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FACULTY PUBLICATION

RESEARCH PAPERS

November-2025



TITLE:

A Lenient Research Policy is Hurting Data Sharing Practices in Social Science Research

AUTHOR :

Kumar, A.; Gawande, A.; Sane, A.; Kale, S.; Paliwal, J.; Agarwal, A.; Brar, V.; Dixit, N.; Saini, A.; Raibagkar, S.

JOURNAL NAME:

Journal of Academic Ethics (Vol.-24, No.-1)

DETAILS:

Published on 11 November 2025



ABSTRACT:

Leading agencies, such as the Committee on Publication Ethics (COPE), the World Association of Medical Editors (WAME), and the Open Access Scholarly Publishing Association (OASPA), recommend sharing research data. Further, all major publishers also encourage researchers to practice openness and transparency by sharing the data sets. In contrast, many researchers from social science streams are reluctant to share their data sets. We employ multiple methodologies to understand the causes and repercussions of this contrast. Four case studies show no rationale for social science authors not sharing their data sets. Survey results (391 social science Scopus-Q1 authors worldwide) support the hypothesis that the non-availability of data and non-compulsion from journals/editors/reviewers are the major causes for the non-sharing of research data. Interviews with ten senior editors reveal that publishers are reluctant to impose compulsion out of the fear that there would be a reduced supply of articles if data sharing is made compulsory. The study provides reasonable evidence to conclude that those who do not share their research data are most unlikely to have it. To address this serious flaw, we recommend compulsory data sharing to discourage unauthentic research not backed up by underlying data. This paper uses sizable empirical evidence to highlight the lack of authenticity in social science research. It further recommends policy change to make data sharing compulsory to increase the authenticity of social science research.

Link: <https://doi.org/10.1007/s10805-025-09699-9>





TITLE:

Crop type classification using Sentinel-2 images and AI-enabled methods for precision agriculture

AUTHOR :

Khan, A.; Patil, C.H.; Vibhute, A.D.; Mali, S.

JOURNAL NAME:

Applied Geomatics (Vol.-18, Issue-1)

DETAILS:

Published on October 2025



ABSTRACT:

The present study proposes the deep learning-enabled U-Net model for crop classification required in crop area calculation, crop status monitoring, and food production. The traditional approaches are time-consuming, costly, and insufficient. Therefore, the Sentinel-2 images were initially pre-processed in this study, and spectral features were extracted from time-series data using the Normalized Difference Vegetation Index (NDVI) method. Then, the composite of Sentinel-2 bands and NDVI output was generated for data stacking. Lastly, classification algorithms such as random forest, artificial neural network (ANN), and U-Net models were implemented on stacked data based on training samples. In this case, we used cloud-based open-source Google Earth Engine (GEE) and Google Colab programming for crop classification using Sentinel-2 L2A (S2) images. The results depict that the U-Net model is superior in terms of overall accuracy (94.8%) than the random forest (91.2%) and ANN (93%), with a kappa statistic of 89%, 85.7%, and 87.9%, respectively, for crop classification. The present study is suitable for farmland and crop status monitoring for future food security and decision-making.

Link: <https://doi.org/10.1007/s12518-025-00659-x>



TITLE:

Integrating in silico and in vitro approaches for the development of chloropyrazole-based InhA inhibitors with potent anti-tubercular activity

AUTHOR :

Raut, K.G.; Chabukswar, A.R.; Waghmare, P.S.; Jagdale, S.C.; Giri, P.T.

JOURNAL NAME:

Journal of Molecular Structure (Vol.-1353)

DETAILS:

Published on November 2025



ABSTRACT:

Tuberculosis (TB) remains a major global health burden, aggravated by the rise of drug-resistant Mycobacterium tuberculosis strains, thereby necessitating the development of new chemotherapeutic agents. In this study, a series of novel chloropyrazole-based derivatives were designed, synthesized, and evaluated as potential inhibitors of the enoyl-acyl carrier protein reductase (InhA), a validated target in the mycolic acid biosynthesis pathway. Structure-based molecular docking, validated by redocking of the co-crystallized carboxamide ligand (PDB ID: 4TZK), identified KR4 and KR5 as promising candidates with favourable binding energies and critical interactions within the InhA active site. Molecular dynamics simulations, supported by principal component analysis (PCA), dynamic cross-correlation matrix (DCCM), and free energy landscape (FEL) analyses, confirmed the stability of these complexes, with KR5 demonstrating superior conformational rigidity and KR4 displaying moderate flexibility. Biological evaluation using the Microplate Alamar Blue Assay (MABA) revealed that KR5 exhibited the most potent anti-tubercular activity (MIC = 1.6 $\mu\text{g/mL}$), comparable to isoniazid, while KR1 and KR4 also showed significant activity (MIC = 3.12 $\mu\text{g/mL}$). Importantly, cytotoxicity studies on Vero cells confirmed that KR1, KR4, and KR5 were non-toxic up to 100 $\mu\text{g/mL}$, underscoring their excellent safety profiles. The Selectivity Index (SI) further emphasized their therapeutic safety margin, with KR1 and KR4 showing SI > 32.05 and KR5 exhibiting SI > 62.5, comparable to isoniazid, confirming their high selectivity toward Mycobacterium tuberculosis. Furthermore, the in vitro InhA enzyme inhibition assay validated the computational predictions, with KR5 showing dose-dependent inhibition comparable to isoniazid, confirming its direct biochemical interaction with the target enzyme. This integrated computational-experimental approach establishes chloropyrazole derivatives, particularly KR5, as promising InhA-targeting anti-tubercular leads. These findings provide a strong foundation for further optimization and preclinical development of chloropyrazole scaffolds as novel therapeutic candidates against TB.

Link: <https://doi.org/10.1016/j.molstruc.2025.144731>



TITLE:

Optimization of solid oxide fuel cell using novel in-cell reformer for enhanced thermal management

AUTHOR :

Ahuja, A.; Waghole, D.R.; Ramdasi, S.S.

JOURNAL NAME:

Applied Thermal Engineering (Vol.-283)

DETAILS:

Published on 25 September 2025



ABSTRACT:

Solid oxide fuel cell using syngas offer efficient, low-emission power generation with high fuel flexibility. Challenges like material durability, carbon deposition, and sulphur poisoning require advanced solutions. This research introduces a novel in-cell reformer and an advanced optimization framework that combines Multiphysics simulation with an elite and dynamic opposite learning-enhanced walrus algorithm. A validated Multiphysics model was initially developed to conduct parametric simulations and create a comprehensive dataset. The in-cell reformer efficiently utilizes excess heat and minimizes internal temperature variations. Computational Multiphysics Solutions (COMSOL) is used to evaluate the heat generation and current flow. The Multiphysics model incorporates fluid flow, species transport, chemical and electrochemical reactions, and thermal effects within the cell. Key structural parameters such as the inner cell size and reforming layer thickness, along with operating parameters like anode flow rate and gas composition, are considered. The performance is also executed in the MATLAB platform and compared with Multi-Physical field Simulation (MPS). The COMSOL-based multiphysics simulations are validated against experimental and literature data, demonstrating accurate polarization behaviour, thermal distribution, and carbon deposition. The optimized system achieves a net efficiency of 60.5 %, maximum power density of 5350 W/m², an 18 % reduction in carbon deposition, and improved thermal management, balancing performance and durability.

Link: <https://doi.org/10.1016/j.applthermaleng.2025.128503>





TITLE:

EchoSight: An Assistive Device for the Visually Impaired

AUTHOR :

Papanwar, K.; Shrivastava, S.; Askhedkar, A.

JOURNAL NAME:

Lecture Notes in Networks and Systems (1656 LNNS)

DETAILS:

Published on 12 November 2025



ABSTRACT:

This paper presents an intelligent assistive navigation system designed to enhance the mobility and spatial awareness of visually impaired individuals. The system is built on a compact and low-power Raspberry Pi platform, enabling portability and affordability. It integrates real-time object detection using the YOLOv8 deep learning model with AprilTag-based localization to estimate the user's position within a mapped environment. A calibrated monocular camera captures visual input to detect both objects and tags, while geometrical calculations estimate distances and directional angles to guide navigation. Users can input their desired destination via speech, and the system provides auditory instructions using a text-to-speech engine. By combining computer vision, lightweight edge computation, spatial localization, and audio feedback, the system transforms visual data into actionable navigation commands. Experimental evaluations in controlled indoor environments demonstrate the system's ability to deliver accurate, real-time guidance. This work advances the development of portable, intelligent, and cost-effective assistive technologies for independent mobility among the visually impaired.

Link:

<https://www.scopus.com/pages/publications/105022847190>





TITLE:

Intelligent Weather Prediction for Accurate
Forecasting Using Machine Learning

AUTHOR :

Khande, R.; Shete, N.; Rajapurkar, S.; Supe, A.

JOURNAL NAME:

Lecture Notes in Networks and Systems (1656
LNNS)

DETAILS:

Published on 12 November 2025



ABSTRACT:

Weather forecasting is essential to many businesses, such as agriculture, transportation, and disaster assistance. Traditional forecasting methods rely on numerical models, which are helpful but may not accurately predict very complex and dynamic weather patterns using machine learning (ML) algorithms to improve conventional forecasting techniques. Models seek to improve conventional numerical weather prediction techniques by utilizing their capacity to identify intricate patterns in large datasets. These machine learning algorithms can identify complex interdependencies and nonlinear interactions that may be missed by traditional forecasting methods by integrating historical meteorological data that includes a variety of characteristics such as temperature, humidity, wind speed, precipitation, and air pressure. By combining the results of several models, ensemble approaches like Random Forests enable the creation of forecasts that are more reliable and accurate. Neural networks, especially deep learning architectures like recurrent or convolutional neural networks, are skilled at identifying spatial and temporal correlations in meteorological data sequences, offering important new information about changing weather patterns. Understanding the complex links between meteorological variables is greatly aided by decision trees, which are renowned for their interpretability and capacity to capture nonlinear correlations. This research attempts to develop hybrid models that combine the advantages of both conventional numerical approaches and cutting-edge machine learning methodologies by utilizing these various ML techniques and training them on sizable datasets. The ultimate objective is to provide weather forecasts that are more accurate, dependable, and timely—essential for sectors that depend on exact weather predictions. This combination of approaches aims to lessen the drawbacks of traditional approaches and greatly improve forecasting abilities in several industries, including disaster assistance, transportation, and agriculture.

Link: https://doi.org/10.1007/978-3-032-06703-6_9



TITLE:

Asana Master—Intelligent Yoga Mat

AUTHOR :

Amuna, A.; Rokde, H.; Gosavi, A.; Gulhane, G.;
Chepurwar, I.; Jadhav, A.; Musale, V.

