTERIZATION, AND LIFE CYCLE ASSESSMENT OF CELLULOSE NANOFIBERS USING A CRADLE-TO-GATE APPROACH

Madhu A.K.; Rosa D.S.; de Oliveira S.A.; Ajithkumar T.G.; **Parameswaranpillai J.**; Badawi M.; Midhun Dominic C.D.

Materials Chemistry and Physics

Dr. Jyotishkumar P
Professor
Chemistry
Alliance School of Sciences

Materials Chemistry and Physics
Supports open access

Abstract

This work examines a sustainable approach for the isolation, characterization and Life Cycle Impact Assessment of cellulose nanofibers derived from post-consumer lottery tickets. The lottery tickets were subjected to bleaching using 15% H2O2 and 10% NaOH in a 5:1 ratio at 80 °C, followed by acid hydrolysis using 5% oxalic acid assisted with steam explosion. The isolated cellulose nanofibers were 16 to 36 nm diameter range with a crystallinity index of 84.5%. The zeta potential value of –25.19 mV revealed moderate colloidal stability for nanocellulose suspension. The thermal stability of nanocellulose fibers was reported around 300 °C in N2 atmosphere. The films fabricated from the nanocellulose fibers reported a tensile strength of 4.6 ± 0.90 MPa. The cradle-to-gate Life Cycle Impact Assessment revealed the impact of electricity consumption and bleaching process on the isolation of nanocellulose from waste lottery paper. These findings underline the potential of waste-derived CNFs for sustainable applications such as biodegradable packaging while promoting circular economy principles and green nanotechnology through waste valorisation, eco-friendly chemistry, and life cycle sustainability. © 2026 Elsevier B.V.

Author keywords- Cellulose nanofibers (CNFs); Life cycle impact assessment; Lottery tickets; Waste to wealth

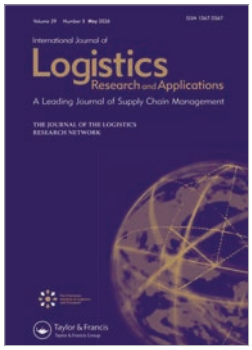
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**96th**	**4.9**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

HYBRID NEUROMORPHIC AI FRAMEWORK FOR ENERGY-EFFICIENT AND LOW-LATENCY SUPPLY CHAIN ANALYTICS

Karmakar M.; Periyasami K.; Tay H.L.

International Journal of Logistics Research and Applications

Dr. Mousumi Karmakar
Assistant Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Modern supply chains must comply with stringent environmental regulations, manage escalating energy costs and ensure operational agility. Traditional cloud frameworks often suffer from high latency, excessive energy consumption and privacy risks, prompting a shift to edge-AI. This paper introduces SEONE, a smart energy optimisation solution based on neuromorphic edge-AI that integrates Spiking Neural Networks (SNNs) with deep learning models (CNNs, LSTMs, Transformers) to deliver real-time predictions under strict power constraints. SEONE employs a dynamic scheduling algorithm to optimise energy use and minimise latency across neuromorphic and AI layers. A fusion module merges outputs from both components, enhancing accuracy and resilience. Leveraging event-driven neuromorphic processing and edge intelligence, SEONE dynamically manages sensor data and energy consumption. Evaluations on real-world supply chain datasets show notable gains in accuracy, reduced latency, energy efficiency and higher task success rates, laying the groundwork for scalable, sustainable neuromorphic AI in decentralised supply chains.
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Author keywords- edge-AI; energy optimisation; green AI Systems; Neuromorphic computing; spiking neural networks (SNNs); supply chain analytics

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	91st	5.7	03 GOOD HEALTH AND WELL-BEING

FROM DIGITAL STRATEGIES TO LOYAL STAYS: EXPLORING THE IMPACT OF DMC, CRM, AND TRUST ON HOTEL REVISIT INTENTIONS

Sofi M.R.; Bashir I.; Alshiha A.A.; Alnasser E.M.; Alkhozaim S.M.; **Charag A.H.**; Alshiha F.A.

International Journal of Tourism Research

Dr. Asif Hamid Charag
Assistant Professor
General Management
Alliance School of Business



Abstract

This study investigates the dynamic interplay between Digital Marketing Capabilities (DMC), Customer Relationship Management (CRM), trust, Customer Engagement (CE), and Customer Revisit Intentions (CRI) within the hospitality industry in Kashmir, India. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), the research evaluates both direct and indirect effects among the constructs. The findings reveal that DMC and CRM significantly influence revisit intentions, both directly and indirectly, through the mediating role of trust—a critical psychological mechanism that fosters customer loyalty. Moreover, CE moderates these relationships, amplifying the positive effects of DMC and CRM on revisit intentions. This suggests that engaged customers respond more favorably to digital initiatives and relationship-building efforts. The study offers practical insights for hospitality managers by emphasizing the strategic importance of integrating digital technologies and CRM systems to build trust and enhance engagement. It advocates for a trust-centric, inclusive approach to digital transformation within the regional hospitality sector.
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Author keywords- CRM; customer engagement; DMC; Kashmir; revisit intention; trust

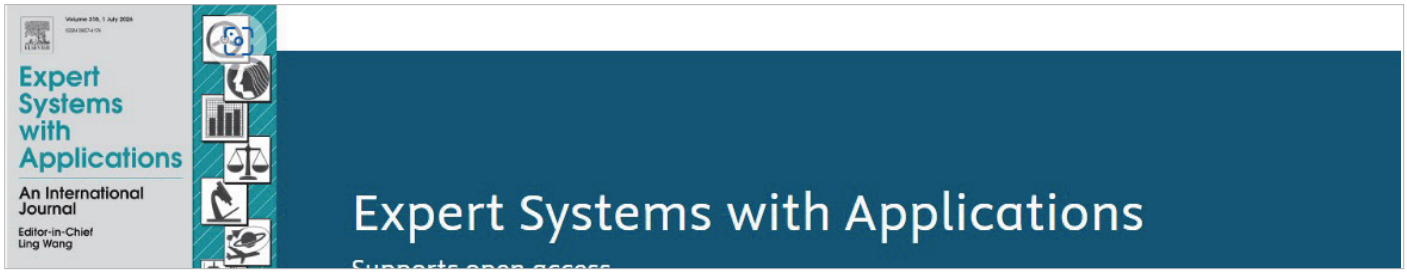
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**97th**	**7.5**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

GRADIENT-INFORMED MBO WITH CONSTRAINT-AWARE GRAPH REFINEMENT NETWORK FOR PRIVACY-PRESERVING FEDERATED MASK R-CNN SEGMENTATION (GIMBO-CAGRN-FL)

Vidyullatha P.; Ioannou I.; **Pradeep Ghantasala G.S.**; Vassiliou V.; Babu B.S.

Expert Systems with Applications

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



Abstract

Instance segmentation in privacy-sensitive, multi-institutional settings requires a careful balance among accuracy, computational efficiency, robustness to distributional shift, and strict data locality. We present GIMBO-CAGRN-FL (Gradient-Informed Modified Monarch Butterfly Optimization with Constraint-Aware Graph Refinement Network for Federated Learning), a unified framework that integrates three tightly coupled technical contributions: (i) a Constraint-Aware Graph Refinement Network (CAGRN) that enforces geometric consistency across predicted instance masks through differentiable soft projection, (ii) a gradient-informed Modified Monarch Butterfly Optimization (MBO) algorithm for structured, mixed-variable head and hyperparameter search under latency constraints, and (iii) a communication-aware federated learning (FL) extension with optimization-driven aggregation weights and selective parameter-block transmission. Across (Formula presented) runs, on COCO instance segmentation the proposed method achieves 43.2 ± 0.4 APmask versus 35.2 ± 0.3 for baseline Mask R-CNN (+8.0 AP, paired t-test p < 0.001), with 65.8 ± 0.5 AP50mask and 46.9 ± 0.5 AP75mask[jls-end-space/]. On the Human-pet instance segmentation set it attains 45.8 ± 0.4 APmask versus 38.5 ± 0.4 (+7.3 AP, (Formula presented)). On ADE20K semantic segmentation it obtains 48.3 ± 0.4% mIoU versus 39.8 ± 0.3% (+8.5 points, (Formula presented)). For auxiliary classification on Human-pet, centralized training achieves 98.0 ± 0.3% accuracy and federated training achieves 98.7 ± 0.4%. Inference latency is 53.5 ± 2.1 ms/image (18.7 FPS). In the federated setting, selective updates reduce cumulative uplink communication by 42% relative to full-model transmission while preserving COCO performance at 42.1 APmask. With client-level DP-SGD, the method provides a formal privacy guarantee of (Formula presented) using a Rényi differential privacy accountant and reduces membership inference accuracy to 51.8%. These results indicate that the proposed combination improves instance-segmentation quality and communication efficiency under privacy constraints. © 2026 Elsevier Ltd. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

Author keywords- Constraint-aware graph refinement; Federated learning; Graph neural networks; Hyperparameter tuning; Instance segmentation; Mask R-CNN; Metaheuristic optimization; Multi-objective optimization; Privacy-preserving machine learning; Robustness; Selective up

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	31st	2.75	03 GOOD HEALTH AND WELL-BEING

BLOCKCHAIN-ASSISTED SECURE LOCALIZATION AND MALICIOUS NODE DETECTION IN IOT-ENABLED WIRELESS SENSOR NETWORKS VIA DUAL-DOMAIN QUANTUM-INSPIRED DEEP LEARNING

Nisha U.N.; **Pitchai S.**; Gopu A.P.; Thillaikkarasi R.

International Journal of Advanced Science and Engineering

Dr. Saravanan P
Professor
Computer Science and Engineering
Alliance School of Advanced Computing

International Journal of Advanced Science and Engineering
ISSN 2349-5359(Online) ISSN 2454-9967(Print)
A Peer Reviewed Journal ijase@mahendrapublications.com

Abstract

Wireless Sensor Networks (WSNs) enabled with the Internet of Things (IoT) are susceptible to hostile node behavior that compromises routing integrity and localization reliability. This paper describes a hierarchical malicious-node-detection and secure localization model for WSNs using IoT technologies and blockchain. To achieve practical viability, sensor nodes undertake lightweight sensing and forwarding, while preprocessing, consensus, and learning are performed at the edge and cloud layers. The UNSW-NB15 and CIC-IDS-2017 benchmark datasets are used to assess detection performance and model malicious traffic behavior. Missing or corrupted records are reconstructed using a denoising autoencoder, and optimized feature selection is performed. An authorized Byzantine Fault Tolerant blockchain system ensures the integrity of records and eliminates malicious behavior when nodes communicate. A dual-domain attention-based convolutional neural network is used to identify malicious nodes, and the network memorizes both spatial and frequency-domain interaction anomalies. The localization accuracy is evaluated independently based on Euclidean distance errors in dense, sparse, and mobile WSN deployments. Simulation experiments under controlled conditions demonstrate that, with a network density of 0.5, the detection accuracy is approximately 99%, and the localization error is between 0.42 m and 0.74 m. Though Evaluation is performed using benchmark intrusion datasets and simulation-based localization, it shows that considering trust-aware blockchain logging alongside attention-driven detection can enhance resilience against malicious-node behavior without impacting scalability or energy efficiency in IoT-WSN settings.

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Author keywords- Internet of Thing-driven Wireless Sensor Networks; localization errors; malicious node attacks; tamper-resistant communication; Wolf-Bird Optimizer

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**71st**	**5.0**	03 GOOD HEALTH AND WELL-BEING

AN ADAPTIVE ATTENTION DROPBLOCK FRAMEWORK FOR REAL-TIME CROSS-DOMAIN DEFECT CLASSIFICATION

Pasupuleti S.; **Krishnamoorthy R.**; Gunasekaran H.

AI (Switzerland)

Dr. K. Ramalakshmi
Professor
Computer Science and Engineering
Alliance School of Advanced Computing

AI (Switzerland)
Published by Multidisciplinary Digital Publishing Institute (MDPI) (Journal Finder)
eISSN : 2673-2688

Abstract

The categorization of real-time defects in heterogeneous domains is a long-standing challenge in the field of industrial visual inspection systems, primarily due to significant visual variations and the lack of labelled information in real-world inspection settings. This work presents the Adaptive Attention DropBlock (AADB) framework, a lightweight deep learning framework that was developed to promote cross-domain defect detection using attention-guided regularization. The proposed architecture integrates the Convolutional Block Attention Module (CBAM) and an organized DropBlock-based regularization scheme, creating a unified and robust framework. Although CBAM-based approaches improve localization of defect-related areas and traditional DropBlock provides a generic spatial regularization, neither of them alone is specifically designed to reduce domain overfitting. To address this limitation, AADB combines attention-directed feature refinement with a progressive, transfer-aware dropout policy that promotes the learning of domain-invariant representations. The proposed model is built on a MobileNetV2 base and trained through a two-phase transfer learning regime, where the first phase consists of pretraining on a source domain and the second phase consists of adaptation to a visually dissimilar target domain with constrained supervision. The overall analysis of a metal surface defect dataset (source domain) and an aircraft surface defect dataset (target domain) shows that AADB outperforms CBAM-only, DropBlock-only, and conventional MobileNetV2 models, with an overall accuracy of 91.06%, a macro-F1 of 0.912, and a Cohen's k of 0.866. Improved feature separability and localization of error are further described by qualitative analyses using Principal Component Analysis (PCA) and Grad-CAM. Overall, the framework provides a practical, interpretable, and edge-deployable solution to the classification of cross-domain defects in the industrial inspection setting.

Author keywords- CBAM; cross-domain classification; MobileNetV2; real-time image processing; transfer learning

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	32nd	0.8	03 GOOD HEALTH AND WELL-BEING

DEVELOPMENT OF A COGNITIVE SCREENING TOOL FOR ADULTS TO DETECT EARLY DEMENTIA AT PRIMARY CARE LEVEL: A PILOT STUDY IN SOUTHERN INDIA

Gowda R.J.; Mehta A.; Jayanna K.

Neurology India

Dr. Jeevitha Gowda R
Assistant Professor
Department of Social Sciences (Psychology)
Alliance School of Liberal Arts

NEUROLOGY INDIA
Publication of the Neurological Society of India

Abstract

Background: Dementia is an emerging public health challenge in India, particularly among older adults in rural and underserved regions. Early detection is crucial for timely intervention and care planning. However, existing screening tools, such as the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA), have limitations in low-literacy populations due to their reliance on reading, writing, and numeracy skills. In India's primary healthcare (PHC) settings—where time, training, and resources are limited—there is a critical need for a culturally appropriate, easy-to-administer cognitive screening tool. Objective: This study aimed to develop and validate a brief, culturally relevant, and literacy-independent tool—the Primary Healthcare Cognitive Screening (PHC-CS) tool—for the early detection of cognitive impairment among adults aged 50 years and above in Indian primary healthcare settings. Methods: The PHC-CS tool was developed through a multistep process, including a literature review, expert consultation, and field testing. The final 21-item tool assessed eight cognitive domains (memory, attention, language, visuospatial ability, executive function, orientation, constructional ability, and mental flexibility) using orally delivered tasks supported by visual aids. The tool was administered to 172 participants at a rural PHC in Karnataka. MoCA scores and neurologist-confirmed ICD-10 diagnoses served as reference standards. Psychometric validation included ROC curve analysis, internal consistency (Cronbach's alpha), test–retest reliability, and interrater agreement. Results: At an optimal cutoff score of <45, the PHC-CS tool demonstrated an area under the ROC curve of 0.957 (95% CI: 0.922–0.992), with a sensitivity of 95%, a specificity of 92%, a positive predictive value of 96%, and a negative predictive value of 92%. Internal consistency was strong (Cronbach's alpha = 0.90), with good test–retest reliability (r = 0.88) and interrater agreement (= 0.88). The average administration time was 15 minutes. Conclusion: The PHC-CS tool demonstrates promising preliminary validity and feasibility for routine cognitive screening in Indian PHC settings, particularly for low-literate populations. Further multicentric validation is recommended.
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Author keywords- Cognitive impairment; dementia screening; India; low literacy; MoCA; neurocognitive screening; PHC-CS tool; primary healthcare; psychometric validation; ROC analysis

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	88th	6.6	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

EFFECT OF GRAPHITE, ZINC BORATE AND PROSOPIS JULIFLORA FIBER PARTICULATES ON MECHANICAL AND THERMAL PROPERTIES OF SIDA ACUTA NATURAL FIBER REINFORCED COMPOSITES

Gopinath R.; Komala J.; **Rajeshkumar L.**; Sathishkumar T.P.; Manivel S.; Sathishkumar M.

Journal of Materials Research and Technology

Dr. Rajeshkumar L
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Journal of Materials Research and Technology
Open access

Abstract

The mechanical, water absorption, and thermal properties of Sida acuta fiber reinforced composites added with fillers such as graphite, zinc borate, and Prosopis juliflora (PJ) fiber particulates were investigated. Tensile strength of Sida acuta fiber reinforced composites attained a maximum value of 34.48 MPa and 39.59 MPa with addition of 7 wt. % graphite and 10 wt. % PJ fiber particulates. Flexural and impact strength also attained their maximum value at 7 wt. % graphite and 10 wt. % Prosopis particulate addition. Composites with graphite fillers exhibited better resistance against water absorption wherein zinc borate offered the least resistance. Fourier transform infrared spectroscopy (FTIR) analysis confirmed the existence of functional groups that govern good compatibility and dispersion of filler particles within the polymer matrix. X-ray diffraction (XRD) plots revealed a substantial increase in the crystallinity index with the addition of graphite and PJ particulates. The addition of filler particles increases the crystallite size of composites. Composite with zinc borate and graphite showed superior flame-retardant characteristics through the formation of char and subsequent suppression of flame propagation. The morphological analysis of graphite and PF fibers added specimens revealed existence of dense microstructure with less voids and less fiber pullout and debonding failures. © 2026 The Authors.

Author keywords- Fillers; Mechanical; Sida acuta fiber; Thermal; Water absorption

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	83rd	5.6	07 AFFORDABLE AND CLEAN ENERGY

SILVER-MODIFIED KNN PEROVSKITE: A LEAD-FREE ROUTE TO HIGH-PERFORMANCE ENERGY STORAGE AND PIEZOELECTRIC ENERGY HARVESTING

Sikdar A.; Nandi S.; Sanga A.P.; **Roy S.**; Dasgupta Ghosh B.

Ceramics International

Dr. Sunanda Roy
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

The increasing demand for environment-friendly and high-performance materials has driven significant research into lead-free perovskite systems for energy storage and harvesting applications. Among these, silver-doped Potassium Sodium Niobate (K, Na)NbO3 (KNN) has emerged as a promising candidate due to its excellent piezoelectric, dielectric, and energy storage properties. This study explores the structural, electrical, and functional characteristics of Ag-doped KNN ceramics, synthesized via hydrothermal route, emphasizing their potential in energy storage and piezoelectric energy harvesting. The structural analysis showed the successful formation of KNN and Ag-doped KNN filler. The structural study also showed that 3 wt% Ag-doped KNN has the highest crystallite size among the synthesized composites. Further, the dielectric and piezoelectric properties of all the samples were analyzed. The study also highlights the material's ability to efficiently convert mechanical energy into electrical energy, making it ideal for piezoelectric energy harvesting. In this case, 3 wt% Ag-doped KNN showed the highest dielectric constant of 2373 with low dielectric loss properties, indicating its high energy storage capacity. It also showed the highest piezoelectric output voltage of 28.4 V, and power density of 12.9 μWcm−2. The output voltage reaching up to 32.14 V when used as a flexible nanogenerator. These energy harvesting properties, along with already established strong structural properties and high Curie temperature, make 3 wt% Ag-doped KNN an ideal sustainable alternative for powering Internet of Things devices, wearable and implantable electronics. © 2026 Elsevier Ltd and Techna Group S.r.l. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

Author keywords- Ag-doped KNN; Energy harvesting; Hydrothermal synthesis; Lead-free perovskites; Piezoelectric properties

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**89th**	**6.0**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

A NANOBRIDGE STRATEGY TO FABRICATE MULTIFUNCTIONAL SILICONE RUBBER NANOCOMPOSITES WITH SYNERGY INTERPLAY IN ENHANCING THERMAL CONDUCTIVITY VIA BNNS-GO-PDA@MWCNT TERNARY FILLERS

Hegde M.; Chandrashekar A.; **Gopi J.A.**; Prabhu T.N.

Journal of Industrial and Engineering Chemistry

Dr. Jineesh A G
Associate Professor
Chemistry
Alliance School of Sciences



Abstract

The development of thermally conductive, electrically insulating polymer nanocomposites at lower filler concentrations presents a critical challenge in thermal management materials. In this study, we propose a potential strategy to synergistically improve the thermal conductivity of Silicone Rubber (SR) by incorporating 2-D Boron Nitride Nanosheets (BNNS), 2-D Graphene Oxide (GO), and 1-D Polydopamine-coated Multi-Walled Carbon Nanotubes (PDA@MWCNT) at 10 wt% of filler loading. The hybrid fillers, BNNS and GO, are systematically investigated in SR at varying weight ratios (8:2, 6:4, 4:6, and 2:8), identifying the optimal BNNS: GO (2:8) composition for thermal conductivity improvement. To further enhance the performance, 1-D PDA@MWCNT is incorporated as a third filler, creating continuous thermal pathways between the 2-D fillers. The SR nanocomposites were further characterised for structural, thermal, and electrical properties. The results indicated that the SR/BNNS-GO-PDA@MWCNT ternary nanocomposite demonstrated an excellent synergistic effect, resulting in significantly improved thermal conductivity compared to hybrid composites. The incorporation of 2 wt PDA@MWCNT to SR/BNNS-GO composite (2:8) resulted in a thermal conductivity of 0.743 W/m. K, which is a 223 % improvement compared to neat SR. Additionally, the improved electrical insulation properties of the developed ternary nanocomposite highlight their potential application as advanced thermal management materials.

Author keywords- Nanobridge; Silicone rubber; Synergy; Ternary nanocomposites; Thermal conductivity

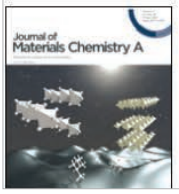
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	93rd	9.5	13 CLIMATE ACTION

DESIGN OF NOVEL ECO-FRIENDLY LIGHTWEIGHT CELLULOSE/ LIGNIN/PVA COMPOSITE XEROGELS WITH SUPERIOR THERMAL INSULATION, FLAME RETARDANCY AND CO2 CAPTURE

Roy S.; Ghosh B.D.

Journal of Materials Chemistry A

Dr. Sunanda Roy
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering



Journal of Materials Chemistry A

Abstract

Escalating global temperatures driven by unchecked CO2 emissions, inefficient waste management, and deforestation have intensified the search for sustainable, multifunctional building materials capable of addressing energy efficiency, fire safety, and carbon mitigation simultaneously. In this article, we report a novel bio-based xerogel that combines excellent thermal insulation, outstanding flame-retardancy, and significant CO2 adsorption, offering a practical and eco-friendly solution in one innovative material. The xerogel was carefully engineered using cellulose nanofibers (CNFs), lignin, and polyvinyl alcohol (PVA), crosslinked with glutaraldehyde (GA). Diammonium phosphate (DAP) was added to impart flame resistance, while diethylenetriamine (DETA) synergistically enhanced structural integrity and CO2 capture. The resulting xerogel exhibited high porosity (96.1%), low density (30.1 mg cm−3), and excellent compressive strength (569.3 ± 14 kPa at 50% strain). The compressive strength was found to be 308% higher than that of the neat CNF-xerogels (139.4 ± 11 kPa). It also demonstrated superior thermal insulation (27.6 mW m−1 K−1), 18.1% higher than CNF-xerogels (33.7 mW m−1 K−1), and remarkable fire resistance, outperforming many commercial insulators and recently reported aerogels/xerogels. In CO2 adsorption tests, the xerogel achieved a high capacity of 3.09 mmol g−1 and maintained over 98.6% regeneration efficiency across six cycles. To the best of our knowledge, this work presents the first bio-based xerogel that simultaneously addresses thermal insulation, fire safety, and CO2 capture, offering a promising pathway toward advanced green materials and circular sustainability.

Author keywords- Aerogels; Carbon dioxide; Cellulose; Energy efficiency; Environmental protection; Sustainable building; Sustainable development; Thermal insulation; Xerogels

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

BIOLOGICALLY INSPIRED NEUROMORPHIC-XAI SYNERGY FOR TRANSPARENT AND LOW-CARBON HEALTHCARE INTELLIGENCE

Sungheetha A.; Rajesh Sharma R.; Balusamy B.; Mapari S.; Karthik P.; Yogarayan S.

Scientific Reports

Dr. Akey Sungheetha
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Rajesh Sharma R
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

scientific reports

Abstract

The exponential growth of artificial intelligence in healthcare has created unprecedented computational demands, contributing significantly to carbon emissions while often lacking transparency in critical medical decisions. Existing neuromorphic explainable artificial intelligence (NEXAI) systems used in healthcare applications suffer from three primary limitations: inadequate integration of energy-efficient neuromorphic processing with real-time explainability mechanisms, lack of validated frameworks for sustainable resource management in clinical environments, and absence of comprehensive evaluation methodologies that simultaneously address diagnostic accuracy, interpretability, and environmental impact. We develop the NEXAI-Health framework by processing continuous spike streams, iteratively sampling spike rates in the range −520 spikes/s, with cycle-to-cycle variations of spikes confirming stable neuromorphic firing behavior. Event-driven thresholds are dynamically tuned to, and simulation sweeps further validate threshold drift within the narrow interval. The integrated explainability module processes gradient-based attributions using sample magnitudes −0.94, internally expanding to per-layer saliency scores across representative trials. Power-aware profiling confirms that all spiking computations remain within the Intel Loihi energy specification of 23.6 pJ per event, supporting sustainable deployment. Experimental iterations on 109,446 MIT-BIH heartbeat samples yield mean diagnostic accuracy of with explainability scores of, and projected energy-efficiency gains converging to over conventional AI baselines. Statistical validation employs 10-fold stratified cross-validation with Bonferroni-corrected paired t-tests (), demonstrating significant improvements over conventional approaches (Cohen's,). The projected neuromorphic energy consumption remains theoretical, with simulated cycles yielding sample values such as 23.6pJ−28.2pJ per spike under a modeled firing rate of −. Claims regarding biodegradable substrate integration are likewise conceptual, assuming provisional material constants −1.34 for tensile−thermal coupling. Clinical translation further mandates regulatory approval and structured physician training, while algorithmic correctness is supported through iterative validation on the MIT-BIH dataset (109, 446 labeled beats). Ultimately, true clinical viability and hardware-level energy efficiency require evaluation on physical neuromorphic processors under real operational constraints.This study presents a theoretical framework validated through software simulation using publicly available MIT-BIH Arrhythmia Database; no physical neuromorphic hardware implementation, clinical trials, or human participants were involved. © The Author(s) 2026.

Author keywords- ECG arrhythmia Detection; Energy efficient AI; Explainable aartificial intelligence (NEXAI); Low-carbon diagnostics; Neuromorphic computing; Sustainable healthcare systems

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	73rd	1.0	01 NO POVERTY

INCIDENCE, INTENSITY, AND SEVERITY OF MULTIDIMENSIONAL POVERTY IN INDIA

Ogbonna A.O.; **Deepika M.G.**

Journal of Social and Economic Development

Dr. Deepika M G
Professor
Department of Economics
Alliance School of Economics



Abstract

While methodologies for poverty measurement have evolved considerably, the Multidimensional Poverty Index (MPI) has emerged as a widely adopted global tool to identify poor, seen through deprivations across the dimensions of health, education, and living standards. Existing studies on poverty in India have primarily focused on the incidence and intensity of multidimensional poverty, often decomposing the MPI to highlight disparities across states and social groups. Building on this literature, our study extends the analysis by examining the deprivation gap and severity in deprivation among the poor. The study also decomposes the underlying deprivations across Indian states and social groups, using data from the latest three rounds of the National Family Health Survey (NFHS). Additionally, we classify the population across four thresholds—non-poor, vulnerable to poverty, moderately poor, and severely poor—to capture the heterogeneity in multidimensional poverty. Our findings underscore the importance of considering deprivation gap and severity alongside incidence and intensity, and the spread of population across the poverty profiles, as such an assessment would help to understand the dynamics of poverty below the poverty line and allow policymakers to identify the priority groups for policy formulation, targeting, and implementation. © The Author(s), under exclusive licence to Institute for Social and Economic Change 2026.

