



ALLIANCE  
UNIVERSITY  
CENTRE for RESEARCH



OCTOBER 2025

Volume 10

# ALLIANCE RESEARCH CHRONICLES





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# ALLIANCE RESEARCH CHRONICLES

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OCTOBER 2025

Volume 10

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# ABOUT ALLIANCE UNIVERSITY

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

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

## VISION

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

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

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

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

## MISSION

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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

## VISION

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

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

## MISSION

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



# ABOUT CENTRE *for* RESEARCH (Contd.)

## CORE VALUES

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

## OBJECTIVES

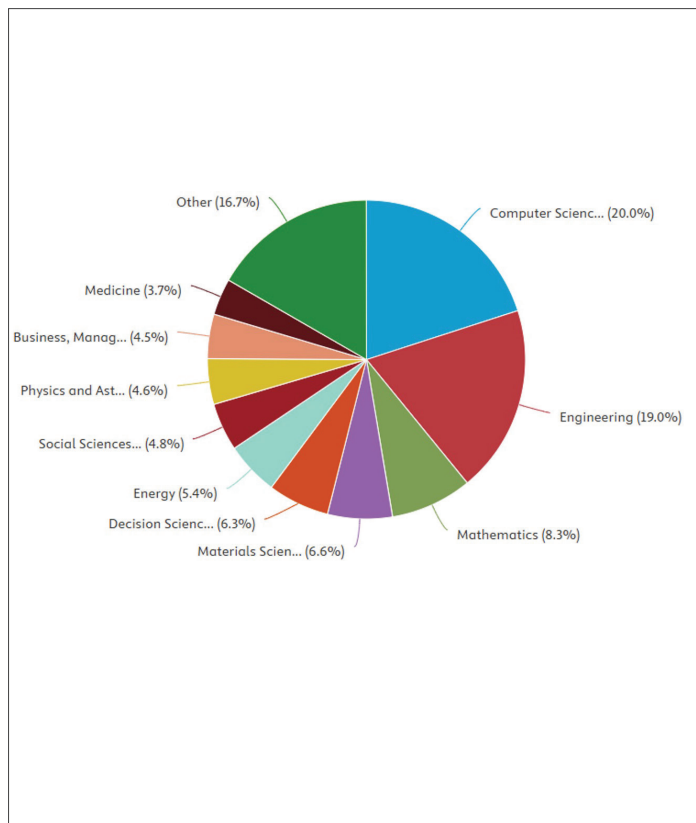
- Support the Ph.D. Admission process and facilitate the Ph.D. Program across all academic units of Alliance University.
- Providing resources and support for faculty, students, and visiting/full-time scholars engaged in research activities.
- Contributing to the advancement of knowledge through publications,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



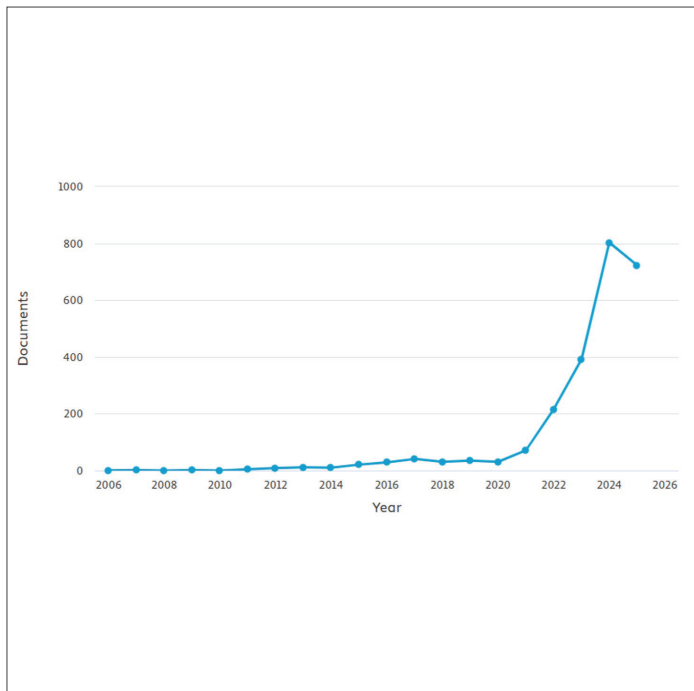


|                          |                       |
|--------------------------|-----------------------|
| <b>2435</b><br>Documents | <b>947</b><br>Authors |
|--------------------------|-----------------------|

### Documents by Subject Area



### Documents by Year

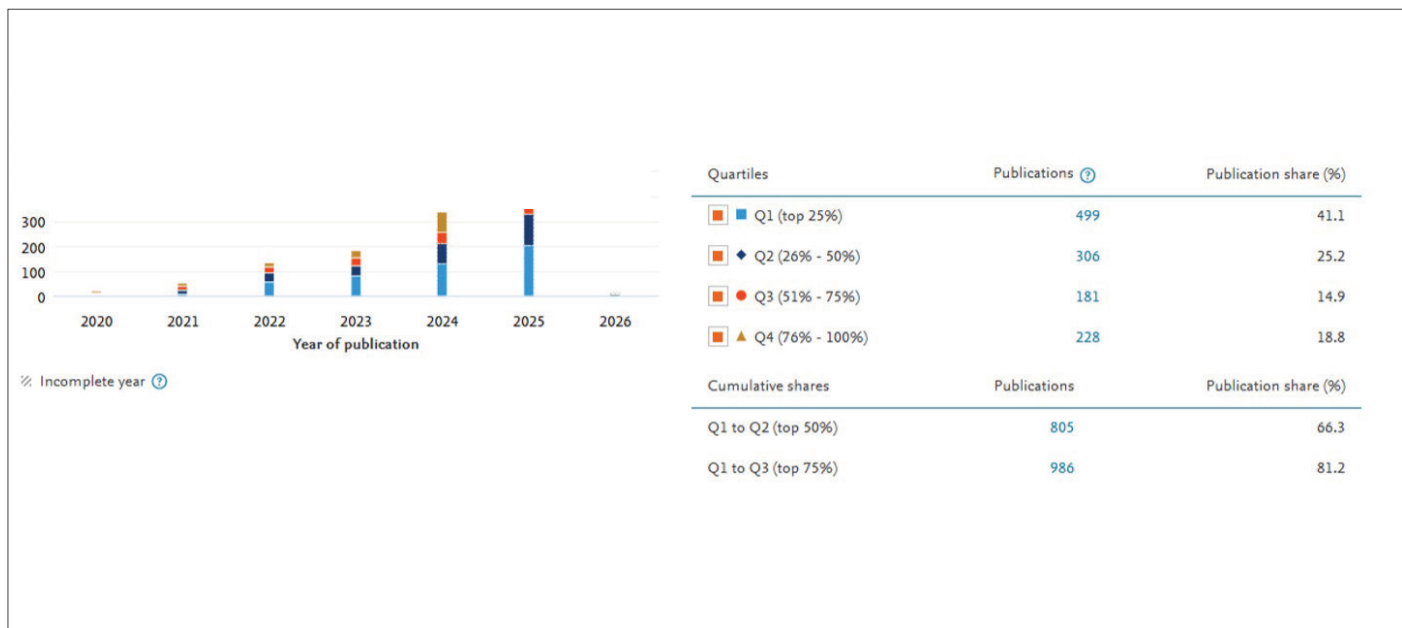


### Summary

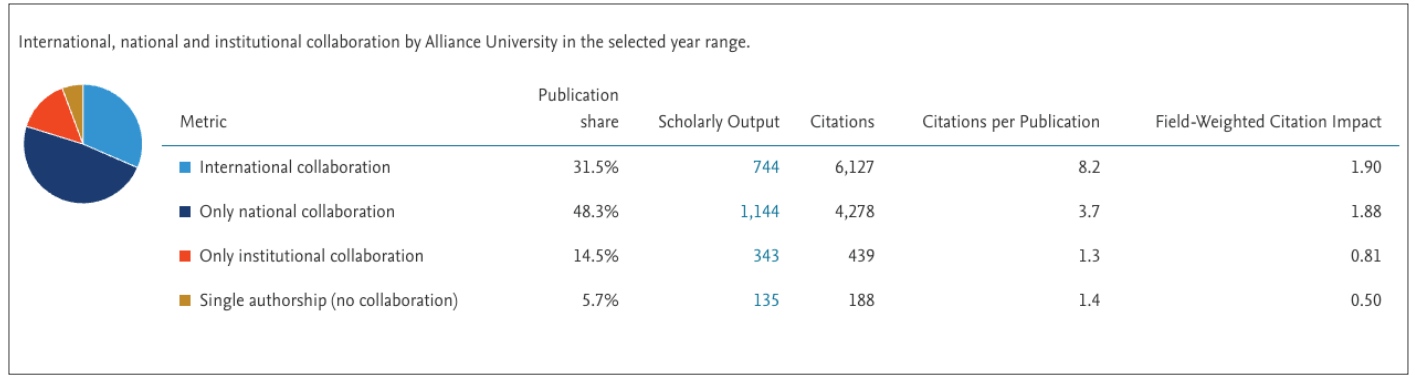
|                  |            |                |                           |                                |           |
|------------------|------------|----------------|---------------------------|--------------------------------|-----------|
| <b>2435</b>      | <b>947</b> | <b>11507</b>   | <b>6.4</b>                | <b>1.62</b>                    | <b>44</b> |
| 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.

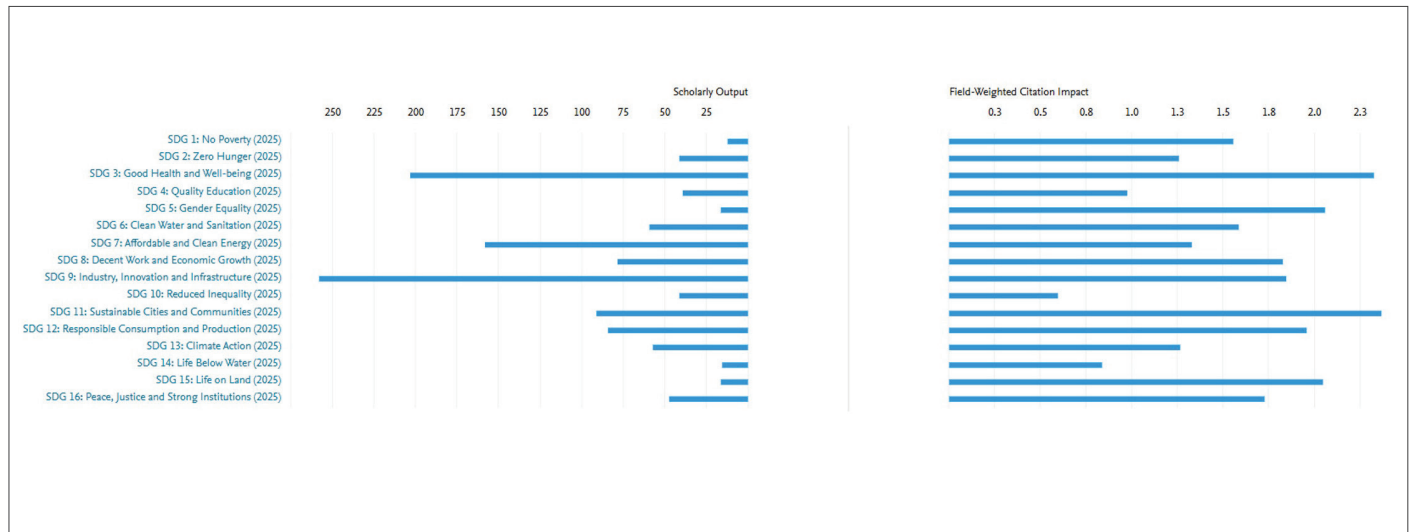
### Publication by Journal Quartile



## Geographical Collaboration Overall



## Publication by SDG



\* The Publication metrics and the author affiliations are taken from SCOPUS/SciVal as on 15/11/2025



Scopus  
JOURNALS



**Clarivate<sup>TM</sup>**  
**Web of Science**

Indexing/Quartile

**SCOPUS/WOS/Q2**

Percentile

**58<sup>th</sup>**

Impact Factor

**1.85**

SDG



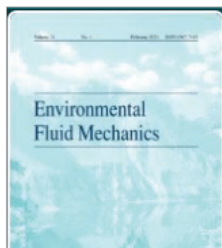
## **ANALYTICAL STUDY OF MULTI-LAYER ONE-DIMENSIONAL SPATIALLY DEPENDENT SOLUTE TRANSPORT MODELING**

Bharti, P.; M.; Singh, M.K.; **Chaudhary, M.**

*Environmental Fluid Mechanics*

### **Dr. Manish Chaudhary**

Assistant Professor  
Department of Pure and Applied Mathematics  
Alliance School of Applied Sciences



## **Environmental Fluid Mechanics**

Publishing model  
**Hybrid**

### **Abstract**

The present study is focused on the development of the analytical solution of a one-dimensional advection-dispersion equation (ADE) by using Laplace transform in a semi-infinite multilayer heterogeneous porous medium. Seepage velocity, hydrodynamics dispersion, and retardation factor are considered to decrease exponentially with space. The model is developed with the basic principle of general dispersion theory, where the dispersion parameter is considered to be directly proportional to the flow velocity. The solution is formulated under the assumption that the aquifer is free of pollutants initially. At the input location of the initial boundary of the uppermost layer (UML), a point source is considered,

while the concentration at the intermediate inlet layer is directly obtained from the outlet concentration of the preceding layer. The zero gradient condition describes the outlet boundary. The semi-infinite aquifer is divided into discrete sub-layers in a like manner. To demonstrate the validity of the model, the developed analytical solutions are additionally verified by corresponding numerical solutions. Also, the impact of spatially dependent parameters on pollutant migration are graphically depicted. Such a study will be advantageous for the groundwater hydrologist to predict and analyze the flow and transport behavior of the groundwater in various multilayer aquifer systems. © 2025 Elsevier B.V., All rights reserved.