JOURNAL NAME:

Lecture Notes in Networks and Systems (1653
LNNS)

DETAILS:

Published on 4 November 2025



ABSTRACT:

In today's digital age, most of the work has become sedentary. Whatever you want to do is now available at the tip of your fingers, reducing your physical activity and causing individuals to suffer from chronic health issues, such as back pain and postural disorders. Yoga has been publicised throughout the world, and now all of us are aware, and many of us even perform yoga regularly. But doing yoga is not enough. We must do it efficiently & with the correct posture to get the benefits of yoga. It has been observed that more than 40% of people doing yoga do it incorrectly. This motivated us to develop a smart, Iot-enabled solution that addresses this problem during yoga practice. The system integrates Force Sensing Resistors (FSRs) to measure the force applied on the sensor, LED indicators to guide the correct position for palms and feet for every yoga pose, and a buzzer to give auditory feedback for misalignment. By combining all of these along with the Arduino Uno microcontroller board, this solution bridges the gap between self-guided yoga practice and expert supervision, making each yoga pose more efficient, easier, and more effective for the user's body.

Link: https://doi.org/10.1007/978-3-032-06694-7_38



TITLE:

An IoT-Powered Real-Time Cattle Health Monitoring System for Enhanced Agricultural Productivity

AUTHOR :

Gandal, J.; Gorade, N.; Sonawane, K.; Patil, K.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-1648 LNNS)

DETAILS:

Published on 4 November 2025



ABSTRACT:

Cattle health and productivity are fundamental to the livelihoods of agriculturalists and the overall agricultural economy. Traditional cattle health monitoring methods are often time-consuming and lack the capacity for real-time assessment of cattle health, resulting in reduced milk productivity and economic losses. To address these challenges, we propose the implementation of an Internet of Things (IoT) technology-based, low-cost, real-time cattle health monitoring system. The system comprises wearable sensors for continuous monitoring of vital parameters such as body temperature, heart rate, and activity level. These sensor values are relayed wirelessly to a cloud server, where data is processed and analyzed to identify anomalies indicative of potential health-related problems. This information is presented to the farmer through a user-friendly mobile application, which displays real-time alerts and suggests preventive or remedial actions. The system facilitates early disease detection, leading to improved cattle health, enhanced milk production, and enhanced farm profitability. The system emphasizes cost-effectiveness by utilizing readily available hardware, thereby increasing accessibility for smallholder farmers. The system offers a long-term solution for cattle health management. This paper aims to demonstrate the transformative potential of integrating low-cost IoT technologies with livestock farming to establish precision agriculture and enhance the prosperity of rural farming communities

Link: https://doi.org/10.1007/978-3-032-06671-8_38





TITLE:

A Comprehensive Approach to Web Security Enhancement

AUTHOR :

Desai, M.; Bapna, T.; Patil, A.; Wanjari, N.;
Lahane, P.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1653 LNNS)

DETAILS:

Published on 4 November 2025



ABSTRACT:

Web applications are critical to modern digital infrastructure, yet they remain prime targets for cyberattacks due to vulnerabilities like cross-site scripting (XSS) and SQLi (SQL Injection). The Open Web Application Security Project (OWASP) reports that such flaws consistently rank among the top threats to web security. While the Linux OS stands as one stop shop for all security related tools, they require technical expertise and standalone execution, leaving casual users and small developers underserved. This research paper addresses the gap by developing a Google Chrome extension that passively scans websites for vulnerabilities during browsing and reports them for. By integrating real-time detection into a familiar browser environment, this tool aims to enhance accessibility and awareness of web security, offering a practical contribution to both education and practice.

Link: https://doi.org/10.1007/978-3-032-06694-7_27





TITLE:

Real Time Object Detection for Visually Impaired People

AUTHOR :

Sharma, K.; Langote, V.; Rambhia, K.; Gupta, A.;
Shaikh, R.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1652 LNNS)

DETAILS:

Published on 31 October 2025



ABSTRACT:

This paper explores an innovative real-time object detection system designed to empower visually impaired individuals with enhanced spatial awareness. Due to their inability to see their surroundings, people with visual impairments constantly struggle to navigate daily life. The real-time object detection system presented in this research provides an easy-to-use method of identifying items in the surroundings by converting visual information into meaningful audio cues. Using AI-powered image processing for precise recognition, the system's straightforward activation mechanism, camera, speaker, and Raspberry Pi provide user-friendliness. The goal of this innovation is to improve the independence, safety, and confidence of visually impaired people by fusing assistive technology with practical applications. Our method combines little hardware with a sophisticated processing unit to deliver real-time audio input on things in the environment, utilising the potential of embedded systems and artificial intelligence.

Link: https://link.springer.com/chapter/10.1007/978-3-032-06691-6_38





TITLE:

LiFi-WiFi Hybrid Systems for Industrial Fast Data Transfer

AUTHOR :

Gandal, J.; Tiwari, B.; Katre, G.; Ambrale, A.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-1645 LNNS)

DETAILS:

Published on 30 October 2025



ABSTRACT:

The increasing demand for high-speed, secure, and reliable data transfer in industries such as healthcare, media production, and smart manufacturing has exposed the limitations of traditional WiFi networks, including bandwidth congestion, latency issues, and vulnerability to interference and eavesdropping. While edge computing alleviates some processing bottlenecks, it does not fully address the challenges of transferring large files (e.g., medical imaging, 4K/8K video, or industrial IoT datasets) in real-time with low latency and high security. This study explores a hybrid LiFi-WiFi network (HLWNet) architecture as a superior alternative for industrial-scale data transfer. Unlike WiFi alone, LiFi offers ultra-high-speed (multi-gigabit), low-latency, and inherently secure optical wireless communication, while WiFi ensures mobility and broader coverage. The research addresses key challenges in hybrid networking, including seamless handover between LiFi and WiFi, optimized cell deployment under illumination constraints, and support for both stationary and mobile users in multi-tier LiFi networks. Additionally, we investigate the integration of WiFi HaLow (IEEE 802.11ah) with LiFi to enhance long-range, low-power connectivity for industrial IoT applications. By proposing a structured framework for HLWNets, this work demonstrates how hybrid networks can outperform standalone WiFi and edge computing in scenarios requiring high-throughput, interference-free, and secure data transmission. The findings highlight the potential of LiFi-WiFi systems in smart factories, telemedicine, and media production, while also discussing future directions, such as AI-driven handover optimization and scalable deployments for 6G convergence.

Link: https://doi.org/10.1007/978-3-032-06662-6_48



TITLE:

Attire Classification in Indian Cinema

AUTHOR :

Patil, N.; Patil, P.; Patil, M.; Jha, K.; Apte, R.;
Bedekar, M.; Maitre, N.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1645 LNNS)

DETAILS:

Published on 30 October 2025



ABSTRACT:

The increasing influence of cinema on fashion trends in India has prompted a need for data-driven analysis to quantify its impact. Prior research has explored general fashion classification or cultural impacts through surveys, but none have automated the study of cultural attire in movies

This work addresses that gap by developing a machine learning-based system to analyze movies and classify the attire of actresses as Indian or Western. Using tools such as OpenCV, TensorFlow, and face recognition libraries, the system extracts movie frames, detects actress presence, and categorizes attire.

Results from around 100+ movies highlight a significant shift in representation, with Indian attire percentages varying from 1.44% to 99.72% across films. For example, Sholay (1975) demonstrated 99.72% Indian attire, while Genius (2018) depicted only 1.44%. These findings reveal trends correlating with cultural changes over decades.

The work concludes that cinema plays a pivotal role in shaping fashion preferences, providing a foundation for further studies to include comprehensive cultural analyses. Future enhancements aim to broaden attire classification and explore thematic cultural representations.

Link: https://doi.org/10.1007/978-3-032-06662-6_16



TITLE:

Modelling and Classifying Sleep Disorders with
Machine Learning Algorithms

AUTHOR :

Kuri, M.; Jadhav, P.; Patil, S.; Goure, P.;
Chandre, P.; Kamble, P.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1645 LNNS)

DETAILS:

Published on 30 October 2025



ABSTRACT:

The sleep disorders significantly affect quality of life and overall health. Accurately diagnosing and classifying these disorders is crucial for effective treatment. This study explores the use of machine learning techniques, specifically Random Forest, Logistic Regression, and Support Vector Machine (SVM) algorithms, to classify sleep disorders using the Sleep Health and Lifestyle dataset from Kaggle. The dataset includes information on sleep duration, quality, physical activity, stress, and other lifestyle factors. The models are evaluated for accuracy, precision, recall, and F1-score. The Random Forest model performed best with an accuracy of 91.67%. However, further refinement is needed for classes such as insomnia and sleep apnea, which show lower recall scores.

Link: https://doi.org/10.1007/978-3-032-06662-6_9



TITLE:

Query Optimization: Techniques and Strategies
for MySQL Performance Improvement

AUTHOR :

Kosamkar, P.; Sharma, G.; Upadhyaya, L.;
Shah, B.; Patel, S.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1645 LNNS)

DETAILS:

Published on 30 October 2025



ABSTRACT:

In this paper, we will focus on optimization of MySQL queries. Different factors are taken into account when calculating the cost of a query, such as the number of disk accesses, CPU processing time, and the number of rows scanned. Considering all this, we can create a price estimate, price analysis of all the different ways to write questions, metrics, constraint integrity, JOINS, nested queries, and other queries that come up when writing a lot of code from questions. Interfacing with the data logic and cost calculations is done in Python and is used with libraries like Matplotlib to find a more efficient comparison query writing strategy. MySQL's EXPLAIN keyword extracts execution details like the number of rows scanned and usage metrics and combines them with Python's timing module for execution time. These factors lead to the final price estimate and are plotted using graphs to help to draw conclusions. We also developed a MySQL user-defined function called `calc_query_cost`, which includes a formula that estimates query cost based on the number of queries, the number of rows scanned, the processing time, and usage metrics. Experimental results demonstrate that indexed queries were found to reduce the average query execution time by 70%–90%, with non-indexed queries taking up to 5x longer in certain scenarios also JOIN operations proved to be 2–3x more efficient than nested queries in terms of execution cost, especially for larger datasets. Optimizing query-writing strategies resulted in an execution time improvement of up to 60% for complex queries.