Author keywords- Deprivation gap; India; Intensity of poverty; Multidimensional poverty; Poverty thresholds; Severity of deprivation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**71st**	**2.7**	03 GOOD HEALTH AND WELL-BEING

EXPLAINABLE AI FRAMEWORK FOR PSILOCYBIN DEPRESSION TREATMENT OPTIMIZATION

Sungheetha A.; Rajesh Sharma R..; Aroba O.J.; **Mahapatra S.**; Mahendhiran P.D.

Frontiers in Computer Science

Dr. Akey Sungheetha
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Rajesh Sharma R
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Sheila Mahapatra
Professor
Electrical & Electronics Engineering
Alliance School of Applied Engineering



Abstract

Introduction: This computational modeling study introduces a novel Explainable Artificial Intelligence (XAI) framework for optimizing single-dose psilocybin treatment protocols through personalized intervention modeling using publicly available mental health datasets. All results presented are derived from novel simulated data and predictive modeling only, not from real-time clinical implementations or actual patient treatments. Methods: The mathematical optimization model integrates digital twin technologies, multimodal depression detection systems, and Bayesian optimization algorithms to create comprehensive computational patient profiles with temporal resolution processing capabilities at 250 Hz sampling frequency. Validation employed three publicly available datasets: (1) the Psilocybin Precision Functional Mapping dataset from OpenNeuro containing neuroimaging data from 7 participants, (2) the MODMA multimodal mental disorder dataset with 53 participants including electroencephalography and audio signals, and (3) a meta-analytic psilocybin therapy outcomes dataset containing aggregated results from 10 clinical trials. The framework incorporates pharmacokinetic modeling with an absorption rate constant of 0.45 per hour and an elimination rate constant of 0.23 per hour, receptor occupancy dynamics based on a dissociation constant of 6.3 nanomolar, and simulated real-time monitoring protocols processing physiological parameters including heart rate variability, blood pressure measurements, and cortisol levels at a 1 Hz frequency. Results: The simulated computational model demonstrates significant improvements in prediction accuracy, reaching 94.7%, and therapeutic transparency, achieving 89.3% explainability scores. Simulated validation demonstrates computational precision of 92.8% in predicting treatment response patterns across diverse patient populations in silico. The proposed computational methodology addresses key challenges in psychedelic-assisted therapy modeling through interpretable artificial intelligence models, achieving 96.2% computational safety index scores and 91.5% algorithmic compliance metrics in simulation environments. Energy-efficient computational architecture achieves 73.4% carbon footprint reduction through optimized algorithm design and sparse matrix representations. Discussion: This study presents a theoretical computational framework for modeling therapeutic outcomes through simulation and prediction, establishing a foundation for future clinical validation through prospective randomized controlled trials. The framework supports sustainable digital mental healthcare delivery systems compatible with renewable energy infrastructure. All findings represent computational predictions and simulated scenarios requiring extensive clinical validation before any practical application. Copyright © 2026 Sungheetha, Rajesh Sharma, Aroba, Mahapatra and Mahendhiran.

Author keywords- computational modeling; depression treatment optimization; digital twin technology; explainable artificial intelligence; personalized medicine; psychedelic therapy simulation

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	89th	7.6	07 AFFORDABLE AND CLEAN ENERGY

H-CLAS: A HYBRID CONTINUAL LEARNING FRAMEWORK FOR ADAPTIVE FAULT DETECTION AND SELF-HEALING IN IOT-ENABLED SMART GRIDS

Babu T.; Nair R.R.; Balusamy B.; Yogarayan S.

IoT

Dr. Tina Babu
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Rekha R Nair
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

The rapid expansion of Internet of Things (IoT)-enabled smart grids has intensified the need for reliable fault detection and autonomous self-healing under non-stationary operating conditions characterized by frequent concept drift. To address the limitations of static and single-strategy adaptive models, this paper proposes H-CLAS, a novel Hybrid Continual Learning for Adaptive Self-healing framework that unifies regularization-based, memory-based, architectural, and meta-learning strategies within a single adaptive pipeline. The framework integrates convolutional neural networks (CNNs) for fault detection, graph neural networks for topology-aware fault localization, reinforcement learning for self-healing control, and a hybrid drift detection mechanism combining ADWIN and Page–Hinkley tests. Continual adaptation is achieved through the synergistic use of Elastic Weight Consolidation, memory-augmented replay, progressive neural network expansion, and Model-Agnostic Meta-Learning for rapid adaptation to emerging drifts. Extensive experiments conducted on the Smart City Air Quality and Network Intrusion Detection Dataset (NSL-KDD) demonstrate that H-CLAS achieves accuracy improvements of 12–15% over baseline methods, reduces false positives by over 50%, and enables 2–3× faster recovery after drift events. By enhancing resilience, reliability, and autonomy in critical IoT-driven infrastructures, the proposed framework contributes to improved grid stability, reduced downtime, and safer, more sustainable energy and urban monitoring systems, thereby providing significant societal and environmental benefits.
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Author keywords- convolutional neural networks; Elastic Weight Consolidation (EWC); graph neural networks (GNNs); Model-Agnostic Meta-Learning (MAML); reinforcement learning (RL)

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	80th	4.7	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

Dr. P Senthamaraikannan
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering

spe INSPIRING PLASTICS PROFESSIONALS POLYMER COMPOSITES

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. © 2025 Society of Plastics Engineers.

Author keywords- Cissus quadrangularis; genetic algorithm optimization; injection molding; orthopedic fixture; PLA; sustainable composites

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

A HYBRID XGBOOST–SVM ENSEMBLE FRAMEWORK FOR ROBUST CYBER-ATTACK DETECTION IN THE INTERNET OF MEDICAL THINGS (IOMT)

Abdelhaq M.; **Palanisamy S.**; Gopinath M.; Manasa V.G.S.; Ram M.A.; MD S.K.

Scientific Reports

Dr. Satheesh Kumar P
Assistant Professor
Electronics and Communication Engineering
Alliance School of Applied Engineering

scientific reports

Abstract

Today, the rise of the Internet of Medical Things (IoMT) has evolved into a highly valued global market worth billions of dollars. However, this growth has also created many opportunities for massive and advanced attack scenarios due to the vast number of devices and their interconnected communication networks. Based on recent reports, it is observed that during the Covid-19 pandemic, the necessity of the IoMT ecosystem has increased significantly. On the other hand, attackers and intruders aim to impair data integrity and patient safety with the prevalence of sophisticated cyber attacks including Man in the Middle (MITM) attacks like spoofing and data injection. In this research work, WUSTL-EHMS-2020 dataset is utilized to demonstrate a robust IoMT cyberattack detection method based on machine learning and the efficiency of the proposed model is validated by employing TON-IoT and CICIDS 2017 datasets. We offer an ensemble approach that employs Extreme Gradient Boosting (XGBoost) and Support Vector Machine (SVM) classifiers to address the exclusive challenges in IoMT security. By utilizing the complementing advantages of SVM's decision boundary precision and XGBoost's gradient-based optimization, our model outperforms baseline techniques with a superior detection accuracy of 98.04% with WUSTL-EHMS-2020 dataset. In addition, the practicality of the proposed model is examined by considering peculiar features of IoMT like resource restrictions, medical device communication diversity, and healthcare data privacy by comparing with IoMT and IoT datasets by exposing the patterns of cyberattack in dynamic IoMT environment. Hence, this research will be considered as the pioneer for developing reliable IoMT security solutions by adapting trustworthy and scalability.

Author keywords- Cyber attacks; IoMT; Machine learning; Soft voting; SVM; XGBoost

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	25th	3.3	11 SUSTAINABLE CITIES AND COMMUNITIES

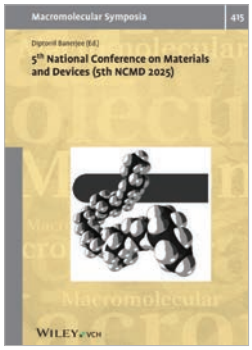
EFFECT OF BAMBOO FIBER INCORPORATION IN COMPRESSIVE AND TENSILE STRENGTH FOR FLY-ASH BASED CONCRETE

Asha Rani. N.R.; Thapa S.; **Devaiah N.G.**; Mayura B.S.; M Reddy K.; Patni J.C.

Macromolecular Symposia

Ms. Asha Rani N R
Assistant Professor
Civil Engineering
Alliance School of Applied Engineering

Dr. Devaiah N G
Professor
Alliance School of Law



Abstract

Fly ash waste obtained from the coal industry has been studied multiple times as a potential cementitious replacement in concrete construction. Multiple previous studies described higher fly ash replacement (above 20%) in concrete show a decrease in mechanical properties in comparison to normal ordinary Portland cement (OPC) based concrete. Although fly ash based concrete is sustainable in comparison to OPC based concrete. The applications of this material are limited in the construction industry due to higher brittleness at a larger replacement percentage. In this study, specimens were prepared by replacing OPC with fly ash by 30%. This study investigates the compressive and tensile strength variation in fly ash-based concrete due to the addition of different percentages of sustainable bamboo fiber. The tests were conducted in various curing intervals i.e. 14, 28, 45, 60, 75, and 90 days. The bamboo fiber was used from 1% upto 10% weight of cement. The incorporation of bamboo fiber up to 4% increases the compressive strength by 15.1%, and similarly bamboo fiber up to 5% increases split tensile strength by 10.88%. Addition of bamboo fiber in fly-ash concrete provides better load distribution due to interconnections between different sections of the concrete specimen even after crack formations during compressive strength and tensile strength testing, resulting in better results. Reduction in both mechanical properties of concrete above optimum fiber percentage was observed, due to reduced workability, unequal fiber distribution, and increased porosity, which impaired the development of strength.
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Author keywords- bamboo fiber; compressive strength; eco-friendly concrete; fly ash concrete; split tensile strength

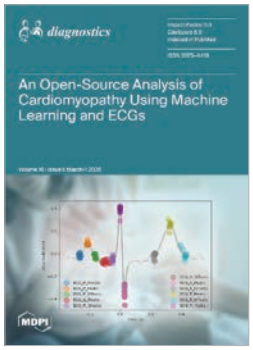
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	72nd	3.3	03 GOOD HEALTH AND WELL-BEING

A SOPHISTICATED ONSCREEN SMART FRAMEWORK FOR PREDICTING DIABETES IN REMOTE HEALTHCARE

Seerangan K.; Gunasekaran P.; Sivakumar N.R.; Ravi Nair R.; Nandagopal M.; **Eralil Abi N.**; Manogaran N.

Diagnostics

Dr. Neeba E A
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Background/Objectives: Diabetes is one of the most familiar and common diseases among people currently, and is a type of metabolic disease that is caused due to high levels of sugar in the blood for longer periods of time. If the disease is predicted at an earlier stage, the severity and risks associated with diabetes are significantly reduced, which helps to save the lifespan of people. In earlier investigations, various kinds of automated models based on artificial intelligence (AI) were developed for this purpose. However, key issues still revolve around the lack of robustness, dependability, and precise prediction. The motivation behind the proposed study is to design and develop an automated tool for the diagnosis of chronic disease with the use of novel AI methodology. Methods: For this purpose, a new detection framework is introduced, known as the Brass Optimized Learning-Based Diabetes Prediction (BOLD) model for remote healthcare applications. By using this kind of optimization-integrated deep learning technique, the overall performance and efficiency of the diabetes detection system are maximized. This framework preprocesses the input diabetes dataset before performing the data splitting, normalization, and cleaning activities. Next, the best attributes for improving the prognostic performance of the classifier are chosen using the Brassy Pelican Optimization (BPO) procedure. The Hunting Optimized Recurrent Neural Network—Long Short-Term Memory (RNN-LSTM) method is used to categorize the people into those who are diabetic and those who are not based on the chosen attributes. The approach employs a Deer Hunting Optimization (DHO) method to choose the hyperparameters needed to make an informed choice. A variety of parameters have been employed to confirm the results, which are evaluated for performance verification using the PIDD, Indonesia diabetic database, and kidney disease dataset. Results: The BOLD framework is successful to the extent that it has been able to achieve several metrics of comparably good results, such as an RMSE value of 0.015, a Cohen's Kappa measure of 0.99, a precision of 0.991, a recall of 0.99, an accuracy equal to 0.996, and an AUC equal to 0.99. Conclusions: It is also remarkable that a very short time of 0.8 s was enough for it to deliver this kind of performance, making it a neat combination of both time and power efficiency.
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Author keywords- Artificial Intelligence (AI); Brass Optimized Learning-based Diabetes Prediction (BOLD); Brassy Pelican Optimization (BPO); classification; Deep Learning (DL); Deer Hunting Optimization (DHO); diabetes prediction; Recurrent Neural Network—Long Short Term

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	49th	0.80	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

PRECLUSION OF CARBIDE SEGREGATION AND ENHANCING MECHANICAL STRENGTH OF INCONEL 690 THROUGH PCGTAW PROCESS

Sivalingam S.; Sathishkumar M.; Porchilamban S.; **Rajeshkumar L.**

Chiang Mai Journal of Science

Dr. Rajeshkumar L
Professor
Mechanical Engineering
Alliance School of Applied Engineering

Chiang Mai Journal of Science

Abstract

Superalloys based on nickel find common usage in high temperature corrosive conditions, where conventional stainless steels cannot be used due to stress corrosion cracking. Inconel 690 made of around 30 wt.% chromium has proven to have resistance to oxidation and intergranular attack. But microsegregation of alloying elements is common in welding resulting in the formation of chromium carbides deteriorating mechanical properties. The impact of filler metals, ERNiCrFe-7 (I52) and ERNiCr-3 (I82), on microsegregation, microstructural development, and mechanical properties of Inconel 690 weldments made via pulsed current gas tungsten arc welding (PCGTAW). The pulse current minimized the use of heat input with 0.922 for I52 fillers and 0.865 for I82 fillers and enhanced the microstructure of fusion zones. SEM/EDS also showed that the amount of chromium carbide segregation in the I52 weldments was considerably less than in the I82 weldments. As a result, I52 weldments had better tensile strength of 681.53 MPa and better impact toughness of 63 J. Fractographic studies revealed the presence of finer and uniformly distributed dimples in I52 weldments, signifying better energy absorption. These results indicate that the synergistic interaction between the optimized filler chemistry (I52) and PCGTAW has potential in restricting microsegregation, driving metallurgical stability, and building better mechanical reliability of Inconel 690 weldments used in critical high-temperature applications.
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Author keywords- chromium carbides; inconel 690; mechanical properties; microsegregation; pulsed current GAS tungsten arc welding

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	99th	2.5	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ADAPTIVE SEMANTIC INTEGRITY AND PRIVACY SHIELDING IN AGENTIC AI NETWORKS FOR TRUSTWORTHY 6G COGNITIVE COMMUNICATION SYSTEM

Senbagavalli M.; Debnath S.; Vaneeta M.; Arumugam T.; Beena B.M.; Prajapat S.

IEEE Communications Standards Magazine

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

Dr. Saswathi Debnath
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

IEEE Communications Standards Magazine

Abstract

The 6G cognitive communication systems are evolving very fast and present novel autonomy, semantic awareness, and agent-driven decision intelligence. Since agentic AI systems dynamically communicate through sharing contextual knowledge to make optimal use of the communication resources, it allows the capabilities of self-learning, the integrity, privacy, and trust become a pressing issue. Traditional cryptographic and authentication systems are incapable of securing the changing semantic data structures and dispersed collaborative AI activities. The new 6G cognitive system is susceptible to semantic manipulations, adversarial reasoning, identity fraud, and privacy intrusion as a result of distributed reasoning, cross-agent cooperation, and real-time training. Such threats undermine reliability, transparency, and trust of the users. This paper proposes AI-SHIELD (Adaptive Intelligence Shield for Hierarchical Explainable Learning and Distributed Security), a new multilayer security model, that incorporates self-adaptive semantic validation, embedding of differentially private, cross-agent trust consensus, and explainable decision auditing. The AI-SHIELD is an active knowledge exchange assessor based on a hybrid semantic fingerprinting model and implements agent negotiation based on federated reinforcement learning at the cost of privacy. The results of simulation show decreased inference attacks by 41%, enhanced semantic consistency by 37%, and better metrics of explainability without compromising the communication latency. AI-SHIELD strengthens trust, resilience, and transparency of agent-based 6G cognitive networks to facilitate autonomous communications at large scale securely.
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Author keywords- Artificial intelligence; Authentication; Autonomous agents; Cognitive systems; Distributed computer systems; Intelligent agents; Knowledge transfer; Network security; Shieldinglearning; Robustness; Selective up

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	84th	4.1	16 PEACE, JUSTICE AND STRONG INSTITUTIONS

DATAFICATION OF MOURNING: EMOTIONAL LABOUR, MEMORY POLITICS, AND ETHICAL INNOVATION IN DIGITAL GRIEF TECHNOLOGIES

Thommandru A.; Mone V.

Journal of Responsible Technology

Dr. Abhishek Thommandru
Assistant Professor
Alliance School of Law

Dr. Varda Mone
Assistant Professor
Alliance School of Law



Abstract

This paper explores how digital technologies like artificial intelligence, blockchain archives, and platform-specific memorial systems change the grieving phenomenon. It examines how datafication processes, which transform emotional labour into content that is managed by algorithms, also redefine grief expression and remembrance and bring up ethical issues of commodification, privacy and consent. The discussion points out the historical continuities of mediated grief and how the traditional memorial artefacts were replaced by interactive digital settings and deals with the psychosocial consequences of long-term digital interaction with grieving. The most significant ones are ownership and control of digital legacies, being biased by an algorithm, the nature of representation and visibility, and the political aspects of collective mourning on the Internet. Relying on the principles of Responsible Research and Innovation (RRI), the work promotes the use of interdisciplinary methods in attaching human-centred design, ethics, sociocultural understanding, and legal changes to prevent the exploitation and inequality of digital afterlife technologies by applying humanistic, ethical, sociocultural and legal values and concerns.

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Author keywords- Algorithmic bias; Datafication; Digital legacies; Digital mourning; Ethical frameworks

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	97th	8.9	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

A MULTI-LAYERED FRAMEWORK FOR ADAPTIVE AND OPTIMIZED REAL-TIME DATA PROCESSING IN EDGE-FOG IOT ENVIRONMENTS

Pradeep Ghantasala G.S.; Ioannou I.; Kolla T.; Vidyullatha P.; **Vijayalakshmi N.**; Michalis S.; Vassiliou V.

IEEE Internet of Things Journal

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

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

IEEE
INTERNET OF THINGS JOURNAL

Abstract

Real-time Internet-of-Things (IoT) analytics in smart cities demand millisecond-scale responsiveness and energy efficiency requirements that challenge cloud-only deployments, which struggle with latency and bandwidth constraints. In brief, this paper presents a unified three-layer edge-fog decision stack comprising (i) queueing-theoretic performance modeling, (ii) NSGA-II Pareto-based offline trade-off mapping, (iii) a training-free Genetic-Algorithm Offloader for online adaptation, (iv) formal tail-latency guarantees, and (v) comprehensive validation through both simulation and a Raspberry Pi/Jetson prototype. We introduce a novel three-layer decision framework that couples a queueing-theoretic edge-fog pipeline with offline Pareto optimization and online adaptation. Our key contributions are: (1) an analytical model, validated through simulation, demonstrating edge latency of 10 ± 2 ms and fog latency of 40 ± 10 ms (processing time only, excluding network RTT); (2) NSGA-II-based offline optimization yielding Pareto-optimal configurations that reduce energy and cost by 32.6% while adding only 0.7 ms of latency; (3) A novel training-free Genetic-Algorithm Offloader (GAO) for real-time adaptation, eliminating the costly training phase required by DRL; (4) Formal tail-latency guarantees via Kingman's bounds that ensure provable SLA compliance; and (5) a comprehensive evaluation against 15 baselines, including state-of-the-art DRL and hybrid approaches. In simulation, GAO achieves 2.03 ms 99th-percentile latency (4.7× better than the strongest DRL baseline, GNN-SAC, and 8× better than vanilla DQN), 100% SLA compliance, and 25% energy reduction. On a Raspberry Pi 5 and NVIDIA Jetson Orin Nano hardware prototype, GAO achieves 18.2 ms p99 latency and outperforms Azure IoT Edge, KubeEdge, and Eclipse ioFog by over 30% on latency and 22% on energy. © 2014 IEEE.

Author keywords- Adaptive Systems; Edge Computing; Fog Computing; Genetic Algorithms; Green Smart Cities; Latency-Energy Trade-offs; Multi-Objective Optimization; Real-Time IoT

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	**71st**	**2.9**	07 AFFORDABLE AND CLEAN ENERGY

TAILORED YB@SRMOO4/MOS2 HYBRID NANOSTRUCTURES: APPLICATION IN HIGH-PERFORMANCE ASYMMETRIC SUPERCAPACITORS

Kumar A.; **Kumar K.Y.**; Avadhani D.N.; Prasanna B.P.; Raghu M.S.; Jeon B.-H.; Prasana B.P.

Topics in Catalysis

Dr. Yogesh Kumar K
Professor
Chemistry
Alliance School of Sciences



Abstract

A simple method for the fabrication of Yb doped SrMoO4, MoS2 and Yb@SrMoO4/MoS2 was developed using precipitation aided hydrothermal method. The structural, morphological and x-ray photoelectron spectroscopy (XPS) confirms the formation of nanocomposite and occurrence of mixed oxidation states. All the three materials were subjected to electrochemical studies towards supercapacitor applications in three electrode system and showed pseudocapacitor behaviour in the Yb@SrMoO4/MoS2 nanocomposite. Due to the combined effect of Yb@MoO4 and MoS2, Yb@SrMoO4/MoS2 nanocomposites exhibited superior electrochemical activity when compared to counter parts. The specific capacitance values recorded at a scan rate of 10 mV s ^{1} were 724, 121, and 29 F g ^{1} for Yb@$SrMoO_4$/MoS_2, Yb@$SrMoO_4$, and MoS_2, respectively. Among these, the Yb@$SrMoO_4$/MoS_2 electrode demonstrated superior electrochemical performance, achieving a notable power density of 750 W kg ^{1} and an energy density of 75.4 Wh kg ^{1} at a current density of 0.5 A g ^{1}. Furthermore, this electrode showed commendable cycling durability, retaining 87% of its initial capacitance even after 5000 charge–discharge cycles. An asymmetric supercapacitor device (ASD) was fabricated using Yb@$SrMoO_4$/MoS_2 as the positive electrode and activated carbon as the negative counterpart. This configuration delivered a specific capacitance of 78 F g ^{1} at a scan rate of 5 mV s ^{1} and maintained 92.5% of its original capacitance during stability testing. © The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2025.

Author keywords- Device fabrication; MoS2; Pseudocapacitors; Yb@SrMoO4

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	72nd	5.4	13 CLIMATE ACTION

SOLVENT FREE LUX FLOOD MOLTEN SALT METHOD FOR THE SYNTHESIS OF $Gd_2Ru_2O_7$ / RuS_2 HETEROSTRUCTURE FOR PHOTOCATALYTIC CO_2 REDUCTION AND BPA DEGRADATION

Kumar K.Y.; Alhamzani A.G.; Abdelrahman E.A.; Varghese A.; Prashanth M.K.; Raghu M.S.

Inorganic Chemistry Communications

Dr. Yogesh Kumar K
Professor
Chemistry
Alliance School of Sciences



Abstract

The current study focuses on dual functionality for achieving sustainable renewable energy generation and sustainable environmental remediation. A molten salt flux method has been developed for the formation of pyrochlore $Gd_2Ru_2O_7$ (GdRuO), RuS_2 (RuS) and GdRuO/RuS heterostructures. All three synthesized materials were characterized for their structural and morphological studies and confirm the formation of effective oxide-sulphide interaction through the formation of heterostructure of type-II. Catalysts were examined for their bifunctionality towards light driven carbondioxide reduction reaction (CRR) and degradation of bisphenol A (BPA). Enhanced activity was found in the GdRuO/RuS heterostructure and found to evolve 53, 132 and 75 μmol h−1 of H_2, CO and CH_4, respectively. The stability of GdRuO/RuS for CRR was examined and found to evolve 1045, 1421 and 2234 μmol respectively for H_2, CH4 and CO at 24 h. In-situ DRIFT-IR and GC–MS results confirm the formation of carbonaceous products due to CO_2 reduction. GdRuO/RuS showed superior efficiency towards BPA degradation and was found to degrade 84.3, 94.1, and 98% under UV, visible, and solar light sources, respectively. Computational studies on the degradation of BPA were carried out using the Gaussian 09 W computational program based on the DFT/B3LYP (hybrid functionals)/6–31G(d,p). The energy profile thermodynamic studies suggest the light-driven degradation of BPA is found to be spontaneous and exothermic in nature. Based on the scavenger studies and theoretical observations, a photocatalytic mechanism has been predicted and shows the formation of type –II heterostructure between GdRuO and RuS through an oxygen-sulfide interface. Real sample analysis and stability studies show the effective and probable practical applicability of the GdRuO/RuS heterostructure for future energy and environmental remediation.
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Author keywords- BPA degradation; CO2 reduction; Heterostructure: Pyrochlore; Photocatalysis; Solvent free lux flood molten salt

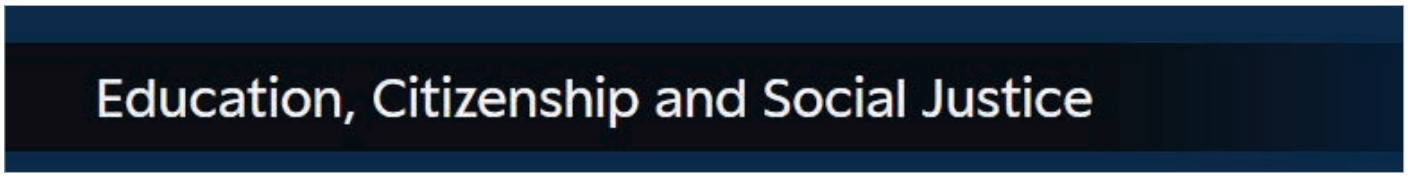
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	59th	1.3	04 QUALITY EDUCATION

NATION AND ITS STUDENTS: REFLECTIONS ON EDUCATIONAL ACTIVISM FROM A PUBLIC UNIVERSITY IN DELHI, INDIA

Sinha S.

Education, Citizenship and Social Justice

Dr. Soumodip Sinha
Assistant Professor
Department of Social Sciences(Sociology)
Alliance School of Liberal Arts



Abstract

This article examines contemporary facets of student mobilization that unfolded with the introduction of the Citizenship Amendment Act of 2019 (CAA). Taking cues from a premier public university in India, the article explores how CAA-driven activism enabled the political socialization of students, and how such a process was entangled with their identities and ideologies. It provides an ethnographic description of student mobilizations for and against the amended citizenship laws to show that (1) the space of the university has witnessed a steady resurgence insofar as the questions of nationalism and nation-building are concerned, (2) higher education in India is at a paradoxical crossroads, and is traversing through rapid neoliberalisation and burgeoning religious nationalism, and (3) 'competing nationalisms' between student organizations are on display, where each group believes that their idea of the nation is more suitable than another. Using Pierre Bourdieu's conceptual armory, the article's contribution lies in arguing that campus activism leads to the formation of dispositions that enable and assist in the production of political capital among student activists. It concludes that the university then serves as a platform and creates further pathways for accumulating such capital. © The Author(s) 2024

Author keywords- citizenship; Delhi; nation; Pierre Bourdieu; political capital; university

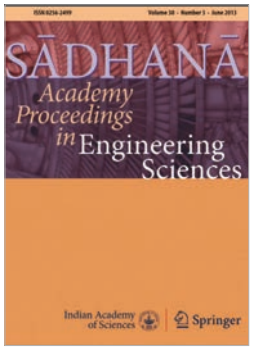
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	75th	1.4	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

STATIC AND DYNAMIC INSTABILITY CONTROL OF THE SANDWICH COMPOSITE BEAM COATED WITH VIBRATION-DAMPING COMPOUND

Gupta A.; Mishra V.N.