**Author keywords-** Advection-dispersion; Analytical solution; Groundwater; Multilayer aquifer

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q1</b> | <b>89<sup>th</sup></b> | <b>3.9</b>    |     |



## STUDY ON PISTACHIO SHELL FILLED PLA COMPOSITES FOR FDM-BASED PROCESSING

Begum, S.R.; Devan, B.A.; Kavya, S.; Pranav, H.; Rakul, R.; Vasumathi, M.; **Senthamaraikannan, P.**; Adediran, A.A.; Saravana Kumar, M.

*Scientific Reports*

### Dr. Senthamaraikannan P

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Alliance School of Applied Engineering

# scientific reports

### Abstract

In this research, Polylactic Acid (PLA)/Pistachio shell particles (PSP) composite filaments were developed using a single screw extruder for Fused Deposition Modeling (FDM) process. Alkali and silane treatments were applied to PSP to enhance bonding between the filler particles and the PLA matrix. FTIR analysis indicated the removal of lignin and hemicellulose from the PSP surface and formation of siloxane bonds due to the chemical treatments. XRD analysis indicated reduced crystalline organization due to treated PSP incorporation. Despite slight decreases in tensile, compressive, and flexural strengths, PSP addition improved tensile modulus and matrix stiffness. When comparing 2%, 4%, and 6% PSP additions, the 4-wt% composite demonstrated the highest tensile strength (49.81 MPa), which can be attributed to the improved dispersion

of PSP particles as confirmed by SEM images. In contrast, the 6-wt% composite exhibited the maximum compressive strength (43.06 MPa) and flexural strength (58.06 MPa), likely due to the higher filler loading providing greater resistance to deformation. Hardness and impact resistance also showed steady improvement with increasing PSP content. However, the inclusion of treated PSP reduced the wettability of the PLA matrix. Interestingly, the 4-wt% composite recorded the highest Melt Flow Index (12.80 g/10 min), suggesting enhanced processability. Taken together, the 4-wt% composite with uniformly dispersed PSP offered the best balance of mechanical and thermal properties.

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**Author keywords-** 3D printing; Contact angle; Filament; Pistachio; PLA

| Indexing/Quartile | Percentile             | Impact Factor | SDG |
|-------------------|------------------------|---------------|-----|
| <b>SCOPUS/Q3</b>  | <b>32<sup>nd</sup></b> | <b>0.89</b>   |     |



## DEEP LEARNING MODEL WITH ENHANCED SEGMENTATION AND COMBINED FEATURE ACTIVATION FOR MITOSIS CLASSIFICATION

Lijo, J.; Subramanian, J.S.; **Babu, T.**

*Journal of Innovative Image Processing*

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|   |   |  |
|---|---|--|
|  | <b>Journal of Innovative Image Processing</b><br><b>Editor-in-Chief: Dr. Abdullah M. Ilyasu</b><br><b>e-ISSN: 2582-4252</b><br>4 issues per year<br><a href="https://doi.org/10.36548/jiip">https://doi.org/10.36548/jiip</a><br>Starting year of publication: 2019<br><b>Open Access Journal</b> |       |
|   |   |  |

### Abstract

Mitosis is a cell division mechanism vital for the growth of tissues and repair, Histopathological images are used by pathologists to diagnose cancer, but mitosis classification plays an important role in disease diagnosis. The mitotic counts are a proliferative indicator to find the aggressiveness of breast cancer. Detecting the mitotic tumor cells in tissue areas is a critical marker in cancer prognosis. Various researchers have focused on developing an automatic detection framework to identify mitotic figures, but detecting and classifying mitosis accurately remains a significant challenge in the medical field. Moreover, this research has designed a proposed Aggressive Tracing Seeking Optimization (ATSO) based Deep Convolutional Neural Network (Deep CNN) for the mitosis classification framework. The proposed framework uses less

memory and increases the convergence rate; hence, it is globally efficient in achieving optimal solutions in the search space. The inspiration for considering the ATSO is its excellent behavior, as well as its scalable and adaptable mechanism, which allows optimization to move away from local optima. Moreover, it is computationally faster and exhibits higher global convergence capability in searching for the best solution. ATSO optimally trains a Deep CNN to generate higher classification accuracy by minimizing the false rate using the loss function. More explicitly, the proposed ATSO-Deep CNN model attained higher performance with an accuracy of 96.31%, an F1-score of 96.3%, precision of 96.84%, and recall of 95.78% with a 90% training percentage for the BreCaHAD dataset.

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**Author keywords-** Cancer Prognosis; Deep Convolutional Neural Network; Feature Fusion; Histopathological Images; Mitosis Classification; Segmentation

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q1</b> | <b>89<sup>th</sup></b> | <b>3.9</b>    |     |



## WEAR BEHAVIOUR OF HYBRID CERAMIC REINFORCED FSP SURFACE COMPOSITE AT VARYING TEMPERATURES

**Venkatesh, C.; Shahapurkar, K.;** Natarajan, P.; Bhaviripudi, V.R.; Tirth, V.; Algahtani, A.; Petrů, J.; Bashir, M.N.; Soudagar, M.E.M.

*Scientific Reports*

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# scientific reports

## Abstract

The greater challenges in the manufacturing and machine tool sectors are the periodic replacement of moving components due to wear, and its subsequent escalated product cost. The present research aims to address the issue by developing of novel lightweight surface composite reinforced with hybrid particles SiC and Y<sub>2</sub>O<sub>3</sub> processed through the Friction Stir Process (FSP). The test specimens were prepared by FSP by following four different wt.% of hybrid particles. The sliding tribological examination was executed to examine the wear characteristics of the surface composite at both ambient and elevated temperature environments. The achievement of dynamic recrystallisation is acknowledged through microstructure and grain size analysis results that reveal the finer grain structure at the nugget zone with the smaller grain size. The wear assessment outcomes endorse the improved wear

characteristics of the Al-3SC-1Yo variant by upholding its 126% and 53.88% higher wear resistance than the base material at ambient and elevated temperatures, subject to the normal load of 45 N. The post-worn-out surface analyses proclaim that ambient wear is driven by adhesion, two and three-body abrasion, whereas elevated temperature wear is driven by pure abrasion. It is comprehended from the wear results that 90% more wear loss is recorded during the elevated temperature than the same in the ambient environment. The quantitative comparison of ambient and elevated temperature wear through the observation of surface topography, and the inclusion of hybrid reinforcement on unique base materials are the key novelties of the proposed study.

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**Author keywords-** Coefficient of friction; Dynamic recrystallisation; Grain size; Hardness; Wear rate

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q2</b> | <b>69<sup>th</sup></b> | <b>3.01</b>   |     |



## INVESTIGATION OF ROTOR ASSEMBLY MODEL FOR VIBRATION SIGNATURE ANALYSIS BY XLROTOR TOOL

Savanur, S.; Sridhar, I.; **Murgayya, B. S.**; Talapati, R.J.

*Journal of Vibration Engineering and Technologies*

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### Abstract

**Purpose:** In industrial field, the initial indication of defects in machine parts often appears as small isolated pits. If these problems are not promptly detected and addressed, they can lead to early or even disastrous failures of the rotor system, causing a substantial increase in maintenance expenses and machine downtime. **Methods:** In the present study, a novel approach integrating FFT-based vibration analysis with the Xlrotor simulation tool was investigated to develop a more effective diagnostic framework for rotor assemblies. An undamped critical speed map, Campbell Diagram and unbalanced response analysis were produced using Xlrotor and is validated with experimental vibration results. **Results:** The findings of the present study indicate that the first critical speed increased from 576.2 to 3678.2 cpm when the bearing

stiffness was increased from  $1.0 \times 10^6$  to  $1.0 \times 10^9$  N/m. This is attributed due to the support rigidity of bearings, which increases the system's natural frequency, thereby shifting the critical speed to a higher value. At 3000 cpm, resonance resulted in peak vibrations of 0.01 mm (non driven end), which was more than twice the drive ends. This is due to uneven support conditions at the non-drive end, which results in higher displacement amplitudes than at the stiffer drive end. **Conclusion:** The results highlight the importance of understanding the relationship between the input speed and natural frequency, revealing a higher rate of failures at the non-driven end bearings than at the drive end.

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**Author keywords-** Critical speeds; Rotor dynamics; Vibration signature analysis

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q1</b> | <b>89<sup>th</sup></b> | <b>3.9</b>    |     |



## CHEMICAL SIGNIFICANCE AND DEGENERACY OF WEIGHTED DEGREE-BASED TOPOLOGICAL DESCRIPTOR SECOND DAVAN INDEX FOR OCTANE ISOMERS AND COMPUTATION OF CERTAIN NANOSTRUCTURES

Swapna, B.S.; Chetana, G.; Shanmukha, M.C.; Manjunath, G.; **Usha, A.**

*Scientific Reports*

### Dr. Usha Arcot

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Department of Pure and Applied Mathematics

Alliance School of Sciences

# scientific reports


### Abstract

This study introduces a novel topological descriptor, the second Davan index (SDI) based on weighted degree of molecular graphs. Its chemical significance is validated through QSPR modelling of octane isomers, where it exhibits superior correlation with physico-chemical properties such as entropy, acentric factor, density and molar volume, outperforming classical indices like the Sombor index, second hyper Zagreb

index and redefined third Zagreb index. The second Davan index demonstrates enhanced isomer discrimination capability, as evidenced by its high sensitivity values compared to established descriptors. Further, bounds are established for connected graphs and closed form expressions are computed for standard graph classes and certain nanostructures.

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**Author keywords-** Line graph; Nanostructures; QSPR analysis; Second Davan index; Subdivision graph; Topological indices; Weighted degree

| Indexing/Quartile    | Percentile             | Impact Factor | SDG   |
|----------------------|------------------------|---------------|---|
| <b>SCOPUS/WOS/Q2</b> | <b>68<sup>th</sup></b> | <b>5.1</b>    |  |

## TUNING THE ELECTRICAL PARAMETERS OF NON-STOICHIOMETRIC GALLIUM OXIDE-BASED MEMRISTOR

Nithya, N.; Mallikarjun, R.; **Itapu, S.**; **Murthy, G.R.**; S, S.; Borra, V.


*Discover Materials*

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### Dr. G Ramana Murthy

Professor & Program Director - Ph.D  
Electronics and Communication Engineering  
Alliance School of Applied Engineering



## Discover Materials

Publishing model

Open access

### Abstract

In this work, we investigate the electrical performance of gallium oxide-based memristors by tuning the stoichiometry. Three variants of gallium oxide-based memristors ( $\text{Ga}_2\text{O}_3$ ,  $\text{Ga}_2\text{O}_{3-x}$ ,  $\text{Ga}_2\text{O}$  where  $x = 1.1$ ) with titanium (Ti) as top electrode and copper (Cu) as the bottom electrode are modeled in SILVACO TCAD ATLAS tool. Oxygen vacancies and charge carrier dynamics significantly modulate the resistive switching behavior of memristor devices. The ON/OFF current ratio varies, with  $\text{Ga}_2\text{O}_3$  achieving the highest switching efficiency. The hysteresis loop confirms stable resistive switching behavior. It emphasizes the interplay of stoichiometry on the conduction mechanism across the memristor. This work presents a technique to enhance memristors for energy-efficient memory applications and next-generation neuromorphic computing by deepening our understanding of defect-engineered switching in ultra-wide-bandgap oxides.

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**Author keywords-** Current density; Gallium oxide; Memristors; Silvaco TCAD

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q2</b> | <b>73<sup>rd</sup></b> | <b>1</b>      |     |



## NEIGHBOURHOOD FIRST? STATUS QUO OF INDIA'S TRADE WITH THE NEIGHBOURS

Saikia, M.; Hoque, D.

*Foreign Trade Review*

**Dr. Munmi Saikia**

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Alliance School of Economics



### Abstract

Driven by the objective to create a congenial relationship with the neighbours, the Narendra Modi Government of India instituted the 'Neighbourhood First' policy (NFP) in 2014 which is a continuation of the neighbourhood policy with some new features. Sadly, despite India's diligent effort expended to enhance its relationship with its neighbours, all exercises were nugatory. It poses the question of how India can effectively pursue the objectives of its foreign policies. The realisation of the NFP's intended goals remains ambiguous. Consequently, it becomes imperative to assess the impact of Modi's NFP at this opportune moment. Bilateral trade serves as an essential indicator, reflecting the state of relationships between nations. Thus, this study raises two key questions: first, whether the

neighbourhood factor influences India's exports, and second, how the NFP affects India's trade with neighbouring countries. The study aims to quantify the impact of the neighbourhood on India's exports and evaluate the NFP's role in facilitating trade within the region. The findings reveal that the neighbourhood, as a collective entity, significantly influences India's exports to neighbouring countries. However, when considering individual countries, the results present a different perspective. Moreover, the study demonstrates that, despite the NFP's original intention to promote friendly relations with its neighbours, it has not been notably successful. The failure of this policy, along with India's deteriorating relationships with its neighbors, is evident in its export patterns. © 2025 Elsevier B.V., All rights reserved.