Link: https://doi.org/10.1007/978-3-032-06662-6_13





TITLE:

Orchestrating Adaptive AI in Video Games Using
Dynamic Sentiment Modulation and Dual-
Memory Architectures

AUTHOR :

Shaikh, A.; Chinchakar, H.; Jagtap, V.;
Kulshreshtha, A.; Jain, P.
Santosh

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1652 LNNS)

DETAILS:

Published on 31 October 2025



ABSTRACT:

This paper presents a novel conversational engine for non-player characters (NPCs) in role-playing games, designed to deliver adaptive, personality-driven dialogue without the need for training and maintaining custom models. The system integrates dynamic sentiment-based tone modulation with a dual-memory architecture that combines short-term conversational context and long-term narrative history. Advanced decay and cooldown mechanisms are implemented to gradually diminish the influence of older interactions and sentiments, thereby enabling smooth transitions in NPC behavior. Our approach dynamically recalibrates NPC responses based on real-time player inputs, world state, and historical interactions, resulting in immersive and context-aware dialogue that is highly humanlike. Coupled with the Generative AI models, our framework generates NPC responses that convincingly emulate actual personalities and emotions, while maintaining minimal reliance on the underlying large language model for fine-tuning. Experimental evaluations demonstrate that the engine produces coherent, emotionally consistent interactions, significantly enhancing the realism of NPC communication in gaming environments. This work contributes a scalable and technically robust framework that bridges the gap between traditional scripted dialogues and modern adaptive storytelling.

Link: https://link.springer.com/chapter/10.1007/978-3-032-06691-6_51



TITLE:

Climate-adaptive performance and environmental benchmarking of R600a refrigeration systems under tropical operating conditions

AUTHOR :

Dhavale, A.A.; Lele, M.M.

JOURNAL NAME:

Next Energy (Vol.-10)

DETAILS:

Published on October 2025



ABSTRACT:

In the context of rising global temperatures and the urgent need for low-Global Warming Potential (GWP) alternatives, enhancing the climate adaptability of domestic refrigeration systems is essential for sustainable cooling. Tropical regions like India regularly experience ambient temperatures exceeding 35 °C, yet conventional energy rating protocols evaluate refrigerators under fixed and moderate conditions, which poorly reflect real-world usage. This discrepancy highlights a critical gap: the lack of performance data under dynamic, high-stress thermal environments that influence system efficiency, refrigerant behavior, and energy consumption. Addressing this, the present study experimentally investigates the thermodynamic behavior of a modified 190 L refrigerator using R600a, a natural hydrocarbon refrigerant with low global warming potential, under varying cabinet temperatures (0–15 °C) and ambient conditions (30–40 °C) that simulate tropical environments. Performance metrics such as evaporator heat absorption (Q_{evap}), condenser heat rejection (Q_{cond}), power consumption, compressor discharge temperature, and coefficient of performance (COP) were measured and analyzed. Results showed up to 17% and 20% increases in Q_{evap} and Q_{cond} , respectively, with rising cabinet temperatures. A 10 °C ambient temperature rise caused an 11.2% COP drop and a ~16% increase in discharge temperature, indicating considerable thermal stress. Findings were validated against IMST-ART simulations with deviations within ± 5 –7%. By shifting away from idealized, static test conditions, this study offers climate-responsive insights into the real-world performance of R600a systems. Academically, it introduces climate responsive coefficient of performance and sustainability index as advanced performance indicators that address both engineering and sustainability goals. Socio-economically, the study underscores the potential for carbon savings, energy-efficient appliance policy reform, and better refrigerant selection for developing nations. Academically, it introduces performance mapping techniques that integrate thermal efficiency with environmental and economic metrics.

Link: <https://doi.org/10.1016/j.nxener.2025.100453>





TITLE:

Cartoon Analysis – Chhota Bheem Character Detection and Screen Time Analysis Using YOLO (You Only Look Once)

AUTHOR :

Korde, S.; Kanitkar, R.; Gaikwad, V.; Khachane, H.; Apte, R.; Bedekar, M.; Dongaonkar, R.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-1646 LNNS)

DETAILS:

Published on 8 October 2025



ABSTRACT:

The influence of children's media on young audiences is both profound and far-reaching, playing a pivotal role in shaping their values, behaviours, attitudes, and overall cognitive development. Television programs and cartoons, in particular, have a unique ability to capture the attention of young viewers and leave a lasting impact on their understanding of the world around them. Recognizing this, the current work focuses on an in-depth analysis of the popular Indian cartoon series Chhota Bheem. The main objective of this work is to assess and analyse the screen time allocated to key characters within the series, paying special attention to how positive and negative roles are represented. By applying advanced AI-based techniques for character recognition and screen time measurement, the study seeks to uncover critical insights about the narrative structure and character emphasis in the series. These insights can then be used to evaluate the extent to which such portrayals contribute to shaping children's perceptions of morality, relationships, and problem-solving abilities. In addition, this research delves into the balance between the portrayal of positive and negative influences within the show, offering a nuanced perspective on how these dynamics can affect children's psychological development. Ultimately, the work aims to provide meaningful and actionable insights that are relevant to various stakeholders, including parents, educators, and creators of children's media. These findings serve as a valuable resource for fostering responsible media consumption and production, ensuring that children are exposed to programming that nurtures their development in positive and meaningful ways. The influence of children's media on young audiences is both profound and far-reaching, playing a pivotal role in shaping their values, behaviours, attitudes, and overall cognitive development. Television programs and cartoons have a unique ability to capture the attention of young viewers and leave a lasting impact on their understanding of the world around them. Recognizing this, the current work focuses on an in-depth analysis of the popular Indian cartoon series Chhota Bheem.

Link: https://doi.org/10.1007/978-3-032-06665-7_10





TITLE:

Analyzing Airline Sentiment in a Multilingual Twitter Landscape via Vectorization and ML Models

AUTHOR :

Pabalkar, V.; Bokhare, A.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-1646 LNNS)

DETAILS:

Published on 8 October 2025



ABSTRACT:

Sentiment analysis in multilingual social media data is a challenging and critical task due to the diversity of languages and sentiments expressed by users worldwide. In this study, we focus on conducting sentiment analysis on the Twitter US Airline Sentiment dataset, which includes tweets in English from users expressing their opinions about various US airlines. We address the research gap of multilingual sentiment analysis by leveraging advanced NLP techniques and machine learning algorithms. Count Vectorization and TF-IDF Vectorization is used during the study to extract features after cleaning up the data and processing the text. To categorize tweets as having positive or negative sentiment, we assess the effectiveness of three classifiers: Multinomial Naive Bayes, Bernoulli Naive Bayes, and Logistic Regression. We examine these classifiers' accuracy on a different collection of unlabeled tweets without ratings in more detail. The work provides valuable insights into the opinions posted by individuals on Twitter about US airlines and intends to develop multilingual sentiment analysis, especially for social media data. The findings serve as a basis for creating sentiment analysis algorithms that are more precise and reliable and that can be used to various language groups on social media platforms.

Link: https://doi.org/10.1007/978-3-032-06665-7_42





TITLE:

Real-Time Football Match Analysis and
Substitution Recommendations Using Machine
Learning and API Integration

AUTHOR :

Shah, M.; Goyal, S.; Rane, R.; Patankar, R.;
Bobde, S.; Jain, A.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1461 LNNS)

DETAILS:

Published on 1 October 2025



ABSTRACT:

This study investigates the impact of risk-taking on football match outcomes, focusing on player substitutions. The analysis reveals that risk-taking propensity peaks when a team is trailing by 2-3 goals and diminishes when leading by the same margin. Younger managers outperform middle-aged ones in risky decisions, while older managers excel in later substitutions. Additionally, a manager's tenure with the team increases the effectiveness of risk-taking, particularly in earlier substitutions and stronger teams. This study also emphasizes the importance of mental state in player performance, proposing a framework combining Match Score Analysis (Kaplan-Meier Fitter) and Score Analysis to evaluate players' mental stability and survival rates during the game. By integrating these models, teams can make better-informed decisions regarding substitutions, considering both past performance and mental health, ultimately enhancing match outcomes. This research underscores the synergistic potential of combining black-box causal machine learning with interpretable models, offering valuable insights for football management and beyond.

Link: https://doi.org/10.1007/978-981-96-7508-1_20





TITLE:

SmartMail Insights: Revolutionizing Email Management

AUTHOR :

Naik, S.; Khande, R.; Rajapurkar, S.; Dalvi, K.;
Rajpure, S.; Kalhapure, V.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1463 LNNS)

DETAILS:

Published on 1 October 2025



ABSTRACT:

SmartMail Insights is an intelligent web-based toolkit that is created for email management and all goes above delivering the basic functions of most online mail applications. Through the automation priority ranking, auto-responses and emails summarization, it makes it easier for the users to deal with urgency and important mails to emails that may not be very tiresome. The ML algorithms that it uses help easily sort the emails by content, sender, and, there are separate filters to highlight important emails with variable options. Auto replies are supported by NLP and there is the summarization of text to make it easier to read. Despite this, there are ways that SmartMail Insights could advance its current model of categorization one way is to incorporate its model for identifying and sorting through spam emails and promotional ones at least, into more refined sort of emails such as personal, business, and so on since doing so would prove helpful in improving categorization accuracy.

Link: https://link.springer.com/chapter/10.1007/978-981-96-7514-2_19



TITLE:

Trust in Social Media Through Deepfake
Detection: A Literature Review

AUTHOR :

Guha, D.; Sirsikar, S.

JOURNAL NAME:

Mechanisms and Machine Science (Vol.-185)

DETAILS:

Published on 14 October 2025



ABSTRACT:

This paper provides a comprehensive review of the growing cybersecurity challenges posed by deepfake technology and advanced language models such as ChatGPT. With the advancement of machine learning techniques like Generative Adversarial Networks (GANs), deepfake technology can produce increasingly realistic synthetic media, which malicious actors exploit for purposes ranging from misinformation to identity theft. The paper examines these technologies' dual-use potential, noting their roles in both enhancing and undermining cybersecurity measures. Current detection strategies, categorised into image, video, and text-based methods, are analysed alongside potential integrations with social media platforms for more robust defence mechanisms. Emerging technologies, such as blockchain, are also discussed for their potential to strengthen digital content authentication and protect against cyber deception. By exploring application scenarios, including social media engineering and the Internet of Things (IoT), the paper highlights key insights, challenges, and open questions. It concludes by recommending proactive measures and future research directions, emphasising the urgency of developing adaptive, multi-modal detection systems to safeguard against deepfake-related threats in the evolving cybersecurity landscape.