Sadhana - Academy Proceedings in Engineering Sciences

Dr. Abhay Gupta
Assistant Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

This study proposes a novel passive damping configuration to enhance the static and dynamic stability of sandwich composite (SWC) beams using vibration-damping compound (VDC) coatings. In the proposed design, commercial damping materials, including high-stiffness-based Decidamp SP450 material and low-stiffness-based butyl rubber material, are applied as thin coatings on the outer surfaces of the stiff face layers of the SWC beam. This approach introduces dual-mode energy dissipation through axial deformation (extension/compression) in the coated layers and shear deformation in the viscoelastic core of the VDC-coated SWC beams. A finite element model based on higher-order layer-wise theory is developed to assess the critical buckling load, damping capacity, and parametric instability behavior. The studies include the influence of VDC material properties and coating thickness. Comparative analysis reveals that the Decidamp-coated SWC beam achieves a 3.124% increase in critical buckling load and a 5.02% enhancement in damping compared to the conventional SWC beam, whereas butyl rubber exhibits lower improvements. Additionally, the performance improvements are more pronounced with increased coating thickness. The coating material and its thickness serve as key tuning parameters for tailoring the structural response. The findings highlight the effectiveness and practical potential of VDC-coated SWC beams for passive vibration and instability control in flexible structures, offering a viable design alternative using commercially available damping materials.
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Author keywords- buckling analysis; coating; damping; passive vibration control; Sandwich composite structure; static and dynamic instability

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	94th	9.8	07 AFFORDABLE AND CLEAN ENERGY

SUSTAINABLE AUGMENTATION OF TUBULAR SOLAR STILL PERFORMANCE USING CARBONISED CUSTARD APPLE SEEDS AS ENERGY STORAGE MATERIAL: A WASTE-TO-EXERGY APPROACH WITH MULTI-DOMAIN ASSESSMENT

Noman S.; Manokar A.M.; **Mahapatra S.**; Pqurushothaman R.; El-Sebaey M.S.; Alrashidi A.

Journal of Energy Storage

Dr. Sheila Mahapatra
Professor
Electrical & Electronics Engineering
Alliance School of Applied Engineering



Abstract

This study aims to use biowaste materials such as custard apple seeds (CAS), which are subjected to carbonisation in a muffle furnace to enhance their absorption capacity and surface area. The prepared material is utilised in the tubular solar still (TSS) system to improve the modified structure's water production and thermal and exergy conditions. This research further discusses the impact of carbonised material on economic, environmental, exergo-economic, exergo-environmental, and sustainability assessments in the Modified Tubular Solar Still (MTSS) which is compared with the conventional tubular solar still (CTSS) system. The experimental work revealed that using carbonised CAS in the TSS system, yielded a freshwater generation of 4.88 kg/m2. In contrast, the same for the CTSS system is measured to be 2.27 kg/m2, resulting in an augmentation of 115.5% in the MTSS model over the CTSS model. The mean daily energy efficiency for the MTSS system was 41.2%, while for CTSS it was 18.8%. Similarly, exergy efficiencies of 3.95% and 1.34% were achieved for the MTSS model with carbonised material and the CTSS structure, respectively.
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Author keywords- Biowaste material; Carbonised material; Custard apple seeds; Desalination; Energy storage; Water purification

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	86th	3.6	03 GOOD HEALTH AND WELL-BEING

MULTIMODAL FUSION OF DEEP TRANSFER LEARNING WITH WAVELET NEURAL NETWORK FOR AUTISM SPECTRUM DISORDER DETECTION USING FACIAL IMAGES

Shaik J.; **Shekhar R.; Shelke C.J.**

Multimedia Tools and Applications

Dr. Shekhar R
Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Chetan J Shelke
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Autism spectrum disorder (ASD) is a complex psychological disease described by persistent problems in restricted behaviours, speech, social interaction, and non-verbal communication. Individuals with ASDs have trouble identifying and connecting with others. The ASD symptoms might arise in an extensive range of conditions. Many dissimilar kinds of functions exist for individuals with ASD. Emerging expert methods for recognising ASD that depend on the facial signs of children are one of the foremost contributions for perceiving ASD at an initial phase. At present, deep learning (DL) models have delivered excellent performance in a diversity of pattern recognition tasks. The utilization of models that depend on convolutional neural networks (CNNs) was projected by numerous researchers to be utilized in the study of ASD. In this paper, an innovative methodology called Deep Feature Fusion Integrated with Wavelet Neural Network for Autism Spectrum Disorder Identification (DFFWNN-ASDI) utilizing facial images is proposed. The primary goal of the DFFWNN-ASDI technique is to serve as a promising diagnostic aid in clinical settings for the early and non-invasive detection of autism. Initially, the DFFWNN-ASDI technique performs pre-processing by utilising the Gaussian Gabor Filter (GGF) to enhance relevant facial features and suppress noise. Furthermore, a feature fusion strategy is implemented by incorporating deep features extracted from VGG16, DenseNet-121, and XceptionNet models, ensuring a rich and diverse representation of facial cues relevant to ASD. Moreover, the wavelet neural network (WNN) technique is employed for detecting ASD. Additionally, the chimp optimisation algorithm (COA) technique is implemented for optimal tuning of WNN parameters to enhance classification performance. Eventually, the Grad-CAM + + technique is applied to provide visual interpretation and abnormality detection. To establish the improved performance of the DFFWNN-ASDI approach, an extensive set of simulations was conducted under the autism image dataset. The comparison outcomes of the DFFWNN-ASDI model established a greater accuracy value of 98.42% compared to existing approaches across diverse metrics. © The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2026.

Author keywords- Autism Spectrum Disorder; Chimp Optimisation Algorithm; Deep Learning; Facial Images; Wavelet Neural Network

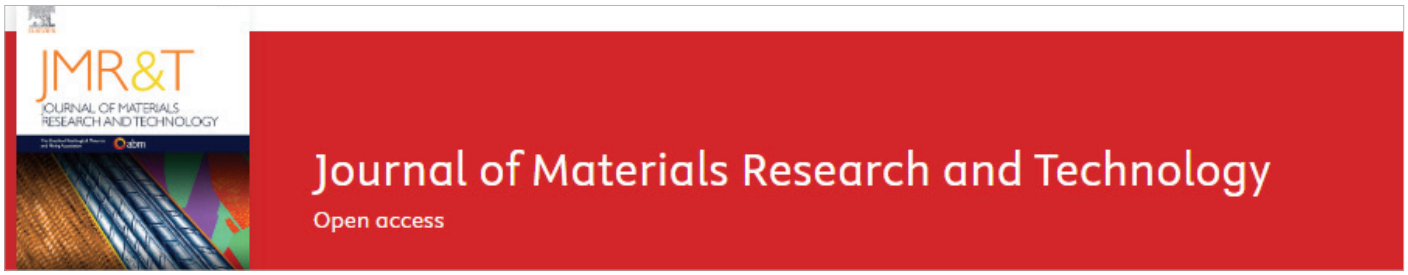
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**88th**	**6.6**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

METALLIC ADDITIVE MANUFACTURING: STATE-OF-THE-ART, PROCESS-STRUCTURE-PROPERTY RELATIONSHIPS, AND EMERGING TRENDS

Arunprasath K.; Shanawaz A.M.; Kavitha S.; Narayanaperumal S.; **Solaman Bobby S.**; Velmurugan G.

Journal of Materials Research and Technology

Dr. Solaman Bobby
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

The Metal Additive Manufacturing (AM) has become a revolutionary manufacturing paradigm which facilitates the production of complex, lightweight and high-performance parts which are more design flexible compared to the traditional subtractive manufacturing. The review discusses the leading metal 3D printing technologies and they include Selective Laser Melting (SLM), Direct Metal Laser Sintering (DMLS), Electron Beam Melting (EBM), Directed Energy Deposition (DED), and Binder Jetting. The experiment examines how the feedstock properties, especially powder morphology and wire based materials affect the process stability and quality of the part. Moreover, the most important process parameters, including laser power, scanning speed, and thermal conditions are addressed in connection with microstructure development, defect formation and residual stresses. Mechanical performance such as tensile strength, hardness, fatigue resistance, and anisotropy are measured and methods of post-processing are measured through heat treatment, hot isostatic pressing, and surface finishing. The review also shows new industrial uses and explains the existing issues in terms of cost, reproducibility, certification, and sustainability, as well as describes the future research opportunities in multi-material printing, in-situ monitoring, and AI-based optimization of processes. © 2026 The Authors.

Author keywords- Artificial intelligence (AI) supported optimization; Directed energy deposition (DED); Mechanical properties; Metal 3D printing; Selective laser melting (SLM)

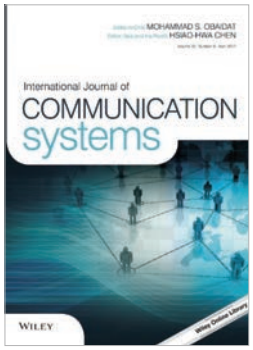
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	76th	1.8	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

DYNAMIC POWER-AWARE ROUTING AND FLOW MANAGEMENT FOR SCALABLE 3D WIRELESS NETWORK-ON-CHIP COMMUNICATION SYSTEMS

Kumar T.; **Nanjappan V.**; Gopal D.

International Journal of Communication Systems

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



Abstract

The purpose of this research is to develop an efficient and scalable communication framework for 3D Wireless Network-on-Chip (WiNoC) systems by introducing dynamic, power-aware routing and intelligent flow management techniques. Traditional routing approaches often suffer from high power consumption, congestion, and limited adaptability, which hinder the performance and energy efficiency of densely integrated, multi-layer chip architectures. To overcome these limitations, this work proposes DynaQ-NoC, an intelligent and scalable communication framework that leverages reinforcement learning to enable routers to make autonomous, context-aware routing decisions based on local traffic, thermal, and power conditions. At its core, DynaQ-NoC employs a Q-learning-based dynamic routing algorithm integrated with adaptive flow control mechanisms to balance network load, mitigate thermal hotspots in real-time, and ensure energy-efficient communication. Intelligent routing decisions are made dynamically to avoid congested or overheated regions, improving latency and reliability. Furthermore, DynaQ-NoC introduces energy-saving features such as sleep-mode activation for idle links and efficient link utilization policies, which significantly contribute to reduced static energy consumption. The proposed system was implemented using Python and evaluated with a cycle-accurate 3D WiNoC simulator using realistic traffic patterns. Results demonstrate that DynaQ-NoC reduces power consumption by up to 30% compared to baseline methods and achieves an average power consumption of 82.3 mW. It also reduces latency by approximately 16% and maintains a routing decision accuracy of up to 92%. The system sustains a packet delivery ratio of over 95% under moderate traffic loads while ensuring high throughput scalability. These results validate DynaQ-NoC's potential for enhancing system reliability, thermal stability, and energy efficiency in next-generation multi-core and 3D integrated circuits. © 2026 John Wiley & Sons Ltd.

Author keywords- 3D wireless network-on-chip; data congestion; latency; power-aware; routing

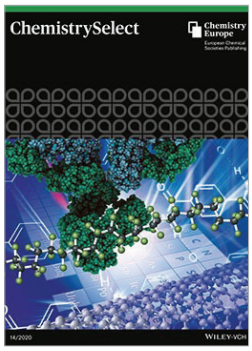
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	**45th**	**2.0**	03 GOOD HEALTH AND WELL-BEING

THERAPEUTIC POTENTIAL OF MORIN IN ALZHEIMER'S DISEASE: AN INTEGRATED NETWORK PHARMACOLOGY, MOLECULAR DOCKING, ADMET, AND MOLECULAR DYNAMICS STUDY

Kumar B.S.; Dinesh B.G.H.; Ganjipete S.; Ramar M.; Murugesan S.; Ammunje D.N.; **Kunjiappan S.**; Pavadai P.

ChemistrySelect

Dr. Selvaraj Kunjiappan
Associate Professor
Biotechnology
Alliance School of Applied Engineering



Abstract

Neurotherapeutics that target kinases are necessary because Alzheimer's disease (AD) is characterized by a persistent decrease in cognitive function that is linked to amyloid-accumulation and tau hyperphosphorylation. This research highlights the dietary flavonoid morin as a potential therapeutic agent through a comprehensive integrated approach that incorporates network pharmacology, molecular docking, long-timescale molecular dynamics (MD), density-functional theory (DFT), and in silico ADMET profiling. With a focus on the significance of GSK-3 in AD, network pharmacology successfully connected Morin's predicted targets with genes relevant to AD by highlighting important kinase hubs using the STRING/Cytoscape and DAVID/ShinyGO tools. Within the ATP site of GSK-3 (PDB: 8FF8), Morin showed a competitive binding score of around −8.8 kcal/mol in docking tests. Along with contact with Gly185, Asp200, Lys85, and Phe67, it formed crucial connections with residues like Val135 and Asp133. The stability of the docking posture was validated by molecular dynamics simulations conducted over 1000 ns. The ligand RMSD averaged 3.58 ± 0.92 Å, whereas the protein C RMSD stabilized at 2.34 ± 0.31 Å, indicating a stable kinase conformation and a consistent contact network. The DFT study provides electronic descriptors that show how well Morin works in π-stacking and hydrogen-bonding interactions, which are crucial for its role in kinase pockets. Morin has problems with blood–brain barrier (BBB) permeability. However, ADMET profiling indicates that it is feasible for oral administration with minimal Geno and cardiotoxic hazards. Therefore, the need for CNS-targeted delivery methods, including lipid carriers, prodrugs, or intranasal routes, is highlighted. The combination of network pharmacology, docking fidelity, MD stability, good electrical properties, and a respectable ADMET profile makes Morin a viable option for GSK-3 inhibition in AD. Research is underway to support its therapeutic potential via experimental validation using CNS-targeted formulation studies, neuroprotective assessments, and enzyme inhibition experiments. © 2026 Wiley-VCH GmbH.

Author keywords- ADMET; Alzheimer's disease (AD); density functional theory (DFT); molecular docking; molecular dynamics (MD); morin; network pharmacology (NP)

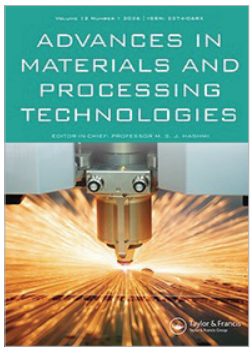
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	70th	2.2	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SYNERGISTIC EFFECT OF CARBON FILLERS ON TRIBOLOGICAL BEHAVIOUR OF KEVLAR FABRIC REINFORCED EPOXY COMPOSITES FOR HIGH-PERFORMANCE CONTACT APPLICATIONS

Sathishkumar T.P.; Manikandan H.; **Rajeshkumar L.**; Srinivasan N.; Bhuvaneswari V.; Gopinath R.

Advances in Materials and Processing Technologies

Dr. Rajeshkumar L
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

This study investigates the wear behaviour of Kevlar fiber-reinforced epoxy composites hybridized with carbon filler, focusing on their tribological properties under varying operational conditions. Composites were fabricated using 0.5, 2, and 4 % carbon filler by weight, and tested at sliding velocities of 1 m/s, 1.5 m/s, and 2 m/s under applied loads of 10 N, 20 N, and 30 N. Wear tests revealed that the wear rate increased with higher filler content and sliding speed, with wear values ranging from 8.12 to 24.38 microns. The coefficient of friction (COF) exhibited an increasing trend with higher filler content, peaking at 0.47 for composites with 4 % filler at 30 N load and 1.5 m/s sliding speed. Design of Experiment (DOE) results showed that 0.5 % carbon filler provided the most stable COF and wear resistance across all conditions and composites with 4 % filler exhibited higher wear. Machine learning prediction was carried out to evaluate the wear and coefficient of friction of carbon filled Kevlar fabric composites. Scanning Electron Microscopy (SEM) analysis revealed wear mechanisms including abrasion, adhesion, and material transfer. The findings highlight that moderate carbon filler concentrations enhance wear resistance and frictional performance, enabling their applications in automotive, aerospace, and other high-performance contact applications.
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Author keywords- carbon filler; Contact applications; Kevlar fibre; machine learning; tribological properties

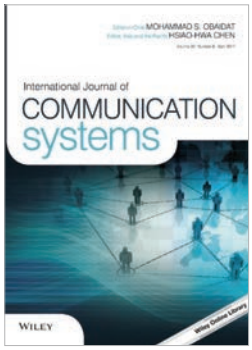
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**76th**	**1.8**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ENHANCING THE WEIGHT PARAMETERS OF THE DCGAN MODEL OF BEST ROUTE IDENTIFICATION

Nithya T.M.; Shyamala C.; **Pitchai S.**; Saraswathi S.

International Journal of Communication Systems

Dr. Saravanan P
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

A mobile ad hoc network (MANET) is a collection of mobile nodes that connect to one another over wireless networks. A number of researches have been suggested for enhancing the reliability among routing nodes, trust management, cryptographic systems application, and centralized routing decisions. Nevertheless, most of the routing approaches are challenging to implement in practical scenarios because it is problematic to find out the malevolent activities of the routing nodes. Therefore, a blockchain (BC) and dual-discriminator conditional generative adversarial network optimized with momentum search algorithm (TDRS-BCDCGAN-MSA-MANET) is proposed for delivering the reliable distributed routing-based information using BC token transactions. The aim is to demonstrate an efficient data transmission method that creates tokens for packet stream admission using a secret key that is provided to each routing mobile node. The proof of continuous work (PoCW) consensus–based BC technology is used to provide the reliable routing information. Then dual-discriminator conditional generative adversarial network (DCGAN) is employed for identifying optimal routes in MANET. Then momentum search algorithm (MSA) is proposed for enhancing the weight parameters of DCGAN for improving the efficiency of best route identification. The simulation of the proposed system is performed in network simulator-2 and the metrics like delay, average latency, average energy consumption, and throughput of BC token transactions are evaluated. The TDRS-BCDCGAN-MSA-MANET approach has attained 24.6%, 21.7%, and 16.8% lower delay and 41.087%, 39.87%, and 36.85% low energy consumption than the existing models.
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Author keywords- blockchain; MANET; momentum search algorithm; routing scheme; security analysis

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q2	72rd	3.0	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

EXPERIMENTAL INVESTIGATION OF FATIGUE, CREEP AND TRIBOLOGICAL PERFORMANCE OF ALOE VERA-, CORN-, EUCALYPTUS-, AND SOYBEAN NATURAL FIBER-BASED BIO COMPOSITES

Chaudhary V.; Ahlawat C.; Dwivedi S.P.; **Palanisamy S.**; Avudaiappan S.; Ramar K.

Polymers and Polymer Composites

Dr. P Senthamaraikannan
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering

Polymers and Polymer Composites

Abstract

In present work, tribology tests were enacted to analyze the wear behavior of composite reinforced with Aloe vera, Corn, Eucalyptus and Soybean Fiber and Epoxy resin. Fatigue and creep tests were accomplished to evaluate the strength of prepared composite specimen under fluctuating and static load conditions. Tribological analysis revealed that hybrid composites achieved higher frictional force as compared to single fiber-based composites. Hybrid ACESE composite exhibits maximum frictional force of 14.01 N, 35.78 N and 37.46 N at 10, 30 and 50 N load for 5 m/s sliding speed as compared to other prepared composite specimens. COF of prepared composite samples were calculated at different sliding speeds (3, 5 and 7 m/s) and applied load of 10, 30 and 50 N load. Hybrid ACESE composite shows maximum value of COF at 10, 30 and 50 N load for 3, 5 and 7 m/s sliding speed. Sliding speed (3, 5 and 7 m/s) with respect to applied load (10, 30 and 50 N) shows the variations in specific wear rate (SWR) for all prepared specimens. During tribological analysis, higher frictional force achieved by hybrid ACESE composite exhibits the highest value of interfacial temperature at 5 m/s sliding speed for 10, 30 and 50 N applied load. While the lower value of frictional force achieved by CE composite displays the lowest value of interfacial temperature at 5 m/s sliding speed for 10, 30 and 50 N applied load. The fatigue test illustrated that hybrid ACESE composite attained the highest fatigue number of cycles at 3822, 3217 and 2218 for 25, 50 and 75% UTS. While CE composites resulted in the lowest fatigue number of cycles at 2234, 1826, and 1219 for 25, 50 and 75% UTS among all prepared specimens.

Author keywords- bio composites; frictional force; interfacial temperature; specific wear rate; tribology

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	79th	3.6	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

BIOCONVERSION AND CHARACTERIZATION OF WATERMELON RIND WASTE-BASED MICROCRYSTALLINE CELLULOSE: A GREEN ALTERNATIVE TO SYNTHETIC REINFORCEMENTS

Suyambulingam I.; Narayanaperumal S.; Divakaran D.; Ayrilmis N.; **Senthamaraikannan P.**; Avudaiappan S.; Munusamy Y.; Rao H.J.

Polymer International

Dr. Indran S
Professor
Mechanical Engineering
Alliance School of Applied Engineering

Dr. Senthamaraikannan P
Associate Professor
Mechanical Engineering
Alliance School of Applied Engineering

Polymer International

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Abstract

The increasing accumulation of agricultural waste from watermelon (Citrullus lanatus) represents a substantial environmental concern, particularly in view of the extensive production and consumption of the fruit on a global scale. This study investigated the valorization of watermelon waste, specifically peel biomass, through the extraction of microcrystalline cellulose (MCC) using acid hydrolysis, providing an eco-friendly and value-added waste management solution. To produce high-purity MCC, the watermelon peel underwent successive bleaching, alkali treatment, and acid hydrolysis. Characterization indicated a crystallinity index of 71.65% and a crystallite size of 31.14 nm, showing good structural order. Fourier transform infrared analysis indicated the elimination of lignin and hemicellulose, whereas SEM and AFM revealed a homogeneous and slightly rough surface shape. TGA verified thermal stability, with substantial deterioration occurring at 319.53 °C and a 28% char residue at 600 °C. The isolated MCC had an average particle size of 77.5 µm, making it suitable for medicinal, food packaging, and biodegradable polymer applications. This work proposes a sustainable technique for transforming watermelon agro-waste into a high-value biomaterial that adheres to the principles of circular economy and green chemistry. © 2026 The Author(s). Polymer International published by John Wiley & Sons Ltd on behalf of Society of Chemical Industry.

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Author keywords- Biomass; Biopolymer; Microcrystalline cellulose; SDG 12: Food Waste; SDG 1: Sustainable

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	90th	3.6	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ENHANCED CORROSION RESISTANCE AND AESTHETIC PROPERTIES OF TITANIUM ALLOYS THROUGH STABILIZED ANODIZING PROCESSES: A REVIEW

Chikkamath A.S.; Meti V.K.V.; Siddhalingeshwar I.G.; Umarfarooq M.A.; Banapurmath N.R.; Sajjan A.M.; **Shahapurkar K.**; Khan T.; Sebaey T.A.; Murugaiah M.; Singh B.

IEEE Access

Dr. Kiran Shahapurkar
Assistant Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

This review comprehensively examines the advancements in anodizing processes applied to titanium and its alloys, emphasizing the enhancement of corrosion resistance, surface aesthetics, and functional performance. The study critically evaluates the influence of key process parameters — such as electrolyte composition, temperature, voltage and anodizing duration on the formation, morphology, and crystallinity of anodic oxide layers. Conventional anodizing in sulfuric acid electrolytes is compared withemerging green alternatives, namely deep eutectic solvents (DES), which offer environmentally benign, cost-effective and tuneable electrochemical environments. Results from recent studies reveal that the anodic current density, oxide thickness, and surface colouration are strongly dependent on applied voltage and electrolyte temperature, while DES-based anodizing enables precise control over oxide layer structure and porosity. Morphological and structural analysis indicate the formation of both amorphous and crystalline TiO2 phases, whose characteristics can be altered for specific applications. The review further highlights the role of stabilized anodizing in producing durable, chromatically varied, and corrosion resistant coatings suitable for aerospace, biomedical, and defence applications. Finally, potential research directions are proposed to advance sustainable anodizing technologies and deepen understanding of parameter-property relationships in titanium surface engineering. © 2013 IEEE.

Author keywords- anodizing; chromaticity; corrosion; osseointegration; pH value; photocatalyst; porous film; surface colouration; titanium alloy

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	**80th**	**3.6**	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

JUTE FIBER AND ITS COMPOSITES: PROCESSING, PROPERTIES, AND APPLICATIONS

Kanaginahal G.M.; **Shahapurkar K.**; Kakkamari P.; S S R.; **Chenrayan V.**; Magi M.; Tirth V.; Algahtani A.; Bhaviripudi V.R.; Venkatachalam V.; Umarfarooq M.A.; Singh B.

Journal of Natural Fibers

Dr. Kiran Shahapurkar
Assistant Professor
Mechanical Engineering
Alliance School of Applied Engineering

Dr. C Venkatesh
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

Environmental and sustainability concerns have sparked important developments in green composites, including the creation of composites reinforced with natural fibers. Because NFRCs are lightweight, they can be used in industries including construction, automotive, and aerospace that demand great strength and remarkable fatigue resistance. A variety of sources, including microbes, minerals, plants, and animals, can create NFs. Plant fibers, which contain cellulose, a semi-crystalline polymer essential to the mechanical strength and structure of plant cell walls, are the most common natural fiber source on Earth. Plant stems with strong tensile strength, thermal stability, and adaptability include flax, hemp, and jute. Plant fibers are prized for their sustainability, biodegradability, and contribution to the creation of environmentally benign materials in addition to their mechanical qualities. This study concentrates on the extraction of natural jute fiber, the several steps required to make the fibers, and the smooth extraction of microfibrils. A detailed review of the mechanical, thermal, and other properties of jute fibers will be conducted. Finally, an analysis and conclusion will be drawn about their usage in conjunction with thermoset resins for suitable applications.
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Author keywords- Jute fiber; mechanical properties; natural fiber-reinforced composites; surface modification; thermal properties and sustainable materials

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q1	88th	4.6	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

PHOSPHORENE: SYNTHESIS, PROPERTIES, AND SURFACE FUNCTIONALIZATION FOR EMERGING APPLICATIONS

Akshaya R.; Jain A.A.; **Keerthana P.**; Cherian A.R.; Rajasekaran S.; Devikrishnan T.M.; Vinayak S.; Sreeja P.B.

Materials Science in Semiconductor Processing

Dr. Keerthana P
Assistant Professor
Chemistry
Alliance School of Sciences



Abstract

Phosphorene, a two-dimensional (2D) monolayer of black phosphorus, has garnered considerable attention due to its distinct anisotropic properties, adjustable bandgap, high carrier mobility, and mechanical flexibility. Since its isolation in 2014, phosphorene has garnered significant attention for its potential applications in various domains, including electronics, optoelectronics, energy storage, sensing, and biomedicine. This review provides an in-depth examination of the structural, electronic, and physicochemical properties of phosphorene, along with its diverse applications, emphasizing its advantages relative to other two-dimensional materials, such as graphene and transition-metal dichalcogenides. The primary methods of synthesis-mechanical exfoliation, liquid-phase directed toward exfoliation, and chemical vapour deposition are thoroughly examined, alongside the challenges related to scalability and stability. Significant attention is directed towards the surface reactivity and degradation of phosphorene under ambient conditions, along with the diverse passivation strategies developed to improve its environmental stability. The functional versatility of phosphorene is detailed through its incorporation into lithium-ion batteries, supercapacitors, drug delivery, catalysis, and sensors. Furthermore, its compatibility with biological systems and ability to convert light into heat present new opportunities for drug delivery and cancer treatment. Even with these advancements, the real-world application of phosphorene-based technologies encounters challenges like oxidative degradation, obstacles in large-scale production, and intricate device integration. Proposed avenues for addressing these challenges include advancements in surface engineering, the development of heterostructures, and the implementation of controlled doping techniques. By overcoming these existing challenges, phosphorene has significant potential to emerge as a fundamental material in the future of nanoelectronics and biomedical applications. © 2026 Elsevier Ltd

Author keywords- Black phosphorus; Catalysis; Drug delivery; Heterostructures; Phosphorene; Sensors

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/Q3	41st	4.5	06 CLEAN WATER AND SANITATION

TWO-DIMENSIONAL MATERIAL-POLYMER HYBRID MEMBRANES FOR ENHANCED MECHANICAL STABILITY AND ENVIRONMENTAL REMEDIATION

Talreja N.; Chauhan D.; Ramalinga Viswanathan M.; Srituravanich W.; Ashfaq M.