**Author keywords-** export; F13; F14; India; neighbour; 'Neighbourhood First Policy'

Indexing/Quartile

**SCOPUS/WOS/Q1**

Percentile

**88<sup>th</sup>**

Impact Factor

**3.5**

SDG

02  
ZERO HUNGER

## PHYSICS-AWARE ENSEMBLE LEARNING FOR SUPERIOR CROP RECOMMENDATION IN SMART AGRICULTURE

Hemalatha, H.; **Ramalakshmi, K.**; **Debnath, S.**; Swaminathan, D.K.*Sensors***Dr. K. Ramalakshmi**Professor & HOD (All Specializations)  
& Director - CoE (Computer Vision)  
Computer Science and Engineering  
Alliance School of Advanced Computing**Dr. Saswati Debnath**Assistant Professor  
Computer Science and Engineering  
Alliance School of Advanced Computing**3.5**  
Impact Factor


### Abstract

Agriculture remains the backbone of many countries; it plays a pivotal role in shaping a country's overall economy. Accurate prediction in agriculture practices, particularly crop recommendations, can greatly enhance productivity and resource management. IoT and AI technologies have great potential for enhancing precision farming; traditional machine learning (ML) and ensemble learning (EL) models rely primarily on the training data for predictions. When the training data is noisy or limited, these models can result in inaccurate or unrealistic predictions. These limitations are addressed by incorporating physical laws into the ML framework, thereby ensuring that the predictions remain physically plausible. In this study, we conducted a detailed analysis of ML and EL models, both with and without optimization, and compared

their performance against a physics-informed ML model. In the proposed stacking physics-informed ML model, the optimal temperature and the pH for each crop (physics law) are provided as input during the training process in addition to the training data. The physics-informed model was trained to simultaneously satisfy two objectives: (1) fitting the data, and (2) adhering to the physics law. This was achieved by including a penalty term within its total loss function, forcing the model to make predictions that are both accurate and physically feasible. Our findings indicate that the proposed novel stacking physics-informed model achieved a highest accuracy of 99.50% when compared to ML and EL models with optimization.

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**Author keywords-** ensemble models; IoT sensors; machine-learning models; physics informed neural network model; smart agriculture

| Indexing/Quartile    | Percentile             | Impact Factor | SDG   |
|----------------------|------------------------|---------------|---|
| <b>SCOPUS/WOS/Q1</b> | <b>95<sup>th</sup></b> | <b>0.6</b>    |  |

## SERVANT SUBVERSIONS: READING THE BRITISH ANXIETY OVER 'NATIVE NUISANCE' AS INFRA-POLITICS IN ANGLO-INDIAN HOUSEHOLD MANUALS

Banerjee, F.; **Das, A.**

*3L: Language, Linguistics, Literature*

### Dr. Arindam Das

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Alliance School of Liberal Arts



### Abstract

The British colonial domestic space emerges as a critical site for interrogating the racialised dynamics of empire, owing to the proximity it fostered between the coloniser and the colonised. While extant scholarship predominantly underscores colonial hegemony and control within this space, our study, while acknowledging this premise, undertakes a contrapuntal, against-the-grain reading of Anglo-Indian domestic manuals to foreground the subversive agency of “native” servants. These manuals—produced between 1850 and 1900, a period roughly coterminous with the apogee of Victorian moralism and imperial confidence—serve not merely as instructional texts but as anxious colonial archives, inadvertently documenting servant resistance. Using a qualitative methodology grounded in close textual analysis, this study probes the discursive constructions of “native servant problems” as symptomatic of deeper tensions and anxieties embedded in the colonial

household. By exposing the manuals’ aporias and symptomatic silences, we argue that seemingly mundane acts—such as feigned ignorance, strategic disobedience, delay, pilferage, and non-verbal defiance—constitute forms of infrapolitics that subtly unsettled the Anglo-Indian domestic order and, by extension, the colonial power matrix. The manuals analysed were selected based on their accessibility and availability, ensuring a representative sample of prescriptive domestic literature circulating during high imperialism. Our findings reveal that native servants were not passive subjects but stealth agents of disruption, whose infrapolitical manoeuvres subverted the performative authority of white domesticity. This reframing compels a reconsideration of the colonial household as a fraught space of power, negotiation, and everyday resistance.

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**Author keywords-** Anglo-Indian; colonial; domestic manuals; infrapolitical resistance; servants



## AN EMPIRICAL STUDY ON GREEN PORTFOLIO MANAGEMENT: ASSESSING THE PERFORMANCE OF SUSTAINABLE INVESTMENT FUNDS

Mahabub Basha, S.M.; **Banu, A.**; Mamatha, D.S.; Anilkumar, J.; Aravinda, H.G.; Raj, K.C.

*Indian Journal of Information Sources and Services*

### Dr. Aisha Banu

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Alliance School of Business

Library & Information Science ♦ Social Sciences & Humanities

## Indian Journal of Information Sources and Services (IJISS)

### Abstract

An evaluation of sustainable (green) mutual fund performance versus traditional equity mutual funds takes place in the Indian context during the period from 2020 to 2024. The research design uses a descriptive approach to analyze 10 sustainable funds alongside 10 traditional funds through the performance indicators of Sharpe Ratio, Jensen's Alpha, Beta, Standard Deviation together with Compound Annual Growth Rate (CAGR). The risk-adjusted performance assessment shows that sustainable funds produce better returns than traditional funds as measured through higher Sharpe Ratios and Jensen's Alpha measures. The market sensitivity levels of sustainable funds are lower because their Beta values demonstrate reduced exposure

to market fluctuations. Standard deviations from ESG funds are slightly higher but the funds demonstrate competitive returns through their top performers including SBI Magnum ESG Fund and ICICI Prudential ESG Fund with CAGRs above 11%. Sustainable investment funds create a secure foundation for investors who get access to solid future returns in emerging markets and thus present an appealing investment alternative. The research provides crucial implications which benefit investors at all levels aiming to establish sustainable finance operations alongside climate-conscious investments in India's capital markets.

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**Author keywords-** CAGR; ESG; Green Portfolio Management; Jensen Ratio; Sharpe Ratio

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q1</b> | <b>90<sup>th</sup></b> | <b>1.7</b>    |     |



## ROLE OF POWER BASES AND LEADERSHIP STRATEGIES: A STUDY ON PHYGITAL EMPLOYEES IN INFORMATION TECHNOLOGY ORGANIZATIONS

**Patrick, H.A.;** Prabakaran, N.

*Public Organization Review*

**Dr. Harold Andrew Patrick**

Professor & Director  
General Management  
Alliance Ascent College



## Public Organization Review

A Global Journal

Publishing model

Hybrid

### Abstract

The study explores the impact of power bases on leadership strategies in IT organizations, focusing on the influence of expert and credibility power bases on prescriptive leadership strategies. The research, conducted using a stratified sampling method, involved 487 IT employees who spend at least two days per week in the office or two days per week in work from

home and have spent at least two years under the same boss. The findings suggest that referent power negatively influences restrictive leadership strategies, while expert and credibility power bases significantly influence prescriptive leadership strategies.

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**Author keywords-** IT organizations; Leadership strategies; Power bases; Prescriptive strategy; Restrictive strategy

## INVESTIGATING THE PROPERTIES OF HYBRID ABUTILON INDICUM AND OKRA FIBER-REINFORCED COMPOSITES

Mohanraj, C.M.; Mariappan, M.; **Senthamaraikannan, P.**; **Suyambulingam, I.**; Kumar, R.

*Journal of Engineered Fibers and Fabrics*

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Alliance School of Applied Engineering

## Journal of Engineered Fibers and Fabrics

### Abstract

This study systematically evaluated the mechanical and thermal properties of hybrid Abutilon indicum (AI) and okra fiber-reinforced epoxy composites. The composite was fabricated by needle punch weaving and a hand layup process. Various compositions of AI and okra fibers were used for fabrication, and the subsequent characteristics of the resulting composites were analyzed. Mechanical tests, including tensile testing, flexural testing, compression testing, and impact testing, were carried out to determine the properties of the resultant composites. The results showed that 35wt% fiber loading in nonwoven composites significantly improved the mechanical properties, with increases of 4.75% in tensile strength, 3.32% in flexural strength, 4.23% in compressive strength,

and 6.57% in impact strength. composites with 40wt% fiber loading. Among the composites, the H4 sample exhibited the highest tensile strength (49.521MPa) and flexural strength (72.523MPa), attributed to the optimal fiber content and effective matrix wetting. The compression strength and impact energy also peaked in the H4 sample due to the balanced fiber properties and efficient load transfer. This study highlights the potential of AI and okra fiber hybridization in creating eco-friendly, high-performance epoxy composites, with significant mechanical and thermal property enhancements achieved at specific fiber loadings and ratios.

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**Author keywords-** Abutilon indicum; hybrid composite; mechanical properties; okra fiber

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q2</b> | <b>50<sup>th</sup></b> | <b>2.72</b>   |     |



## PREDICTIVE PERFORMANCE AND DEGENERACY OF TEMPERATURE-BASED INDICES THROUGH QSPR ANALYSIS AND COMPUTATION OF N-SUNLET AND MONGOLIAN TENT GRAPHS

**Usha, A.**; Shanmukha, M.C.; Swapna, B.S.; Shilpa, K.C.

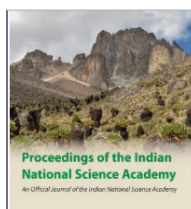
*Proceedings of the Indian National Science Academy*

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Alliance School of Sciences



## Proceedings of the Indian National Science Academy

Publishing model

Subscription

### Abstract

This study aims to introduce novel temperature-based topological descriptors such as Temperature Harmonic-Geometric index, Temperature Geometric-Harmonic index, Temperature SS index and Temperature Geometric-Arithmetic index derived from the concept of vertex temperature, defined as a function of degree and graph order. These indices are used to enhance structural interpretation and predictive modelling within QSPR/QSAR frameworks. The framework initiates by establishing mathematical definitions and

expressions for the proposed indices, followed by sensitivity analysis to assess their discriminative capacity in distinguishing molecular isomers. To further explore their applicability, two structured graph families n-sunlet and mongolian tent graphs are considered where these indices are computed using vertex and edge partitions. It lays foundational work for temperature-based descriptors and highlights their theoretical potential in both combinatorial graph analysis and chemical modelling.

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**Author keywords-** Mongolian tent graph; N-sunlet graph; Octane isomers; Temperature indices

| Indexing/Quartile    | Percentile             | Impact Factor | SDG   |
|----------------------|------------------------|---------------|---|
| <b>SCOPUS/WOS/Q2</b> | <b>73<sup>rd</sup></b> | <b>1.5</b>    |  |

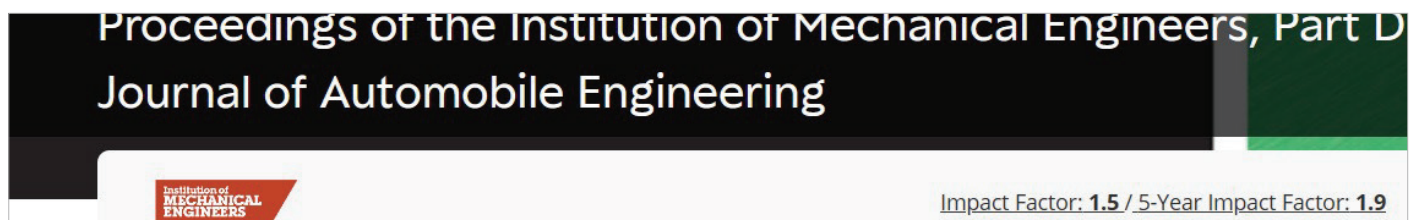
## INTELLIGENT POWER-SPLIT DEVICE OPTIMIZATION USING A MULTI-SURROGATE FRAMEWORK INTEGRATING BAYESIAN LEARNING AND PHYSICS-BASED DESIGN FOR NEXT-GENERATION HYBRID VEHICLES

Mandol, S.; Bhattacharjee, D.; **Hemanth Kumar, M.**; Jain, N.; Verma, A.

*Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering*

### Dr. Mohit Hemanth Kumar

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Alliance School of Applied Engineering



### Abstract

This article introduces a knowledge-augmented design process for power-split devices in hybrid electric vehicles, one of the important devices where improvement in fuel consumption and emissions is critical. In this work, a three-phase framework is presented for mechanical and informatics-driven design that combines computational intelligence with traditional mechanical design methodologies through the coupling of data-driven and engineering-based modelling methodologies. Phase 1 used the validated ADVISOR simulation platform to produce detailed data on vehicle performance, creating a solid base for optimization. In Phase 2, multi-surrogate framework was designed with Bayesian Neural Networks (BNNs) and regression models, which produced an accurate prediction with a mean absolute percentage error (MAPE) of 0.552748% and a mean uncertainty of 0.001535. The better performance of BNN is due to its advanced capability of representing complex nonlinear relationships between gear parameters and performance metrics. A transition, the theoretical optimizations are incorporated towards potential manufacturing designs by

employing a computer-aided engineering approach in Phase 3 using the SOLIDWORKS platform to transfer theoretical data into a practical design before ultimately running the designs through ANSYS to evaluate performance. With this methodology, major developments were achieved, such as 2% increased fuel efficiency and 6.74% increased load carrying capacity via gear geometry design optimization. Sensitivity analysis indicated that teeth configurations of sun gears exhibited a sensitivity index of 1.4554, whereas that of ring gears was 0.9686, providing important guidance on the location of the design priority. This combined system not only connects the gap between theoretical optimization and practical implementation but also sets up a new paradigm of sustainable automotive design. This methodology balances improvements in performance against the trade-offs in manufacturing feasibility, showing promise that it can become a part of the automotive powertrain development process beyond just the developed prototype, which is a clear contribution towards sustainable transportation. © 2025 Elsevier B.V., All rights reserved.

**Author keywords-** Bayesian neural networks; design optimization; finite element analysis; hybrid electric vehicle; multi-surrogate modelling; power-split device

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q1</b> | <b>80<sup>th</sup></b> | <b>4.38</b>   |     |



## EXPLORING THE POTENTIAL OF UNDERUTILIZED ZINGIBERACEAE FIBERS: A STUDY ON MEISTERA ACULEATA AND AMOMUM ANDAMANICUM

Babu, S.S.; Jiyas, N.; Sasidharan, I.; Bindu Kumar, K.; Thomas, V.P.; Thomas, B.T.; **Senthamaraikannan, P.**; Kumar, R.  
*Journal of Natural Fibers*

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### Journal of Natural Fibers

An open access journal

Publishes research in processing natural raw materials, particularly fibers; related lifecycle asses bioreclamation.