Link: https://doi.org/10.1007/978-3-031-95963-9_39



TITLE:

Enhancing Portfolio Analysis and Stock Prediction Through LSTM and XGBoost Integration

AUTHOR :

Khande, R.; Naik, S.; Tayade, A.; Kale, A.;
Phalke, K.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1462 LNNS)

DETAILS:

Published on 1 October 2025



ABSTRACT:

The authors propose for the LSTM-XGBoost model for portfolio optimization as well as stock price prediction. The model has incorporated the benefits derived from XGBoost, a gradient-boosting algorithm that enhances the ability of a model to predict structured and improved data, and Long Short-Term Memory (LSTM) networks, which excel at characterizing time-series data based on temporal relationships. The XGBoost model takes advantage of the LSTM model by utilizing the anticipated outputs it makes for improving the precision and overall efficiency of the model while the LSTM model is designed to work with ordered data peculiar to stock markets specifically on patterns and trends over time. In the study authors employ this type of hybrid to determine variables such as volatility and the moving average of historical stock price index of NIFTY50. The authors have obtained total model accuracy of 98.33%. Authors also use the Sharpe ratio to maintain an optimal portfolio because it shows investors the optimal ratio of expected stock returns. This research contributes to enhancing financial forecasting by integrating deep learning and machine learning techniques, ultimately offering the formulation of a new risk avert portfolio as well as stock price prediction.

Link: https://link.springer.com/chapter/10.1007/978-981-96-7511-1_16





TITLE:

Onion Crop Disease Identification Using Deep Learning Models: A Machine Learning Approach

AUTHOR :

Amondkar, M.; Tiwari, B.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-1462 LNNS)

DETAILS:

Published on 1 October 2025



ABSTRACT:

Onion, which is also called as *Allium Cepa*, is cultivated over an area of 5.7 million ha (Mha) which represents a production of 106.59 million ton (MT) in the world. Onion is a temperate crop but can be grown under a wide range of climatic conditions such as temperate, tropical, and subtropical climate. The best performance can be obtained in mild weather without the extremes of cold and heat and excessive rainfall (Vikaspedia. <https://vikaspedia.in/agriculture/crop-production>, [1]). As agricultural production increases, there is often a corresponding rise in the incidence of crop diseases, which can significantly impact yield quality and quantity. Early detection of crop diseases is crucial, as it enables farmers to apply the appropriate fertilizers and remedies, thereby preserving the current crop and optimizing resource use. This proposed solution leverages machine learning techniques for identifying diseases in onion crop leaves through image classification. The dataset utilized for this research has been sourced from Karnataka, ensuring region-specific applicability and relevance (Aishwarya and Reddy in Data Brief 54, 2024, [2]). The paper proposed the use of a deep learning model such as DenseNet, Inception, and Convolutional Neural Networks (CNNs) for image classification. All the deep learning models such as DenseNet, Inception, and CNN have shown a good accuracy percentage as 96%, 97%, and 95%, respectively.

Link: https://doi.org/10.1007/978-981-96-7511-1_43



TITLE:

MorseMate: Portable Morse Code to Text Converter

AUTHOR :

Papanwar, K.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-1464 LNNS)

DETAILS:

Published on 1 October 2025



ABSTRACT:

MorseMate is a user-friendly Morse code converter designed to simplify the process of converting Morse code to alphanumerical values by allowing input through three buttons for three separate functions involved in the transmission of the code. This approach eliminates the need for timing-based input, making Morse code more accessible and easier to use. The device, powered by an ESP8266 microcontroller and featuring a 128×64 Organic Light Emitting Diode (OLED) display, converts Morse code into readable text in real-time. Users can input their sequences with the press of a button, and a long press of the submit button clears the display, allowing for continuous use. Custom I2C configuration provides flexibility in hardware setup, while the compact design ensures portability. This paper elaborates on how the system combines simplicity, efficiency, and practicality, to make Morse code more accessible to a wider audience.

Link: https://doi.org/10.1007/978-981-96-7520-3_26





TITLE:

Integrating Automation and Orchestration in
Security Incident Handling: A Review of SOAR
Frameworks and Platforms

AUTHOR :

Rathore, P.; Kolhe, K.

JOURNAL NAME:

Mechanisms and Machine Science (Vol.-185)

DETAILS:

Published on October 2025



ABSTRACT:

Traditional manual incident response procedures are no longer sufficient in today's fast-paced digital environment due to the increasing complexity and frequency of cyber-attacks. Machine learning, automation, and orchestration are all combined in Security Orchestration, Automation, and Response (SOAR) platforms, which have become a potent tool for streamlining and improving incident response processes. In order to automate critical cybersecurity tasks, such as data collecting and analysis and real-time reaction execution, this review paper examines how SOAR systems help. Organizations can gather and compile data from several sources, analyze incidents with sophisticated algorithms, and carry out standardized responses with customizable playbooks by utilizing SOAR systems, which integrate a variety of security solutions. Organizations can improve overall security posture, eliminate human error, and cut reaction times by utilizing SOAR solutions, which automate complicated procedures, increase issue detection, and guarantee rapid resolution. This article examines the architecture, salient characteristics, and advantages of SOAR platforms and highlights their vital role in modernizing incident response, which in turn equips enterprises to remain ahead of the curve in terms of cyber risks.

Link: https://doi.org/10.1007/978-3-031-95963-9_38



TITLE:

Tuning energy bands in the WO₃/ZnO nanocomposite photoanode to improve its photoelectrochemical performance for hydrogen production

AUTHOR :

Chougale, A.S.; Wagh, S.S.; Ladhane, S.; Shelke, H.D.; Dar, M.A.; Shinde, D.R.; Jadkar, S.R.; Patole, S.P.; Pathan, H.M.

JOURNAL NAME:

Journal of Power Sources (Vol.-659)

DETAILS:

Published on September 2025



ABSTRACT:

This study presents an approach to the effective fabrication of tungsten oxide/zinc oxide (WO₃/ZnO) heterojunctions using a hybrid of simple chemical bath deposition (CBD) and spin-coating deposition methods. The variation effect of spin-coated WO₃ layers on the prepared ZnO is investigated for photoelectrochemical (PEC) water splitting performance. A broad spectrum of sophisticated analysis strategies, including X-ray diffraction, ultraviolet spectroscopy, Raman spectroscopy, photoluminescence spectroscopy, X-ray photoelectron spectroscopy, energy dispersive X-ray spectroscopy, and scanning electron microscopy, confirms the noticeable existence of WO₃ and ZnO nanoparticles, as well as the development of the WO₃/ZnO heterostructure. We propose a mechanism of improved PEC performance through linear sweep voltammetry, chronoamperometry, energy band structure diagram, Mott-Schottky curves, and electrochemical impedance spectroscopy. Remarkably, WO₃/ZnO heterojunctions exhibit enhanced visible light absorption, enhanced separation and transfer of photogenerated charge carriers compared to bare ZnO, and lower interfacial resistance across the junction of photoelectrode and electrolyte. The optimum photocurrent density of 1.02 mA/cm² can be seen at 1.8 V vs. Reversible Hydrogen Electrode (RHE). Also, the applied bias photoconversion efficiency of the WO₃/ZnO heterojunction is around 0.45 % at 0.99 V vs. RHE.

Link: <https://doi.org/10.1016/j.jpowsour.2025.238390>



TITLE:

Advances in odor-induced sugar reduction:
Mechanistic insights, substance selection, and
methodology

AUTHOR :

Tewari, S.; Bashir, O.; Mondal, I.H.; Pawase,
P.A.; Khalid, W.; Amin, T.; Morya, S.;
Esatbeyoglu, T.

JOURNAL NAME:

Future Foods (Vol.-12)

DETAILS:

Published on October 2025



ABSTRACT:

Odor-induced sweetness and enhancement is a new promising avenue to reduce the sugar content, particularly in the face of increasing concerns about obesity and metabolic disorders, such as diabetes. This exploits the psychophysical relationship between smell and taste by using certain aromas to enhance the perception of sweetness. This sensory interaction thus could be leveraged, in which the sweetness experience may be maintained and enhanced in foods with a considerable reduction of the actual sugar content, offering a way to address health concerns without loss at the taste level. Research in current activities interrogates the neurological and physiological mechanisms involved in odor-induced sweetness enhancement. Such studies are based on the analyses of neural representations of sensory signals in the orbitofrontal cortex, a critical brain area where neural representations of olfactory and gustatory inputs converge to form a unitary perception of flavor. Another important line of research is the proper choice of substances more precisely odors, capable of causing this rise in sweetness. Researchers are working out the selection criteria for such odors as they have to be carefully chosen not only as smelling enhancers of this sweetness but also according to their matrices and acceptability by consumers.

Link: <https://doi.org/10.1016/j.fufo.2025.100818>



TITLE:

Development of sustainable pervious concrete incorporating industrial waste for enhanced water quality

AUTHOR :

Phatkar, S.; Minde, P.; Patil, J.

JOURNAL NAME:

Innovative Infrastructure Solutions (Vol.-10, Issue-12)

DETAILS:

Published on November 2025



ABSTRACT:

Water scarcity is the condition that happens due to rapid industrialization and urbanization with groundwater depletion. We need to adopt sustainable practices to check depleting groundwater levels. Technologies like pervious concrete can potentially help reduce water drain and evaporation. Using industrial waste materials in pervious concrete will enhance its functional properties as well as help in sustainability by solving the waste disposal problem and conserving useful natural resources. This research focuses on the incorporation of waste materials rubber, ceramic and charcoal in pervious concrete for improving water quality and sustaining groundwater recharge. The experiment shows the ability of the materials to clean the water. The charcoal cubes reduced the turbidity from 86 NTU to 18 NTU (80% reduction). Moreover, the ceramic cubes were able to reduce the BOD from 10.19 mg/L to 7.93 mg/L (22% reduction). Rubber cubes improved dissolved oxygen (DO) by 15%. DO rose from 6.8 mg/l to 7.7 mg/l. The porosity of standard pervious concrete was 0.22 cm/sec while that of ceramic was 0.33 cm/sec. Moreover, the runoff water was found fit for domestic use like irrigation and washing after charcoal and chemically treated rubber. After carrying out aggregate tests like compressive strength, porosity, turbidity, pH, hardness, BOD and DO tests it was found that these pervious concrete after integrating waste material improvised the water quality more than normal mix. The findings of this study suggest that pervious concrete integrated with waste materials can serve as a solution to water shortage.

Link: <https://doi.org/10.1007/s41062-025-02377-0>



TITLE:

Adaptive Power Distribution and Range Enhancement in Electric Vehicles Using Hybrid Energy Storage System

AUTHOR :

Chavan, S.; Yeolekar, S.; Lokhande, N.