Discover Nano

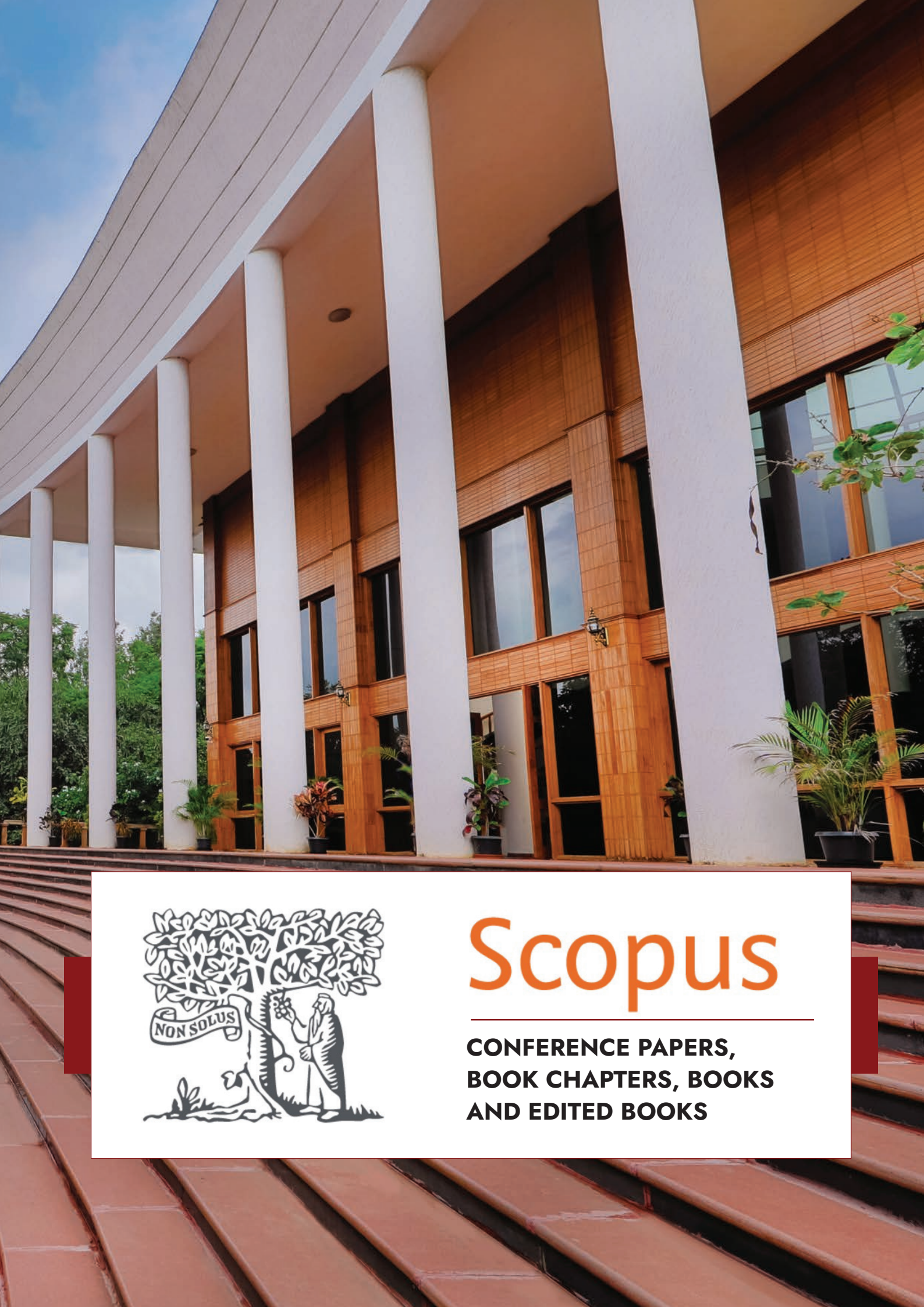
Dr. Neetu Talreja
Associate Professor
Chemistry
Alliance School of Sciences



Abstract

Two-dimensional materials (2DMs) have attracted substantial attention due to their exceptional thermal, tensile, chemical, and mechanical properties, making them promising candidates for designing next-generation polymeric membranes. Incorporating 2DMs with polymers not only improved selectivity and permeability but also considerably enhanced mechanical robustness, thereby improving long-term stability and durability, which are among the greatest challenges today. This review article provides new insights into advancements in 2DMs and 2DMs-based polymeric membranes, with particular emphasis on mechanical strength and their roles in environmental remediation. We also discussed how different 2DMs interact with polymers to address issues such as anti-fouling, stability, and durability in polymeric membranes. Additionally, we explore the challenges associated with polymeric membranes and how we can overcome them by using different 2DMs to develop a multifunctional 2DMs-polymer hybrid membrane that bridges mechanics with environmental remediation applications.

Author keywords- 2DMs; Mechanical stability; Membranes; MXene; Polymers; Water treatment



Scopus

CONFERENCE PAPERS, BOOK CHAPTERS, BOOKS AND EDITED BOOKS

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

FIRE-RESISTANT NATURE-DERIVED COMPOSITE MATERIALS FOR INDUSTRIAL APPLICATIONS

Lakshminarasimhan R.; Palaniappan S.K.; Devarajan B.; Rangappa S.M.; Siengchin S.

Fire-Resistant Nature-Derived Composite Materials for Industrial Applications

Dr. Rajeshkumar L
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

Fire-Resistant Nature-Derived Composite Materials for Industrial Applications presents the latest advances in this important field. The book provides an in-depth understanding of the materials, their properties including both fire resistance and structural integrity, and their industrial applications, including compliance guidelines and safety regulations. The detailed case study examples of successful implementation in industry will bridge the gap between theory and practice. The book will be a valuable reference resource for academic and industrial researchers, as well as materials scientists and engineers who need to keep updated on the latest advances and technologies in fire-resistant composite materials. © 2026 Elsevier Ltd. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

Author keywords- Accident prevention; Composite materials; Data mining; Fireproofing

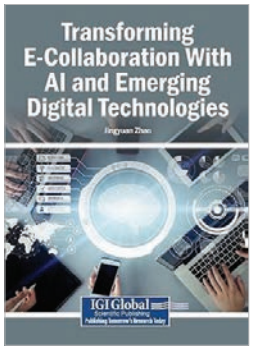
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

ONTOLOGIES OF AUGMENTED COLLEGIALITY IN EDUCATION AND EPISTEMIC ARCHITECTURES OF HUMAN–AI SYNERGY: MULTI-AGENT ORCHESTRATION AND COGNITIVE EQUITY

Alam A.

Transforming E-Collaboration with AI and Emerging Digital Technologies

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability and ESG Research
Alliance School of Law



Abstract

This chapter theorizes and operationalizes augmented collegiality as a deliberate reconstitution of pedagogy in which teachers, students, and artificial agents coordinate accountable knowledge work. It synthesizes CSCL, activity systems, communities of inquiry, knowledge building, distributed cognition, and human- AI teaming to specify a layered architecture spanning experience, collaboration services, intelligence, orchestration, data, integration, infrastructure, and governance. The program details generative feedback, XR, IoT, and privacy preserving analytics while enforcing provenance, accessibility, and calibrated trust. Design patterns translate theory into auditable practice, and implementation blueprints align staffing, procurement, and sustainability with cognitive equity across bandwidths, languages, and abilities. Measurement links inputs to impact through interpretable indicators and mixed methods, and legal regimes inform bias audits, consent, and disclosurebased integrity. The result is a pragmatic agenda that reduces extraneous load and stabilizes equitable voice.
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Author keywords- Cognitive systems; Data privacy; Teaching

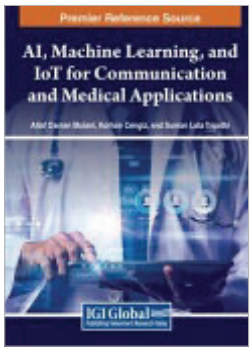
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

DIFFERENTIATION BETWEEN PARKINSON'S DISEASE AND OTHER FORMS OF PARKINSONISM USING SUPPORT VECTOR MACHINE

Soms N.; Azariya S.D.S.; **Manoj S.O.**; Savitha S.J.

AI, Machine Learning, and IoT for Communication and Medical Applications

Dr. Oswalt Manoj S
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Parkinson's Disease (PD) is a debilitating neurodegenerative disorder that affects millions of people worldwide, causing a range of motor and non-motor symptoms. The accurate differentiation between PD and other forms of Parkinsonism is crucial for appropriate treatment, management, and patient care. However, clinical overlap among these conditions often leads to diagnostic challenges and potential misclassification. This chapter proposes an in-depth exploration of the utilization of Support Vector Machine (SVM) for enhancing the differentiation process. It will discuss the ethical considerations, potential benefits, challenges, and the impact of SVM-based diagnosis on patient care, diagnosis accuracy, and cost-effectiveness. By delving into these aspects, this chapter aims to contribute significantly to the advancement of Parkinson's disease diagnosis and management through the application of machine learning techniques. Copyright © 2026, IGI Global Scientific Publishing. Copying or distributing in print or electronic forms without written permission of IGI Global Scientific Publishing is prohibited. Use of this chapter to train generative artificial intelligence (AI) technologies is expressly prohibited. The publisher reserves all rights to license its use for generative AI training and machine learning model development.

Author keywords- Diagnosis; Electronic publishing; Learning systems; neurodegenerative diseases; Patient treatment; Support vector machines

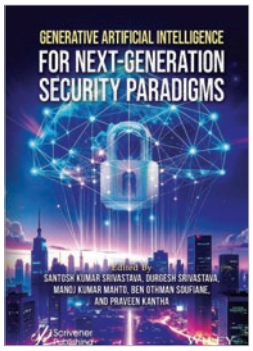
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

LEVERAGING GENERATIVE AI FOR ADVANCED THREAT DETECTION IN CYBERSECURITY

Reddy A.; Kurra M.; **Pradeep Ghantasala G.S.**; Vidyullatha P.

Generative Artificial Intelligence for Next-Generation Security Paradigms

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



Abstract

The landscape of cybersecurity is perpetually developing, with intimidation becoming progressively erudite and stimulating to distinguish using outmoded methods alone. In recent years, the amalgamation of deep learning procedures, mainly procreant AI, has emerged as a promising tactic to improve threat discovery abilities. This chapter discovers the application of procreant AI in cybersecurity and its probability to transform threat discovery. Generative AI discusses a subcategory of artificial intelligence that emphasizes on generating novel data samples that are comparable to a given dataset. In cybersecurity, generative AI models, such as generative adversarial networks (GANs) and variational autoencoders (VAEs), offer unique advantages for sleuthing and investigating malevolent happenings. These replicas can produce artificial data, permitting security systems to train on a more extensive and diverse set of examples, thus enlightening their capability to distinguish new coercions. The potential of generative AI to understand formerly undetectable malware and assault styles is certainly considered one of its maximum essential advantages in cybersecurity. Because they depend upon mounted designs and signs, conventional signature-primarily based total detection strategies generally fail to perceive zeroday moves and polymorphous malware. Furthermore, through decreasing fake positives and illuminating signal-to-noise ratios, generative AI improves the efficacy and precision of glitch popularity systems. These representations can successfully distinguish between secure and suspicious actions through the know-how of the primary distribution of usual conduct inside an organization's network. This reduces the load on protection forecasters and guarantees activate responses to actual threats.
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Author keywords- Adversarial AI; Automated threat response; Behavioral analytics; Intrusion detection; Malware classification; Real-time monitoring

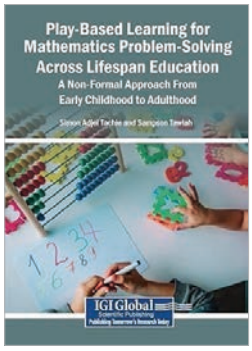
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

INCLUSIVE PLAY-BASED FRAMEWORKS FOR MATHEMATICS PROBLEM-SOLVING IN NON-FORMAL AND ADULT EDUCATION: EPISTEMIC JUSTICE AND PARTICIPATORY GAME PEDAGOGY

Alam A.

Play-Based Learning for Mathematics Problem-Solving Across Lifespan Education: A Non-Formal Approach From Early Childhood to Adulthood

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability
and ESG Research
Alliance School of Law



Abstract

This chapter theorises inclusive play-based mathematics problem-solving in nonformal and adult education as a socio-technical assemblage oriented to epistemic justice. Synthesising constructivist, socio-cultural, ethnomathematical, and adult learning paradigms with participatory game pedagogy, it articulates design heuristics, ecological typologies, and lifespan-sensitive play modalities that mobilise community numeracies while destabilising deficit identities. The chapter activates frameworks such as Universal Design for Learning, culturally sustaining pedagogy, and the capability approach to specify equity-inflected principles for analog and digital games across community, workplace, carceral, and migratory settings. It concludes by sketching governance and data-ethical architectures through which policy makers, educators, technologists, and worker collectives can institutionalise rigorous and joyful mathematics across the lifespan.
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Author keywords- Adult education; Adult learning; Design heuristics; Learning paradigms; Lifespans; Non-formal education; Problem-solving; Socio-cultural; Sociotechnical; Universal Designvector machines

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

NANO DEVICE FOR SRAM MEMORY ARRAYS

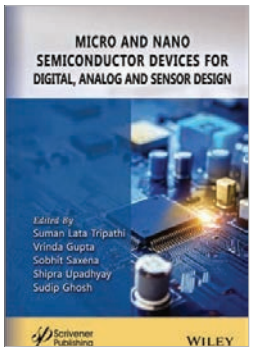
Sungheetha A.; Sharma R. R.; Mahapatra S.

Micro and Nano Semiconductor Devices for Digital, Analog and Sensor Design

Dr. Akey Sungheetha
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Rajesh Sharma R
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Sheila Mahapatra
Professor
Electrical & Electronics Engineering
Alliance School of Applied Engineering



Abstract

Nano gadgets have revolutionized the panorama of Static Random Access Memory (SRAM) arrays, imparting extraordinary upgrades in performance, strength efficiency, and scalability. This bankruptcy explores the modern tendencies in nanoscale gadgets for SRAM applications, that specialize in their design, fabrication, and integration challenges. We have a look at novel substances and architectures that push the limits of traditional SRAM technology, inclusive of rising answers like Carbon Nanotube Field-Effect Transistors (CNTFETs) and Tunnel Field-Effect Transistors (TFETs). The observation provides a complete evaluation of those nano gadgets` effect on SRAM molecular stability, read/write speeds, and strength consumption. Furthermore, we inspect superior strategies for mitigating variability and improving reliability on the nanoscale. Through special simulations and experimental data, this bankruptcy presents insights into the destiny of SRAM technology, paving the manner for next-era reminiscence answers withinside the generation of nanoscale computing.
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Author keywords- CNTFETs; Memory reliability; Mitigation; Nano devices; SRAM arrays; TFETs; Variability

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

KNOWLEDGE SOVEREIGNTY AND DECOLONIAL PARADIGMS IN TRANSNATIONAL PEDAGOGY AND CURRICULAR POLYCENTRISM: POLYLOGUE AND POWER REBALANCING IN GLOBAL ACADEMIA

Alam A.

Rethinking Policy, Innovation, and Global Structures in Higher Education

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability and ESG Research
Alliance School of Law



Abstract

This chapter reconceptualises internationalization of higher education as a stratified assemblage of power, knowledge, and mobility rather than a benign cosmopolitan add- on. It synthesises postcolonial and decolonial paradigms, world-systems political economy, intersectional capabilities, and critical pedagogy to show how rankings, visa architectures, digital platforms, and monocultural canons reproduce coloniality and epistemic exclusion. Against this diagnosis, the chapter advances a compact normative schema grounded in epistemic pluralism, contextual relevance, relational reciprocity, accessibility, and planetary responsibility, translating these into a multi- level design grammar for curriculum, sociotechnical infrastructures, institutional governance, and transnational alliances oriented toward pluriversal, justice- centred knowledge ecologies. © 2026 by IGI Global Scientific Publishing. All rights reserved.

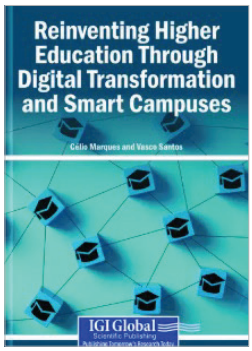
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

PEDAGOGICALLY INTELLIGENT SMART CAMPUSES FOR AI-MEDIATED AND EQUITY-CENTERED KNOWLEDGE PRODUCTION: IMMERSIVE COGNITION IN HIGHER EDUCATION ECOSYSTEMS

Alam A.

Reinventing Higher Education through Digital Transformation and Smart Campuses

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability
and ESG Research
Alliance School of Law



Abstract

This chapter re-theorises the smart campus as a socio-technical learning ecology wherepedagogical intelligence, rather than technological fetishism, becomes the primary optimisation criterion. Integrating learning sciences, embodied cognition, socio-technical systems, and intersectional sustainability, the chapter articulates an integrated framework for AI-mediated, equity-centred knowledge production in higher education. It systematically maps immersive, HyFlex, and AI-supported mastery designs onto XR infrastructures, analytics ecosystems, and living-lab con-figurations, while interrogating epistemic justice, decoloniality, and digital rights. By modelling stakeholders as a polycentric governance network, it specifies risk architectures and capacity-building ecologies that align algorithmic systems with care, autonomy, and planetary responsibility. The chapter concludes by advancing justice-oriented design heuristics and a research agenda that positions smart campuses as reflexive, pluriversal sites of immersive cognition and regenerative institutional transformation. © 2026 by IGI Global Scientific Publishing. All rights reserved.

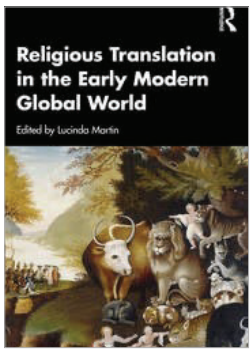
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	16 PEACE, JUSTICE AND STRONG INSTITUTIONS

TRANSLATION, THE UNTRANSLATABLE, AND RESISTANCE: SYRIAN CHRISTIANS OF SOUTH INDIA

Easo B.

Religious Translation in the Early Modern Global World

Dr. Bivitha Easo
Assistant Professor
Department of Language & Literature
Alliance School of Liberal Arts



Abstract

The chapter engages with translations in Christian traditions from a "non-Western" context in order to understand Christianity in translation. It focuses on the powerful minority community of Syrian Christians of Kerala, who claim apostolic and Brahminic origins dating back to CE 52, and trans-regional ties with various "Eastern Churches," especially Persian. The texts under study are translations in Malayalam and English from the Portuguese, old Malayalam, Garshuni Malayalam and Syriac. The chapter examines the Synod of Diamper (1599) to understand how the Roman Catholic Church used translation to posit Catholicism as the only legitimate religion and form of Christianity by expunging "heathen" customs from the "vernacular Church." However, this universalization of a particular form of "Western" Christianity was resisted and rejected consistently in the "vernacular" textualities through which the "native" Christians restored their affiliation to "Eastern" traditions. Therefore, translations of select "vernacular" texts from the sixteenth to the eighteenth centuries are analyzed to delineate untranslatable elements that became sites of resistance against a homogenized and monolithic understanding of a universal Church. At the same time, this chapter makes clear that South Indian Christianity has a long and complicated "translational genealogy" in which many cultures and languages have played a role. © 2026 selection and editorial matter, Lucinda Martin.

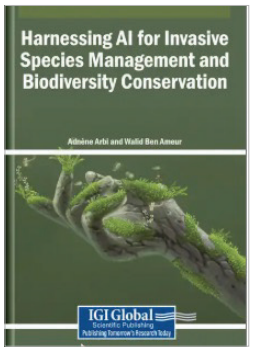
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	15 LIFE ON LAND

ALGORITHMIC ECOPEDAGOGY FOR BIOSECURITY RESILIENCE AND INVASIVE BIOTA GOVERNANCE IN THE ANTHROPOCENE: AI-MEDIATED ECOLOGICAL STEWARDSHIP EDUCATION

Alam A.

Harnessing AI for Invasive Species Management and Biodiversity Conservation

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability and ESG Research
Alliance School of Law



Abstract

This chapter interrogates the strategic integration of artificial intelligence into environmental education as a transformative mechanism for invasive alien species prevention, detection, and control. It synthesises ecological urgency, technological acceleration, and pedagogical reform to propose governance frameworks that embed AI literacy, ethical reasoning, and biodiversity knowledge across educational systems. Drawing on global policy contexts and institutional innovations, the discussion illustrates how AI-enabled curricula can generate actionable data, strengthen conservation decision-making, and cultivate ecologically responsible citizenship. The chapter advances a vision of AI not as a detached tool but as a co-evolving partner in biotic stewardship, with education functioning as a conduit for aligning technological potential with measurable biodiversity outcomes. By linking algorithmic capacity to participatory ecological governance, it positions AI-enabled education as a critical vector for ecological resilience and long-term socio-environmental sustainability. © 2026 by IGI Global Scientific Publishing. All rights reserved

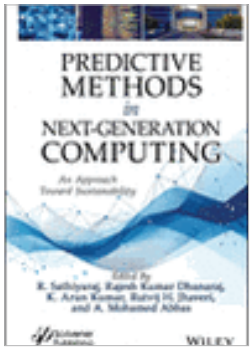
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

ARTIFICIAL INTELLIGENCE AND DEEP LEARNING IN HEALTHCARE: EVALUATION, OPPORTUNITIES, CHALLENGES AND FUTURE PROSPECTS TECHNOLOGIES IN HEALTHCARE SYSTEMS

Ahuja R.; Khalsa G.K.; Kashyap V.; Babbar H.; Sachdeva R.K.; **Ghantasala G.S.P.**

Predictive Methods in Next-Generation Computing: An Approach Toward Sustainability

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



Abstract

Advances in drug research are made possible by artificial intelligence techniques. Numerous obstacles and hurdles, including poor effectiveness, off-target delivery, lengthy development times, and high costs, affect drug research and development. Moreover, a huge amount of complicated data sets that are available from proteomics, genomes, clinical trials, and microarrays block the procedure of drug evolution. In this sense, Artificial intelligence (AI) and deep learning (DL) are critical components of the drug development process. There are several drug discovery methods, such as structure-based virtual screening and ligand-based virtual screening, pharmacophore modeling, polypharmacy prediction of toxicity, based on virtual screening, peptide synthesis, drug monitoring, drug release, drug repositioning, physicochemical activity, and activity quantitative-based structure have been developed. This chapter describes the function of AI and DL in drug discovery. It also covers how many applications, what tools are being used, and what obstacles AI and DL are facing. In short, the chapter discusses the rise of AI and DL in drug development and healthcare data analytics. Finally, it discusses the encounters of artificial intelligence and deep learning models with the aspect of future vision for developing rural health.
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Author keywords- Artificial intelligence; Deep learning; Drug discovery; International health regulations; Machine learning

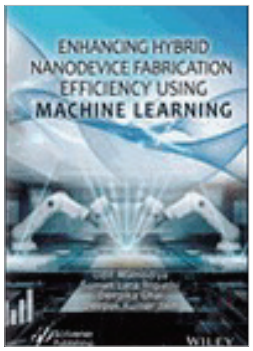
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

ADVANCED ML ALGORITHMS FOR NANOTECHNOLOGY

Remya R.; Saniya S.; **Singh O.J.**; Sampath U.

Enhancing Hybrid Nanodevice Fabrication Efficiency Using Machine Learning

Dr. Jeba Shiney O
Professor
Computer Applications
Alliance School of Computer Applications



Abstract

Advanced machine learning algorithms transform the nanotechnology by making the prediction and control information at nanoscale. Deep learning model such as convolutional neural network exhibits prediction and molecular design by identifying the structural patterns of the nanoscale images. Also, it supports in classifying defects, nanomaterials, and design. Furthermore, graph neural networks support complex molecular interaction to predict stability and reactivity in fields such as nanoelectronics and drug delivery. Quantum computing addresses the nanoscale issues, which designs new nanodevices and quantum materials. Reinforcement learning performs the optimization of nanofabrication process by utilizing certain parameters, which are suitable for self-assembly, lithography, and other methodologies adapted in manufacturing. Hybrid physics machine learning models improve the accuracy with reduced data utilization. Meta learning algorithm that adapts new materials leads to the development of the upcoming generations' technology and materials, which bridges the gap among the practical and theoretical outcomes. © 2026 Scrivener Publishing LLC.

Author keywords- Artificial intelligence; machine learning; nanomaterials; nanotechnology; neural networks

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	06 CLEAN WATER AND SANITATION

SMART WATER MONITORING OF GREEN MICROBIAL NANOTECHNOLOGY FOR POLLUTION CONTROL

Omar R.A.; **Talreja N.**; Chauhan D.; Ashfaq M.
Green Microbial Nanotechnology for Pollution Control: New and Future Developments in Microbial Biotechnology and Bioengineering

Dr. Neetu Talreja
Associate Professor
Chemistry
Alliance School of Sciences



Abstract

Monitoring the water parameters is a key step in the purification of water. As technology advnces, the need for pure water is also increasing. Multiple technologies have been employed previously for the purification of water that includes filtration, adsorption, biological treatments, or some integrated approaches. However, to confirm the level of contamination and determine the purity of water, smart monitoring of water is a necessary step. Various methods have been utilized for monitoring of the quality of water, such as electrochemical, colorimetric, and photochemical. The literature suggests that electrochemical methods for monitoring water are the best method due to their immediate response, quantitative measurements, and accurate detection. These monitoring systems use different types of nanomaterials, including metal nanoparticles and carbon-based nanomaterials, for the development of sensors for these monitoring systems. These nanomaterials can be synthesized by physical, chemical. or biological methods. The literature suggests that, among these methods, biological methods that use microorganisms to synthesize the nanomaterials could be a more economical and convenient method. In this chapter, we have explained the types of contamination that require monitoring in water, along with their corresponding monitoring techniques. The impact of various nanomaterials for the treatment and monitoring of water is also covered. Separately, the role of microorganisms in smart water monitoring is extensively explained. This chapter briefly covers contaminants in water, their monitoring, and treatment through the microbial world.
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Author keywords- agronomy discipline; chemical compound; environmental monitoring; environmental nanotechnology; environmental science; environmental toxicology; hydrology; materials class; materials in biotechnology; microorganism; Nanomaterials; nanotechnology; smart wa

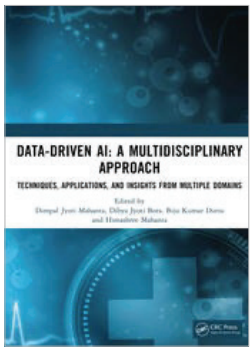
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

A COMPREHENSIVE SURVEY ON GEOMETRIC DEEP LEARNING

Chatterjee A.; **Venkatesh K.A.**; Choudhury S.L.

Data-Driven AI: A Multidisciplinary Approach: Techniques, Applications, and Insights from Multiple Domains

Dr. K A Venkatesh
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Geometric deep learning (GDL) has transformed the application of deep learning in non-Euclidean spaces, allowing effective learning on graphs, manifolds, and other geometric structures. Various architectures have been developed to improve representation learning, expressivity, and computational efficiency. Graph convolutional networks (GCNs) by researchers utilised spectral graph convolutions for semi-supervised learning yet deeper layers suffered from over-smoothing. To enhance scalability, GraphSAGE, was introduced which used inductive learning with neighbourhood sampling though it struggles to capture global structures effectively. Graph attention networks (GATs) framework was proposed which leveraged self-attention to refine feature aggregation but encountered instability in deeper models. Another model graph isomorphism networks (GINs), offered strong power to capture structural differences between nodes through injective aggregation though careful tuning was required. A structure diffusion convolutional networks (DCNNs) was used random walk-based message passing to capture long-range dependencies. Later graph transformers, brought self-attention into graph learning, making it easier to model distant relationships though memory usage remains a concern, for scalability. Beside these developments, topological methodologies drew attention of researchers. Persistent homology, helped in identifying topological features that persist across scales, while sheaf neural networks allowed traditional message passing by incorporating localised dependencies. This survey walks through these evolving ideas and point future directions like self-supervised learning, hyperbolic embeddings, and graph attention models. © 2026 selection and editorial matter, Dimpal Jyoti Mahanta, Dibya Jyoti Bora, Biju Kumar Dutta, Himashree Mahanta, individual chapters, the contributors.

Author keywords- Geometric deep learning; graph neural networks; persistent homology; self-attention; transformer-based models

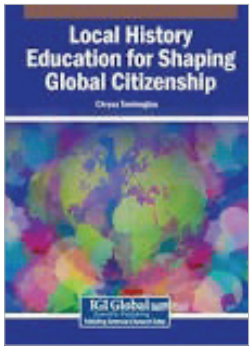
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

HISTORICAL- DISCURSIVE DECENTRALIZATION AND THE DIGITAL RECONSTITUTION OF COLLECTIVE MEMORY: PEDAGOGIES OF MEMORY IN HISTORY EDUCATION

Alam A.