### Abstract

This study presents the first comprehensive characterization of fibers extracted from two novel species belonging to Zingiberaceae family: Meistera aculeata (MAF) and Amomum andamanicum (AAF). Physical, chemical, thermal, and mechanical properties were evaluated using FTIR, TGA, XRD, and tensile testing. MAF exhibited a 4.7% higher cellulose content, enhanced crystallinity, improved fiber alignment, and reduced moisture absorption compared to AAF. These attributes contributed to superior mechanical performance, with tensile stress values reaching 1418.42 MPa for MAF and 970.00 MPa for AAF, along with higher tensile modulus and lower tensile strain. In this study, AFM provided detailed

surface roughness and topography, SEM revealed structural features along with fracture study, and EDX identified elemental composition, collectively offering a comprehensive insight into the fibers' morphology and suitability for composite reinforcement. The results underscore the potential of these fibers for high-performance engineering applications. Furthermore, the study offers a sustainable solution for managing pseudostem biomass waste, aligning material innovation with environmental stewardship. By unveiling the structural merits of these underutilized fibers, the research paves the way for their integration into advanced bio-composite development. © 2025 Elsevier B.V., All rights reserved.

**Author keywords-** Abutilon indicum; hybrid composite; mechanical properties; okra fiber

| Indexing/Quartile    | Percentile             | Impact Factor | SDG  |
|----------------------|------------------------|---------------|--|
| <b>SCOPUS/WOS/Q3</b> | <b>30<sup>th</sup></b> | <b>0.53</b>   | <br>11<br>SUSTAINABLE CITIES<br>AND COMMUNITIES |

## 2-PRODUCT CORDIAL LABELLING OF K-REGULAR BIPARTITE GRAPHS

Sapre, P.P.; **Usha, A.**; Shanmukha, M.C.; John, J.R.

*Journal of Applied Mathematics and Informatics*

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## Journal of Applied Mathematics and Informatics

The Korean Society for Computational and Applied Mathematics (KSCAM)

### Abstract

This article explores the concept of  $p$ -product cordial labeling of graphs, which generalizes the well-established notion of cordial labeling. Cordial labeling techniques have significant applications in various fields such as cryptography, neural networks, artificial intelligence, chemistry, and network modelling. In this study, we define  $p$ -product cordial labeling as a vertex labeling function  $\lambda : V(G) \rightarrow \{0, 1, \dots, p-1\}$ , where  $p \in \mathbb{N}$  and  $p \leq |V(G)|$ , with an induced edge labeling  $\mu : E(G) \rightarrow \{0, 1, \dots, p-1\}$  given by  $\mu(uv) = (\lambda(u) \cdot \lambda(v)) \bmod p$ . A labeling

is said to be  $p$ -product cordial if, for all labels  $i$  and  $j$ , the number of vertices labeled  $i$  and  $j$  differ by at most one, and similarly, the number of edges labeled  $i$  and  $j$  differ by at most one. The paper specifically investigates the 2-product cordiality of  $k$ -regular bipartite graphs. It is shown that every 1-regular bipartite graph is 2-product cordial. Further, the study presents conditions under which general  $k$ -regular bipartite graphs are 2-product cordial and identifies cases where such cordiality does not hold. © 2025 Elsevier B.V., All rights reserved

**Author keywords and phrases:** Labelling of graph;  $k$ -regular bipartite graph; product cordial labelling of graph

| Indexing/Quartile | Percentile             | Impact Factor | SDG   |
|-------------------|------------------------|---------------|---|
| <b>SCOPUS/Q3</b>  | <b>23<sup>rd</sup></b> | <b>0.91</b>   |  |

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

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

*Macromolecular Symposia*

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### Dr. Devaiah N G

Associate Professor & Program Director - UG  
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. © 2025 Elsevier B.V., All rights reserved.

**Author keywords-** bamboo fiber; compressive strength; eco-friendly concrete; fly ash concrete; split tensile strength

| Indexing/Quartile    | Percentile             | Impact Factor | SDG   |
|----------------------|------------------------|---------------|---|
| <b>SCOPUS/WOS/Q1</b> | <b>93<sup>rd</sup></b> | <b>2.8</b>    |  |

## GOVERNMENT SUPPORT, LEADERSHIP AND FINANCIAL PERFORMANCE OF MSME RESTAURANTS IN EGYPT: A MODERATED MEDIATION MODEL

Elkhwesky, Z.; Castañeda-García, J.-A.; Afjal, M.; Knawel, S.; **Das, A.**

*Tourism and Hospitality Research*

### Dr. Arindam Das

Professor & Program Director - Ph.D  
Department of Language & Literature  
Alliance School of Liberal Arts

## Tourism and Hospitality Research

Impact Factor: **2.8** / 5-Year Impact Factor: **3.2**

### Abstract

Grounded in the resource-based view and leadership theory, this study seeks to explore the interactive relationship between government policies, programmes, and the financial performance of micro, small, and medium-sized enterprise (MSME) restaurants, while also considering the moderating influence of open leadership. Quantitative data were gathered from 179 managers/owners of MSME restaurants in Egypt. The analysis was performed utilising model 15 of the PROCESS macro for SPSS. The findings indicate that government policies exert a favourable and statistically significant influence on financial performance. Nevertheless, the direct impact of government programmes on financial performance was found

to be insignificant. Government policies directly influence financial performance, predominantly when the manager or owner demonstrates a low degree of open leadership. Conversely, when the manager or owner expresses a willingness to engage with the implemented programmes, this willingness emerges as the principal avenue for enhancing financial performance. This research provides practical implications by guiding policymakers in designing more effective support mechanisms and helping restaurant managers/owners understand how leadership openness can enhance the benefits of government initiatives.

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**Author keywords-** financial performance; government policies; government programmes; MSME restaurants; open leadership

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q2</b> | <b>73<sup>rd</sup></b> | <b>3.58</b>   |     |




## SYNTHESIS AND PHYSICOCHEMICAL CHARACTERIZATION OF COPPER OXIDE NANOPARTICLES FROM PHENOLIC-RICH MUSTARD SEED EXTRACT FOR POTENTIAL APPLICATIONS

Mohamed, R.B.; Arunachalam, K.P.; Ayrilmis, N.; **Suyambulingam, I.**; Narayanaperumal, S.  
Waste and Biomass Valorization

### Dr. Indran S

Professor  
Mechanical Engineering  
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## Waste and Biomass Valorization

Publishing model  
**Hybrid**

### Abstract

The environmental and health hazards linked to chemically manufactured metal nanoparticles highlight the necessity for sustainable alternatives. This research demonstrates an eco-friendly production of copper oxide (CuO) nanoparticles utilizing mustard seed (*Brassica juncea*) extract, which is abundant in phenolic compounds that serve as reducing and stabilizing agents. The produced nanoparticles were studied using FTIR, which confirmed the presence of organic functional groups responsible for reduction and stabilization, and UV–Vis spectroscopy, which revealed absorption peaks between 230 and 280 nm. X-ray diffraction indicated a crystallinity index of 70.56% and an average crystallite size of 25.48 nm, whilst

TGA and DSC studies validated thermal stability. The SEM and TEM investigations revealed primarily spherical nanoparticles measuring between 5 nm and 50 nm, with an average size of 32.24 nm as estimated using ImageJ software. The phenolic chemicals enabled regulated nanoparticle development and inhibited aggregation. The homogeneous morphology, nanoscale dimensions, and enhanced stability of biosynthesized CuO nanoparticles render them promising candidates for further investigation in areas such as nanocomposite fillers, functional coatings, and environmental remediation.

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**Author keywords-** Biomaterial; Biosynthesis; Metal nanoparticles; Mustard seed; Nanoparticle

| Indexing/Quartile    | Percentile             | Impact Factor | SDG   |
|----------------------|------------------------|---------------|---|
| <b>SCOPUS/WOS/Q1</b> | <b>78<sup>th</sup></b> | <b>4.1</b>    |  |

## ENHANCING FLEXURAL PERFORMANCE OF FRICTION-STIR-PROCESSED AL COMPOSITES VIA SiC AND Y<sub>2</sub>O<sub>3</sub> REINFORCEMENTS: A COMBINED EXPERIMENTAL AND NUMERICAL STUDY

Venkatesh, C.; Natarajan, P.; Tamilperuvalathan, S.; Shahapurkar, K.; Murthy, H.C.A.

*Emergent Materials*

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Alliance School of Applied Engineering



**Emergent Materials**  
Publishing model  
Hybrid  
Submit your manuscript →

### Abstract

The sustained need for high-strength, low-weight materials drives the research community to develop a sophisticated material to address the emerging industrial needs. The significance of the present research is to improve the flexural attributes by utilizing the process and reinforcement benefits. The Friction Stir Processing (FSP) technique was employed to fabricate the surface composite reinforced through varying weight percentages of two ceramic elements, SiC and Y<sub>2</sub>O<sub>3</sub>. The three-point bending test was implemented to investigate the bending attributes. The process benefits were proclaimed by Scanning Electron Microscopy (SEM) and grain size analysis, which revealed that the nugget zone attained finer grain sizes,

followed by the mixed coarser-finer grain size at Thermo Mechanically Affected Zone (TMAZ) and blended coarser-zero grain refinement at Heat Affected Zone (HAZ). The flexural examination outcomes manifested a remarkable enhancement of 33% flexural strength and 36.36% flexural modulus for an Al-3SC-1Yo FSPed composite variant than the base material. The post-flexural failure study supported layer sliding as the origin of the failure as a result of the shear stress effect. The numerical analysis performed to authenticate the experimental findings explored the good concurrence between the experimental and numerical outcomes.

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**Author keywords-** Dynamic recrystallization; Flexural strength; Friction Stir Processing; Grain size; Silicon carbide (SiC); Yttrium Oxide (Y<sub>2</sub>O<sub>3</sub>)

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOPUS/WOS/Q1</b> | <b>99<sup>th</sup></b> | <b>6.03</b>   |     |



## WHO OWNS THE FUTURE? AI, DIGITAL SOVEREIGNTY, AND THE POLITICS OF KNOWLEDGE

Keerthiraj, n.; Misra, A.

*AI and Society*

**Dr. Apoorva Misra**

Assistant Professor  
Alliance School of Law



### Abstract

What we today call “digital sovereignty” is neither a universal concept nor a neutral one. It is a product of specific cultural histories—American liberalism, Chinese statism, and European legalism—each grounded in theological and political trajectories unique to the West. This paper examines how these models—when exported globally—produce epistemic tensions in societies shaped by different traditions of thought. Through four case studies—Aadhaar, GDPR, China’s Social Credit System, and ChatGPT—it shows how digital infrastructures are not merely tools of governance, but enactments of particular moral orders. Aadhaar performs modernity through a postcolonial state’s imitation; GDPR legislates morality through

Europe’s juridical universalism; China encodes Confucian ethics via algorithm; and ChatGPT extends Western epistemology under the guise of intelligence. These are not exceptions that require explanation—they are symptoms of a deeper malady: the global circulation of categories that were never born global. What masquerades as universal is, in fact, provincial knowledge on a global tour. This paper, then, is not a call for better models, but for a different conversation—one that begins with civilizational difference, not ends with it. Sovereignty, here, becomes the right to think otherwise—and to build from that thinking.

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**Author keywords-** Action—knowledge; Algorithmic power; Artificial intelligence (AI); Digital sovereignty; Epistemic injustice; Experience

| Indexing/Quartile    | Percentile             | Impact Factor | SDG   |
|----------------------|------------------------|---------------|---|
| <b>SCOPUS/WOS/Q1</b> | <b>99<sup>th</sup></b> | <b>1.7</b>    |  |

## EMPOWERING INTEGRITY AND CONFIDENTIALITY IN SMART HEALTHCARE SYSTEMS THROUGH EFFECTIVE EDGE CRYPTOGRAPHIC STRATEGIES

Gowthamani, R.; Manoj, S.O.; **Rani, K.S.K.**

*Automatika*

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## Automatika

*Journal for Control, Measurement, Electronics, Computing and Communications*

 An open access journal

Publishes open access research on automatic control robotics, autonomous


### Abstract

Cybersecurity threats pose a significant risk to IoT-based smart healthcare technologies by compromising patient safety, disrupting services, and exposing sensitive health data to unauthorized access and misuse. This research aims to strengthen data integrity and confidentiality in smart healthcare systems by developing edge-level cryptographic strategies tailored for IoT-enabled edge environments, addressing the security and privacy challenges of resource-constrained devices. The proposed methodology Cryptographic Security Framework with SignaVault Authentication (CSFVA) integrates lightweight cryptographic techniques with edge computing to secure healthcare data efficiently and in real time. The novelty of this research lies in the unified implementation of a layered cryptographic pipeline, comprising Elliptic Curve

Cryptography (ECC) for encryption, a Secure Hash Crypto Technique (SHCT) for data integrity, and a Signa-Vault (SV) authentication mechanism for user and device verification. This tri-layered approach ensures data confidentiality, integrity, and authenticity while supporting the low-latency requirements of edge computing environments. Performance evaluation shows the model's efficiency, achieving a processing time of 5.81 seconds, memory use of 45.78 MB, power consumption of 4.2 W, and throughput of 99.67%. These results indicate that the proposed solution effectively balances security and resource efficiency, making it suitable for resource-limited IoT healthcare and scalable smart healthcare systems.