JOURNAL NAME:

Energy Storage (Vol.-7, Issue-8)

DETAILS:

Published on 11 November 2025



ABSTRACT:

The automotive industry's transition to green mobility has increased the focus on electric vehicles (EVs) due to their low emissions and reduced reliance on conventional carbon-based fuels. To support wider EV adoption, enhancing the efficiency and performance of their energy storage systems—particularly, by increasing power and energy density—is essential. Although various advanced energy storage systems (ESSs) are available, batteries remain the most viable option for meeting the average power demands of EVs. However, challenges such as excessive heat generation, limited power density, and reduced operational lifespan hinder optimal performance when relying solely on batteries. A hybrid energy storage system (HESS) presents a promising solution by enabling more efficient power management. Key functions of HESSs include supporting vehicle acceleration, capturing energy during regenerative braking, and reducing stress on the battery. By integrating a battery with a supercapacitor (SC), HESSs can meet instantaneous power demands and facilitate energy recovery during deceleration. This study evaluates the performance of a standalone battery and an HESS by using MATLAB–Simulink simulations. The results show that the SC absorbs most peak current loads over short durations, while the battery supplies the average current. The HESS reduces average battery current demand and extends vehicle range by 38%. Additionally, hybridization allows for a reduction in battery power capacity, resulting in a 33 kg weight decrease. These findings demonstrate the potential of HESS to enhance EV performance, promote energy efficiency, and support the broader adoption of sustainable transportation.

Link: <https://doi.org/10.1002/est2.70292>



TITLE:

Effectiveness of various plasma treatments on nutrient retention and food quality: A comprehensive review of applications and impact

AUTHOR :

Gupta, R.K.; Shams, R.; Bahndral, A.; Dash, K.K.; Pawase, P.A.; Shaikh, A.M.; Béla, K.

JOURNAL NAME:

Applied Food Research (Vol.-5, Issue-2)

DETAILS:

Published on October 2025



ABSTRACT:

The growing need to find non-thermal processing technology has increased the pace of research on minimal processing, high-quality, and safe foods. Cold plasma (CP) has been one of such techniques, and it is promising as an environmentally friendly and energy efficient method with the ability to decontaminate food surfaces without affecting nutritional and sensory properties. This review thoroughly addresses the concepts, operation and various discharge setups of CP such as dielectric barrier discharge (DBD), corona discharge (CD), plasma jet (PJ), gliding arc discharge (GAD), microwave plasma (MP) and plasma-activated water (PAW) and its application prospects in food processing and preservation. The principles of the plasma generation and microbial inactivation mechanism are described, and it is highlighted that the reactive oxygen and nitrogen species (RONS) have a significant role in the process of adequately decontaminating. The effects of CP in the critical alteration of the major food components: proteins, lipids, carbohydrates, bioactive compounds are critically discussed, which proves the ability of the compound to change the physicochemical, rheological, and functional properties without significant thermal damage. Besides, the review indicates the versatility of CP in increasing shelf life, enhancing extraction performance, increasing starch and protein structures, and countering microbial and enzymatic degradation. Plasma efficacy is also addressed in terms of factors such as processing parameters, gas composition and characteristics of food matrix. In spite of the enormous industrial potential of CP, issues of equipment design, discharge uniformity and regulatory validation still exist. All in all, CP is a viable and controllable technology that unites food safety and quality preservation, and it gives a modernized alternative to traditional thermal treatments as well as establishing the future generations of food processing technologies.

Link: <https://doi.org/10.1016/j.afres.2025.101422>



TITLE:

Nonlinear dynamics in bipolar photorefractive GaAs under picosecond pulsed optical excitation

AUTHOR :

Ziółkowski, A.; Katti, A.; Barcinski, T.

JOURNAL NAME:

Optics Communications (Vol.-597)

DETAILS:

Published on November 2025



ABSTRACT:

We investigate the spatio-temporal evolution of carrier concentrations and the electric field in a bipolar, photorefractive GaAs structure subjected to periodic excitation by a sequence of picosecond optical pulses. Using numerical methods, we analyze how the dynamic response of the system depends on the characteristics of the excitation pulses. Our results reveal that even under relatively simple Gaussian beam excitation, the system exhibits a rich variety of nonlinear behaviors. In particular, we observe the emergence of field modulation patterns that evolve from regular oscillations toward more complex, quasi-periodic structures. These features are enhanced under conditions of increased excitation intensity and extended pulse duration, suggesting proximity to bifurcation points and the potential onset of deterministic chaos. The presented results show how diverse the photorefractive response of semiconductors such as GaAs can be and offer a preliminary roadmap for identifying key parameters that govern the transition from periodic to irregular regimes in such materials.

Link: <https://doi.org/10.1016/j.optcom.2025.132625>



TITLE:

A comprehensive survey of artificial intelligence methods for cardiovascular disease detection: Recent advances and future challenges

AUTHOR :

Gunjal, A.; Judgi, T.

JOURNAL NAME:

MethodsX (Vol.-15)

DETAILS:

Published on October 2025



ABSTRACT:

Global health is increasingly concerned with and interested in Cardiovascular Diseases (CVD), which necessitates new and innovative ways of identifying them earlier and treating them more effectively. AI techniques, such as ML and DL provide a promising pathway to address these challenges. This study investigated the interplay between advancing technology and medical science, focusing on AI's application in improving CVD diagnosis. Traditionally, CVD diagnosis has relied on clinical assessments, laboratory tests, and imaging modalities such as echocardiography and angiography. Several researchers are using online datasets as well as utilizing inexpensive sensors to collect data in the healthcare field to carry out their research to develop different ML and DL algorithms that can detect diseases automatically. Feature-based ML algorithms, CNNs, RNNs, and hybrid models are commonly used techniques in this area. This study highlights the importance of ML and DL in cardiac health and emphasizes precise and enhanced prediction of cardiovascular disease. The developments in state-of-art technologies and the increasing influence of cardiovascular disease on public health, this study attempts to present an in-depth analysis of the topic based on current AI-based methods used for CVD management based on reports from Electronic Health Records (EHR) and Electrocardiogram (ECG). It shows areas which requires improvement, and proposes avenues for future investigation. This study aims to direct future advancements in diagnostic tools by highlighting the critical role of AI in rethinking methods to CVD diagnosis and treatment approaches to enhance the patient outcomes.

Link: <https://doi.org/10.1016/j.mex.2025.103678>



TITLE:

Exploring the role of adipocytokines in obesity associated depression

AUTHOR :

Keswani, R.; Thorat, V.G.; Patil, C.R.; Bhatt, S.

JOURNAL NAME:

Drug Discovery Today (Vol.-30, Issue-12)

DETAILS:

Published on October 2025



ABSTRACT:

The pathophysiology of obesity and depression, frequent comorbidities of our modern society, involves a predominant role of adipocytokines. Dysregulated adipocytokines, including leptin, adiponectin, and resistin, promote chronic low-grade inflammation, neuroendocrine imbalances, and a neuroplasticity deficit. These adipocytokines trigger the hypothalamic-pituitary-adrenal (HPA) axis, increasing cortisol levels and ultimately inducing hyperphagia and affective symptoms. Adipocytokines also modulate the neurotransmitter systems essential for mood regulation and cognitive functions. In this review, we explore the role of adipocytokines as bidirectional links between obesity and depression, highlighting them as novel druggable targets for treating comorbid obesity and depression.

Link: <https://doi.org/10.1016/j.drudis.2025.104509>



TITLE:

Life cycle energy assessment of conventional and modular buildings: a case study analysis in the Indian context

AUTHOR :

Minde, P.; Kore, K.

JOURNAL NAME:

Energy Efficiency (Vol.-18, Issue-8)

DETAILS:

Published on 8 November November 2025



ABSTRACT:

Precast construction provides better quality control, improved site safety, and faster project timelines than traditional RCC (Reinforced Cement Concrete) methods. The push for sustainable building practices has increased in India, yet few studies offer a detailed comparison between conventional RCC buildings and modular alternatives. This study addresses that gap by conducting a comprehensive life cycle energy assessment (LCEA) of both construction types (Traditional RCC building and Light gauge steel frame (LGSF)-Ferron Modular Building in a mid-rise residential project in Maharashtra. Using a hybrid approach that integrates process-based and input–output methods, the study evaluates embodied, operational, and demolition energy, offering valuable insights into the energy efficiency of modular construction in the Indian context. Findings show that operational energy accounts for ~ 83% of total life cycle energy, followed by embodied (~ 15%) and demolition (~ 2%). The LGSF-Ferron building consumes 11.06% less life cycle energy (18,486.54 MJ/m²) than RCC (20,787.26 MJ/m²), mainly due to reduced embodied energy. This difference is specific to the case study and may vary with regional factors. The study provides evidence-based insights into material choices, construction methods, and energy-efficient strategies that contribute to India's sustainable development goals. However, broader sustainability claims require further analysis of additional environmental impacts. The study also offers actionable insights for architects, engineers, and policymakers to explore energy-efficient modular construction, contributing to sustainable development in India..

Link: <https://link.springer.com/10.1007/s12053-025-10392-4>



TITLE:

Design, Synthesis, Characterization and Evaluation of Anti-Inflammatory Activity of Amino Thiazole Coumarin Derivatives

AUTHOR :

Adsule, P.; Purandare, D.; Kulkarni, S.; Raut, K.G.; Chabukwar, A.R.

JOURNAL NAME:

Egyptian Journal of Chemistry (Vol.-68, Issue-13)

DETAILS:

Published on May 2025



ABSTRACT:

This research aims to design, synthesize, and assess the in-vitro anti-inflammatory activity of aminothiazole coumarin derivatives by reacting 3-bromoacetyl coumarin with thiourea in ethanol to give 5 substituted coumarin derivatives. The synthesized compounds were designed & evaluated to investigate their binding interactions with the protein target 3PGH. All the newly synthesized aminothiazole coumarin derivatives are characterised by IR, ¹H NMR and mass spectroscopy. Compounds were evaluated for in-vitro anti-inflammatory activity by using membrane stabilization assay & BSA denaturation assay, measuring their ability to modulate key markers of inflammation. Compounds 5b, 5c and 5e exhibited significant activity and Compound 5d showed moderate activity by membrane stabilization assay. Compound 5c exhibited significant activity & Compound 5c showed moderate activity by BSA denaturation assay. Compounds 5b and 5c are found to exert significant anti-inflammatory activity by membrane stabilization assay as well as BSA denaturation assay and can serve as potential compounds as anti-inflammatory agents to treat inflammation in future.