Local History Education for Shaping Global Citizenship

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability
and ESG Research
Alliance School of Law



Abstract

This chapter advances a re- envisioned paradigm for history education in India by integrating community- based inquiry with digital storytelling as a vehicle for epistemic justice and civic engagement. It interrogates the historiographical, pedagogical, and socio- political imperatives of embedding local histories within global ethical frameworks that is solidarity oriented. Drawing on interdisciplinary insights, the chapter examines structural constraints, from curricular rigidity to infrastructural inequities, and offers policy, institutional, and pedagogical interventions to transform fragmented innovations into systemic practice. By amplifying marginalized voices through ethically grounded digital platforms and cultivating teacher capacity for critical, place- based pedagogy, the chapter positions history education as an active, participatory process that links the ethics of remembering to the imperatives of justice, thus preparing learners as informed local actors and ethically engaged global citizens, capable of confronting historical silences while shaping equitable futures.
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Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

NANOCELLULOSE FOR FUNCTIONAL AND FUTURE MATERIALS: OPPORTUNITIES, LIMITATIONS, AND OUTCOMES

Norfarhana A.S.; Azriena H.A.A.; Hawanis H.S.N.; Ilyas R.A.; **Rajeshkumar L.**; Wirawan W.A.; Azmi A.; Dungani R.; Aditiawati P.; Sari N.H.; Yusuf M.; Asrofi M.; Ghozali M.

Nanocellulose: Harnessing Sustainability from Biomass to Biocomposites

Dr. Rajeshkumar L
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

Nanocellulose is a promising biomaterial for the development of next-generation functional materials due to its biodegradability, low density, and excellent mechanical strength. This chapter provides a comprehensive overview of nanocellulose classifications, including cellulose nanocrystals, cellulose nanofiber, and bacterial nanocellulose, and explores their potential applications across multiple sectors, such as sustainable packaging, biomedical devices, flexible electronics, energy storage systems, and environmental remediation. Recent innovations, including 3D printing, surface modification, and hybrid system development, have further expanded the material's applicability. Despite its significant potential, widespread adoption of nanocellulose remains limited by high production costs, challenges in material integration, and unresolved regulatory and sustainability issues. Through multidisciplinary collaboration and supportive policy frameworks, nanocellulose holds substantial promise as a key enabler in the transition toward green technologies and a circular global economy.
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Author keywords- cellulose nanocrytal; cellulose nanofibre; Nanocellulose; natural fiber; sustainability

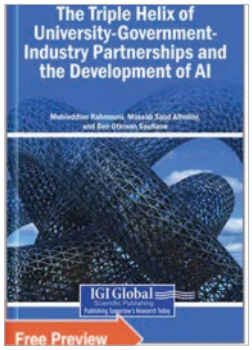
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SCOPUS/WOS/NA	NA	NA	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

GOVERNING INTELLIGENT FUTURES THROUGH AIREADY EDUCATION ECOSYSTEMS IN THE TRIPLE HELIX MODEL: EXTENDED HELIX REGIMES OF EDUCATIONAL MANAGEMENT

Alam A.

The Triple Helix of University-Government-Industry Partnerships and the Development of AI

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability
and ESG Research
Alliance School of Law



Abstract

This chapter theorises AI- ready education ecosystems as complex, multi- scalar infrastructures for governing intelligent futures. Integrating National Innovation Systems, Triple and extended Helix models, socio- technical transition theory, capability- oriented justice frames, and learning- sciences metatheory, it reconceptualises education as a strategic regime that co- produces AI competencies, normative orientations, and civic agency. Through ideal- typical AI strategy regimes, multilevel talent pipelines, industry- university- government partnership modalities, and reflexive governance architectures, the chapter assembles a conceptual matrix linking actor constellations, knowledge flows, and regulatory instruments. It advances a design vocabulary centred on human- AI co-flourishing, epistemic and data justice, ecological responsibility, and experimentalist public- value governance, and sketches a research agenda for academics, policymakers, and digital learning technologists.
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SCOPUS/WOS/NA	NA	NA	12 RESPONSIBLE CONSUMPTION AND PRODUCTION

GREEN INVESTMENTS IN MANUFACTURING PATHWAYS THROUGH CIRCULAR ECONOMY AND SUSTAINABLE MATERIAL INNOVATIONS

Megha H.U.; Asha Rani N.R.

The Impact of Carbon Pricing on Green Investment in Manufacturing

Dr. Megha H U
Assistant Professor
Finance
Alliance School of Business

Ms. Asha Rani N R
Assistant Professor
Civil Engineering
Alliance School of Applied Engineering



Abstract

Carbon pricing has become crucial instrument of climate policy which is used to decarbonize manufacturing industries. Governments internalize environmental externality by imposing a financial cost on the emission of greenhouse gases through carbon taxes or emissions trading scheme and redefine the cost borne by the energy- intensive sectors. The manufacturing sector, which contributes almost a third of the world- wide CO2 emissions is a focus point and a pilot project under consideration of such policies. This chapter examines the impact of carbon pricing on green investment in manufacturing based on economic theory, empirical evidence, and comparative case studies of both developed and emerging economies. The chapter gives the theoretical premise of carbon pricing in detailed inclination on such mechanisms as relative price effect, future- facing investments, and financial channels to green investments. The results in the chapter demonstrate that effective green investment in manufacturing is based on strong policy design, institutional support, and price signals in the long- term. © 2026 by IGI Global Scientific Publishing. All rights reserved.

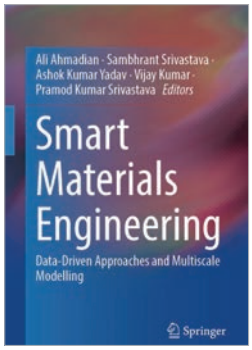
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SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

ECO-INNOVATIVE FIBER COMPOSITES: UTILIZATION OF INDUSTRIAL AND AGRICULTURAL WASTE FOR SUSTAINABLE STRUCTURES

Mishra V.N.; Singh D.P.; **Gupta A.**; Rajpoot Y.S.

Smart Materials Engineering: Data-Driven Approaches and Multiscale Modelling

Dr. Abhay Gupta
Assistant Professor,
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

The agriculture, polymer, and textiles industries have the highest production yields to fulfill human requirements, but they also contribute heavily to environmental contamination and the creation of waste worldwide. A scarcity of post-consumer disposal is a major challenge for the majority of developing nations, as the unsustainable nature of this trash has produced severe environmental degradation. These by-products and wastes can be turned into useful products to fulfill the needs of society to some extent. The development and applications of various composites from industrial waste will be explored in this work. The increasing utilization of composite materials in heavy industries has also resulted in an increase in waste generation due to the limitations of sustainability and effective End-of-Life (EoL). This work highlights the reuse and other forms of recovery of EoL Composites. The design and analysis of innovative fiber composites from waste using software to get enough strength for applications has been discussed. The application of sensors, the Internet of Things for automation, and smart production of composite materials is explored in this work. Therefore, the results of this review might be used as a basis for further studies on composites using waste to improve the sustainable and eco-friendly development.
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Author keywords- Biodegradable; EoL Composites; Fiber reinforced composites; Industrial waste; Sustainable development

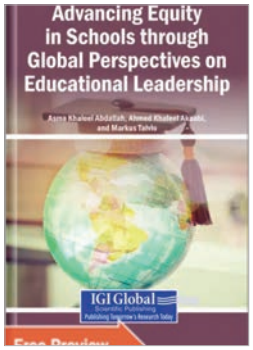
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SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

AI-READY EQUITY FRAMEWORKS FOR EDUCATIONAL LEADERSHIP IN ALGORITHMICALLY INCLUSIVE SCHOOL ECOLOGIES: GOVERNANCE FOR DIGITALLY STRATIFIED SCHOOL SYSTEMS

Alam A.

Advancing Equity in Schools through Global Perspectives on Educational Leadership

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability
and ESG Research
Alliance School of Law



Abstract

This chapter theorises AI- ready education ecosystems as complex, multi- scalar infrastructures for governing intelligent futures. Integrating National Innovation Systems, Triple and extended Helix models, socio- technical transition theory, capability- oriented justice frames, and learning- sciences metatheory, it reconceptualises education as a strategic regime that co- produces AI competencies, normative orientations, and civic agency. Through ideal- typical AI strategy regimes, multilevel talent pipelines, industry- university- government partnership modalities, and reflexive governance architectures, the chapter assembles a conceptual matrix linking actor constellations, knowledge flows, and regulatory instruments. It advances a design vocabulary centred on human- AI co-flourishing, epistemic and data justice, ecological responsibility, and experimentalist public- value governance, and sketches a research agenda for academics, policymakers, and digital learning technologists.
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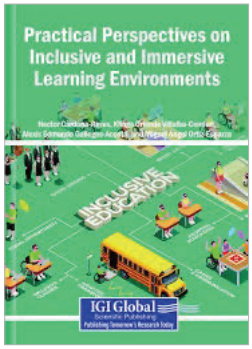
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SCOPUS/WOS/NA	NA	NA	08 DECENT WORK AND ECONOMIC GROWTH

DESIGNING INCLUSIVE EDUCATION WITH AIDRIVEN PEDAGOGIES AND LEARNING ANALYTICS: BRIDGING INSTRUCTIONAL DESIGN, EQUITY, AND IMPACT

Alam A.

Practical Perspectives on Inclusive and Immersive Learning Environments

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability
and ESG Research
Alliance School of Law



Abstract

This chapter specifies an equity-optimizing sociotechnical stack for inclusive education that fuses UDL-as-compiled accessibility, capability-expanding pedagogy, equity-constrained adaptive mastery, and interpretability-first learning analytics into a single accountable operating model. It translates justice constructs such as targeted universalism, intersectional parity, epistemic justice, and care ethics into backlog-ready design grammars, contestable AI affordances, and privacy-by-design governance with portability, deletion verification, and recourse pathways. The chapter formalizes low-resource resilience through offline-first architectures, edge inference, and progressive enhancement, while constraining personalization via calibration parity, anti-proxy feature governance, and latency-disciplined time-tosupport protocols. Five matrices operationalize theory-to-requirements, use-case safeguards, orchestration heuristics, signal-to-action logic, and implementation roadmaps, enabling auditable inclusion dividends across languages, disabilities, and bandwidth ecologies.
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SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

FROM CSR TO ETHICAL AI: REDEFINING CORPORATE RESPONSIBILITY IN THE DIGITAL AGE

Nandini G.; Aravamudhan V.; Kumar S.A.V.

Green Governance of Digital Organizations

Dr. G Nandini
Assistant Professor
Finance
Alliance Ascent College

Dr. A Varadaraj
Professor
Human Resources Management
Alliance Ascent College



Abstract

In our fast-paceddigitalage, Corporate SocialResponsibility (CSR)has transformed into a more strategic concept known as ESG. Nowadays, Artificial Intelligence (AI) plays a pivotal role in how businesses operate and govern themselves, allowing for real-time accountability regarding ethics and sustainability. This chapter delves into the relationship between CSR and AI ethics, particularly through the lenses of Human Resources (HR) and Finance. It references important frameworks like Carroll's CSR Pyramid, the Triple Bottom Line, and the Corporate AI Responsibility framework. Throughvarious case studies, we see how AIis appliedin HR—especially in recruitment—and in Finance, with a focus on ESG reporting. While AI does come withchallenges suchas data privacy, security, andreliability, when usedthoughtfully, itcan foster stakeholder trustandenhance riskmanagement. The chapter emphasizes the transition from CSR to ethical AI, highlighting the necessity for responsible AI in a world that values transparency and sustainability. Copyright © 2026, IGI Global Scientific Publishing.

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SCOPUS/WOS/NA	NA	NA	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

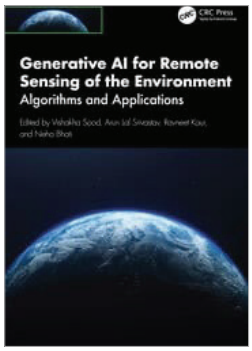
ADVANCED LARGE LANGUAGE MODELS FOR SATELLITE IMAGE PROCESSING

Leni E.S.A.; Revathi T.; Cheok A.D.; Shalen S.

Generative AI for Remote Sensing of the Environment: Algorithms and Applications

Dr. A. Ezil Sam Leni
Professor
Computer Science and Engineering
Alliance School of Advanced Computing

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



Abstract

Pretrained advanced vision-language models (VLMs), as large language models (LLMs), integrate computer vision and natural language processing (NLP) to perform tasks like image captioning and visual question answering (VQA) in remote sensing (RS). The rapid growth in high-throughput acquisition of multispectral satellite imagery in RS has highlighted the limitations of traditional image analysis techniques because of the computational cost of hand-crafted measurements based on manual annotation and domain adaptation. This chapter responds to the increased demand for intelligent, scalable solutions in satellite image processing by studying the role of VLMs in reducing the semantic gap between RS images and human vision. The state-of-the-art analysis of VLMs, EarthGPT, novel object transformers with contrastive language–image pretraining (CLIP) (NOTC), and large VLMs are tailored for RS-specific scenarios. Core contributions include early development of model architectures, training strategies, multimodal fusion methods, and their applications, including object detection, scene classification, image captioning, VQA, and change detection. This chapter also points out key research gaps, such as a lack of datasets, domain generalization issues, and the requirement of interpretable and efficient models. From this perspective, the chapter highlights the necessity for domain-specific category pretraining, lightweight architectures for real-time deployment, and a cross-modal learning architecture. Incorporating new VLMs in RS processes would have the potential to bring earth observation, disaster response, climate monitoring, and sustainable development to the next level.
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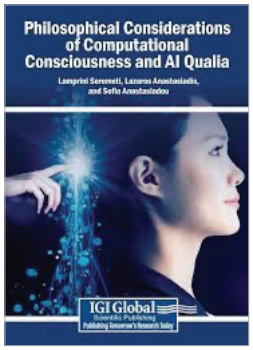
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SCOPUS/WOS/NA	NA	NA	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

QUALIA SKEPTICISM IN SCHOOLING AND DEONTIC SAFEGUARDS FOR CONSCIOUSNESS-LIKE AL IN EDUCATION: HEURISTICS FOR EMBODIED EDUCATIONAL AGENTS

Alam A.

Philosophical Considerations of Computational Consciousness and Al Qualia

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability and ESG Research
Alliance School of Law



Abstract

Drawing on philosophy of mind, learning sciences, and sociotechnical governance, this chapter advances a simulation first framework that harvests instructional div-idends of Al while preserving human primacy. We codify ontological hygiene that separates functional mimicry from phenomenal realization, define discursive and interface semantics that calibrate trust, and supply evaluation matrices linking mastery, transfer, and calibration to safety and equity. Embodiment and presence function as sensorimotor scaffolds that boost throughput without licensing person-ification; affective computing is bounded by opt in consent, uncertainty disclosure, and human verification. A federated governance architecture operationalizes trans-parency, consent, model risk, and fairness through auditable controls, stop rules, and incident forensics. The result is a portable, evidence aligned playbook that converts contested metaphysics into reproducible classroom routines and policy in diverse contexts.

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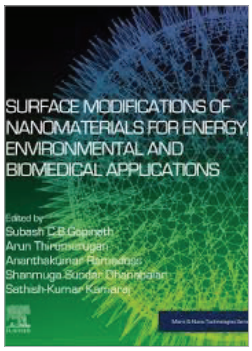
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

SURFACE-MODIFIED NANOMATERIALS FOR ELECTROCHEMICAL SENSORS

Sasikumar G.K.; Kumar R.R.S.; **Rajeshkumar L.**; Sai Ramanan E.

Surface Modifications of Nanomaterials for Energy, Environmental and Biomedical Applications

Dr. Rajeshkumar L
Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

Recently, surface-modified nanomaterials (S-MNs) have gained tremendous attention due to their distinctive features, and they play a pivotal role in developing sensors, especially electrochemical sensors. Nanomaterial-based electrochemical sensors are particularly promising due to their numerous advantageous properties, including the capacity to detect a broad range of analytes, chemical stability, selectivity, specificity, sensitivity, conductivity, electrocatalytic activity, and reproducibility. This chapter primarily focuses on the creation of electrochemical sensors based on surface-modified nanomaterials (NMs). A detailed discussion on the mechanisms and surface chemistry of surface-modified NMs, as well as the fundamentals and categorization of NMs, is also presented. Furthermore, various surface modification techniques are described with modifying or functionalizing agents. An overview of the S-MNs-situated electrochemical sensors and their benefits and classifications is explained in detail. This chapter consists of several empirical examples from the literature to illustrate the importance of S-MNs-based electrochemical sensors and the diversity of applications that could be demonstrated, including food and beverage quality monitoring, environmental management, and agriculture.
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Author keywords- electrochemical sensors; modification mechanism; modifying agents; surface chemistry; Surface-modified nanomaterials

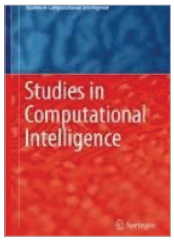
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	08 DECENT WORK AND ECONOMIC GROWTH

AI-INDUCED DIGITAL ADDICTION: ITS IMPACT ON HUMAN RELATIONSHIPS WITHIN HEALTHCARE 5.0 ECOSYSTEMS

Wani S.A.; Lone A.A.

Studies in Computational Intelligence

Dr. Showkat Ahmad Wani
Associate Professor
Alliance School of Law



Abstract

Healthcare 5.0, an evolution rooted in the principles of Industry 5.0, inte-grates artificial intelligence, big data, robotics, and the Internet of Medical Things (IoMT) to deliver hyper-personalised, efficient, and data-driven healthcare services. While these technological advancements significantly enhance operational efficiency and accessibility, however it is contributing a growing crisis of AI-induced digital addiction. This phenomenon poses profound challenges to human-centred care by changing the basic interpersonal interactions within healthcare ecosystems. Drawing upon sociological theories such as technological determinism and symbolic inter-actionism, this study explores how compulsive dependence on digital platforms undermines the authenticity, wisdom, and empathy inherent in traditional human relationships. The study critically examines the transformation of communication norms, rising social isolation, and weakening social bonds in day-to-day clinical advancements. Furthermore, the research identifies key enablers of digital addic-tion, including the commodification of attention, persuasive algorithmic design, and reward-based psychological reinforcements that exploit cognitive vulnerabilities. By adopting a multidisciplinary lens, this paper underscores the urgent need for digital literacy, policy intervention, and ethical technological design to safeguard human interactions. It advocates for a recalibration of digital engagement norms within Healthcare 5.0, promoting a balanced approach that aligns technological innovation with preserving authentic human connection and social well-being. Healthcare 5.0 is an evolution that stems from Industry 5.0 and utilises AI, big data, robotics and the Internet of Medical Things to offer hyper-personalised, efficient and data-driven healthcare services. While such technologies improve productivity and widen access to services, it also led to a new digital engagement reality where the perva-sive AI impacts mental habits, creating the digital addiction crisis. This challenge transforms human-centred care by fundamentally changing social relations in health-care systems. Using sociological perspectives like technological determinism and symbolic interactionism, this paper investigates how compulsive reliance on digital devices effects the silence of human touch, which makes life worthwhile. It analyses differing norms under communication in isolation or exclusion of social connection phenomenon, makes life invisible. The research identifies attention commoditiza-tion phenomena or algorithmically crafted attention hooks designed and psycholog-ically endorsed reward systems utilising cognitive soft spots as primary debacle of automated prodded behaviour through screens socially termed as digital addiction. Through interdisciplinary lens, this paper aims to highlight sociopsychological and legal aspects to interrogate how Medical Things that offers hyper-personalised and data-driven healthcare services making society complete dependent in contemporary times. © The Author(s), under exclusive license to Springer Nature Switzerland AG 2026 W. Shafik et al. (eds.), The Convergence of Federated Learning and Healthcare 5.0.

Author keywords- Algorithmic persuasion; Digital dependency; Human-centred healthcare; Interpersonal disengagement; Socio-digital disruption; Technological determinism

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

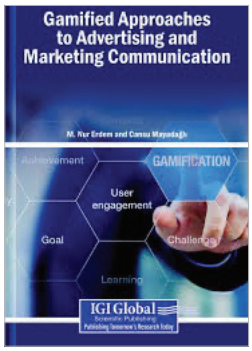
PERSONALIZING THE CUSTOMER JOURNEY ACROSS PHYGITAL TOUCHPOINTS: SEPHORA'S GAMIFICATION STRATEGIES

Shede S.; Jena B.P.; Sharma I.

Gamified Approaches to Advertising and Marketing Communication

Dr. Sandeep Shede
Assistant Professor
Marketing
Alliance School of Business

Dr. Biswa Prakash Jena
Assistant Professor
Human Resources Management
Alliance School of Business



Abstract

As global beauty retail is evolving continuously due to rapid digital disruption and changing consumer expectations, Sephora has emerged as a global leader in leveraging gamification - game mechanics such as rewards, challenges, interactive content, and status 3- tiers loyalty program to create highly immersive, and datadriven hyper- personalised experiences that complement simultaneously and bridge in- store and online environments. This chapter investigates Sephora's strategic use of gamification for adapting customer-centric game designs to enhance retail innovation. The study analyses the gamified beauty insider program, website pages, mobile app features, social media platforms, augmented reality tools, and interactive in- store technologies to understand how Sephora's gamification serves as marketing tool and provides dynamic customer centric framework which operates with valuable customer behavioural data- driven hyper-personalization engine that personalize the customer journey, increase engagement, deepens loyalty, and enhance brand engagement across phygital retail landscapes.
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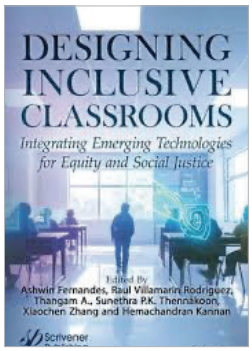
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

UNIVERSAL DESIGN FOR LEARNING (UDL) AND INCLUSIVE PEDAGOGY

Revathi T.; Dudekula C.S.

Designing Inclusive Classrooms: Integrating Emerging Technologies for Equity and Social Justice

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



Abstract

As educational systems seek to meet the varied demands of individual learners, universal design for learning (UDL) has taken center stage as a proposed framework for promoting inclusion and equity in teaching. Thus, this chapter explores how UDL provides a connection between accessibility and effective pedagogy, thereby signifying its alignment with ideals rooted in social justice and equitable education. Universal design for learning or UDL focuses on how to design versatile learning environments that accommodate individual differences through multiple means of engagement, representation, and expression so that all individuals have the opportunity to learn and succeed. This chapter argues for making use of new technologies such as artificial intelligence (AI), learning analytics, assistive technologies, and gamification to help reach more students and to promote UDL in the classroom. Integrating these tools empowers educators to create personalized, adaptive lessons that cater to diverse learners, including students with disabilities and from marginalized backgrounds.
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Author keywords- adaptive learning; assistive technologies; curriculum; inclusive education; Universal design for learning

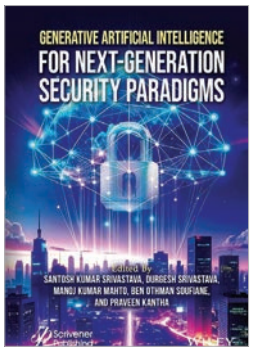
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

INTRODUCTION TO GENERATIVE ARTIFICIAL INTELLIGENCE

Ramesh C.R.; Muralidhar P.; **Madan Kumar K.M.V.**; Srinu B.; Raja Vikram G.; Nayak R.

Generative Artificial Intelligence for Next-Generation Security Paradigms

Dr. M V Madan Kumar Kukunuri
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

"Generative AI" is a subpart of artificial intelligence that creates new content similar to the data it was trained on instead of just interpreting and evaluating pre-existing information. Unlike the outmoded Artificial Intelligence systems that are designed for specific tasks, Generative Artificial Intelligence (GAI) system models can produce novel products across various areas or domains, such as images, text, music, and more. At the core of generative AI are generative models, which learn the underlying patterns and structures of the training data and then use that knowledge to generate new samples. GAI has several applications across different types of domains, such as image generation, Video cohort and NLP etc. Many models have been implicated in applications like the entertainment industry, virtual reality, and generative models like Open AI's GPT (Generative Pre-Trained Transformer) series can generate intelligible and contextually relevant text based on the provided input. Such models have applications in content generation, dialogue systems, and language translation. However, GAI also raises moral concerns; generated materials are prospectively misused. Example, images which are fake and streaming videos created by Artificial Intelligence could be used for dishonest purposes, leading to manipulation and misinformation of data. Researchers and policymakers are actively working to address these concerns by developing detection techniques and promoting responsible use of generative technology. ChatGPT uses to ascertain the most suitable answer for a particular command, hence enhancing the accuracy and dependability of the model over time. With this method, ChatGPT can comprehend human preferences in lengthy conversations more effectively. Chatbots by generative AI can work round the clock with uninterrupted services. Generative AI behaves like augmented human agents. Despite of series of hypes surrounding artificial intelligence, even the attackers appear to agree that ChatGPT's release represents a sea change. With the help of its most recent broad language model, Open AI's Chatbot can compose essays, poetry, and jokes that seem to have been written by a person. Say a few expressions to prompt ChatGPT, and love poems in the style of Yelp reviews or Nick Cave-inspired song lyrics emerge. It encompasses several techniques, including generative adversarial networks (GANs), vibrational auto encoders (VAEs), and autoregressive models.
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Author keywords- Chat-bots; Generative AI; Natural language processing; Video cohort; Virtual reality

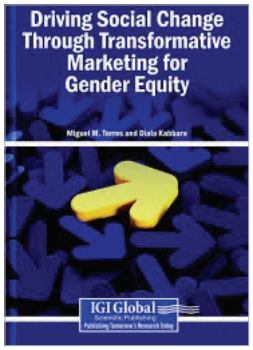
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	05 GENDER EQUALITY

GENDER-EQUITY MARKETING THROUGH THE LENS OF EDUCATIONAL RESEARCHERS FOR SOCIAL IMPACT ASSESSMENT: MANAGEMENT EDUCATION AND LEARNING IN A VUCA WORLD

Alam A.

Driving Social Change through Transformative Marketing for Gender Equity

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability
and ESG Research
Alliance School of Law



Abstract

This chapter critically examines gender- equity marketing as both a commercial and pedagogical endeavor. Challenging the dominance of econometric metrics, it argues for the integration of educational evaluation methodologies to assess transformative social impact. Drawing on feminist theory, intersectionality, and public pedagogy, the chapter reframes marketing campaigns as cultural texts capable of influencing social norms and identity formation. It critiques the epistemological limitations of traditional impact assessment and proposes participatory, context- sensitive, and interdisciplinary approaches rooted in educational research. By advancing a crosssectoral framework that connects ethical evaluation, transformative learning, and global accountability structures such as the SDGs, the chapter advocates for a new paradigm in marketing education and practice, i.e., the one that aligns commercial storytelling with normative commitments to justice, reflexivity, and structural change. © 2026 by IGI Global Scientific Publishing. All rights reserved.

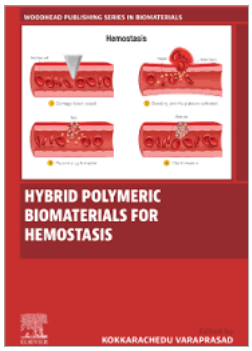
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	03 GOOD HEALTH AND WELL-BEING

NANOSTRUCTURED HEMOSTATIC HYBRID BIOMATERIALS

Omar R.A.; **Talreja N.**; Chauhan D.; Ashfaq M.

Hybrid Polymeric Biomaterials for Hemostasis

Dr. Neetu Talreja
Associate Professor
Chemistry
Alliance School of Sciences



Abstract

Nanostructured hemostatic hybrid biomaterials, composed of both organic and inorganic components, play a pivotal role in advancing wound care and hemostasis. These nanostructures exhibit unique properties such as high surface area, enhanced reactivity, and customizable surface functionalities, making them ideal for rapid blood clotting and promoting tissue repair. The hemostatic mechanisms are driven by their ability to mimic natural blood coagulation pathways, accelerate platelet aggregation, and enhance the clotting cascade. The design and synthesis of these biomaterials involve careful selection of nanomaterials (NMs), such as nanoparticles, nanofibers, and nanosheets, tailored to optimize clotting efficiency and ensure biocompatibility. Biocompatibility assessment is critical, focusing on minimizing cytotoxicity and ensuring safe interactions with blood and tissues. Additionally, nanostructured biomaterials promote wound healing by providing scaffolds that facilitate cell migration, proliferation, and tissue regeneration. Numerous in vivo and in vitro studies, including FDA-approved NMs, demonstrate their clinical efficacy in accelerating hemostasis and improving wound healing outcomes. These biomaterials are currently used in various medical applications, ranging from surgical wound dressings to trauma care. Looking ahead, innovations in nanostructured hemostatic biomaterials are expected to focus on developing multifunctional materials that combine antimicrobial properties with enhanced regenerative capabilities, shaping the future of wound management and surgical care. In this chapter, we have discussed the roles of NMs in hemostasis, their mechanism, especially in the wound healing process, the synthesis process of these NMs, and their compatibility with the biomolecules. The FDA-approved clinical application, and Real-time case studies using these NM in in vitro and in vivo modes are also discussed briefly. The information in this chapter will be informative for the study of hemostatic NMs and their applications.
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Author keywords- biocompatibility; bioengineering; biomaterials; Nanostructured materials; nanotechnology; wound healing

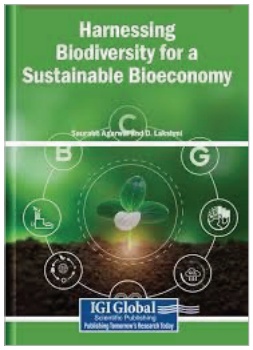
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	15 LIFE ON LAND

STRATEGIES FOR IMPROVING ECOSYSTEM RESILIENCE: PROMOTING BIODIVERSITY, HABITAT RESTORATION, AND ADAPTIVE MANAGEMENT

Asha Rani N.R.