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**Author keywords-** Action—knowledge; Algorithmic power; Artificial intelligence (AI); Digital sovereignty; Epistemic injustice; Experience

| Indexing/Quartile    | Percentile             | Impact Factor | SDG   |
|----------------------|------------------------|---------------|---|
| <b>SCOPUS/WOS/Q1</b> | <b>80<sup>th</sup></b> | <b>4.38</b>   |  |

## INFLUENCE OF WATER ABSORPTION ON THE INTERLAMINAR SHEAR STRENGTH AND FRACTURE TOUGHNESS OF HYBRID HEMP–BANANA FIBER-REINFORCED COMPOSITES

Umarfarooq, M.A.; Uppin, V.S.; Subhapiya, P.; K C, V.; Nivedhitha, K.S.; Joshi, A.; Banapurmath Nagaraj, N.R.; Gouda, P.S.S.; **Shahapurkar, K.**; Olekar, S.D.; Singh, B.

*Journal of Natural Fibers*

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## Journal of Natural Fibers

 An open access journal

Publishes research in processing natural raw materials, particularly fibers; agriculture; bioreclamation.

### Abstract

This study investigates the impact of water absorption on the interlaminar shear strength (ILSS) and fracture toughness of hybrid hemp-banana/epoxy composites, in comparison to pure hemp/epoxy and banana/epoxy systems. Building on previous work under dry conditions, this research focuses on moisture-induced degradation to simulate humid service environments. Composite laminates were fabricated via compression molding and subjected to water immersion tests. Hemp/epoxy composite exhibits the highest water absorption (22%), followed by banana/epoxy (18%) and hybrid composites (15%), reflecting cellulose content and fiber–matrix interfacial bonding differences. Under dry conditions, hybrid composites achieved superior ILSS (18.17 MPa) and fracture toughness (7.66 MPa·m<sup>1/2</sup>), attributed to synergistic fiber interactions

that improved the stress transfer and crack deflection. Post-immersion, ILSS declined by 47%, 40%, and 36% for hemp, banana, and hybrid composites, respectively, while fracture toughness dropped by 62%, 48%, and 39%. Statistical analysis (paired t-tests) confirmed that these property reductions were highly significant, with the hybrid composite showing the least severe degradation. SEM micrographs revealed matrix plasticization, fiber swelling, and interfacial debonding as a dominant degradation mechanism. This work highlights the synergetic effects of hemp-banana hybridization in mitigating moisture-induced mechanical degradation, offering insights into optimizing natural fiber composites for sustainable applications in humid environments.

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**Author keywords-** fracture toughness; hybrid hemp/banana composite; interlaminar shear strength; moisture degradation; Water absorption

| Indexing/Quartile | Percentile             | Impact Factor | SDG   |
|-------------------|------------------------|---------------|---|
| <b>SCOPUS/Q3</b>  | <b>49<sup>th</sup></b> | <b>1.21</b>   |  |

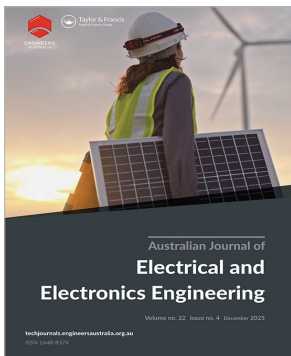
## TRADITIONAL AND ADVANCED HEFFRON PHILLIPS MODELS: DAMPING PERFORMANCE COMPARISON WITH AN ENHANCED SNAKE OPTIMISATION ALGORITHM

Agrawal, N.; Mahapatra, S.

*Australian Journal of Electrical and Electronics Engineering*

### Dr. Sheila Mahapatra

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### Abstract

An Advanced Heffron Phillips Model (AHPM) has been developed to address the issues brought about by Low-Frequency Oscillations (LFO) in the Power System. It is based on a higher-order Synchronous Machine (SM) model 1.1. The internal voltage's d and q-axis components' dynamics are included in the AHPM. This is a detailed model with improved mathematical modelling and a smaller number of assumptions for stability studies. The Power System Stabilizer (PSS) is tuned using the Enhanced Snake Optimization Algorithm (ESOA), a novel meta-heuristic algorithm that draws inspiration from nature. With AHPM, the highest damping ratio is (0.9750), and the settling time for various parameters is less than 2.0 seconds.

LFO reduces the power system's ability to transfer power and interferes with regular operation. Enhanced damping torque provided by AHPM with PSS to the system leads to dampening LFO, improvements in stability and power transfer capacity of the system, and hence the achievement of Sustainable Development Goal (SDG) -7. It helps prevent financial losses caused by disturbances in the power system. This illustrates the ESOA-based AHPM's efficiency and economy. The AHPM ensures the power system operates in a trustworthy, safe, and secure manner, which is essential for overall development.

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**Author keywords and phrases:** Damping; eigenvalue; grid; oscillations; power system; simulation; stability

| Indexing/Quartile | Percentile            | Impact Factor | SDG   |
|-------------------|-----------------------|---------------|---|
| <b>SCOPUS/Q4</b>  | <b>4<sup>th</sup></b> | <b>0.10</b>   |  |

## OPTIMIZED MACHINE LEARNING MODELS FOR ENHANCED DIABETES PREDICTION THROUGH HYPERPARAMETER TUNING APPROACH

Akasam, S.; **Rajasekar, R.**; Poola, P.K.; Harika, D.; Kumar, Ch.P.; Vijayakumar, Y.; Narayana, G.; Gundagani, M.; Tawade, J.V.

*Asian Journal of Statistical Sciences*

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## ASIAN JOURNAL OF STATISTICAL SCIENCES

Frequency :Bi-Annual

ISSN :2582-9912

Peer Reviewed Journal

### Abstract

This study presents a comparative analysis of various machine learning models applied to a classification problem, both before and after hyperparameter tuning. Models including Logistic Regression, Support Vector Machine, K-Nearest Neighbors, Decision Tree, Random Forest, Gradient Boosting, and XGBoost were evaluated. Performance metrics such as accuracy, precision, recall, and F1-score were used to assess each model. The results indicate that hyperparameter tuning significantly enhances the performance of certain models, particularly Decision Tree, Random Forest, and Gradient

Boosting. Gradient Boosting outperformed all other models post-tuning with an accuracy of 0.80 and F1-score of 0.75. Models like KNN and SVM exhibited minimal improvements after tuning. Ensemble methods generally achieved better results compared to individual models. The study highlights the importance of fine-tuning model parameters to optimize results. Accuracy and F1-score suggest a consistent performance boost for tuned ensemble algorithms. These findings provide valuable insights for selecting and optimizing models in machine learning tasks. © 2025 Elsevier B.V., All rights reserved.

**Author keywords-** Diabetes Prediction; Grid Search Optimization; Hyperparameter Tuning; Machine Learning Models; Performance Metrics

| Indexing/Quartile    | Percentile             | Impact Factor | SDG   |
|----------------------|------------------------|---------------|---|
| <b>SCOPUS/WOS/Q2</b> | <b>68<sup>th</sup></b> | <b>2.28</b>   |  |

## FABRICATION OF CO–HF-DOPED BA–SR HEXAGONAL FERRITE FOR ECONOMICAL AND LIGHTWEIGHT MICROWAVE ABSORBER APPLICATION: FUNCTIONALIZATION OF STRUCTURAL, MORPHOLOGICAL, HYSTERESIS, ELECTROMAGNETIC METRICS, AND TUNABLE BANDWIDTH

Joshi, R.; Singh, J.; Dhruv, P.; Jotania, R.B.; Ammar-Merah, S.; Sombra, A.S.B.; **Singh, C.**

*IEEE Transactions on Magnetics*

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## IEEE Transactions on Magnetics

### Abstract

Microwave absorbers are used to mitigate the unwanted wireless/electromagnetic signals that interfere with the functioning of electrical/electronic devices. In this article, Co<sup>2+</sup>–Hf<sup>4+</sup>-doped M-type Ba–Sr hexagonal ferrite samples have been synthesized using a solid-state ceramic method. The phase structure and surface morphology were studied using X-ray diffraction (XRD) and scanning electron microscopy (SEM), respectively. The magnetic hysteresis was investigated with a vibrating sample magnetometer (VSM). A two-port vector network analyzer characterized the microwave absorption in terms of frequency, dopants, and geometrical thickness of the samples. XRD confirmed that the produced powders are of M-type hexaferrite structure without any additional phases. SEM revealed inhibition of grain growth with dopants and small grain size, as well as grain cluster formation. This morphological behavior caused a reduction in coercivity and enhanced microwave absorption. As a consequence, the dopants caused a better soft magnetic nature with a room temperature (r.t.) coercivity (H<sub>c</sub>) varying between 788 Oe (x = 0.0) and 489 Oe (x = 1.0). The measured dielectric constant/dielectric loss

and permeability/magnetic loss parameters were increased with dopants. The dopants caused an increase in the absorption from –20.67 dB at 6.5 mm in the undoped composition (x = 0.0) to –40.21 dB at 1.6 mm in the doped composition (x = 1.0). Additionally, a –10-dB absorption bandwidth of 3.13 GHz was exhibited in x = 1.0 from the 8.47- to 11.60-GHz frequency band, while x = 0.4 revealed a –10-dB absorption bandwidth of 1.92 GHz from 10.48 to 12.40 GHz. Microwave absorption has been substantiated by impedance matching/ $\lambda/4$  mechanism, and absorption peaks have been tuned in the desired frequency spectrum by careful selection of thickness/dopants. Significant variations were seen associated with dopant-based tuning of absorption peaks in the frequency spectrum, an increase in microwave absorption, and a decrease in the thickness of the samples. The tunable performance metrics and economical synthesis imply the potential application of prepared compositions for microwave absorbers and passive device applications for wireless communication.

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**Author keywords and phrases:** Ceramic processing route; hysteresis; M-type hexaferrites; microstructure; microwave absorption

| Indexing/Quartile    | Percentile             | Impact Factor | SDG |
|----------------------|------------------------|---------------|-----|
| <b>SCOUPS/WOS/Q1</b> | <b>92<sup>nd</sup></b> | <b>5.92</b>   |     |



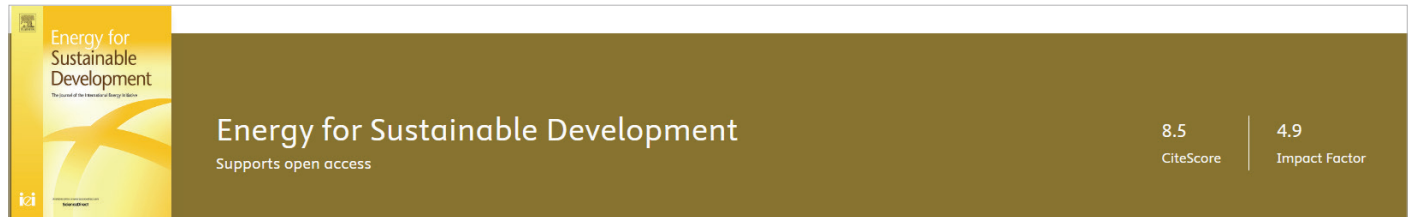
## TOWARD GREEN STEEL: ROLE OF PILOT-SCALE CARBON CAPTURE AND UTILIZATION TECHNOLOGIES

**Rathore, D.**

Energy for Sustainable Development

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### Abstract

The global steel industry contributes of total carbon dioxide (CO<sub>2</sub>) emissions 7–9 %, indicating it a critical focus area for industrial decarbonization. This review examines the function of pilot-scale carbon capture and utilization (CCU) technologies in reducing emissions from steel manufacturing, with a specific focus on highly carbon-intensive steel sector. It provides a comprehensive overview of CO<sub>2</sub> emission sources in steel production techniques, explores emerging CCU technologies such as post-combustion, pre-combustion, and oxy-fuel combustion. It discusses various operation pathways, including mineralization, methanol and urea synthesis, and biological conversion. Key findings reveal that pilot-scale demonstrations consistently achieve high CO<sub>2</sub> capture efficiencies (80–90 %) and can reduce greenhouse gas emissions by

30–50 % when integrated with low-carbon energy sources. However, energy penalties, high capital and operating costs, and integration challenges remain major barriers to large-scale deployment. Techno-economic assessments confirm long payback periods without policy incentives, while life cycle assessments validate the environmental benefits when supported by renewable energy inputs. The analysis underscores that successful scale-up requires policy support, industrial collaboration, and the use of digital monitoring frameworks. Overall, strategic deployment of CCU at pilot scale provides critical data, builds confidence, and positions CCU as a cornerstone of the transition toward green steel production.

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**Author keywords and phrases:** Carbon capture and utilization (CCU); CO<sub>2</sub> emissions; Industrial emissions; Mineralization; Pilot-scale demonstration; Steel decarbonization

Indexing/Quartile

**SCOUPS/WOS/Q1**

Percentile

**82<sup>nd</sup>**

Impact Factor

**4.2**

SDG

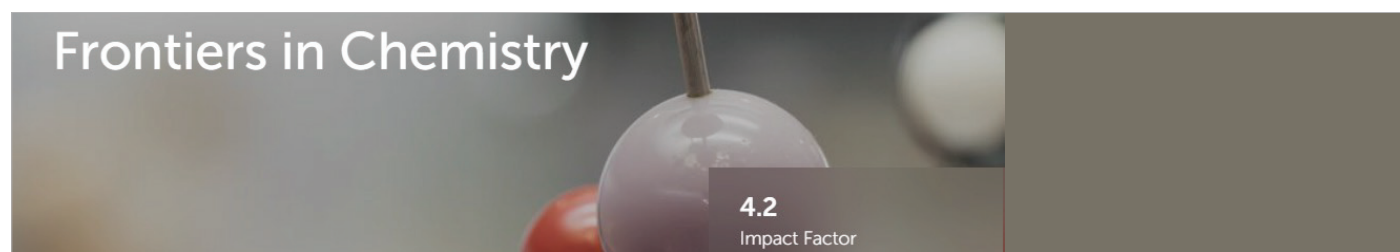


## COMPREHENSIVE MEDICINAL CHEMISTRY SURVEY HIGHLIGHTS A PORTFOLIO OF LEAD MOLECULES FOR ALZHEIMER'S DISEASE THERAPY

**Bhansali, P.R.**; Sonkusare, S.M.; Savale, S.S.; Wijayasinghe, Y.S.; Liao, Y.; Sloan, D.C.; Chaturbhuj, G.U.; Muntean, B.S.  
*Frontiers in Chemistry*

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### Abstract

The World Health Organization reports 10 million new patients with dementia each year. The most common form of dementia is Alzheimer's disease (AD), which constitutes up to 70% of cases. AD is mainly characterized by loss of memory, which, in addition to its debilitating individual effect, represents a burden of 1.3 trillion US dollars globally. The staggering scale of hardship has spurred intense investigations from the scientific community in search of therapeutic solutions. Recent advances to combat AD involve the identification of numerous neural targets and concomitant chemical interventions as nodes of

therapy. Due to disparate biological and chemical facets of AD therapy, a comprehensive perspective covering both arenas is currently missing from the literature. This perspective aims to provide an extensive understanding of anti-AD mechanics alongside small-molecule drug design efforts from a medicinal chemist viewpoint. We are confident that this survey of the literature will provide a resourceful motivation to propel future research efforts towards successful Alzheimer's disease therapy.  
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**Author keywords and phrases:** Alzheimer's disease; dementia treatment; drug design; medicinal chemistry; neurobiology of disease



# Scopus

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

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



## PEACE, POLITICS, AND SDGS: ANALYSING REGIONAL DISTURBANCES TO SUSTAINABLE DEVELOPMENT

Mansoor, S.I.U.; Shah, M.A.; **Wani, S.A.**; **Ahmed, S.**; Yadav, G.