Link: <https://doi.org/10.21608/ejchem.2025.337094.10820>



TITLE:

Towards safer environments: A YOLO and MediaPipe-based human fall detection system with alert automation

AUTHOR :

Kothari, V.P.; Chakurkar, P.S.

JOURNAL NAME:

MethodsX (Vol.-15)

DETAILS:

Published on September 2025



ABSTRACT:

Detecting human falls is essential to ensuring public safety, particularly in public areas like transit terminals. This study provides a precise and effective real-time fall detection system by utilising pose estimation and deep learning-based object detection approaches. The system correctly detects falls in dynamic circumstances by combining MediaPipe's pose estimate for in-depth body posture analysis with the YOLOv8 model for human recognition. The paper provides a novel method that improves the system's scalability and robustness in real-world scenarios by utilising position landmarks and activity identification algorithms. To enable accurate fall detection and reduce false positives, the system also uses anomaly detection techniques. The system uses Twilio to send real-time warnings as soon as a fall is detected, send out video footage of the incident, and alert the appropriate authorities. The system is an excellent option for enhancing safety in sizable public areas because to its effectiveness, scalability, and privacy-preserving features. Metrics like accuracy, precision, recall, and F1-score are used in the study to assess the system's performance and show its usefulness. The system outperformed existing fall detection approaches, achieving 96.06 % accuracy and 100 % recall, confirming its robustness in real-world scenarios.

Link: <https://doi.org/10.1016/j.mex.2025.103623>



TITLE:

Photothermal Micro-Nano Solid Substrates for Intracellular Delivery via Laser-Assisted Photoporation

AUTHOR :

Silva, J.D.N.; Sarnaik, P.; Fajardo Barocio, C.E.; Chopra, V.; Chauhan, G.

JOURNAL NAME:

ACS Applied Bio Materials (Vol.-8, Issue-11)

DETAILS:

Published on 14 October 2025



ABSTRACT:

Introducing functional molecules into cells relies on carrier- or membrane disruption-based methods. Photoporation, utilizing laser irradiation to create transient membrane pores, facilitates the cytoplasmic entry of exogenous molecules. Photothermal agents, such as nanoparticles, bind to cell membranes and induce localized damage via thermal conversion or vapor nanobubbles. Vapor nanobubbles form thermally or via multiphoton ionization. Photothermal substrates, with immobilized agents, reduce cytotoxicity and serve as biocompatible cell culture platforms. Cell morphology and cytoskeletal organization significantly influence the efficacy of membrane disruption. Micronanopatterned surfaces control focal adhesion spatial organization and cytoskeleton arrangement. Engineered photothermal agents regulate cell spreading and adhesion, enhancing membrane disruption or resealing. In the context of intracellular delivery, this review examines the interactions among membrane mechanics, cytoskeletal structure, and photothermal agents. Recent developments in photothermal substrates, the effect of cell shape on membrane rupture, and current approaches to designing photothermal platforms to increase delivery efficiency are also covered. Understanding these mechanisms advances intracellular delivery strategies, improving targeted molecule delivery efficiency and minimizing cytotoxic effects. Further exploration of the interplay between the cell structure and disruption mechanisms is warranted for optimizing intracellular delivery techniques.

Link: <https://pubs.acs.org/doi/10.1021/acsabm.5c00742>





TITLE:

Impact of Outlet Vent Configurations on Indoor Environmental Quality, Occupant Comfort, and Energy Efficiency: An Optimisation Study

AUTHOR :

Ghogare, G.A.; Sinha, S.L.; Panchore, V.; Nath Verma, T.N.

JOURNAL NAME:

International Journal of Automotive and Mechanical Engineering (Vol.-22, Issue-4)

DETAILS:

Published on November 2025



ABSTRACT:

The rising demand for building energy and the time spent indoors are driving the need for a sustainable balance between building energy demand and occupant comfort. The detailed analysis of fluid flow, radiation heat transfer, heat load on a radiator, and the comfort of indoor occupants is essential for sustainable buildings. This study numerically evaluates the well-validated 3D empty-room model for energy demand in a cold-climate environment to support occupant comfort. Efforts have been made to optimise the factors affecting occupant comfort and the energy demand of the office room to maintain sustainable stability. A well-validated 3-dimensional model simulated airflow, heat transfer, and occupant comfort. The study optimises factors affecting comfort and energy use using multi-objective optimisation (MOO) techniques. Outlet vent location significantly impacts indoor comfort, energy, and fluid flow. Indoor environments can be optimised for both energy and comfort, especially in symmetrical indoor spaces. Floor-level vents improve air circulation but have little impact on energy use in cold climates. In symmetrical fluid domains, symmetrical outlet vent placement achieved the lowest objective function value (0.026), with a heat load of 412.27 W, PMV of 0.24, and PPD of 7.12, whereas floor-level outlet vents showed the highest objective function value (0.575), with PMV of 0.51 and PPD of 12.11, indicating reduced comfort. Overall, optimising ventilation strategies allows for prioritising occupant comfort and energy efficiency based on specific needs.

Link: <https://doi.org/10.15282/ijame.22.4.2025.4.0981>



TITLE:

Assessing implications of occupational heat stress on the physiological and productive attributes of small-scale foundry workers in Northern India

AUTHOR :

Sharma, M.; Alam, M.S.; K.; Kataria, K.K.

JOURNAL NAME:

Work (Vol.-82, Issue-3)

DETAILS:

Published on December 2024



ABSTRACT:

Background: Work operations involving intensive physical activities under hot stressful workplaces may impose substantial heat stress on the employed workforce, particularly in underdeveloped countries. Objective: The present study analysed occupational heat stress and its effect on workers' well-being and productivity under distinct work environments in small-scale foundries in Northern India. Methods: Several dominant heat indices were used for evaluating the occupational heat risk exposure among foundry workers. The workers' thermal perception was examined using the Heat Strain Score Index (HSSI) subjective assessment. Further, physiological parameters were recorded to evaluate the heat strain endured by workers. Work productivity losses under thermal work conditions were also estimated. Results: Higher occupational heat risk exposures were associated with furnace (Wet Bulb Globe Temperature (WBGT): 33.54°C (0.784), Tropical Summer Index (TSI): 38.82°C (3.273)) and metal pouring (WBGT: 32.93°C (0.663), TSI: 38.47°C (1.441)) sections, with indices exceeding permissible limits. From subjective assessment, 90% and 86.7% of workers in furnace and metal pouring section perceived higher thermal discomfort. A rise in workers' physiological attributes was observed under sections involving high radiant heat exposure and intensive physical workload. Strong relations were observed among WBGT and HSSI indices ($r = 0.831$), indicating good agreement between quantitative and subjective assessments. With the exception of systolic and diastolic blood pressure, positive associations were seen among WBGT and monitored physiological variables (core body temperature ($r = 0.705$), skin temperature ($r = 0.670$), and heart rate ($r = 0.353$)). The productivity model estimated work performance losses associated with metal pouring (53%), furnace (43.24%), and fettling (37.61%) work sections under these foundry industries.

Link: <https://doi.org/10.1177/10519815241289664>



TITLE:

Evaluating the influence of ambient conditions in the cooking space of railway pantry car using selected thermal indices and physiological parameter

AUTHOR :

Alam, M.S.; Sharma, M.; Jadhav, G.

JOURNAL NAME:

Work (Vol.-82, Issue-2)

DETAILS:

Published on 12 August 2024



ABSTRACT:

Background: Hot and humid indoor environment of the kitchen affects worker performance. The Indian Railway's pantry car culinary is one of them that cooks food for the on-board passengers, which could be bothered by the hot indoor climate. Objective: The current study aimed to identify the indoor working environment of the railway "pantry car" using heat stress indices such as "Universal Thermal Climate Index-UTCI," "Wet-Bulb Globe Temperature-WBGT," "Discomfort Index-DI," "Tropical Summer Index-TSI," "Heat Index-HI," and Heart Rate-HR with clothing insulation. METHODS: The study was performed in 2018 (August-summer season) to collect field survey data on 6 railway pantry cars. Measurements were carried out during peak cooking times such as morning "7 : 00 am", day "11 : 30 am", evening "4 : 00 pm," and night "6 : 30 pm". This study's descriptive and Pearson's correlation analysis was accomplished using SPSS version 2016 software. Results: The analysis results revealed that the average values were for UTCI ($37.77 \pm 5.26^\circ\text{C}$), WBGT ($30.42 \pm 2.28^\circ\text{C}$), DI ($30.05 \pm 2.70^\circ\text{C}$), TSI ($33.21 \pm 2.90^\circ\text{C}$), HI ($48.53 \pm 4.86^\circ\text{C}$), correspondingly. During analysis, the strongest correlation association was observed between "TSI and DI" ($r = 0.985$, $p < 0.000$) and WBGT and TSI ($r = 0.958$, $p < 0.000$). A "significant correlation" was found between UTCI and HI ($r = 0.637$, $p < 0.05$). While no significant correlation was found between "heat stress indices and physiological parameters ($p > 0.05$)". Conclusion: In this study, all the heat stress index limit values showed highly harsh working conditions inside the pantry car, which created unfavorable circumstances for the culinarians. Inappropriate "ventilation design" could be a reason for discomfort in the railway pantry car.

Link: <https://doi.org/10.3233/wor-240207>



TITLE:

An integrated deep learning and fuzzy logic system for road crack severity analysis, and pedestrian fall risk prediction

AUTHOR :

Chakurkar, P.S.; Vora, D.

JOURNAL NAME:

Iranian Journal of Fuzzy Systems (Vol.-22, Issue-6)

DETAILS:

Published on November 2025



ABSTRACT:

Cracks on pedestrian sidewalks and walkways pose a significant safety hazard, increasing the risk of trips, falls, and injuries, particularly for vulnerable groups such as the elderly and children. Traditional crack detection and severity assessment methods are usually manual, time-consuming, and subjective, especially in the Indian context, where road and sidewalk inspections are still conducted mainly through visual surveys due to cost and infrastructure constraints. This paper proposes an integrated framework of deep learning and fuzzy logic to analyze sidewalk crack severity and predict pedestrian fall risk automatically. A novel crack quantification method using edge detection and adaptive segmentation is proposed to measure crack width accurately. A fine-tuned deep learning model is employed for automating crack severity prediction, which achieved 95% accuracy and demonstrated robustness to noise, blur, and lighting variations. To estimate fall risk, a fuzzy inference system is developed considering four inputs: crack severity, road condition, weather, and pedestrian age, and a set of expert-defined fuzzy rules is applied to estimate risk levels. The outcomes show the effectiveness of the proposed FIS scheme, which achieved 95% accuracy and outperformed non-fuzzy baseline approaches.