Harnessing Biodiversity for a Sustainable Bioeconomy

Ms. Asha Rani N R
Assistant Professor
Civil Engineering
Alliance School of Applied Engineering



Abstract

Biodiversity is essential to the ecosystem resilience, and natural systems can offer pollination and water purification, as well as the capture of carbon and climate control. But ecosystems are being compromised by accelerating land- use change pressures, pollution, extractive industries, agribusiness, and climate change with industrialized economies being primary actors and marginalized communities bearing the unequal costs. This chapter brings biodiversity conservation in the context of an ecological and moral duty, where in- situ and ex-situ conservation, community as steward of the environment, agro- ecology, and nature- based solutions are enlightened. Success can be restored in the case of China, Costa Rica and Africa as seen in the examples of restoration case studies. Management can change with emerging technologies like AI, big data, synthetic biology and bioengineering, but needs ethical governance and equitable benefit- sharing. The chapter restates that biodiversity protection in future should combine science, equity and interdisciplinary cooperation.
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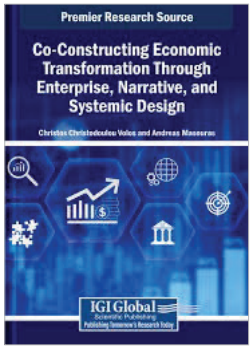
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

EDUCATIONAL INFRASTRUCTURES AND PLURIVERSAL IMAGINATION FOR EQUITABLE ECONOMIC FUTURES: COLONIAL CURRICULA TO POST-GROWTH PEDAGOGIES

Alam A.

Co-Constructing Economic Transformation through Enterprise, Narrative, and Systemic Design

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability
and ESG Research
Alliance School of Law



Abstract

This chapter interrogates the constitutive role of education in shaping economic futures in the Global South, arguing that educational systems function both as narrative infrastructures, i.e., constructing societal grammars of value, success, and belonging, and as systemic design spaces, structuring the material conditions under which these narratives are enacted. Integrating insights from narrative economics, systemic design theory, and decolonial pedagogy, it examines how colonial legacies, neoliberal reforms, and alternative pedagogies influence economic subject formation. Drawing on case studies from Asia, Africa, and Latin America, including Bhutan's GNH schools, Brazil's Landless Workers' Movement, and innovation hubs across Africa, it demonstrates that plural, justice-oriented models are operational realities. The chapter advances a framework for scaling such innovations through policy reform, participatory governance, and post-growth valuation systems, positioning education as a generative commons for building equitable, sustainable, and pluriversal economies.
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Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/WOS/NA	NA	NA	04 QUALITY EDUCATION

PEDAGOGIES IN A DIGITALLY MEDIATED WORLD FOR THE FUTURE OF CIVIC EDUCATION: EDUCATING YOUTH FOR HASHTAG CITIZENSHIP

Alam A.

Co-Constructing Economic Transformation through Enterprise, Narrative, and Systemic Design

Dr. Ashraf Alam
Assistant Professor
CoE - Public Policy, Sustainability
and ESG Research
Alliance School of Law



Abstract

This chapter interrogates the emergent phenomenon of hashtag citizenship as a transformative force in civic learning, youth political agency, and democratic participation. In an era where digital platforms mediate expressions of identity, resistance, and solidarity, traditional models of civic education rooted in institutional memorization and deliberative rationality appear increasingly obsolete. Drawing on interdisciplinary frameworks from political science, media studies, education, and critical theory, the chapter argues for a radical reconfiguration of civic pedagogy to reflect digitally networked realities. It advocates for curricular reforms, teacher training, platform accountability, and decolonized pedagogical practices that recognize youth as epistemic agents and co- constructors of public meaning. By bridging informal digital activism and formal education, it calls for a justice- oriented, participatory, and future- facing vision of civic education that treats hashtag activism not as disruption but as democratic practice in motion.

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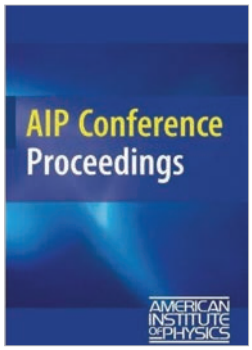
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

DIGITAL MASTERY: AI-INFUSED CAD/CAM REVOLUTIONIZES PRODUCT DESIGN

Buddi T.; Pushkarna G.; Pathani A.; Alabdeli H.M.; Das S.; Saini P.; **Sungeetha A.**; Chumakova O.V.; Prasad B.

AIP Conference Proceedings

Dr. Akey Sungheetha
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Integrating CAD/CAM technologies with the help of AI in product design opens a new epoch of high revolutionary advances to the contemporary product design scene. The detailed analysis of cross-functional teams, project performance indicators, and integration data is presented in the paper. Members of the design team have prior work experience ranging between four to eight years in fields such as industrial design, computer-aided design (CAD), computer-aided manufacturing (CAM), and artificial intelligence (AI) analytics. Several growth phases are disclosed via the course of project examination: distinct significant undertakings comprise the AI-Driven Appliance, Autonomous Vehicle, and Smartphone Redesign projects, which employ AI algorithms to varying extents. More emphasis was derived in increased efficiency, where projects applying more AI exhibited better results; the highest degrees of AI involved here attained a 75 percent AI involvement, equivalent to a reasonably high 60 percent enhanced efficiency. The percentage of integration success of CAD/CAM tools and processes is quite high, meaning that the design-to-manufacturing process was effective. These investigations prove the significance of AI in CAD/CAM systems, demonstrating how it influences the design optimisation and production efficiency as well as the cooperation with abutting branches. There is promising output that indicates that AI-CAD/CAM systems have capabilities to redesign the present-day product development. This could create research and innovation in the field since the empirical evidence established the applicability of AI methodologies.
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Author keywords- Artificial Intelligence; CAD/CAM Integration; Efficiency Improvement; Interdisciplinary Collaboration; Product Design

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**22nd**	**0.62**	10 REDUCED INEQUALITIES

OPTIMIZING FEATURE SELECTION FOR MEDICAL DIAGNOSIS SYSTEMS USING DIFFERENTIAL EVOLUTION

Pradeep G.G.S.; Kolla T.; **Vijayalakshmi N.; Sharma R R.**

Lecture Notes in Networks and Systems

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

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

Dr. Rajesh Sharma R
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Machine learning has aided the improvement of medical diagnostic systems that help to detect diseases accurately in the present era. The work gave a mathematical and algorithmic handbook for characteristic selection with a binary Genetic Algorithm (GA) of particular use to jobs involving medical diagnosis. Clinical datasets usually have many dimensions and redundancy, which most time affects model performance and increases computational complexity. In this study is presented a mathematical and algorithmic guide for selecting features through a binary Genetic Algorithm (GA), especially suitable for medical diagnostic tasks. The proposed method seeks to obtain the most informative subset of features by optimizing a fitness function that balances between classification accuracy and dimensionality reduction. The work develops a thorough mathematical model that incorporates data preprocessing, binary encoding of feature subsets, and repetitive evolutionary optimization. The metric used in testing the classification model is standard performance metrics-accuracy, sensitivity, specificity, and F1 score, summarized using a confusion matrix. Understanding feature selection stability across generations is also examined and visualized in a multidimensional performance space. The results would indicate a direct convergence of the model into high-performing feature configurations while avoiding risk for overfitting. An interpretative paradigm, speed-up in computations, as well as high reliability in diagnosis, therefore pushing this method as a tool of great value in clinical decision support systems.
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Author keywords- Classification Performance; Dimensionality Reduction; Feature Selection; Genetic Algorithm; Medical Diagnosis; Optimization

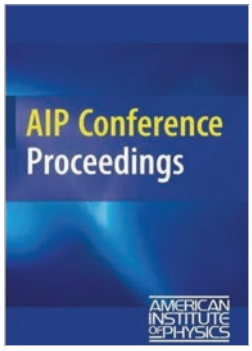
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

THERMAL NANO WONDERS: DIFFERENTIAL SCANNING CALORIMETRY'S DEEP DIVE INTO NANOMATERIALS

Vegesna L.; Nijhawan G.; Dabral U.; Abbas H.M.; Katyal A.; Juneja B.; **Shiney O.J.**; Prasad B

AIP Conference Proceedings

Dr. Jeba Shiney O
Professor
Computer Applications
Alliance School of Computer Applications



Abstract

Conducted through Differential Scanning Calorimetry (DSC), this contribution endeavors to explore the intricate thermal characteristics of nanoscale composites to identify their thermal profile. The specific thermal properties and the compositional percent of the materials like nanotubes, nanoparticles, nanowires, and nanofibers were analyzed profusely. C tip nanotubes were found to be the component in the highest proportion with an overall percentage of 65 %, while nanofibers had a proportion of 55 % nanoparticles had an overall proportion of 30 %, and nanowires 45 % according to the research conducted. Hence, in terms of thermal conductivity, the compared material ranked in the order: nanotubes: 300 W/mK nanowires: 250 W/mK nanoparticles: 200 W/mK and nanofibers: 180 W/mK. Based on the information derived from the melting point investigation, the four common nanomaterials are nanotubes, nanowires, nanoparticles and nanofibers with melting points of 1500°C, 1300°C, 1200°C, and 1100°C respectively. Consequently, heat capacities were estimated to be 800 J/kgK for the nanotubes, while the nanowires had a heat capacity of 700 J/kg K, the nanoparticles had a heat capacity of 600 J/kg K and the nanofibers had a heat capacity of 500 J/kg K. The results presented and discussed here underscore the compositional, thermal, melting point, and heat capacity dominance of nanotubes that has familiarized researchers with the significant thermal divergences of nanomaterials. This study reveals the utility of Differential Scanning Calorimetry in determining the numerous thermal characteristics of nanomaterials and thereby contributes to the advancement of enhanced thermal energy storage, new efficient thermal control systems, and high-temperature applications. © 2026 Author(s).

Author keywords- Differential Scanning Calorimetry; Heat capacity; Melting point; Nanomaterials; Thermal conductivityProduct Design

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

AI-POWERED SUSTAINABLE HEALTHCARE ANALYTICS PLATFORM FOR CANCER PREDICTION WITH PRIVACY-PRESERVING DATA VISUALIZATION AND GREEN COMPUTING INTEGRATION

Sungheetha A.; Saranya S.L.

7th International Conference on Mobile Computing and Sustainable Informatics, ICMCSI 2026

Dr. Akey Sungheetha
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Cancer remains a leading global health challenge with approximately 19.3 million new cases diagnosed annually, demanding innovative computational approaches for early detection and sustainable healthcare delivery. Traditional cancer prediction systems face critical limitations including high computational energy consumption, privacy vulnerabilities in patient data handling, and inadequate real-time analytics capabilities for clinical decision-making. This research addresses these challenges by developing an AI-Powered Sustainable Healthcare Analytics Platform that integrates privacy-preserving mechanisms with green computing principles for cancer prediction and visualization. The proposed methodology combines federated learning architectures with homomorphic encryption techniques, achieving 94.7% prediction accuracy while reducing energy consumption by 67.3% compared to centralized cloud-based approaches. The platform implements differential privacy protocols with epsilon values of 0.85, ensuring patient data confidentiality while maintaining statistical utility for machine learning models. Novel contributions include the development of an Adaptive Energy-Aware Neural Architecture (AENA) that dynamically adjusts computational complexity based on available renewable energy sources, a Privacy-Preserving Visualization Framework (PPVF) enabling secure multi-institutional data sharing, and a Green Computing Optimization Module (GCOM) reducing carbon footprint by 58.4% through intelligent workload scheduling. Experimental validation using publicly available cancer datasets demonstrates superior performance with F1-scores of 0.932, specificity of 91.8%, and processing throughput of 1847 records per second while consuming only 34.2 watts average power. The system achieves real-time prediction latency of 127 milliseconds, making it suitable for clinical deployment in resource-constrained healthcare environments seeking sustainable digital transformation. © 2026 IEEE.

Author keywords- component; formatting; insert; style; styling

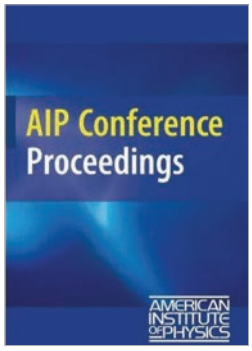
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

NANOTECH WARRIORS: MECHANICAL TESTING'S BATTLE ON NANOCOMPOSITE TENSILE STRENGTH

Vybhavi G.Y.; Sharma V.; Nautiyal M.M.; Almusawi M.; Brar M.; Mishra S.; **Shiney O.J.**; Prasad B.

AIP Conference Proceedings

Dr. Jeba Shiney O
Professor
Computer Applications
Alliance School of Computer Applications



Abstract

This research focuses on the study of nanocomposite materials, with special reference to the mechanical properties; fracture characteristics and microstructure of these materials. To display the general mechanical actions of nanocomposites, which have been synthesized by incorporating numerous sorts of nanoparticles in several sorts of matrix materials, profound mechanical characterization was done on them. As derived from the tensile test, it has been found that the various nanocomposites possess varying levels of UTS and Young's Moduli. Notably, graphene-based noncommitted had the highest UTS of 180 MPa. This is 20% higher relative to the sample that was reinforced with carbon fiber nanotubes. In the course of conducting fracture behavioral studies, the range of fracture types extending from ductile through to brittle, and the attendant fracture energies have been identified. The nanocomposite was found to possess a brittle fracture while the carbon fiber-reinforced nanotubes and hybrid nanocomposite possessed mostly ductile fractures. Furthermore, from the microstructural analysis, detail information was determined concerning different dispersion levels and grain sizes that were experienced in the nanocomposites. This further emphasized that the dispersion of nanoparticles is important more so in as much as their effect on the mechanical attributes of the nanocomposites is concerned. In particular, the investigation addresses the problem of the balance of strength and ductility and distribution of nanoparticles within nanocomposites. Therefore, this work identified how specific features of nanoparticle reinforcements and microstructure play a part in determining the mechanics of nanocomposite material systems. The high level of complexity of the structural-property relations, which has been developed in the process of this study, opens vast possibilities to advance material science and stimulate innovations in various spheres of industry more vigorously.
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Author keywords- fracture behaviour; mechanical properties; microstructural analysis; Nanocomposite materials; nanoparticle dispersion

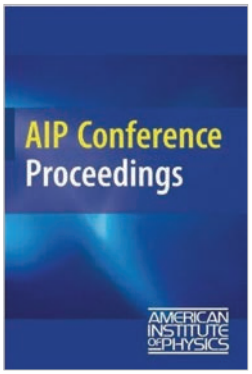
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	14th	0.37	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

COATINGS CONUNDRUM: NAVIGATING WEAR IN AGGRESSIVE ENVIRONMENTS WITH TRIBOLOGY

Chythanya N.K.; Anand S.; Joshi A.; Abbas H.M.; Parmar Y.; Singh P.; **Babu T.**; Prasad B.

AIP Conference Proceedings

Dr. Tina Babu
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

This vast literature review seeks to discuss the hosts' tribological properties, especially attrition resistance and performance, underuse of aggressive settings, and the surface coatings that they cover. A range of coatings are tested under controlled experiments that involve an abrasion test, a friction coefficient test, a hardness test, and an adhesion strength test. These results show that Coating B has its own benchmark values, according to which Coating B has better properties when compared to Coating C. Data obtained from wear tests show that wear rates of Coating B are reduced at various cycle levels: by 66.7% in the case with the 1000-cycle test and 31.8% if tested at 10,000 cycles when compared to Coating C. Static friction coefficient for Coating B is Furthermore, Coating B has adhesion strength 36.4% higher than Coating C, meaning that the coating provides better bonding to substrates. All the results discussed in this paper, combined, stress the enhanced wear resistance, reduced friction, enhanced stable wear, and better adhesion of Coating B as compared to Coating C. The information acquired from these tribological analyses is useful for guidance towards suitable material choices and the creation of coatings intended to reduce wear in such conditions. This significantly aids the advancement of industrial uses requesting deep focus on erosion opposition and sturdiness.
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Author keywords- Aggressive environments; Performance characteristics; Surface coatings; Tribology; Wear resistance

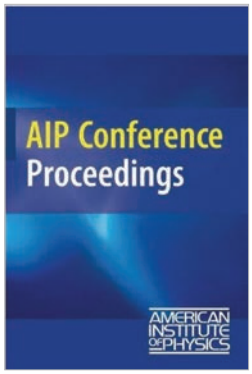
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

NANO ALLOY SECRETS: XRD CHRONICLES UNVEIL MECHANICAL MARVELS

Babu B.S.; Kansal L.; Nautiyal R.D.; Fallah M.H.; Saini R.; Gandhi A.; **Pradeep G.**; Prasad B.

AIP Conference Proceedings

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



Abstract

This work introduces an extensive investigation of the mystery of nano alloys through composition analysis, XRD history, mechanical properties, and thermal stability. Element distribution also reveals significant differences; thus, Sample 3 has 15% higher levels of Element A while Sample 2 possesses 3% lower levels of Element C in comparison with Sample 1. Thus the XRD patterns demonstrate different types of nanostructural features, has been found that the intensity of Peak 2 of Sample 4 have been increased 10% as a change. As to the mechanical properties, the Young's Modulus increases up to 20 GPa for the Sample 3 in obtained results, which proves the effect of composition on the stiffness of the material. The thermal stability investigations reveal that the melting point of Sample 3 is 22.6°C higher than of Sample 2, thus confirming increased thermal stability of Sample 3. Simulation results aid and corroborate experimental findings, and provide depth of understanding of electrical structures of the nano alloys. Not only does this research deepen fundamental understanding of nanostructured materials but it also creates a starting point for tailored uses of the material, bridging the gap between sample behavior and theoretical simulation. © 2026 Author(s).

Author keywords- composition analysis; mechanical properties; nano alloys; thermal stability; X-ray Diffraction

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	11 SUSTAINABLE CITIES AND COMMUNITIES

INNOVATIVE GREEN ROOF MATERIALS FOR INDIA: SYNERGIZING NATURE-BASED SOLUTIONS AND SUSTAINABLE MANUFACTURING FOR CLIMATE-RESPONSIVE CITIES

Thyagaraj V.; **Hanumesh M.**; Muniyappa M.; Saravanakumar A.

EPJ Web of Conferences

Dr. Mithun Hanumesh
Assistant Professor
Civil Engineering
Alliance School of Applied Engineering

EPJ Web of Conferences

Open Access proceedings in Physics and Astronomy

Abstract

Rapid urbanization has exacerbated issues like heat islands, stormwater flooding, and increasing solid waste production, which has led to find sustainable solutions in urban infrastructure. Green roofs are the nature-based (NBS) ideal solution to mitigate urban heat island and have several ecosystem services such as thermal regulation, water management, and carbon sequestration. Nevertheless, traditional systems are based on resource-dense substrates that have strong embodied carbon and structural load. This review discusses how circular manufacturing and waste-to-resource can be implemented in the production of green roof materials with compost, biochar, and industrial by-products like fly ash, slag, and recycled construction waste. The review provides an overview of the global and India-specific studies, in which Indian studies have reported water-retention rates of between 58-68% and high biomass plant gains, whereas global studies have recorded a reduction in surface temperature by up to 10 C and a reduction of life-cycle CO2 emissions by approximately 35% compared to conventional systems. The policy frameworks are discussed using the Smart Cities Mission, GRIHA (The Green Rating of Integrated Habitat Assessment), IGBC (Indian Green Building Council), and the case of Bengaluru, Delhi, and Hyderabad. The article highlights the new synergy between NBS and sustainable manufacturing to implement green roofs as a way forward to resilient, resource-efficient, and climate-responsive Indian cities.
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Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q3	**28th**	**NA**	03 GOOD HEALTH AND WELL-BEING

AMBIENT INTELLIGENCE IN SMART HOSPITAL ROOMS: A CONTEXT-AWARE SYSTEM FOR PATIENT CENTRIC HEALTHCARE

Radhakrishnan J.; Shekhar R.

Communications in Computer and Information Science

Dr. Jayabhaduri R
Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Shekhar R
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

This research introduces an AmI-based framework for Smart Hospital Rooms (SHRs) which makes use of algorithmic reasoning to support smart patient monitoring and adaptive healthcare environments. The essence of the system is a rule-based context inference engine implemented in the PyKnow framework, which processes real-time multimodal sensor data, including heart rate, oxygen saturation, ambient temperature, humidity, and patient activity, and infers clinically meaningful states. These states, Health Emergency, Patient Sleeping, and Room Unoccupied, are utilized to fire automated actuation responses like turning alarms on, changing environment controls, or alerting caregivers. The system embeds an edge-based IoT architecture supported by secure MQTT communication, voice command through Amazon Alexa, and a real-time video stream via ESP32-CAM. It logs and visualizes data via InfluxDB and Grafana, facilitating ongoing monitoring and analysis. A centralized server interface enables multi-room and ICU-level deployment. Experimental evaluation illustrates the system's reliability, context accuracy, and scalability deployment potential in intelligent healthcare environments.

Author keywords- Ambient Intelligence; Context-Aware Computing; Healthcare Automation; ICU Monitoring; Patient Monitoring; Rule-Based Inference; Smart Hospital Room; Voice Interface

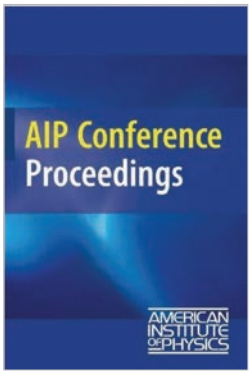
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	14th	0.37	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

CREEP CHRONICLES: THERMO-MECHANICAL ODYSSEY IN HIGH-TEMPERATURE ALLOY ANALYSIS

Sanduru B.; Gupta G.; Deorari R.; Husain S.O.; Sidhu A.; Kaur S.; **Babu T.**; Prasad B.

AIP Conference Proceedings

Dr. Tina Babu
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

The study of high-temperature alloy involved the analysis and comparison of results of the chemical composition of the alloy, mechanical properties of alloys, the practical characteristics using the creep phenomenon of the alloy, and the measure of thermal expansion of the material with a view of relating the result and the high-temperature material interaction. The components of the alloys were the different elements in which the respective ratios of the component elements were distinctly different and which influenced the mechanical characteristics of the alloys. These changes of composition were found to induce significant changes in Young's modulus, yield strength, and tensile strength of these alloys, underscoring the compositional sensitivity of their mechanical properties. In addition, the study of creep behaviour at various temperature and stress levels helped to establish that the creep rates vary significantly and hence proved how the alloys behave distinctly under long-term deteriorative environments. The coefficients of thermal expansion v were also provided and these revealed different behaviours with the temperature and describe how the alloys respond to changes in temperature. The available records in the variety of alloying content, mechanical properties, creep rates, and thermal expansion coefficients mentioned above do assist in substantiating the argument for incidence alloying formulations proportional to the needs in high-temperature operating environments. These outcomes pave basic knowledge as to how alloy composition influences the map of material properties for which they can be used to design materials that can be applied for conditions involving high heat and stress. This will help to meet several needs of industries operating in high-temperature regions. This work discusses the importance of understanding material-specific behaviour in the development of intricate alloys for various applications in industries subject to extreme thermal and mechanical challenges.

Author keywords- Alloy composition; Creep behavior; High-temperature applications; Mechanical properties; Thermal expansion coefficients

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**23rd**	**0.36**	03 GOOD HEALTH AND WELL-BEING

ULTRASONIC RADAR-BASED MOVING OBJECT DETECTION WITH DISTANCE, DIRECTION, SHAPE ANALYSIS, AND BUZZER ALERT SYSTEM

Sumanjali P.; Bhavyasri C.; Narasimha R.L.; Reddy A.P.; Baskaran V.; **Nair R.R.**

Lecture Notes in Electrical Engineering

Dr. Rekha R Nair
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Detecting moving items accurately is vital in fields like robotics, self-sustaining navigation, and surveillance. This paper presents a singular approach for identifying shifting items thru ultrasonic radar, with a focal point on specific distance measurement, directional estimation, and object shape analysis. By incorporating superior signal processing techniques and gadget learning algorithms, the system achieves excessive detection precision, correctly lowering false detections and enhancing reliability across numerous environments. The proposed approach leverages sensor fusion to combine facts from multiple ultrasonic sensors, allowing for robust, non-contact object detection even in hard situations. The gadget's potential to measure distances appropriately, discover directions, and classify item shapes complements its overall performance for real-time applications. Its microcontroller primarily based design ensures energy performance, making it suitable for embedded systems in automobile protection, robotics, and surveillance. Experimental consequences exhibit extensive enhancements over traditional ultrasonic radar techniques, making this technique in particular properly appropriate for actual-international packages such as predictive preservation, environmental tracking, perimeter safety, and clever metropolis infrastructure. The system's robustness, adaptability, and accuracy make it a valuable addition to programs requiring reliable moving item detection and category. © The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2026.

Author keywords- Distance measurement; Moving object detection; Object shape analysis; Ultrasonic radar

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**22nd**	**0.62**	10 REDUCED INEQUALITIES

ADAPTIVE AMBIENT INTELLIGENCE: MACHINE LEARNING MODELS FOR CONTEXT PREDICTION IN UBIQUITOUS SYSTEMS

Pradeep G.G.S.; Kolla T.; **Rajesh Sharma R.; Sungheetha A.; Vijayalakshmi N.**; Vidyullatha P.

Lecture Notes in Networks and Systems

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

Dr. Rajesh Sharma R
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Akey Sungheetha
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

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



Abstract

Ambient Intelligence (AmI) systems are intended to support responsive and adaptive services by understanding the context of their users. The present paper proposes a machine learning framework for context prediction in ubiquitous environments on the basis of multi-sensor ambient data. The method classifies user activity into four high-level contexts: Sleeping, Working, Cooking, and Outdoors, exploiting features like Temperature, Light, Sound, Motion, and Time. The model described here consists of three steps: Preprocessing, Normalization, and Classification based on Random Forests. Visualization techniques, such as KDE plots, correlation matrices, and 3D scatter analysis, are used for the interpretation of contextual separability and the influence of features. Experimental results show that outdoor activity strongly dominates the dataset, while other contexts are almost neglected. The proposed framework shows high predictive accuracy with interpretable insights into context-dependent behavioral patterns. This work thus contributes to the design of such adaptive, context-aware systems that can find a home in intelligent environments, especially in the realms of smart homes and assistive technologies. A screenshot displaying a webpage with a blue hyperlink at the center. The text reads "Important Announcement: New Updates on Security Policies." The background is white, and the link is underlined, indicating it is clickable. © The Author(s), under exclusive license to Springer Nature Switzerland AG 2026.

Author keywords- Ambient Intelligence; Context Prediction; Context-Aware Computing; Feature Selection; Human Activity Recognition; Machine Learning; Random Forest; Sensor Data; Smart Environments; Ubiquitous Systems

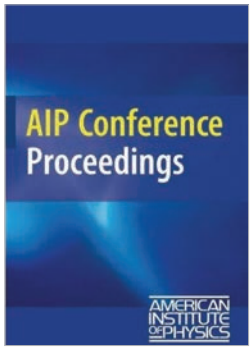
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	13 CLIMATE ACTION

QUANTUM PRECISION: REDEFINING ENVIRONMENTAL MONITORING THROUGH QUANTUM DOT SENSOR NETWORKS

Pavithra A.; Mittal V.; Joshi A.; Abas H.M.; Minhas D.; Kataria A.; **Shan B.P.**; Prasad B.