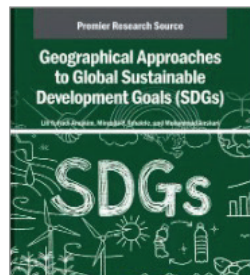
*Geographical Approaches to Global Sustainable Development Goals (SDGs)*

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Alliance School of Law

### Mr. Sofiul Ahmed

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Alliance School of Law



## Geographical Approaches to Global Sustainable Development Goals (SDGs)

Lili Yulyadi Arnakim (Binus University, Indonesia), Miranda P. Tahalele (Binus University, Indonesia), and **Muhammad Anshari** (Universiti Brunei Darussalam, Brunei)

Release Date: September, 2025 | Copyright: © 2026 | Pages: 514

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ISBN13: 9798337313009 | ISBN13 Softcover: 9798337313016 | EISBN13: 9798337313023

### Abstract

This chapter investigates the difficult nexus between peace, politics and sustainable development looking at how regional disturbances interfere with the culmination of the SDGs. It examines how instability in politics, economy, environment and human rights violations contribute to the perpetuation of systemic challenges. Critical assessment is given to the legal and policy frameworks that govern governance, trade and environmental sustainability, to identify gaps that increase the regional conflict. This study emphasizes about how economic sanctions, resource scarcity and governance failures affect the

long run stability. It also highlights the need for legal reforms, cooperation at the international level, as well as institutional accountability, and this is achieved by means of an evaluation of case studies and policy responses. It recommends strategic interventions in form of legal safeguards, equitable economic policy and environmental resilience to mitigate the regional conflicts and to promote sustainable development in a legalized and political globalized world.

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### Indexed keywords-

**Engineering controlled terms:** Environmental regulations; Public policy

**Engineering uncontrolled terms:** Critical assessment; Economic sanctions; Environmental sustainability; Human rights; Legal frameworks; Longest run; Policy framework; Regional conflict; Resource scarcity; Run stability

**Engineering main heading:** Sustainable development

| Indexing/Quartile | Percentile | Impact Factor | SDG |
|-------------------|------------|---------------|-----|
| <b>SCOPUS/NA</b>  | <b>NA</b>  | <b>NA</b>     |     |



## GENERATIVE AI IN VIRTUAL MEDIA IMAGE, VIDEO, AND ANIMATION GENERATION

**Rajkumar, N.; Viji, C.;** Nachiappan, B.; Mohanraj, A.; Nagarajan, G.; Ravi, J.; Prabhu Shankar, B.

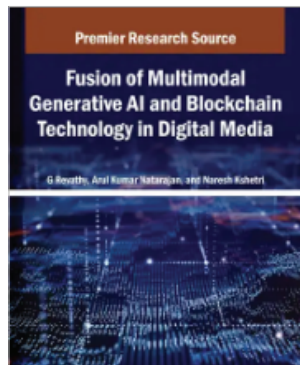
*Fusion of Multimodal Generative AI and Blockchain Technology in Digital Media*

### Dr. N Rajkumar

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### Dr. C. Viji

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Alliance School of Advanced Computing



## Fusion of Multimodal Generative AI and Blockchain Technology in Digital Media

G. Revathy (SASTRA University, India), Arul Kumar Natarajan (Samarkand International University of Technology, Uzbekistan), and Naresh Kshetri (Rochester Institute of Technology, USA)

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DOI: 10.4018/979-8-3373-1504-1

ISBN13: 9798337315041 | ISBN13 Softcover: 9798337315058 | EISBN13: 9798337315065

## Abstract

Generative Artificial Intelligence (AI) is revolutionizing the virtual media panorama by means of manner of allowing the advent of surprisingly practical and modern virtual content. Leveraging deep studying models like Generative Adverse Networks (GANs), Variational Autoencoders (VAEs), and diffusion models, generative AI helps the producing of images, motion pics, and animations that rival human creativity in each exceptional and detail. This technology is not simply reshaping inventive expression but also redefining industries which

include leisure, marketing, education, and gaming. In photo era, generative AI has accomplished top notch milestones, from synthesizing hyper-sensible pix to growing surreal, innovative landscapes. Those fashions are knowledgeable on massive datasets, getting to know how to replicate styles and textures with extraordinary precision. Packages include virtual attempts in style, more CGI effects in movies, or even growing digital twins for architectural visualizations.

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### Indexed keywords-

**Engineering controlled terms:** Animation; Artificial intelligence; Engineering education; Learning systems; Virtual reality

**Engineering uncontrolled terms:** Animation generation; Auto encoders; Diffusion model; Human creativity; Image generations; Image motion; Massive data sets; Media images; Video generation

**Engineering main heading:** Technology transfer

| Indexing/Quartile | Percentile | Impact Factor | SDG |
|-------------------|------------|---------------|-----|
| <b>SCOPUS/NA</b>  | <b>NA</b>  | <b>NA</b>     |     |



## FUSION OF GENERATIVE AI AND BLOCKCHAIN CONCEPTUAL FRAMEWORK

Nachiappan, B.; **Rajkumar, N.**; Radha, V.; Kalpana, C.; **Viji, C.**; Nagarajan, G.; Mohanraj, A.

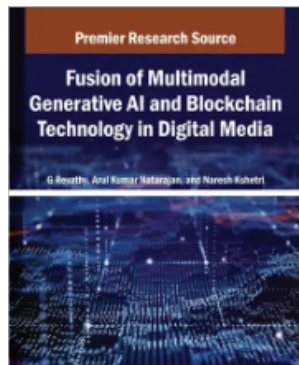
*Fusion of Multimodal Generative AI and Blockchain Technology in Digital Media*

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## Fusion of Multimodal Generative AI and Blockchain Technology in Digital Media

G. Revathy (SASTRA University, India), Arul Kumar Natarajan (Samarkand International University of Technology, Uzbekistan), and Naresh Kshetri (Rochester Institute of Technology, USA)

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## Abstract

The convergence of generative synthetic intelligence (AI) and blockchain technology marks a transformative step within the evolution of decentralized and realistic systems. Generative AI, with its capacity to create modern-day content material, models, and simulations, complements blockchain's inherent strengths in ensuring transparency, safety, and decentralization. This paper proposes a conceptual framework for integrating those ground-breaking eras, aiming to address key demanding conditions,

including data authenticity, possession rights, and operational performance. The framework leverages blockchain's allocated ledger to soundly keep and verify AI-generated outputs, ensuring traceability and tamper resistance. Clever contracts function a middleman to automate tactics that encompass royalty control for AI-generated intellectual property and verification of model outputs.

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### Indexed keywords-

**Engineering controlled terms:** Artificial intelligence; Decentralized systems

**Engineering uncontrolled terms:** Block-chain; Breakings; Conceptual frameworks; Decentralisation; Decentralized system; Material modeling; Material simulation; Model and simulation; Realistic systems; Synthetic intelligence

**Engineering main heading:** Blockchain

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



## THE JANUS PARADOX: CYBERCRIME AND CRYPTOCURRENCY IN THE DIGITAL AGE

J.P.

*Innovations in Cryptocrime and Financial Fraud*

**Dr. James Patrick Pwelch**

Professor  
Alliance School of Law



### Innovations in Cryptocrime and Financial Fraud

Leo S.F. Lin (Charles Sturt University, Australia)

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## Abstract

This chapter explores the Janus Paradox, of dematerialization, highlighting the inherent tension and pronounced duality of crime and justice; anonymity and traceability, regulation and privacy, profit and loss, individual rights, and collective responsibilities; technology and social repercussions; and the risks and opportunities offered by the digital ecosystem. The chapter also examines the role of technology as both a positive catalyst for security advancement and a negative instrument of cybercriminal enterprise, in an ever-evolving threat environment.

Selected case studies shed light on current and emerging challenges posed by cybercrime, cryptocrime, economic fraud, and identity theft. The chapter further outlines technological and strategic response emphasizing policy recommendations to strengthen government, corporate, and private security. Finally, the chapter underscores the importance of cyber literacy, secure infrastructure, robust regulatory measures, and digital tools as vital instruments for enhancing resilience in the digital age. © 2025 Elsevier B.V., All rights reserved.

### Indexed keywords-

**Engineering controlled terms:** Anonymity; Crime

**Engineering uncontrolled terms:** Collective responsibility; Cyber-crimes; Cybercriminals; Dematerialization; Digital age; Digital ecosystem; Profit and loss; Risk and opportunity; Role of technologies; ]+ catalyst

**Engineering main heading:** Digital devices

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/NA

NA

NA



## GREEN COMPUTING FOR SUSTAINABLE LULC MAPPING: MACHINE LEARNING AND CLOUD-BASED GEOSPATIAL ANALYSIS IN BANGALORE

Asha Rani, N.R.A.; Thapa, S.; Inayathulla, M.

*Recent Trends in Intelligent Computing and Communication: Volume 1*

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Assistant Professor  
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Alliance School of Applied Engineering



## Recent Trends in Intelligent Computing and Communication

Volume 1

### Abstract

The machine learning and cloud-based geospatial study is used to examine Landuse and landcover (LULC) changes in Bangalore Urban District between 1999 and 2024. A rapid urbanization and industrial growth led to 77.38 percent increase in the built up areas, the agricultural land reduced by 69.39 percent, forest cover by 65.58 percent, and the water bodies reduced by 37.41 percent. Such changes are posing critical environmental challenges, including the loss of biodiversity,

water scarcity and increased city heat islands. By integrating Random Forest algorithms with Google Earth Engine, it achieved the high accuracy (over 90%), the scalability, and the low energy consumption for the LULC mapping. By implementing this approach, we support the sustainable urban planning by offering real time observation and insights of the environment.

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**Author keywords-** Google Earth Engine (GEE); LULC Mapping; Machine Learning; Random Forest (RF); Sustainable Growth; Urban Development

| Indexing/Quartile | Percentile | Impact Factor | SDG                       |
|-------------------|------------|---------------|---------------------------|
| <b>SCOPUS/NA</b>  | <b>NA</b>  | <b>NA</b>     | <b>02<br/>ZERO HUNGER</b> |

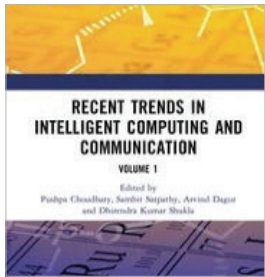
## A COMPARATIVE INVESTIGATION OF MACHINE LEARNING ALGORITHMS FOR CROP YIELD FORECAST AND AGRICULTURAL OPTIMIZATION

Asha Rani, N.R.A.; Thapa, S.; Inayathulla, M.

*Recent Trends in Intelligent Computing and Communication: Volume 1*

### Ms. Asha Rani N R

Assistant Professor  
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Alliance School of Applied Engineering



## Recent Trends in Intelligent Computing and Communication

Volume 1

### Abstract

In this study, crop yield forecast is studied by machine-learning methods with respect to accuracy and reliability. Using algorithms like Decision Trees, Random Forests, Support Vector Machines (SVM), Neural Networks, XGBoost, and LightGBM the research scatters environmental elements, for instance rainfall, temperature, type of soil, and agriculture, for example fertilizer and irrigation utilization. With highest performance of key metrics like accurateness, exactness, recall and F1 score, Random Forest model made itself the best model capable of

doing complex, nonlinear data relationship. The rainfall and irrigation frequency were found to be the two factors that affect the crop yield significantly using statistical tests such as ANOVA and Chi Square. This suggests that machine learning is a viable means towards improving the productivity of the agricultural resource. The inputs from the study can serve to guide farmers, agricultural policymakers and stakeholders in implementing data based sustainable farming strategies for better food security.

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**Author keywords-** Agricultural Data Analysis; Crop Yield Prediction; Machine Learning Algorithms; Model Evaluation Metrics; Precision Agriculture; Sustainable Farming Practices

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/NA

NA

NA



## ADAPTIVE VIRTUAL REALITY EXPOSURE THERAPY AND MOTOR REHABILITATION FROM HEBBIAN LEARNING RULE IN METAVERSE: $\Delta IJW$ FOR PSYCHOANALYSIS

Sungheetha, A.; Rajesh Sharma, R.; Blake, J.; Sreeja, B.P.