Link: https://ijfs.usb.ac.ir/article_9519.html



TITLE:

Anti-inflammatory effects of Glycyrrhiza glabra homeopathic formulations in a rat model of lipopolysaccharide-induced inflammation

AUTHOR :

Gawai, B.; Tagalpallewar, A.A.; Pawar, A.T.;
Baheti, A.M.

JOURNAL NAME:

Journal of Ayurveda and Integrative Medicine
(Vol.-16, Issue-6)

DETAILS:

Published on November 2025



ABSTRACT:

Background: Inflammation plays a crucial role in the pathogenesis of various chronic diseases. Alternative therapies, such as homeopathy, have gained attention for their potential in managing inflammatory conditions. Glycyrrhiza glabra, commonly known as licorice, is well-documented for its anti-inflammatory properties in herbal medicine. However, its efficacy in homeopathic formulations remains largely unexplored. Objective: This study aimed to evaluate the anti-inflammatory potential of different homeopathic potencies of Glycyrrhiza glabra against lipopolysaccharide (LPS)-induced inflammation in rats. Methods: Male Wistar rats were divided into seven groups: normal control, LPS-induced inflammation control, dexamethasone-treated, Glycyrrhiza glabra homeopathic mother tincture (GHMT)-treated, and groups treated with Glycyrrhiza glabra homeopathic potency (G6CH, G30CH, G200CH). Anti-inflammatory effects of GHMT, G6CH, G30CH, and G200CH were evaluated against LPS-induced inflammation by measuring paw volume, serum pro-inflammatory cytokine levels [tumor necrosis factor-alpha (TNF- α) and interleukin-6 (IL-6)], levels of oxidative stress biomarkers (superoxide dismutase, glutathione, and catalase) in paw tissues, and histopathological changes in inflamed paw tissues. Results: The results demonstrated a significant reduction in paw volume in GHMT and G200CH-treated groups ($p < 0.0001$) as compared to the inflammation control group. Additionally, the levels of serum TNF- α and IL-6 were significantly lowered ($p < 0.0001$), and oxidative stress biomarkers showed significant improvement ($p < 0.0001$) in GHMT and G200CH-treated groups. Histopathological examination further confirmed the reversal of inflammation-induced tissue changes by G. glabra homeopathic formulations, indicating its anti-inflammatory activity.

Link: <https://doi.org/10.1016/j.jaim.2025.101267>



TITLE:

The Reporting and Methodological Recommendations for Observational Studies Estimating the Effects of Deprescribing Medications (REMROSE-D) ISPE-Endorsed Guidance

AUTHOR :

Hayes, K.N.; Niznik, J.D.; Gnjjidic, D.; Moriarty, F.; Bennett, D.; Laroche, M.-L.; Talbot, D.; Alcusky, M.; Sessa, M.; Coe, A.B.; Sirois, C.; Zullo, A.R.; Li, X.; Chalasani, S.H.; Syed, J.; Sawan, M.; Moga, D.C.

JOURNAL NAME:

Pharmacoepidemiology and Drug Safety (Vol.-34, Issue-11)

DETAILS:

Published on November 2025



ABSTRACT:

Purpose: Pharmacoepidemiologic studies on deprescribing are challenging to implement, yet little guidance exists on methods to avoid bias and minimum reporting for replicability and appraisal. We developed consensus recommendations for the methods and reporting of observational studies that aim to examine the effects of deprescribing. **Methods:** We formed candidate recommendations based on our prior systematic review that methodologically appraised observational studies on deprescribing. We then conducted a two-round modified Delphi process with researchers working in deprescribing pharmacoepidemiology to refine, select, and reach consensus on recommendations for a checklist based on > 70% agreement of their importance. We termed this list the REMROSE-D (Reporting and Methodological Recommendations for Observational Studies estimating the Effects of Deprescribing medications) guidance. **Results:** Twenty-three candidate recommendations were presented to the Delphi panel. The round 1 survey was completed by 55 participants, and 18 of the 23 candidate recommendations were selected for inclusion. Five candidate recommendations without consensus plus two additional items suggested by participants were included in a round 2 survey of 25 deprescribing researchers. Five of these seven items garnered consensus for inclusion, and two were excluded. The final REMROSE-D guidance contains 23 recommendations for the methods and reporting of observational research on deprescribing. **Conclusion:** To ensure rigor and reproducibility in observational studies of the effects of deprescribing, the REMROSE-D guidance provides recommendations for important reporting and methods considerations, including time zero, precise definitions of deprescribing, addressing confounding by indication, and careful consideration of follow-up to avoid immortal time bias.

Link: <https://doi.org/10.1002/pds.70255>



TITLE:

Enhancing electoral participation among migrants in India: Challenges, solutions, and the role of e-voting technology

AUTHOR :

Varma, A.; Mane, R.; Lakhotiya, P.; Tilekar, A.;
Sonnekar, P.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3297, Issue-1)

DETAILS:

Published on 28 October 2025



ABSTRACT:

This survey paper delves into the complexities surrounding electoral participation among internal migrants in India. With migration being a prevalent phenomenon, it significantly impacts voting rights, leading to a considerable number of migrants facing obstacles in exercising their franchise. The study aims to bridge this gap by examining the challenges faced by migrants in the electoral process and exploring potential solutions to enhance their participation. Existing research papers and innovative proposals are synthesized to gain insights into the issue. Technologies such as Remote Electronic Voting Machines (RVMs), blockchain-based voting systems, and mobile ballot boxes are scrutinized for their efficacy in addressing migrant voting constraints. Despite promising solutions offered by these technologies, challenges related to security, feasibility, and acceptance persist. The research identifies a notable gap in comprehensively integrating security, efficiency, and inclusivity in voting systems. While advancements like Aadhar biometric authentication and blockchain technology have been explored, there remains a need for scalable, reliable, and secure voting solutions. The study underscores the importance of targeted initiatives, policy reforms, and awareness campaigns to facilitate migrant voting and strengthen democratic inclusivity. It emphasizes the role of secure and accessible e-voting technologies in overcoming geographical and logistical barriers. However, challenges such as security threats and technological adoption resistance persist. Through a comprehensive survey of various research papers, the study aims to provide insights into the advantages, disadvantages, and challenges associated with different voting methodologies. It seeks to inform the development of future voting systems, ultimately contributing to more inclusive, transparent, and secure electoral practices in India.

Link: <https://doi.org/10.1063/5.0285953>



TITLE:

A review on influence of residual stresses in metal hybrid additive manufacturing processes

AUTHOR :

Kulkarni, A.R.; Barve, S.B.; Kumar, P.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

An assortment of AM innovations is being utilized to manufacture metallic parts and parts for a large number of uses like developments, clinical, atomic, and airplane business. In this review, we will discuss about the residual stresses generated in additively manufactured parts using metallic materials and how they affect the properties of the parts. Due to rise in temperature while part manufacturing and cooling of the material afterwards leads to the development of the residual stresses. Now because of this, the distortions are observed in the part and even the failure of the same. The current work centers around the RS in HMAM.

Link: <https://doi.org/10.1063/5.0291878>



TITLE:

Investigating torsion spring failure: A comprehensive microstructural and finite element analysis

AUTHOR :

Shinde, R.; Pradhan, M.; Sahoo, B.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

The torsion spring in the accelerator assembly of two-wheelers plays a crucial role in vehicle operation, and its failure can significantly increase accident risks. This study explores the premature failure of a torsion spring manufactured from cold-drawn stainless-steel wire (SS304) after only five months of service. A comprehensive analysis was conducted, including microstructural examination, fractography using FE-SEM, and Vickers microhardness testing. These investigations revealed that cyclic loading caused crack initiation and propagation, leading to fracture. Flocculent block spots and shrinkage porosity in the spring's microstructure, negatively impacted its fatigue behavior. Finite element analysis (FEA) was utilized to analyze stress distribution, and the simulation results accurately mirrored the observed failure zones. The findings highlight that material defects and design flaw leads to stress concentration contributing to the torsion spring's premature failure.

Link: <https://doi.org/10.1063/5.0291645>



TITLE:

Stress mapping of fiber reinforced composite through various experimental methods: Review

AUTHOR :

Kande, P.H.; Kumar, P.; Barve, S.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

Fiber-reinforced composites find extensive applications in various industries such as aerospace, automotive, construction and marine due to their lightweight nature and high strength. When these composite materials are manufactured and used, several sorts of defects such voids, inclusions, debonds, poor cure, and delamination are nearly always present. Accurate evaluation of these flaws is necessary to maximize the potential of these materials. This study analyzes existing methods that are currently being used. While there is no doubt that each method has its own potential, but they hardly achieve the degree of proficiency needed for a comprehensive diagnosis of likely flaws and damage evolution in a composite system. Therefore, to enhance the assessment of the damage status of the structures, one approach may be chosen over another or many techniques may need to be combined, depending on the prevailing damage mechanism and the circumstances of usage.

Link: <https://doi.org/10.1063/5.0291740>





TITLE:

School bus monitoring system using Geo-fencing technology

AUTHOR :

Gaikwad, V.; Rajput, V.; Amune, A.; Musale, V.;
Joshi, S.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

Ensuring the safety and security of students during their daily commute to and from school is a top priority for educational institutions and parents alike. In response to this concern, we propose the implementation of a School Bus Monitoring System using Geo-fencing technology. This innovative solution integrates Geo-fencing, RFID scanning, and user-friendly interfaces to provide real-time monitoring of school buses, thereby enhancing safety and accountability within the school transportation system. By establishing virtual boundaries and verifying the authenticity of bus drivers, the system aims to enhance student safety, improve operational efficiency, and ensure transparency in school transportation operations. Through a comprehensive analysis of its design and functionality, this research paper explores the potential impact of the School Bus Monitoring System on student safety and transportation management. Our system can perform 5 location updates per second with a 2.5m horizontal position accuracy.

.Link: <https://doi.org/10.1063/5.0291788>



TITLE:

Performance analysis of green friction brake pad material for environment sustainability

AUTHOR :

Chheda, M.N.; Kothavale, B.; Girase, S.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

The automobile industry is looking for environmentally safe substitutes for existing friction brake pad materials, which frequently include hazardous compounds, as environmental sustainability becomes more and more of a concern. The performance and environmental advantages of green friction brake pad materials are examined in this study. Conventional brake pads and those composed of eco-friendly materials such organic fibres, resins, and natural fillers were compared. This paper discusses the wear and friction analysis of bagasse fiber reinforced brake pad material. Three test specimens (I, II & III) were prepared per ASTM G99 standards for the pin-on disc tribo-test. According to the study's findings, using green friction brake pad materials can help reduce the environmental impact of braking systems while simultaneously meeting the performance requirements for automotive applications. Future studies have to concentrate on the long-term resilience and financial viability of these environmentally friendly substitutes in order to encourage a broad adoption of them in the automobile sector.