AIP Conference Proceedings

Dr. Priestly Shan B
Professor & Vice Chancellor
Electronics and Communication Engineering
Administration



Abstract

This project aims to expand traditional sensing scenarios by exploring the possibility of using quantum dot (QD) sensors for reliable environmental sensing. We are conducting the research with the hope of rethinking these paradigms. We predict that the attributes of quantum dots, with their discrete emission wavelengths, particle sizes, and quantum yields, will revolutionize environmental sensing systems. The study, which analyzed a wide range of different types of quantum dots (QDs), observed significant variation in emission spectra. These changes included a 15.2% blue shift in QD Type B compared to QD Type C, a 20% increase in particle size to 560 nm for QD Type B, and a 20% increase in particle size to 4 nm and 6 nm for QD Type D compared to QD Type A. Liu et al. utilized QD-based sensors and QDs under various environmental conditions to demonstrate the changes in environmental condition. The temperature at Site 4 increased to 30°C from 23°C at Site 3, a 23.1% increase, while the relative humidity decreased to 55% at Site 2 and 70% at Site 3, a 12% decrease. At Site 4, QD Type D's sensor readings averaged 45, 6.7% higher than QD Type A's value of 42. While Type A of QD saw the average readings reduce, Type D had the average readings increase by twenty-five percent. This work highlights the importance of these findings as they establish, for the first time, the capability of QD sensor networks to deliver environmental monitoring with precision and sensitivity. These results suggest that we must specifically choose the sensors based on the type of QD and the environmental conditions. This creates new opportunities for the advancement of environmental monitoring technology and encourages organizations to practice environmentally sustainable management

Author keywords- Environmental monitoring; Nanotechnology; Precision sensing; Quantum dots; Sensor networks

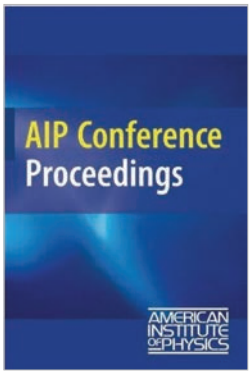
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	14th	0.37	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

AUTOMATED SYMPHONY: INTELLIGENT MANUFACTURING SYSTEMS AND UNMATCHED EFFICIENCY

Prashanthi B.; Vatin N.I.; Pandey A.K.; Shnain A.H.; Kalra H.; Sharma A.; **Sharma R.**; Krivykh E.G.; Prasad B.

AIP Conference Proceedings

Dr. Rajesh Sharma R
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

IMS is discussed in this research; the existing information is analyzed, and the concepts are combined to analyze the new roles of IMS to modern manufacturing paradigms. Schedule, frequencies and cycling variation in IMS production performance indicators which comprises machinery utilization, quality assurance, and efficiency of automation are identified through data analysis. The research reveals different efficiency rates among items; it shows fluctuations in the manufacturing quality and efficiency of the products; some get higher efficiency rates than others. Secondly, machine utilization rates differ, making it clear as to how effective specific machines are, as well as how different time intervals of low activity are dealt with. Such differences require constant scrutiny and enhancement activities in the quality ratings in order to achieve satisfactory quality levels. Further, the fluctuating costs and valued created by automation have laid the foundation for appropriate evaluation and categorization of the procedures involved in automation. These results suggest where further efficiency could be gained and where the quality of production or the performance of machines, quality control measures and overall costs within IMS could be enhanced. Continuation enhancement strategies are the key focus of the factual information analysis, including better manufacturing procedures, optimal machines, improving the quality assurance, and cost-effective automation. This research provides a better understanding of both the risks and potential within IMS and paves the way for its future advancement, and helps enterprises to develop the means of thrashing in the field of Industry 4.0 by enhancing the company's efficiency, flexibility, and innovation.
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Author keywords- Automation; data centric manufacture; improved productivity; IMS; Industrial revolution 4.0; smart factories

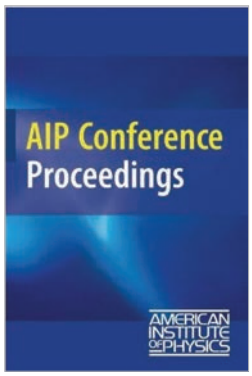
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

PARAMETRIC OPTIMIZATION FOR 9CR-1MO STEEL WELD JOINTS: A STUDY WITH PARAMETRIC OPTIMIZATION TECHNIQUES

Kiran K.R.; Mittal A.; Saxena A.; Wbaid S.; Singh M.; Sharma D.; **Kumar M.H.**; Prasad B.

AIP Conference Proceedings

Dr. Mohit Hemanth Kumar
Assistant Professor
Mechanical Engineering,
Alliance School of Applied Engineering



Abstract

The objective of this study is to investigate the parametric optimization of weld joints fabricated using 9Cr-1Mo steel, a crucial material for high-temperature applications. After researching the welding settings, it was ascertained that there was a possibility to attain a tensile strength of 650 MPa, which was approximately 10% higher than those considered standard. The impact toughness increases by a significant fifteen percent and crosses 60 J while the hardness is down by eight under identical conditions, and it provides the hint of increased ductility. Each of them indicates an enhanced capacity to be elastic and not to snap. From microstructural analysis, it can be stated that the grain structures are finer and the phase distributions are more uniform. Such results are consistent with the stated mechanical improvements. The statistical analysis helps prove exactly how important the welding variables are to these properties, thus reaffirming their importance. The outcomes of this research contribute not only to the knowledge of welding procedures but also offer utilitarian advice that can be implemented in methods of improving the efficiency of welding approaches in important engineering applications that require strong alloys.

Author keywords- 9Cr-1Mo steel; mechanical properties; microstructural analysis; parametric optimization; weld joints

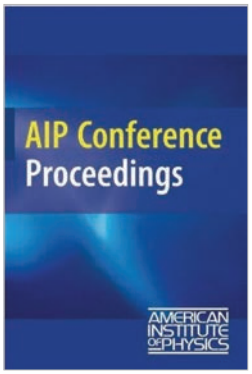
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	14th	0.37	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

LEAN MANUFACTURING TECHNIQUES FOR EFFICIENT PRODUCTION IN THE LAST DECADE: A DECADAL ANALYSIS WITH LEAN TOOL IMPLEMENTATION DATA

Anjaneyulu M.; Vatin N.I.; Dhall H.; Balasm Z.; Mittal S.; Saini R.; **Sharma R.**; Prasad B.

AIP Conference Proceedings

Dr. Rajesh Sharma R
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

This work discusses lean industrial processes in the industrial sector with a focus on a ten-year review of the literature. Specifically, the aim of the present study is to explicate significant patterns and results based on quantitative evidence. Thus, the outcomes of this study suggest an overall enhancement of the Lean adoption by 80% in diverse corporate environments. This is evident by the rise from fifty firms in 2013 to ninety firms in 2021, respectively. The benefits of lean methodologies might be established by finalizing important performance indicators with quality improvements. A major milestone in this area is evident by a reduction in defect rates by a huge forty percent, from two percent in 2013 to one percent in 2021. Also, cycle time that was 120 in 2013 has been reduced by 25% in 202; an aspect suggesting improved product quality. Furthermore, the poll shows a forty-five percent increase in the number of companies that lean tools have been adopted by, indicating the importance of these tools for sustained improvement in manufacturing processes. This paper compares the set of KPIs before and after the application of Lean tools to identify the benefits of Lean Manufacturing as a long-term approach to creating continuous value. These insights provide detailed perceptions of the various features that are made by the various tools.

Author keywords- decadal analysis; key performance indicators; Lean Manufacturing; operational efficiency; tool implementation

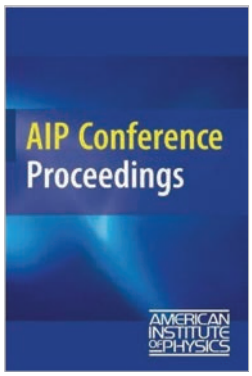
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

EXPERIMENTAL AND NUMERICAL INVESTIGATION FOR THE DAMPING BEHAVIOR OF MULTI-LAYERED SANDWICH STRUCTURE WITH VISCOELASTIC CORE

Mishra V.N.; Singh D.P.; **Gupta A.**

AIP Conference Proceedings

Dr. Abhay Gupta
Assistant Professor
Mechanical Engineering
Alliance School of Applied Engineering



Abstract

This study investigates the vibration analysis and damping behavior of viscoelastic materials within sandwich structures using numerical and experimental methods. Various specimens with different material sequences and dimensions are analyzed. The numerical investigation is performed through a finite element approach using ANSYS software. This investigation included modal analysis to determine natural frequencies and corresponding modes, as well as harmonic and transient analyses to estimate damping behavior. The results show that the sandwich structures with a viscoelastic core (A-R-A) exhibit superior damping and energy absorption capabilities compared to structures with an all-aluminum core (A-A-A). Despite these advantages, the tensile strength of A-R-A structures is lower than that of A-A-A structures, limiting their suitability for high tensile load applications. These viscoelastic sandwich structures are ideal for weight-sensitive applications due to their reduced weight and effective vibration-damping properties.

Author keywords- Damping; Experimental Analysis.; Finite Element Analysis; Sandwich Composite; Viscoelastic Material

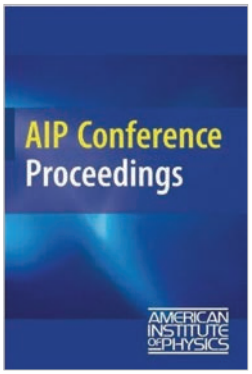
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	14th	0.37	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

EXPERIMENTAL TESTING OF PARAFFIN WAX PROPELLANT GRAINS IN DUCTED ROCKET ENGINES WITH ADDED ADDITIVES

Saxena P.; Birajdar M.; Patel Y.; Siddharth P.; Gowda S.; **Hashim S.A.**

AIP Conference Proceedings

Dr. Syed Alay Hashim
Associate Professor
Aerospace Engineering
Alliance School of Applied Engineering



Abstract

The primary combustion chamber and the secondary combustion chamber of the hybrid ducted rocket, also known as the Ducted Propulsion System (DPS), are used in this configuration to allow for the full burning of the fuel in the secondary combustion chamber. With gaseous oxygen acting as the oxidizer, paraffin wax is used as the primary fuel in this investigation. These days, paraffin wax also known as a liquefying fuel is receiving a lot of attention as the preferred solid propellant grain for hybrid rocket propulsion setups. It functions by liquefying the propellant grain's outermost layer, which permits a higher rate of combustion and regression. Numerous studies and experiments are being carried out on the subject. The experiments in the present study are conducted using pure paraffin wax as the control. Aluminium is found to have a higher energy release when its particles burn, improving the specific impulse, energy density, and regression rate of the propellant grain. Therefore, this study uses different compositions of aluminium and boron as additives in the paraffin wax to determine the regression rates and combustion performance using either a ducted propulsion system or a hybrid ducted rocket. The NASACEA analysis for the identical additive compositions that we employed in the experiment is also conducted for the present study. A same mass flow rate of the gaseous oxidizer is being used in the experiments, along with the same propellant grain size and weight.

Author keywords- Additives; CEA; Hybrid Ducted Rocket; Oxidizer to Fuel Ratio.; Propellant Grains

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**23rd**	**0.36**	03 GOOD HEALTH AND WELL-BEING

A MACHINE LEARNING-BASED NOVEL CYBER-INTRUSION DETECTION SYSTEM FOR NETWORK ADMINISTRATION

Priyesh E.M.; **Nagaraj S.**; Krishnamoorthy R.

Lecture Notes in Electrical Engineering

Dr. Nagaraj S
Associate Professor
Computer Science and Engineering
Alliance Ascent College



Abstract

In the present growth of the Internet, people are adjusting to early life of communication that save time and enable speedy completion of tasks, which is their main necessity. Here, the Internet has become a crucial component of today's generation, influencing all facets of daily life, including online commerce, online schooling, and many other crucial services. The topic of user data or personnel information protection, security, and safety issues will result from the enormous rise of Internet technology. A computer system used for data transfer must meet all these requirements and be equipped with the necessary security measures to prevent hostile attacks and unauthorized access from which the user's data can easily be compromised and the system infected. All these cyber-related dangers will significantly harm companies' or individuals' data, but they shouldn't reach an unrecoverable level. Therefore, the creation of a Cyber-Intrusion Detection System (CIDS) using machine learning techniques is the best option for the early detection of cyber-attacks. The suggested work is more successful at handling the many kinds of cyber-attacks that happen for specific data packets and notifying users or system engineers of the attack as soon as possible via social media tools like e-mail or telegram. As a result, we wanted to create the cyber-intrusion system by modifying ML algorithms that deal with cyber-attack issues dynamically and improve early detection rates, decrease false alarm rates, and minimize communication costs. © The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2026.

Author keywords- Cyber-attacks; Decision tree; IDS and CIDS; Machine learning; Security

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	22nd	0.62	10 REDUCED INEQUALITIES

PATTERN DISCOVERY IN GENOMIC SEQUENCES USING ADVANCED DATA MINING ALGORITHMS

Pradeep G.G.S.; Kolla T.; **Vijayalakshmi N.; Ananthanagu U.; Rajesh Sharma R**

Lecture Notes in Networks and Systems

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

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

Mr. U Ananthanagu
Assistant Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Rajesh Sharma R
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

The booming volume of genomic data requires computational techniques that will allow the efficient extraction of biologically meaningful patterns. This work investigates advanced data mining algorithms for extracting frequent patterns and motifs in DNA and RNA sequences based on k-mer analysis. The nucleotide sequences are divided into shorter pieces called k-mers, where frequent pattern mining, positional frequency mapping, and dimensionality reduction techniques are applied to expose conserved motifs and structural characteristics. The proposed methodology employs Apriori for mining, followed by Principal Component Analysis (PCA) and a variation of a sequence logo style for visualization, which exposes latent relationships and biologically relevant sequence patterns. The experimental data show uniformly distributed occurrences of dominant k-mers and positionally clustered functional motifs like the "ATG" codon. The PCA projections in 2D and 3D space further highlight the structural diversity and possible clustering of sequences according to k-mer profiles. This research extends the frontier of bioinformatics by aiding in the interpretation of genomic sequences, with applications in genome annotation, disease-associated gene prediction, and regulatory motif identification. It serves the purpose of informing about the methods being brought together under k-mer analysis, frequent pattern mining, PCA, and motif visualization.
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Author keywords- Data mining; Genomic sequences; k-mer analysis; Motif discovery; Pattern recognition; PCA

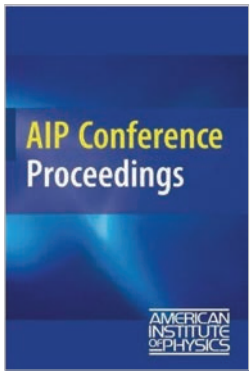
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

NANO-GUARDIANS: SMART COATINGS RESILIENCE IN EXTREME ENVIRONMENTS

Anuradha K.; Lakhanpal S.; Thakur G.; Alabdeli H.; Singh A.; Nanda S.; **Shan B.P.**; Prasad B

AIP Conference Proceedings

Dr. Priestly Shan B
Professor & Vice Chancellor
Electronics and Communication Engineering
Administration



Abstract

The objective of this work is to analyse the tribological behaviour and durability of new generation of Hard Coatings known as Nano-Guardians in harsh environment. Four different types of coatings were examined, and it was discovered that all of the coatings' ingredients differed from one another and comprised such substances as graphene oxide, titanium dioxide, polyurethane, ceramic nanoparticles, and quantum dots. These are known as NanoArmor, TitanShield, PolyResilient and QuantumGuard. During the controlled exposure test wear rates were high due to recreation of such tough conditions. For instance, NanoArmor wear rate was measured at 0.002 mm3/Nm when tested under conditions of controlled exposure. Functional checks confirmed mechanical endurance of the coatings and had indicated that TitanShield had better adhesion and abrasive stress resistance. Some observed characteristics were revealed through the performance assessments. For instance, TitanShield outperformed the NanoArmor by at least twenty percent in terms of wear rate, while QuantumGuard was relatively intermediate in terms of this parameter as well as flexibility. The work reveals the tribomechanical interplay of Nano-Guardians that contributes to the development of smart coatings for multiple applications in industry. These consideration can be based on real data and percentage changes.

Author keywords- controlled exposure experiments; Examples of smart coatings include Nano-guardians; resilience assessment; tribological performance

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	NA	0.02	03 GOOD HEALTH AND WELL-BEING

TO EVALUATE THE ANEURYSM-INDUCED HEMODYNAMICS: INSIGHTS FROM NEWTONIAN AND NON-NEWTONIAN BLOOD FLOW MODELS

Singh D.; Abhijith S.; Manikandan S.; Saikumar K.R.; Mukesh S.

De Gruyter Proceedings in Mathematics

Dr. Digamber Singh
Assistant Professor
Mechanical Engineering
Alliance School of Applied Engineering

De Gruyter Proceedings in Mathematics

Germany | Universities and research institutions | Media Ranking

Abstract

The cerebral aneurysm (CA) profoundly influences blood flow hemodynamics, thereby influencing clinical diagnosis and treatment approaches and preventing rupture risk. This study evaluates the hemodynamic characteristics induced by aneurysms by using both Newtonian and Carreau parameterized blood viscosity models. Analyzing the blood flow in a three-dimensional CT-scan-based aneurysmal artery under steady-state conditions, with Reynolds numbers (Re\mathit{Re}) ranging from 200 to 300, we examine homodynamic behavior of blood near the aneurysm region. To understand the complex anatomical structure of arterial aneurysms, which can alter the shear rates and cause the rupture, accurate modeling of blood flow is essential. The simulation results indicate that the Carreau model provides a more precise representation of flow instability, recirculation zones, and wall shear stress, which are critical biomarkers for assessing rupture risk. By enhancing our understanding of the hemodynamic forces acting on aneurysm walls this research offers valuable insights for potential clinical applications and interventions. © 2026 Walter de Gruyter GmbH, Berlin/Boston.

Author keywords- blood hemodynamic; Cerebral aneurysm (CA); CT-scan model; non-Newtonian model; wall shear stress (WSS)

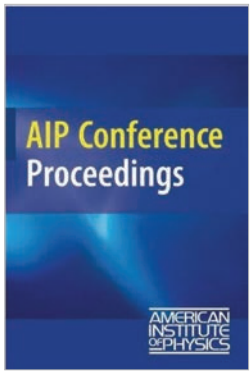
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

APPLICATION OF 5S METHODOLOGY IN INDIAN INDUSTRIAL SECTOR: A COMPREHENSIVE REVIEW WITH IMPLEMENTATION DATA

Awaar V.K.; Kaur N.; Pandey A.K.; Hasan M.M.; Bhatnagar S.; Sood S.; **Mahapatra S.**; Prasad B.

AIP Conference Proceedings

Dr. Sheila Mahapatra
Professor
Electrical & Electronics Engineering
Alliance School of Applied Engineering



Abstract

To achieve the objective of this research, this study uses a comprehensive assessment and analytical approach to examine the transformative impact that 5S methodology has brought on the industrial segment of the Indian economy. The data relating to the implementation is in a wide range of industries and shows a considerable increase. For instance, the manufacturing sector targeted an efficiency improvement of production; this was achieved with 18% efficiency, while the automotive sector aimed at reducing the defect rates, and this was achieved with a 52% reduction. The information technology services sector aimed at reducing the response time, and this was realized with a 33% reduction. Positive response to this is evidenced by employee satisfaction, where the IT information services industry records 92% satisfaction. From the external cost and benefit consideration, it can be seen that 5S is not expensive. This is evident in the fact that the estimated payback time for the automotive sector is only 10 months; also, it has an ability to save up to 18,000,000 INR annually. These results, when combined, go to demonstrate that the 5S technique can indeed be efficient in enhancing operational parameters and creating better culture at work and, in addition, can present proofs that the use of the 5S technique is feasible in terms of cost within the competitive environment of the Indian industrial structure. © 2026 Author(s).

Author keywords- 5S methodology; cost-benefit analysis; employee engagement; operational efficiency

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/NA	NA	NA	13 CLIMATE ACTION

ENERGY-AWARE EXPLAINABLE AI FRAMEWORK FOR SUSTAINABLE CLOUD COMPUTING: A NOVEL APPROACH TO GREEN MACHINE LEARNING WITH REAL-TIME CARBON FOOTPRINT OPTIMIZATION

Sungheetha A.; Rajagopal K.

7th International Conference on Mobile Computing and Sustainable Informatics, ICMCSI 2026

Dr. Akey Sungheetha
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

This research introduces a novel Energy-Aware Explainable AI (EA-XAI) framework that integrates carbon footprint optimization with interpretable machine learning for sustainable cloud computing environments. The proposed system achieves a remarkable 34.7% reduction in energy consumption while maintaining model accuracy at 94.2% and providing realtime explanations with SHAP values computed in 12.3ms average latency. The framework incorporates green computing principles through dynamic resource allocation algorithms that optimize carbon emissions (CO reduction of 2.1 tons/ month), renewable energy utilization efficiency of 87.3%, and cost optimization achieving 41.6% reduction in operational expenses. The methodology addresses critical challenges in sustainable AI deployment by implementing novel carbon-aware scheduling algorithms, energy-efficient model compression techniques achieving 67.8% model size reduction, and transparent decision-making processes suitable for industrial applications requiring regulatory compliance and environmental sustainability certifications.

Author keywords- Carbon Footprint Optimization; Cloud Computing; EnergyEfficient Algorithms; Explainable AI; Green Machine Learning; Sustainable Computing

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**20th**	**0.48**	02 ZERO HUNGER

INVESTIGATION OF COMBUSTOR AND NOZZLE PERFORMANCE IN A HYBRID DUCTED ROCKET USING BORON CARBIDE-BASED SOLID FUEL

Hashim S.A.; Arah A.A.; Parashotambhai A.P.; Arora A.; Narlekar S.; Preethi A.N.; Basak N.

Lecture Notes in Mechanical Engineering

Dr. Syed Alay Hashim
Associate Professor
Aerospace Engineering
Alliance School of Applied Engineering



Abstract

Boron carbide (B4C) has attracted renewed attention due to its outstanding heating values, both in terms of mass and volume, like those of boron. However, boron carbide oxidation products formed during combustion hinder complete combustion due to their low volatility. It has been found that B4C-based solid fuel significantly increases the combustion efficiency for solid fuel ramjets (SFRJ). The current investigation uses a hybrid fuel ducted rocket (HFDR) that operates on gaseous oxygen. Titanium (Ti) nanoparticles are used as combustion enhancers when they are combined with a boron carbide and paraffin wax mixture. This study experimentally investigates the combustion performance of four distinct solid fuel samples, including pure paraffin wax, paraffin wax with 10% B4C particles, and paraffin wax loaded with 10% B4C combined with 1% and 2% Ti particles. Combustion performance is studied based on the regression rate, secondary combustion chamber pressure, and active boron carbide content in the condensed combustion product (CCP) collected from the nozzle region. As-received feed particles and CCP collected from the nozzle surface are subjected to material characterization techniques such as FE-SEM, XRD, and TGA. The energy from paraffin wax and boron carbide-based solid fuel aims to provide insights into the combustion characteristics of B4C particles and the current ducted rocket engine design.

Author keywords- And Regression rate; Boron carbide particles; Ducted rocket; Paraffin wax; Titanium particles

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	23rd	0.36	03 GOOD HEALTH AND WELL-BEING

AN ADVANCED INTELLIGENT CROP RECOMMENDATION FRAMEWORK USING A NOVEL STACKED ENSEMBLE LEARNING APPROACH

Nayak D.; **Nair R.R.; Babu T.**

Lecture Notes in Electrical Engineering

Dr. Rekha R Nair
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Tina Babu
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Precision agriculture has developed to be an essential input for sustainable farming given the two overarching objectives of enhancing agricultural production and promoting environment conservation. This study seeks to fill some of the gaps in crop recommendation systems by presenting the Stacked Ensemble Learning based Intelligent Crop Recommendation System (ICRS). This part links both the soil nutrients—nitrogen, phosphorus, and potassium—to the growth conditions—temperature, humidity, PH level, and rainfall—to provide suitable crop types based on the agro-climatic zones. The aggregation technique adopted in the study comprises four modern tree-based algorithms, namely Random Forest, XGBoost, AdaBoost, and LightGBM arranged in a stacked ensemble format, with high level of tuning from multiple metrics to enhance the prediction error. A comprehensive set of experiments were performed on a large variety of data set which resulted into a fascinating overall classification accuracy of 99.12% over the individual models. Comparing the results with other methods also clarifies how stable and efficient the ensemble approach is in addressing large-scale tasks. The proposed decision-support system increases farmers' awareness in order to make efficient decisions that lead to high yields and reduced wastage of resources. The study supports how artificial intelligence for agriculture can support the practice of sustainable farming for climate variability and change. The result of this work is more than providing a basic contribution to the emerging science of precision agriculture field but it also provides a global framework that can easily be adopted in different growing conditions across the globe.
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Author keywords- AdaBoost; Agricultural decision support; Crop prediction; Ensemble learning; Lightgbm gradient boosting; Random Forest; Soil and climate analysis; XGBoost

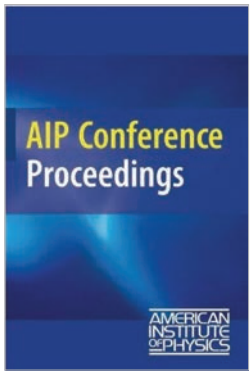
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	03 GOOD HEALTH AND WELL-BEING

INNOVATIVE INTERFACES: TISSUE ENGINEERING EXPLORES BIO-MANUFACTURING

Srilakshmi V.; Bahl A.; Pathani A.; Hussein R.R.; Kundra D.; Sharma D.; **Shan B.P.**; Prasad B.

AIP Conference Proceedings

Dr. Priestly Shan B
Professor & Vice Chancellor
Electronics and Communication Engineering
Administration



Abstract

Research in this field needs to elucidate the specific dynamics between tissue engineering and bio-manufacturing. This work uses advanced tissue engineering and nanotechnology methods and materials to discover essential dynamics required for tissue engineering. This quantitative characterization results in the mechanical strength and porosity of biomaterials like hydrogel scaffolding, nanofiber matrix, and 3D bioprinted structures, among others. Other salient characteristics of the 3D bioprinted structures are a tensile strength of 20 MPa and a porosity of 80% for a consecutive tissue engineering demanding application. It is also possible that the biological responses to different biomaterials may be better indicated by the data arriving from the given cell culture experiments. This research ascertained that chondrocyte vitality was 5% lower compared to MSC, indicating that biomaterials chosen should ideally suit the client. The second change of substrate from hydrogel to scaffolding biomaterials doubles metabolic activity, the data obtained from the bioreactor studies, reflecting the dynamics of in vivo conditions. Of exceptional note is the revelation by the results of precision biofabrication that there is a 5% loss of accuracy in scaffold relative to hydrogel. The patient-specific tissue engineering application development will be informed by these findings as they offer a holistic view of biomass properties, cell associations, and the environmental factors. © 2026 Author(s).

Author keywords- bio-manufacturing; biofabrication; biomaterials; cell culture; Tissue engineering

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	22nd	0.62	10 REDUCED INEQUALITIES

EVOLUTIONARY MULTI-OBJECTIVE OPTIMIZATION OF NEURO-FUZZY SYSTEMS IN NON-STATIONARY TIME SERIES FORECASTING

Pradeep G.G.S.; Kolla T.; **Ananthanagu U.; Sungheetha A.; Rajesh Sharma R.**

Lecture Notes in Networks and Systems

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

Mr. U Ananthanagu
Assistant Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Rajesh Sharma R
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Akey Sungheetha
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

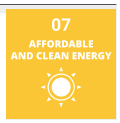


Abstract

Predicting non-stationary time series is still a tough nut to crack: the statistical properties may vary, and so will the temporal dynamics. In this context, a robust and interpretable approach involving the integration of a Takagi—Sugeno neuro-fuzzy inference system and evolutionary multi-objective optimization is proposed. The NSGA-II optimization procedure minimizes prediction accuracy alongside model complexity, evolving the fuzzy rule base and membership parameters and the linear consequents. Contrary to the conventional opaque models, a neuro-fuzzy architecture affords some degree of transparency, letting one see how the functional temporal patterns have been learned. Results of the experiments conducted demonstrate the ability of the system to adapt to structural changes in the data, with a corresponding better capability of reducing residual errors and increasing model compactness using a synthetic non-stationary dataset. Further, residual oscillations and fuzzy rule surfaces, alongside the convergence behavior and the Pareto optimality, present powerful evidence in support of the proposed model's effectiveness and interpretability. The proposed framework represents a potent alternative for real-time adaptive forecasting in dynamic environments where precision and explainability are both crucial. Simulated non-stationary time series will be good enough to justify the approach of lag-embedding. Thoughtful integration of interpretable fuzzy logic and adaptive learning via evolutionary optimization would strengthen the contribution. © The Author(s), under exclusive license to Springer Nature Switzerland AG 2026.