*Healthcare Frontiers in the Metaverse: Innovations and Impacts*

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Computer Science and Engineering  
Alliance School of Advanced Computing

### Dr. Rajesh Sharma R

Associate Professor  
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Alliance School of Advanced Computing



### Abstract

The emerging field of virtual reality (VR) therapies in diverse therapeutic settings is examined in this chapter's investigation. We provide the most recent literature highlighting an important developments and obstacles in VR therapy research. There are two innovative approaches introduced: a VR-based motor rehabilitation program for stroke patients and an adaptive VR experience rehabilitation scheme for concern disorders. The machine learning algorithms and highly developed haptic feedback are used in this method to improve the treatment results. The result of the proposed approach is compared with the conventional therapeutic approaches. Our proposed system shows a major improvement in both patient engagement

and treatment efficiency. The proposed approaches leverage the immersive capabilities of the healthcare metaverse to deliver personalized VR-based motor rehabilitation for stroke patients and adaptive VR exposure therapy for anxiety disorders, utilizing machine learning algorithms and advanced haptic feedback to create a seamless, interactive therapeutic environment that significantly enhances patient engagement and treatment efficacy compared to conventional methods. Many more personalized and successful therapeutic interventions are made possible by the research, which contributes to the continuous development of VR treatments.

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**Author keywords-** Cognitive-Behavioral Therapy; Exposure Therapy; Virtual Reality

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

## THE ROLE OF ROBOTICS: DEEP Q-NETWORK-BASED FUSION FOR HEALTHCARE METAVERSE APPLICATIONS

**Sungheetha, A.; Rajesh Sharma, R.;** Aroba, O.J.; Sreeja, B.P.

*Healthcare Frontiers in the Metaverse: Innovations and Impacts*

### Dr. Akey Sungheetha

Associate Professor  
Computer Science and Engineering  
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### Dr. Rajesh Sharma R

Associate Professor  
Computer Science and Engineering  
Alliance School of Advanced Computing



### Abstract

The subsequent segment determines the various roles that robotics takes in modern-day business and society overall, focusing on the industry-wide transformations they have initiated. The dynamic models are investigated along, with control strategies, and sensing technologies related to robotic systems science. This chapter provides an in-depth examination of the most current studies with an emphasis on important trends and challenges in robotics research. To develop robotic performance in dynamic environments, a unique and innovative method of flexible robot performance using machine learning

techniques has been proposed. The proposed approach explores the integration of robotics in healthcare metaverse environments, leveraging machine learning techniques to enhance robotic performance in virtual medical simulations and remote patient care scenarios, potentially revolutionizing medical training and telemedicine practices. When compared with the conventional techniques, the proposed approach gives better accuracy and effectiveness. The current research enhances the robotic field an advanced level in the upcoming years. © 2025 Elsevier B.V., All rights reserved.

**Author keywords-** adaptive control; human-robot interaction; industrial automation; kinematics; machine learning; Robotics

| Indexing/Quartile | Percentile | Impact Factor | SDG                                  |
|-------------------|------------|---------------|--------------------------------------|
| SCOPUS/NA         | NA         | NA            | 07<br>AFFORDABLE<br>AND CLEAN ENERGY |

## IMPLEMENTING VIRTUAL PATIENT SIMULATION AND SURGICAL TRAINING IN MEDICAL SCHOOL: FINDING DATA-S AND LEARNING-R

Sungheetha, A.; Rajesh Sharma,.; Aroba, O.J.; Sreeja, B.P.

*Healthcare Frontiers in the Metaverse: Innovations and Impacts*

### Dr. Akey Sungheetha

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### Dr. Rajesh Sharma R

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### Abstract

This chapter studies the inventive use of virtual training environments in online medical schools, along with their conception, execution, and effects on the field of medical education. In this extensive review of recent research reveals the important developments and challenges in virtual medical education. The training grants two advanced approaches: a cooperative virtual medical training platform and an adaptive virtual patient simulation system. These methods combine real-time physiological modeling, sophisticated artificial intelligence,

and haptic feedback to enhance the adaptive learning results. Comparing our outcomes to conventional methods of medical education, the work identify that there were prominent improvements in clinical reasoning, procedural skills, and information retention. By flagging the way for more efficient, certainly accessible, and customized training for aspiring medical professionals, this research advances the continuous evolution of medical education.

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**Author keywords-** adaptive learning; artificial intelligence; Cooperative training; haptic feedback; medical education; virtual training

| Indexing/Quartile | Percentile             | Impact Factor | SDG |
|-------------------|------------------------|---------------|-----|
| <b>SCOPUS/Q2</b>  | <b>53<sup>rd</sup></b> | <b>0.60</b>   |     |



## NAVIGATING CLIMATE IMPACTS: ANALYSING WALKER'S CIRCULATION AND ENSO EFFECTS ON INDIA'S AGRI-BUSINESS AND FOOD SECURITY

**Sunil Kumar, S.K.; Asha Rani, N.R.A.; Megha, H.U.;** Rashmi, K.S.; Jerlin Rajan, J.; Srihasa, D.; Harini, R.; Ravindran, D.

*Studies in Systems, Decision and Control*

### Mr. Sunil Kumar L

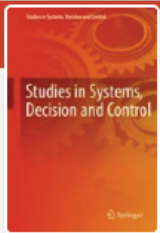
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Book series

## Studies in Systems, Decision and Control

### Abstract

This paper analyzes the interaction between Walker's Circulation (2022)) and Indian agriculture through El-Niño and La-Niña events. Agriculture accounts for approximately 15% of India's GDP and supports nearly 60% of the population, making it crucial to understand how climatic factors, such as the El-Niño Southern Oscillation (ENSO), influence crop production and food security (NITI in, Discussion Paper on Workforce Shift from Agriculture to Other Sectors. Government of India,

This paper scrutinizes regional effects and explores interposition measures, including early prediction techniques, advanced technology, and improved agricultural practices. By analysing historical rainfall data, yield rates, crop trends, and socio-economic factors, this study demonstrates forecasting ENSO events can help enhance food security through strategic interventions addressing specific challenges in agriculture.

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**Author keywords and phrases:** Agribusiness; Agriculture; El-Niño; Food security; La-Niña; Walker's circulation

Indexing/Quartile

Percentile

Impact Factor

SDG

**SCOPUS/Q2****53<sup>rd</sup>****0.60**07  
AFFORDABLE  
AND CLEAN ENERGY

## **DIVERSITY ANALYTICS IN INDIAN HR: DRIVING INCLUSIVE GROWTH IN A GLOBALIZED BUSINESS ENVIRONMENT**

**Sunil Kumar, S.K.; Megha, H.U.; Asha Rani, N.R.A.;** Rashmi, K.S.; Harshitha, K.L.; Pavani, M.

*Studies in Systems, Decision and Control*

**Mr. Sunil Kumar L**

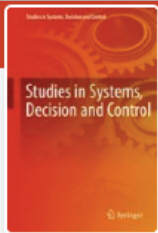
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Civil Engineering  
Alliance School of Applied Engineering



Book series

### **Studies in Systems, Decision and Control**

#### **Abstract**

In the light of the fact that India is a culturally, linguistically and socio-economically diverse country, diversity analytics is proving to be a valuable intervention for creating equal opportunities in workplaces across India. This paper examines how diversity analytics is assisting Indian HR practices to change and considering how diversity analytics can help managers to understand and closing diversity disparities with reference to hiring, retention, leadership, and engagement. Data analytics can help organizations to really focus on inclusion of their work force, innovation and even the global

competitiveness of the business organisation. This paper also discusses general trends, problem, and examples of use of diversity analytics in HRM strategies for industries and cases of some of the leading Indian companies. Also, it provides practical solutions for the challenges, including data protection issues, organizational culture, and skills deficiency. Diversity analytics makes diversity and inclusion strategic, global business imperatives for sustainable economic development by situating Indian organizations in the global business arena.

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**Author keywords and phrases:** Big data analytics for diversity; Diversity; Diversity management; GB environment; Group and organization transformation; HRM; Inclusion; Indian business; Multicultural workplace; OD; Organizational effectiveness

| Indexing/Quartile | Percentile             | Impact Factor | SDG |
|-------------------|------------------------|---------------|-----|
| <b>SCOPUS/Q4</b>  | <b>10<sup>th</sup></b> | <b>0.37</b>   |     |



## BUILDING A SMART GREENHOUSE WITH CUTTING-EDGE TECHNOLOGY INSTALLED TO MONITOR AND REGULATE THE ENVIRONMENT

Alashetty, A.; **Radha, R.**; Nadarajan, S.; J.

*AIP Conference Proceedings*

### Ms. Radha R

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Alliance School of Advanced Computing

CURRENT ISSUE

## Volume 3394, Issue 1,

26 November 2025

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### Abstract

Data sets from a smart greenhouse study conducted at Tikrit University in Iraq offer an invaluable resource for developing agricultural practices in the face of modern challenges. As the global population increases and climate change puts pressure on traditional farming methods. Integrating technology into agriculture has therefore become important. Smart greenhouses represent a major leap forward in this regard. It leverages sensors and actuators to optimize growing conditions and increase crop yields, temperature, and humidity by collecting data on important environmental parameters such as soil nutrient levels. These greenhouses therefore provide a rich source of information to drive agricultural innovation. A comprehensive approach was taken to harness the potential of this dataset. Initially, data cleaning and preprocessing were completed to ensure that the data collection was suitable for analysis. Including normalizing

dimensions. and handling missing values Exploratory data analysis (EDA) follows, revealing underlying patterns and relationships through statistical summaries and visualizations. Then, feature engineering is used to extract relevant features from the data. Especially from date and time entries to better models of environmental effects on plant growth. This will help increase operational efficiency and crop yields. The primary objectives of this analysis are twofold: to optimize greenhouse operations and to promote sustainable agricultural practices. By identifying optimal environmental conditions and their impact on crop yield, the study aims to provide actionable insights for greenhouse management. Predictive modeling facilitates the automation of control systems, enabling real-time adjustments to environmental conditions.

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**Author keywords and phrases:** Agriculture; Crop productivity; Greenhouse; Regression models

Indexing/Quartile

Percentile

Impact Factor

SDG

SCOPUS/NA

NA

NA



## FAKE REVIEWS DETECTION USING AN LSTM MODEL AND NLP TECHNIQUES

G.R.; Rai, I.; Y.V.

3rd IEEE International Conference on Networks, Multimedia and Information Technology, NMITCON 2025

### Dr. Ila Rai

Assistant Professor  
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Alliance School of Applied Engineering

# International Conference on Networks, Multimedia and Information Technology (NMITCON 2026).

## Abstract

Online reviews have come to play a vital role in the changing organizational behaviour of consumers but the influx of fake and deceptive reviews on online shopping portals has emanated serious apprehensions about the trust and transparency. To solve this problem, a fake review detection system, identified by the name Review Guard-LSTM, is proposed, and it seeks to address fake reviews by applying Natural Language Processing (NLP) techniques in combination with the Long Short-Term Memory (LSTM) networks to classify the content of online reviews. The goal is to fight fraudulent, and reviews created by AI that introduce turbulence to the e-commerce transparency. To achieve productive results, the model was trained on the Kaggle 'Fake-Reviews' dataset consisting of 40,432 reviews, balanced approximately 50%

genuine and 50% fake, across various product categories, which allows it to identify the difference between the reviews by finding the slightest linguistic markers and intricate language patterns revealing the fake nature of reviews. Gradio was used to build a web-based user interface that supports real-time classification, significantly reducing the need for manual moderation by 70%. The precision stood at 89.5 percent accuracy and 92 percent recall, and it outdid conventional models such as SVM and XGBoost in the precision. This machine-learning process finds a solution to the scalability issue and offers a sure way of regaining credibility and building the confidence of the consumer in online feedback systems.

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**Author keywords and phrases:** Data-Preprocessing Ecommerce Reviews; Deep Learning; Fake Review Detection; Fraudulent Reviews; Gradio Interface; Long Short-Term Memory (LSTM); Natural Language Processing (NLP); Neural Networks; Opinion Spam; Review Authenticity; Text Classification

| Indexing/Quartile | Percentile             | Impact Factor | SDG  |
|-------------------|------------------------|---------------|--|
| <b>SCOPUS/Q4</b>  | <b>14<sup>th</sup></b> | <b>0.36</b>   | <br>11<br>SUSTAINABLE CITIES<br>AND COMMUNITIES |

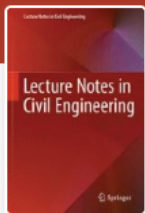
## ANALYSIS AND DESIGN OF WASTE CONTAINMENT FACILITY OF A MUNICIPAL SOLID WASTE TREATMENT PLANT, ERNAKULAM, KERALA

**Kumar, P.R.;** Sajan, S.; Rushaid, M.; Sanju, A.

*Lecture Notes in Civil Engineering*

### Dr. Rajeev Kumar P

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Civil Engineering  
Alliance School of Applied Engineering



Book series

## Lecture Notes in Civil Engineering

### Abstract

This paper highlights the analysis and design of a vertical cut-off wall designed for the waste disposal site at Brahmapuram, Ernakulam district, Kerala, India. Improper disposal of the municipal solid waste had created pollution on the geoenvironment at the site and the Kadambayyar river located nearby the waste disposal site. Geotechnical and environmental studies were conducted to assess the gravity of the situation, and it was found that there was a serious concern about the pollution of the river and surrounding geoenvironment. Thus, as a remedial measure to bring about a practical solution to the issue, a vertical cut-off liner system was considered for the waste treatment plant to attenuate the transport of heavy metals and leachate to the groundwater and the surrounding river as it served to be a habitat for many aquatic living organisms

and a source of water for the domestic use of people residing nearby. Studies were carried out in different stages, including the analysis of water samples, soils, and the pollutant transport behavior and the design of vertical waste containment facility for the solid waste treatment plant. Materials used for this study were local alluvial soil and Kuttanadu clay. Wastewater and leachate samples were collected from three different locations surrounding the site. These materials were characterized in the geotechnical and environmental engineering laboratories at Rajagiri School of Engineering and Technology, Ernakulam, Kerala, India. Computer Modelling was performed using GeoStudio®. It is thought that such a study would be helpful in the design of a municipal solid waste disposal facility.

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**Author keywords and phrases:** Cut-off wall; Geoenvironment; Modeling; Municipal solid waste

| Indexing/Quartile | Percentile             | Impact Factor | SDG |
|-------------------|------------------------|---------------|-----|
| <b>SCOPUS/Q4</b>  | <b>23<sup>rd</sup></b> | <b>0.36</b>   |     |

## AMBULANCE DETECTION AND TRAFFIC CLEARANCE

**Neeba, E.A.**; Gayathri, P.; Mahesh, P.; Varalakshmi, S.; Prithvik, M.; Mamatha, K.

*Lecture Notes in Electrical Engineering*

### Dr. Neeba E A

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- (Curriculum Development Center)  
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Book series

# Lecture Notes in Electrical Engineering

### Abstract

This paper proposes an Intelligent Traffic Management System, ITMS, utilizing AI to improve traffic flow in cities, particularly during emergency events. By employing the YOLOv8 object detection algorithm, the ITMS can detect ambulances in real-time feeds of camera imagery, monitoring traffic status in real time. After detecting the presence of an ambulance, it can

dynamically adjust traffic light signals to allow traffic to clear the way while minimizing response delay. This solution improves public safety, eliminates congestion, and encourages the efficient movement of the city.

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**Author keywords and phrases:** Arduino; Serial communication; YOLOv8

| Indexing/Quartile | Percentile             | Impact Factor | SDG   |
|-------------------|------------------------|---------------|---|
| <b>SCOPUS/Q4</b>  | <b>23<sup>rd</sup></b> | <b>0.36</b>   |  |

## HYBRID APPROACH FOR ADAPTIVE TIMETABLE SCHEDULING USING GENETIC ALGORITHM

Kumar, K.V.; Lohith, R.; Akhila, G.; Udaysree, N.; Ashish, B.; **Nair, R.R.**

*Lecture Notes in Electrical Engineering*

### Dr. Rekha R Nair

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### Abstract

Timetable preparation is a tedious and challenging task in the educational area. In this work, hence proposed to exhibit a hybrid web-based automated timetable generation system based on genetic algorithms (GA), performed with Python and Streamlit. Also, the construction of schedules for educational institutions is a complex task involving constraints of teachers, rooms, subjects, and non-conflicts such as duplication or overlapping of assignments. Conventional methods of scheduling oftentimes do not meet such a requirement, especially when there is a variety in constraints or when the constraints vary with time. In this case, the GA is employed

on account of its versatility in searching the solution space while enforcing multiple constraints so as to quickly crawl to satisfactory solutions. The genetic algorithm model starts with generating an initial population of timetables that includes among 30 other assignments of teachers, subjects, and it sets the number of hours to be assigned per day and sections. Crossover, mutation, and selection of timetables are the three operator functions that the algorithm uses to increase the chances of getting timetables that minimize the number of conflicts, such as assigning more than one teacher to a single time slot. © 2025 Elsevier B.V., All rights reserved.

**Author keywords and phrases:** Adaptive scheduling; Educational institutions; Genetic algorithms; Hybrid approach; Real-time data; Timetable optimization

Indexing/Quartile

**SCOPUS/Q4**

Percentile

**22<sup>nd</sup>**

Impact Factor

**0.62**

SDG

04  
QUALITY EDUCATION

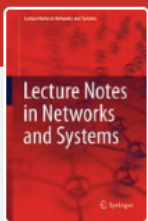
## THE INTERRELATION BETWEEN SUBSIDIZED MORTGAGE LENDING AND THE DEVELOPMENT OF THE HOUSING CONSTRUCTION INDUSTRY IN REGIONAL ECONOMY

Rutskiy, V.; Joudar, F.; **Thommandru, A.**; Levkovich, T.; Ikonnikov, O.; Muracova, N.; Tsarev, R.

*Lecture Notes in Networks and Systems*

### Dr. Abhishek Thommandru

Assistant Professor  
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Book series

## Lecture Notes in Networks and Systems

### Abstract

The paper examines the interrelation between the development of the housing construction industry and subsidized mortgage lending in regional economy. The construction sector has strategic importance at both national and regional levels, especially during economic crises. Regulation and support of the construction industry is one of the key tasks of economic policy. Such support is implemented using various tools, including stimulating demand in the housing market through subsidized mortgage programs. The authors identified several factors influencing the development of the housing construction industry in regional economies. In the quantitative part of the study, the authors conducted econometric modeling of factors affecting the development of the housing construction industry based on Russian regions' data. The results showed varying

relationships between the development of the construction sector and the effects of subsidized mortgage programs. On the one hand, subsidized mortgage lending can serve as an effective tool to support regional and national economies during recessions. On the other hand, the effectiveness of subsidized mortgage programs diminishes over time. Massive subsidized loans result in rising real estate prices outpacing inflation, negating the effect of lower interest rates on mortgages for certain population groups. This underscores the need to find alternative, more effective instruments of state support for the construction industry and fostering regional economic growth. #CSOC1120.

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**Author keywords and phrases:** Development Factors; Economic Development; Housing Construction Industry; Mortgage Lending; Regional Economy

| Indexing/Quartile | Percentile             | Impact Factor | SDG   |
|-------------------|------------------------|---------------|---|
| <b>SCOPUS/Q4</b>  | <b>22<sup>nd</sup></b> | <b>0.62</b>   |  |

## AI-DRIVEN EDUCATION LOAN APPROVAL AUTOMATION FOR INDIAN BANKS

**Kumar, V.**; Kumar, S.; Shukla, V.; **Yadav, S.**; Tiwari, A.

*Lecture Notes in Networks and Systems*

**Dr. Varun Kumar**

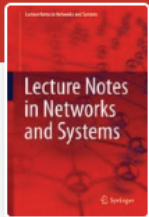
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Book series

### Lecture Notes in Networks and Systems

## Abstract

The aim of this study is to use machine learning to automate and optimize the loan approval process and address the need for timely and effective support for students in India. Using machine learning algorithms, we aim to develop predictive models based on a comprehensive analysis of student demographic, social, and financial data to evaluate the likelihood of approval of loans. We use various machine learning algorithms such as logistic regression, decision trees,

random forests, neural networks, and support vector machines (SVM) to predict loan approvals, with a special focus on neural networks. As neural networks did not perform well on loan defaults in several studies, they performed pretty well on the loan approval task. The effectiveness of these models is compared with accuracy, F1 score, and other relevant metrics to determine the most effective approach.

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**Author keywords and phrases:** Accuracy; Automation; Education loan; Machine learning algorithms; Neural network



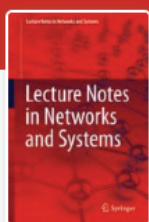
## TRANSFORMATION IN FINANCIAL DATA CALCULATIONS AND EMERGING DEVICES: THE ROLE OF AI, BLOCKCHAIN, AND QUANTUM COMPUTING

Jyoti, n.; **Shukla, A.**; Goel, A.; Pandey, P.; Singh, B.P.; Gupta, V.K.; Kumar, P.

*Lecture Notes in Networks and Systems*

### Dr. Anurag Shukla

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Alliance School of Business



Book series

## Lecture Notes in Networks and Systems

### Abstract

Financial services are already in transition to utilize quantum computing as outlined in the following areas: Portfolio optimization, Risk management, and trading strategies. Further conjunction of artificial intelligence (AI) and machine learning (ML) technologies is anticipated to improve the calculating and alerting devices in the financial area. The Internet of things (IoT) through distributed transaction models and virtual currencies such as Bitcoins has enhanced financial transactions via blockchain technology. Currently, the problem with financial institutions is that they are struggling to deal with the ever-changing requirements concerning the regulation of technology and innovation while trying to protect consumers and the economy. Future advancements in financial devices will be focused on indications such as natural language processing (NLP), sentiment analysis, efficient decision-

making, and the rising usage of quantum computing (QC) in the financial services industry. Cloud computing has already had an impact on data storage and computation in financial institutions by providing versatility, security, and cost reductions. It has the potential to be revolutionized even more by quantum computing. Moreover, responsible innovation involves developing shared goals and reference points among regulatory authorities, financial institutions, and technology suppliers. Thus, financial data calculating and alerting devices have changed from mechanical to electronic ones using AI, big data, blockchain, and quantum computing affecting financial activities, decision-making, trading, and risk management generating new opportunities and threats.  
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**Author keywords and phrases:** Artificial intelligence; Blockchain; Financial data; Financial devices; Machine learning; Quantum computing

| Indexing/Quartile | Percentile             | Impact Factor | SDG  |
|-------------------|------------------------|---------------|--|
| <b>SCOPUS/Q4</b>  | <b>22<sup>nd</sup></b> | <b>0.62</b>   | <br>03<br>GOOD HEALTH<br>AND WELL-BEING |

## A COMPARATIVE STUDY OF EDUCATION LOAN APPROVAL AUTOMATION PROCESS USING MACHINE LEARNING

Shukla, V.; Malik, S.; **Yadav, S.**; Prajapati, V.

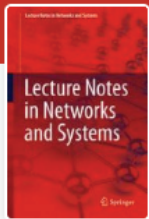
*Lecture Notes in Networks and Systems*

### Dr. Sanjay Yadav

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Book series

## Lecture Notes in Networks and Systems

### Abstract

This study elaborates on the use of the 'Random Forest' algorithm, which is a supervised machine learning algorithm that can be deployed in regression as well as classification problems and has been deployed for prediction of loan approval. The study utilizes the data of Indian customers who want to avail loans for educational purposes from the Indian banks, which are the main loan lending agencies in India. The dataset has been curated from Indian customers who have applied for education loans from the Indian banks. Features of the dataset have been selected by reviewing the application forms of various Indian banks. From the standpoint of Indian banks, the current study shows the potential of machine learning algorithms such as the decision tree classification algorithm, with a particular emphasis on the random forest

method, in predicting education loan eligibility with a high accuracy of 90.6%. The model has been evaluated using the following most pertinent metrics in the classification problem: accuracy, recall, F1 score, and precision. Significantly, our approach eliminates the need for credit scores, making it an ideal solution for education loan applicants who typically have limited or no credit history. To the best of our knowledge, there is a significant gap in the literature because no study has particularly examined the prediction of education loan approval in the context of Indian banks. Our research fills this critical void, providing valuable insights for stakeholders in the Indian education loan sector.

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**Author keywords and phrases:** Accuracy; Automation; Credit score; Decision tree algorithm; Education loan; Machine learning; Random forest

Indexing/Quartile

**SCOPUS/Q4**

Percentile

**22<sup>nd</sup>**

Impact Factor

**0.62**

SDG



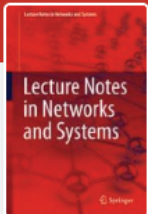
## BANANA LEAF DISEASE DETECTION AND CLASSIFICATION USING CNN MODEL

Manoj, S.; **Shrivastava, V. K.**; Soliman, A.-H.

*Lecture Notes in Networks and Systems*

### Dr. Virendra Kumar Shrivastava

Professor & School Coordinator - Curriculum Development Centre  
Computer Science and Engineering  
Alliance School of Advanced Computing



Book series

## Lecture Notes in Networks and Systems

### Abstract

One of the most extensively farmed tropical fruits is the banana. It produces 16% of global fruit, second only to citrus. Leaves diseases affect banana crop production which results in poor economic condition of banana farmers. This research focuses on the detection and classification of banana plant diseases using deep learning and transfer learning models. The primary objective is to develop a reliable tool for farmers which enables early and accurate banana plant disease detection. Researchers employed multiple convolutional neural network models, such as VGG19, LeNet, ResNet101V2, MobileNetV2,

and InceptionV3, to classify six different banana plant diseases, namely Insect Pests, Cordana, Pestalotiopsis, Sigatoka, Bract Mosaic, and Moko. The data has undergone appropriate data processing steps, and each model was fine-tuned for optimized results. VGG19 model has delineated the best performance, achieving an accuracy of 97%. This study highlights the potential of transfer learning models used in plant disease detection tasks and provides a scalable solution for managing crop health.

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**Author keywords and phrases:** Banana plant disease detection, Deep learning, Transfer learning, Convolutional Neural Networks (CNNs)



**Intellectual Property Rights (AU IPR Cell)**

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# **PATENTS**

|  |  |
|--|--|
| Application No<br><b>202511087885</b>  | <b>AUTOMATED LEGAL DOCUMENT REVIEW SYSTEM USING ARTIFICIAL INTELLIGENCE</b>  |
| <b>Dr. Shashank Kumar Dey</b><br>Assistant Professor<br>Alliance School of Law | Name of Inventor<br>Title of the invention<br>Mr. Anurag Sharma, Dr. Tijender Kumar Singh, Dr. Shashank Kumar Dey, Swapnil Shankhwar, Gopa Mahali, and Koyel Modak |

## Abstract

The present invention relates to the development of an Artificial Intelligence (AI)-based Automated Legal Document Review System is suggested as a solution to these problems. This system uses machine learning, natural language processing (NLP), and sophisticated text analytics to accurately categorize, extract, and evaluate important information from legal documents. The technology expedites the review process and lowers human error by automating labor-intensive and repetitive operations like contract analysis,

compliance checks, and case law comparison. Intelligent keyword identification, context-sensitive interpretation, and risk assessment are made possible by the integration of AI-driven models, providing legal experts with useful information. In the end, this approach is a game-changer for contemporary legal practice and judicial efficiency since it improves decision-making, increases productivity, and guarantees cost-effectiveness while upholding high standards of legal clarity.





OCTOBER 2025

Volume 10

# ALLIANCE RESEARCH CHRONICLES

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