Author keywords- Evolutionary computation; Forecasting models; Fuzzy rule learning; Interpretability; Multi-objective optimization; Neuro-fuzzy systems; Non-stationary time series; NSGA-II

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	

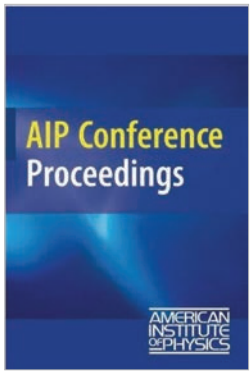


FORECASTING SOLAR ENERGY IN INDIAN REGION: A STUDY WITH DATA ANALYSIS AND PREDICTIVE MODELLING

Rao D.S.; Igorevich O.; Nautiyal R.D.; Obbayed S.; Sharma R.; Dhawan A.; **Mahapatra S.**; Prasad B.

AIP Conference Proceedings

Dr. Sheila Mahapatra
Professor
Electrical & Electronics Engineering
Alliance School of Applied Engineering



Abstract

This work aims to expand the field of solar energy forecasting in the Indian region by combining meteorological data, solar radiation insights, and advanced predictive modeling techniques. According to the examination of climatic characteristics, there is a notable fifteen percent increase in energy output for every two degrees Celsius rise in temperature. Conversely, wind speed has a non-linear relationship, where a ten percent increase results in a seven percent rise in energy production. A robust positive correlation exists between solar radiation and actual energy production, wherein a 10% increase in solar radiation corresponds to a 12% gain in real energy output. The prediction models have a remarkable overall accuracy of 92% when validated against actual energy production data, showcasing their efficacy. However, it is important to note that seasonal variations, particularly a five percent underestimation during the monsoon season, reveal areas that should be improved. The incorporation of Geographic Information Systems (GIS) emphasizes the importance of certain geographical characteristics, hence enhancing the structure for predicting future events. This research not only offers pertinent data to policymakers and stakeholders engaged in developing efficient energy infrastructure using solar resources on the Indian subcontinent, but also provides a substantial contribution to the planning of sustainable energy.

Author keywords- forecasting; Indian region; predictive modelling; solar energy; sustainable energy

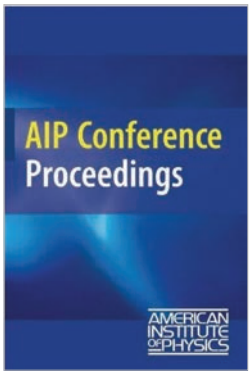
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	14th	0.37	09 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SURFACE ENGINEERING ALCHEMY: CRAFTING MATERIALS FOR OPTIMAL PERFORMANCE

Polepaka S.; Sharma V.; Bisht Y.S.; Husayn S.O.; Dhingra L.; Kalra S.; **Nair R**.; Prasad B.

AIP Conference Proceedings

Dr. Rekha R Nair
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

In this research, surface engineering is explored, and in the process of conducting the study, several methodologies on enhancing the performance of material surfaces are looked at. The various surface coatings, surface roughness changes, adhesion strengths, and corrosion resistances in materials were all explored by the analysis of experimental data into their efficiency. Chromium carbide was identified to have the highest hardness, which is desirable for wear-resistant applications. On the other hand, diamond-like carbon gave a much larger thickness difference and indicated that this product can be utilized in numerous applications to render films of a larger thickness. The results showed that surface coatings can be of different properties. The level of measuring surface roughness was also greatly enhanced in several materials after the coating process, and the result indicated improvement in the rough surface of stainless steel. Evaluated adhesion strength tests showed that chromium carbide and diamond-like carbon possess bonding capacities on specific substrates, and, thus, the composite materials are appropriate for applications with high bonding demand. Furthermore, evaluation of the corrosion resistance in the microstructure disclosed that chromium carbide is a good barrier against corrosion. From the results of the test, it was established that it had the lowest corrosion rate of all the coatings on different substrates. In addition to the outcome of giving guidelines for decision-making regarding appropriate material selection while also considering technical approaches for the implantation of coatings as well as cost optimization in material manufacturing processes, the present work demonstrates the potential application of surface engineering in a range of applications across several industries, including the multifaceted transformation of material surfaces to respond to specific performance requirements. More advancement and study in the methods of surface modification in the field of materials engineering imply not only new opportunities to be discovered in the field but will also embark on a revolution in the field. © 2026 Author(s).

Author keywords- Adhesion Strength; Coatings; Corrosion Resistance; Material Modification; Surface Engineering

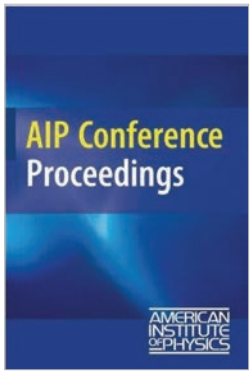
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	03 GOOD HEALTH AND WELL-BEING

OPTICAL ELEGANCE: QUANTUM IMAGING FOR SMART MATERIAL REVELATION

Dev B.P.V.; Ahuja S.; Pant R.; Husain S.O.; Verma R.; Sudan P.; **Kumar M.H.**; Prasad B.

AIP Conference Proceedings

Dr. Mohit Hemanth Kumar
Assistant Professor
Mechanical Engineering,
Alliance School of Applied Engineering



Abstract

The present research expands the understanding of quantum imaging and smart materials to identify the set of experimental parameters and their impact on imaging outcomes. Based on these investigations, we present a novel quantum picture of picture properties using laser wavelengths with proper photon entanglement conditions at 800, 700, & 850 nm. It is necessary to pay attention to Experiment 001 with 120 seconds of observations; it has high brightness levels, 0.92 of contrast ratio and 95% quantum picture resolution indicating possibility of recording material processes. As a result of compromising the specificity of wavelength and 150 seconds of observation time, experiment 003 yields high performance indicators, such as resolution limit of 18 nm, quantum efficiency of 0.92, and signal-to-noise ratio of 28. These experimental results reveal the contributions of tuning the measuring environment on enhancing the performance of quantum imaging and offer a potential way to understand the complex responses of intelligent materials.

Author keywords- control parameters; intelligent materials; material identification; photon correlation; Single photon imaging

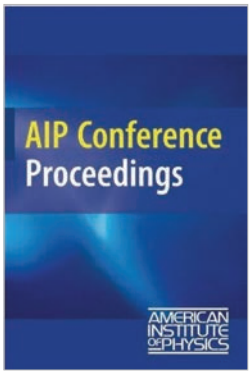
Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**14th**	**0.37**	07 AFFORDABLE AND CLEAN ENERGY

LIFE CYCLE ASSESSMENT OF ETHANOL FUEL IN INDIAN REGION: A STUDY WITH LIFE CYCLE ASSESSMENT DATA

Sharma N.; Gupta G.; Kumar P.; Abbas H.M.; Aneja A.; Kumar A.; **Kaimal A.B.**; Prasad B

AIP Conference Proceedings

Dr. Athira B Kaimal
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

This research is set to provide a comprehensive LCA of ethanol fuel based on the Indian subcontinent. This fuel was evaluated for environmental sustainability through quantitative analysis and qualitative research. The production step requires an energy of 2130 MJ and leads to emissions of 1040 g CO2e. This enlarges on the particular facets that must be enhanced in as much as shipping and processing are concerned. The distribution procedure involves energy consumption of 550 megajoules and gives rise to emissions of 300 g CO2 equivalent. Transportation is one of the significant aspects, and consequently, logistics optimization cannot be overlooked. The use phase, predominantly defined by combustion, has the energy value of 800 MJ and CO2 eq emissions of 400 g. With reference to the whole life cycle, it can be seen that the manufacture of ethanol is a significant factor as regards the environmental profile. It takes 3480 MJ of total energy and gives out 1740 g CO2e when it is produced. The findings of this whole quantification-based research, supported by qualification-based comparisons, may be used to work towards improving the ecological rationality of ethanol fuel in the complex socio-economic and geographical environment of India. They will guide the subsequent research and formulation of legislation, as well as business practices.

Author keywords- Environmental sustainability; Ethanol fuel; Indian region; Life Cycle Assessment; Optimization

Indexing/Quartile	Percentile	Impact Factor	SDG
SCOPUS/Q4	**23rd**	**0.36**	03 GOOD HEALTH AND WELL-BEING

TELEBOT: A VIRTUAL ASSISTANT FOR TELEMEDICINE SYSTEMS FOR DISEASE DIAGNOSIS AND DOCTOR RECOMMENDATION

Mandal L.; Snehal; Ishith T.P.; Keerthana N.; Deepthi D.J.; Raj S.

Lecture Notes in Electrical Engineering

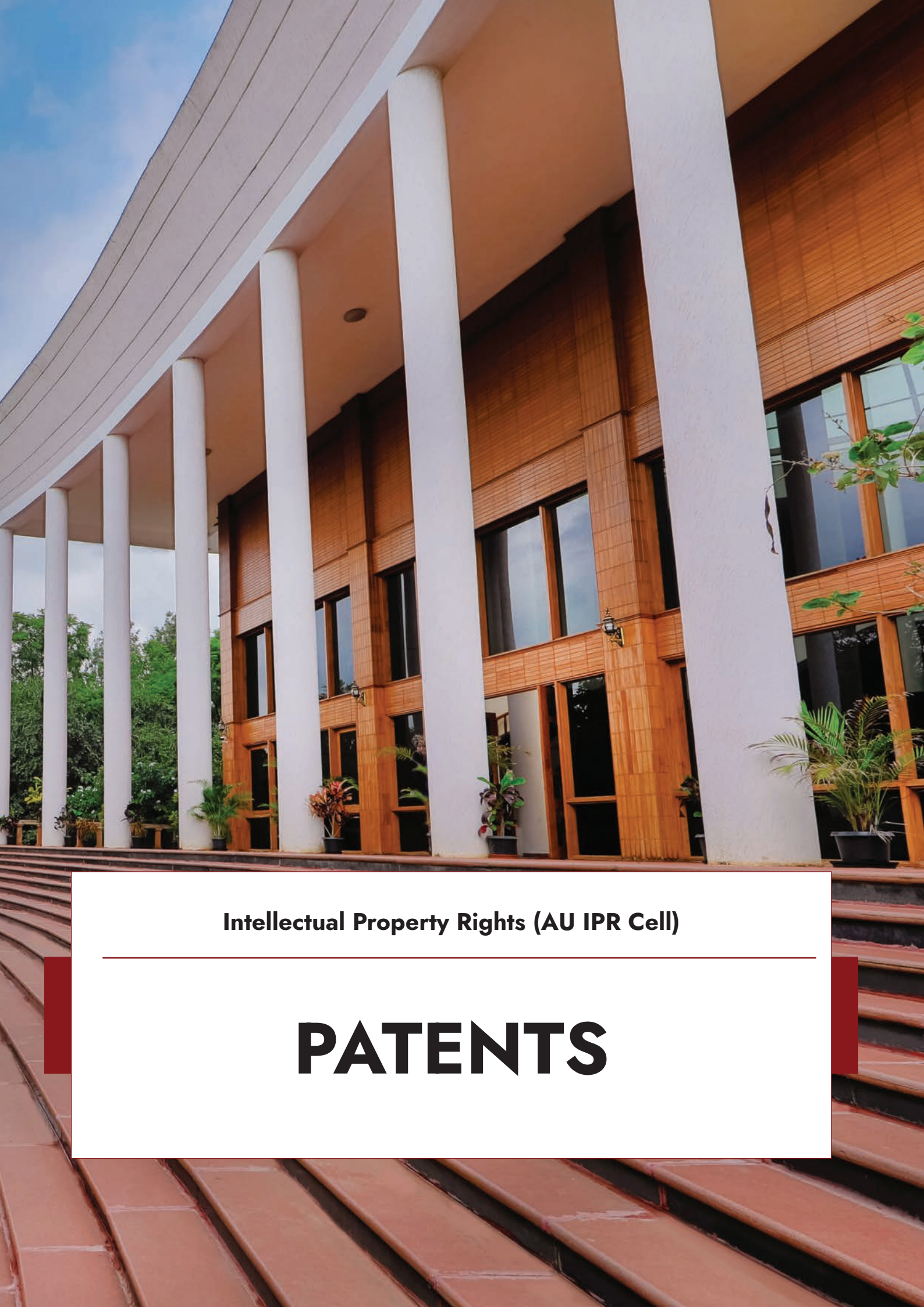
Dr. Lopa Mandal
Professor
Computer Science and Engineering
Alliance School of Advanced Computing



Abstract

Telemedicine has enhanced healthcare delivery by enabling treatment through advanced technologies. This research focuses on developing a virtual assistant to enhance telemedicine services, incorporating artificial intelligence techniques for accurate and efficient disease diagnosis and recommending disease specific specialist doctors. The present work employed a Decision Tree classifier to process the whole data about the patient symptoms for disease diagnosis. After the disease is diagnosed, a list of specialist doctors for the diagnosed disease is recommended. The proposed model gives 98% accuracy. The model has been compared with the existing RNN and CNN based systems and found to outperform those models on the given dataset. The proposed model demonstrates the scalability and adaptability for the diagnosis and symptoms across various medical domains, aiming to streamline telemedicine consultations and improve patient satisfaction.

Author keywords- Decision tree; Disease diagnosis; Doctor recommendation; TeleBot; Telemedicine; Virtual assistance



Intellectual Property Rights (AU IPR Cell)

PATENTS

Application No **202641020852**

Title of the invention **DUAL-FUNCTION MICROBIAL PROCESS FOR SIMULTANEOUS IRON REDUCTION AND BIOELECTROGENESIS**

Dr. Radhika Chandankere
Associate Professor,
Biotechnology
Alliance School of Applied Engineering

Name of Inventor: A. Nasheer Mohammed, and **Dr. Radhika Chandankere**

Abstract

A dual-function microbial process for simultaneous iron reduction and bioelectrogenesis employs naturally isolated Bacillus amyloliquefaciens strain Na_Ra4637_Fr (GenBank Accession No. PV608080; 99.70% identity; 92% bootstrap confidence), isolated from sixmonth anaerobic digestion of mixed fruit waste on Luria Bertani Agar via 16S rRNA sequencing. Characterisation employs biofilm confirmatory assay, methylene blue reduction test, and iron reduction assay in fabricated modified Luria Bertani broth supplemented with ferric citrate (36.6 mg), D-glucose (25 mg), and sodium acetate (12.3 mg) per 15 mL at pH 7.0, 37°C, achieving 95% Fe^{3} to Fe^{2} conversion within 24 hours at 0.4 mM Fe^{3} h^{1}. A single chamber batch-mode microbial fuel cell (500 mL container; 400 mL working volume; carbon cloth electrodes; 10 cm^{2}) achieves maximum open circuit voltage of 34.3 mV, current density of 34.3 mA m^{2}, and power density of 1.18 mW m^{2}, providing a biosafety-compliant, cost effective dual-function bioenergy recovery and iron bioremediation platform without genetic modification.

Application No **202641021433**

Title of the invention **ACTIVE BIODEGRADABLE POLYMER FILM FOR PACKAGING PERISHABLE FOOD PRODUCTS**

Dr. Jyotishkumar Parameswaranpillai
Professor
Chemistry
Alliance School of Sciences

Dr. Jineesh A G
Associate Professor
Chemistry
Alliance School of Sciences

Name of Inventor: Lipsita Panda, **Dr. Jyotishkumar Parameswaranpillai**, and **Dr. Jineesh AG**

Abstract

The present invention relates to an active biodegradable polymer composite film for packaging of perishable food products. A method for manufacturing the film comprises dissolving polylactic acid (PLA) in chloroform under continuous magnetic stirring for two hours, followed by sequential addition of starch with two-hour homogenization, incorporation of nanocellulose, addition of plant-derived rosemary essential oil with one-hour stirring, succeeded by thirtyminute sonication and controlled drying at 60°C under atmospheric pressure. The film formulation maintains 75–100 wt.% PLA, 0–25 wt.% starch, 0.1–1 wt.% nanocellulose, and 1–5 wt.% essential oil, entirely excluding synthetic compatibilizers and plasticizers. Interfacial compatibility is achieved through nanocellulose-mediated hydrogen-bonded network formation between PLA and starch phases without synthetic additives. The film demonstrates antimicrobial and antioxidant active preservation functionality validated through visual spoilage evaluation across multiple experimental formulations, providing a fully biodegradable, additive-free packaging solution for meat, poultry, seafood, and high-moisture perishable food products.

Application No **202641022818**

Title of the invention

AI-BASED DECISION SUPPORT SYSTEM FOR STRATEGIC BUSINESS MANAGEMENT AND RISK MITIGATION

Dr. Varadaraj Aravamudhan
Professor
Human Resources Management
Alliance Ascent College

Dr. Ananth S
Associate Professor
Operations Management
Alliance School of Business

Prof. K. Mohanasundaram
Assistant Professor
Operations Management
Alliance Ascent College

Name of Inventor

Dr. Varadaraj Aravamudhan, Dr. Ananth Sengodan, and Prof. K. Mohanasundaram

Abstract

The present invention discloses an AI-based decision support system for strategic business 5 management and risk mitigation. The system comprises a multi-layer architecture including data ingestion modules, artificial intelligence modeling engines, risk assessment frameworks, scenario simulation modules, and automated recommendation engines. The invention integrates structured and unstructured enterprise data with external market intelligence to generate predictive analytics, dynamic risk exposure scores, and optimized strategic 10 recommendations. Probabilistic modeling, reinforcement learning, and explainable AI techniques enable proactive risk identification, scenario stress testing, and transparent decision-making support. The system provides continuous learning capabilities to improve predictive accuracy and strategic optimization over time, thereby enhancing organizational resilience, governance compliance, and competitive advantage.

Application No **202621006253**

Title of the invention

BLOCKCHAIN-DRIVEN UNIFIED IDENTITY AND TRANSACTION SECURITY ARCHITECTURE FOR MULTI-PLATFORM ENVIRONMENTS

Dr. C. Viji
Associate Professor,
Computer Science and Engineering
Alliance School of Advanced Computing

Name of Inventor

Dr. Ashish Kumar Tamrakar, **Dr. C. Viji**, Mr. Chandrasekhar

Abstract

The present invention discloses a blockchain-driven unified identity and transaction security architecture designed for secure operation across multi-platform environments. The architecture provides a decentralized mechanism for digital identity creation, authentication, and authorization using cryptographic techniques and a distributed ledger. By anchoring identity references and transaction records on an immutable blockchain, the system ensures tamper resistance, traceability, and non-repudiation. Smart contract–based policy enforcement enables automated access control and secure transaction validation without reliance on centralized intermediaries. The invention supports seamless interoperability across web applications, mobile platforms, cloud infrastructures, enterprise systems, and Internet of Things environments. Selective disclosure mechanisms enhance user privacy while maintaining trust and compliance. The proposed architecture overcomes limitations of conventional centralized identity systems by improving security, scalability, and resilience, and is applicable to domains including digital finance, e-governance, healthcare, supply chain management, and secure digital services.

Application No **202641020315**

Title of the invention **FEDERATED LEARNING-BASED PRIVACY-PRESERVING DATA INTELLIGENCE PLATFORM**

Name of Inventor

Sreenu Banoth, **Dr. N. Rajkumar**, and Jayshree Bedade

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

Abstract

A federated learning-based privacy-preserving data intelligence platform is disclosed. The platform enables multiple organizations or devices to collaboratively train machine learning models while keeping raw data localized at each participant. A federation orchestrator coordinates training rounds by distributing global model parameters, receiving client-side updates computed on private data, and aggregating them using secure aggregation protocols and optional differential privacy mechanisms. Client agents interface with local data sources and ML frameworks, enforce data retention policies, and transmit only protected updates. A governance and compliance console configures privacy budgets, participation policies, and monitoring dashboards, while model management services track model evolution and support deployment. The invention delivers scalable, cross-silo data intelligence with strong privacy guarantees, reducing reliance on centralized data aggregation and facilitating regulatory compliance in domains such as healthcare, finance, telecommunications, and IoT.



Application No 202641030753

Title of the invention

DEVELOPMENT OF AN INTELLIGENT INVENTORY MANAGEMENT SYSTEM ALGORITHMS FOR OPTIMAL RESOURCE ALLOCATION

Name of Inventor

Dr. Rekha R Nair, Dr. Tina Babu, Dr. Asha Kurian, Dr. Rashmi Mothkur, and Prof. Swetha C B

Dr. Rekha R Nair
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Tina Babu
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Asha Kurian
Assistant Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Dr. Rashmi Mothkur
Associate Professor
Computer Science and Engineering
Alliance School of Advanced Computing

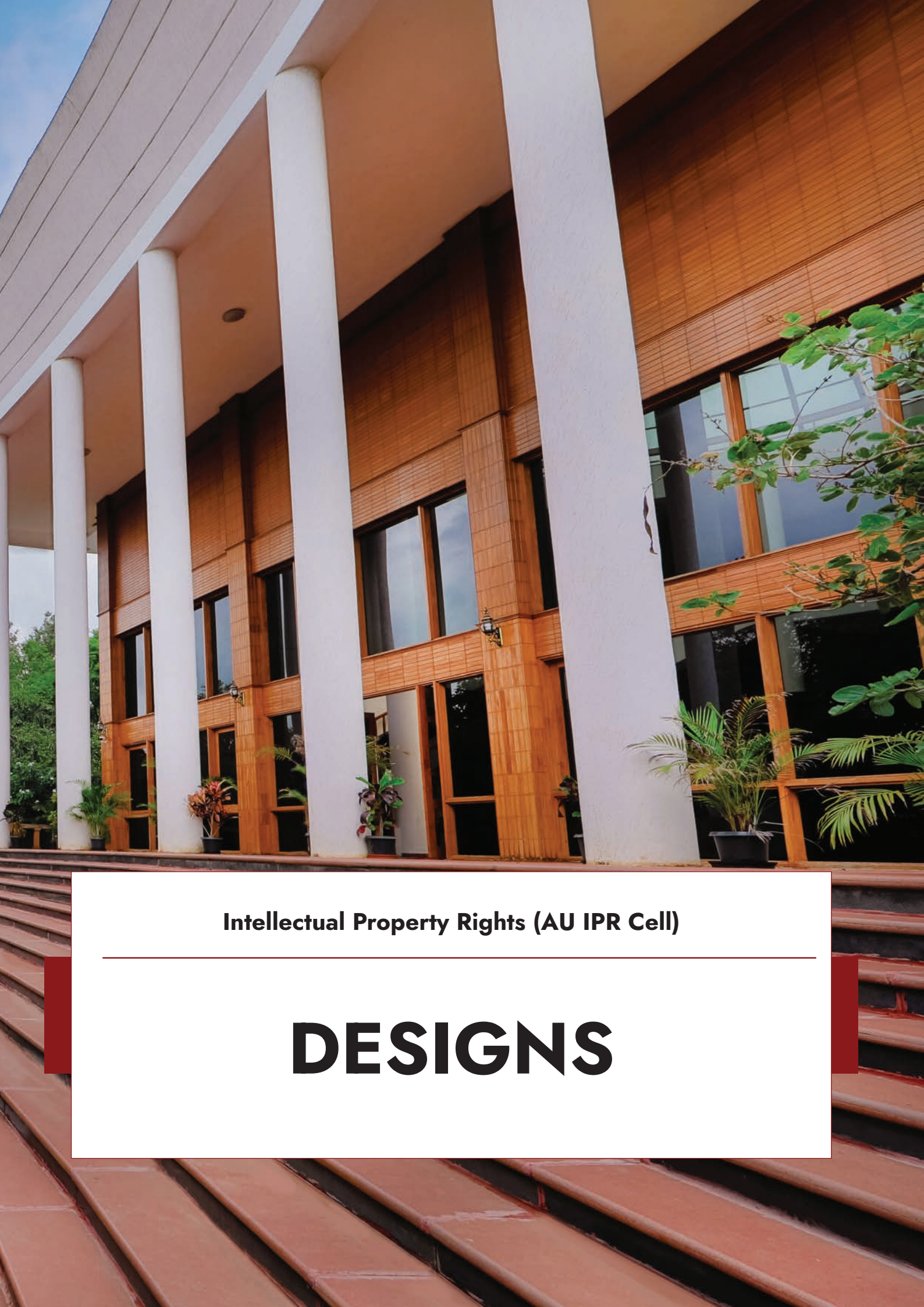
Prof. Swetha C B
Assistant Professor
Computer Science and Engineering
Alliance School of Advanced Computing

Abstract

With the rapid proliferation of smart devices, the necessity for efficient computational paradigms such as the Internet of Things (IoT), fog computing, and cloud computing has significantly grown. Despite this expansion, optimal resource allocation across these paradigms continues to present considerable challenges. The present invention provides a systematic review emphasizing the utilization of artificial intelligence (AI) techniques, particularly machine learning (ML) and deep learning (DL), to address resource allocation optimization. Unlike existing works, no prior studies have comprehensively examined AI based resource allocation strategies within these computational environments. The disclosed review classifies ML approaches into supervised learning and reinforcement learning (RL), while also analyzing DL-based methods and hybrid models that combine DL with RL for enhanced decision-making. Furthermore, the invention highlights unexplored research opportunities and open challenges in this domain, concluding with potential future directions for advancing AI-driven optimization in diverse computational paradigms.







Intellectual Property Rights (AU IPR Cell)

DESIGNS

Design No: **486382-001**

Title of the Design:

WOMAN RIDING BICYCLE TOY

Name of Applicant:

Alliance University, Bengaluru, **Mr. Gajjelakonda Lenin Babu**, and Dr. Gomathi Gowda

Mr. Gajjelakonda Lenin Babu
Assistant Professor,
Department of Foundation Studies
Alliance School of Design

Description

Decorative figurine of a woman riding a bicycle features a stylized human form mounted on a two-wheeled cycle structure with defined handlebars, seating, and wheel components. The design incorporates vibrant color elements, traditional attire representation, and a stable base platform, providing aesthetic appeal and suitability for display or ornamental applications.



Design No: **491701-001**

Title of the Design:

BLOCKCHAIN-INTEGRATED SMART HOME HUB

Name of Applicant:

Dr. Sowjanya Ramisetty and **Dr. GGS Pradeep**

Dr. Ghantasala Gnana Sudha Pradeep

Professor,
Computer Science and
Engineering
Alliance School of Advanced
Computing

Description

Blockchain-integrated smart home hub features a compact, curved structural housing configured to accommodate embedded electronic components for secure connectivity and data management within smart home environments. The design incorporates a streamlined form factor with provision for integrated interface elements and communication modules to support decentralized authentication, device synchronization, and secure control of connected home systems through blockchain-enabled architecture.



Design No: **6505124**

Title of the Design:

ELECTRONIC COMPUTER DEVICE FOR PERSONALISED LEARNING ANALYSIS AND RECOMMENDATION

Name of Applicant:

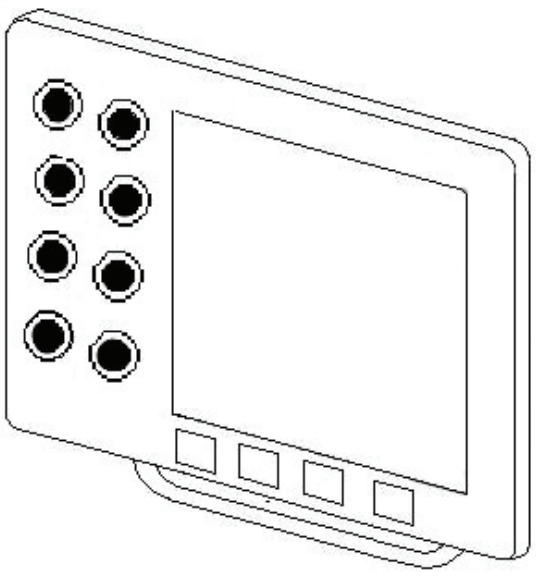
Dr. G. Ramana Murthy and Dr. Jaya Ganesan

Dr. G. Ramana Murthy
Professor
Electronics and Communication Engineering
Alliance School of Applied Engineering

Dr. Jaya Ganesan
Professor
Human Resources Management
Alliance School of Business

Description

Electronic computer device for personalised learning analysis and recommendation features a compact digital unit incorporating a central display interface for visualization of learning analytics and recommendations. The design integrates multiple input control elements positioned adjacent to the display to facilitate user interaction, data navigation, and system operation. The device is configured to support personalized assessment, performance monitoring, and adaptive learning guidance through an organized and technology-assisted interface structure.





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MARCH 2026
Volume 3

ALLIANCE UNIVERSITY
Chikkahadage Cross Chandapura-Anekal,
Main Road, Bengaluru, Karnataka 562106