Link: <https://doi.org/10.1063/5.0292077>



TITLE:

Insilico molecular docking and characterization of drug carrier polyurethane polymer for coronary stent

AUTHOR :

Chopade, J.V.; Hujare, D.P.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

Atherosclerosis is one of the major disease in worldwide. In cardiovascular disease the arteries are blocked due to saturation of fats or cholesterol inside the wall. As a result of this there is a disturbance of normal flow of blood. To regulate the flow of blood in arteries, blockages are open with the help of angioplasty. Drug eluting stent with polymer coating is normally used in such cases. In present study polyurethane polymer is used for releasing the drug at the place of Cather. To analyze the characteristic of polyurethane UV-visible spectrophotometer employed to determine a substance's in purity, Infrared spectroscopy was carried out on a Jasco FTIR spectrophotometer, yielding a spectrum in the wavelength range of 3000 to 800 cm^{-1} . X-ray diffraction analysis (XRD) is a technique used to establish a material's crystallographic structure. X-ray diffraction (XRD) was used to look at the physical properties of polyurethane. The findings of the powdered samples. XRD patterns were recorded over the range of $1-40^\circ$, $2\theta-1$, using an X-ray powder diffractometer equipped with a copper tube anode. The generator tension (voltage) of 45 kV, the generator current of 40 mA, the scan step length of 9 s, and the scan step size of 0.008° (2θ). DSC is a thermal analysis technique that is widely used because it may provide detailed information about the physical and energetic properties of a substance. This investigation's molecular miscibility with polyurethane and the absence of recrystallization peaks indicate that polyurethane was physically stable. Molecular docking has grown in significance as a drug discovery method. Present study of docking was approaches combine scoring functions and search algorithms were performed to find the binding energy of polymer. In ligand-protein docking, the scoring functions typically predict binding free energies in the range of -7 to -10 kJ/mol.

Link: <https://doi.org/10.1063/5.0291886>



TITLE:

Recent developments and future challenges in
clad sheet metal forming: A review paper

AUTHOR :

Patel, Y.N.; Jagtap, R.; Kulkarni, V.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-
1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

Clad sheet metal forming (CSMF) has emerged as a promising technique for fabricating high-performance materials with unique properties. This review paper aims to provide an overview of recent advancements in CSMF, highlighting its applications, advantages, and challenges. The past decade has witnessed significant progress in CSMF research, including the development of new cladding techniques, materials, and tools. Recent studies have demonstrated the potential of CSMF in producing complex-shaped components with improved mechanical properties, reduced weight, and enhanced durability. However, despite these advancements, several challenges remain to be addressed before CSMF can be fully exploited in industry. These issues include the need for more efficient cladding processes, improved material bonding, and enhanced formability. In addition, there is a growing demand for sustainable and environmentally friendly CSMF processes that minimize waste generation and energy consumption. This review aims to summarize the recent progress in CSMF and identify the key challenges and future directions for this field. We will discuss the current state-of-the-art CSMF, including cladding techniques, materials, and applications. Additionally, we highlight the potential of CSMF to address some of the world's most pressing sustainability challenges, such as reducing carbon emissions and conserving natural resources.

Link: <https://doi.org/10.1063/5.0291934>



TITLE:

Design of a balancing mechanism for automated microtome

AUTHOR :

Pansare, V.; Chavan, S.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

This paper presents the design and implementation of a balancing mechanism for an automated microtome, aimed at enhancing tissue sectioning precision and consistency. The study addresses the challenges posed by torque variations during the block holder's reciprocating motion, which can necessitate the use of a larger actuator, potentially leading to vibrations that negatively affect section quality. By employing a spring-based balancing system, we minimized the motor's power requirements, ensuring operational stability across various positions. The design process involved developing a CAD model, followed by the fabrication and integration of the mechanism into the microtome. After applying the calculated change in spring length, the block holder remained stable at various positions along its axis, even without the actuator attached, confirming that a statically balanced state was achieved. A comparison between sections produced by the unbalanced and balanced systems highlights the effectiveness of the balancing mechanism. This work underscores the importance of mechanical balance in automated systems and lays a foundation for future advancements in microtome technology.

Link: <https://doi.org/10.1063/5.0291797>



TITLE:

Structural behavior of PLA auxetic re-entrant core sandwich panels under compression

AUTHOR :

Raje, K.; Patel, V.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

Re-entrant auxetic structures are unique because they have a negative Poisson's ratio, meaning they expand laterally when stretched and contract when compressed. This unusual behavior results from the inward-angled cell walls, which flex outward under tension. These structures offer superior mechanical properties like better energy absorption, increased resistance to indentation, and improved fracture toughness, making them ideal for advanced engineering applications. By adjusting the cell geometry and density, these properties can be further enhanced. This study examines the compression behavior of sandwich panels with re-entrant honeycomb auxetic structures made from PLA material, subjected to both out-of-plane and in-plane loading. Before experimental testing, a detailed computational analysis using Ansys, Hyper mesh, and Abaqus is conducted to predict and optimize structural performance. The experimental results will then be compared with these predictions to validate the models and gain deeper insights into the mechanical behavior of auxetic structures. The findings will help advance the use of auxetic materials in engineering, offering potential for innovative designs and improved performance.

Link: <https://doi.org/10.1063/5.0291700>



TITLE:

Review of dome structures on view of acoustic analysis basis

AUTHOR :

Gangurde, S.; Anekar, N.; Barpande, G.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

Dome structures, with their distinctive architectural and engineering characteristics, pose unique challenges in terms of acoustic management and analysis. This paper delves into the intricate interplay between sound waves and the geometric properties of domes, exploring the multifaceted aspects of acoustics within these structures. The study aims to provide an overall understanding of how acoustic phenomena manifest in domes, offering insights that can inform effective design strategies and enhance the overall auditory experience within such spaces. The paper begins by examining the fundamental principles of acoustics and their application to Dome architectural spaces. Special emphasis is placed on the role of dome geometry, material properties, and surface characteristics in shaping the behavior of sound waves. A thorough review of existing literature and case studies provides a foundation for identifying key factors influencing acoustic performance in domed structures. The impact of design choices on sound propagation, reflection, and absorption within the dome space. In addition to theoretical analysis, the research addresses practical considerations for the implementation of effective acoustic management strategies in dome structures. Case studies of iconic dome buildings from around the world are examined to extract valuable lessons and best practices. The role of innovative materials, sound-absorbing treatments, and strategic placement of acoustical elements is explored to illustrate successful approaches to enhancing acoustic quality within domed spaces.

Link: <https://doi.org/10.1063/5.0291914>



TITLE:

Solar panel monitoring using IOT

AUTHOR :

Rajput, V.; Gaikwad, V.; Amune, A.; Musale, V.;
Joshi, S.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2025



ABSTRACT:

This paper presents a comprehensive solar panel monitoring system leveraging Internet of Things (IoT) technology, offering real-time monitoring of voltage, current, and power generation alongside sun position tracking and cleaning process optimization. Integrated IoT devices and cloud-based platforms enhance efficiency and user-friendliness. Using an ESP8266 node on the Blynk App, real-time voltage readings were obtained, with maximum readings of 5.0 V. Variations in solar panel readings were observed with changes in sun direction, climate, and location. Additionally, by connecting a servo and Light Dependent Resistor (LDR), voltage readings varied from 4.11 V (east) to 4.41 V (west), while readings without these components measured 2.99 V and 1.99 V, underscoring the significant influence of sun position and environmental conditions on solar panel performance.

Link: <https://doi.org/10.1063/5.0291782>



TITLE:

Numerical and experimental investigation of sun-load prediction capability for two-wheeler projector lamps

AUTHOR :

Hule, P.; Havaladar, S.; Nene, A.; Rane, S.;
Kolhe, S.; Dongare, S.

JOURNAL NAME:

AIP Conference Proceedings (Vol.-3325, Issue-1)

DETAILS:

Published on 3 October 2024



ABSTRACT:

This study aims to assess the prediction capabilities designed for projector lights under varied solar load circumstances. The goal is to improve overall driving experiences and safety by knowing and precisely expecting the impacts of changing sunlight conditions on projector lamp performance. The sun's rays, when passing through the vehicle's lens, become focused and concentrated on a specific area of the model. This intense concentration can lead to localized overheating and potential damage to the lamp assembly. Monte Carlo predicting techniques was used in simulation software to assess crucial optics factors such as sun irradiation, hotspots, azimuth angle, and angle of inclination. Three mounting conditions are considered (0-degree, 15-Degree, Side-stand) are used to predict the sun load phenomenon, allowing for an exhaustive study of solar load impacts on lamp performance. To validate the numerical results experimentation has been conducted, both results are well agreed within 5%. The research study will assist thermal engineers in designing and optimizing project lenses for two-wheelers to ensure proper distribution of solar load and prevent overheating issues.

Link: <https://doi.org/10.1063/5.0292141>



TITLE:

Mechanical and tribological analysis of Al/TiC MMC developed through powder metallurgy

AUTHOR :

Sawant, S.; Hujare, D.P.; Shrigandhi, G.; Kumar, P.

JOURNAL NAME:

Biomedical Materials and Devices

DETAILS:

Published on 3 October 2025



ABSTRACT:

Aluminium Metal Matrix Composites (AMMCs) represent a critical advancement in material science, combining the lightweight and versatile properties of aluminium with the enhanced mechanical properties of reinforcement materials. This paper explores the development and characterization of AMMCs, Aluminium 6061 (Al) reinforced with Titanium Carbide (TiC) particles. TiC is selected due to its exceptional hardness and high melting point, which significantly improves the composite's mechanical and wear properties. The study focuses on fabricating AMMCs using a powder metallurgy method, incorporating varying TiC powder concentrations of 5%, 10%, and 15% by weight into an aluminium matrix. The microstructure is studied under the Scanning Electron Microscope (SEM). The resultant composites are subjected to a series of tests, including Brazilian Tensile Strength (BTS) compression testing, Micro Vickers Hardness testing, and Pin-on-Disk wear evaluations. The findings demonstrate that TiC reinforcement markedly enhances the mechanical strength and wear resistance of the aluminium matrix, with optimal improvements observed at specific TiC concentrations. This paper presents a detailed analysis of the fabrication process, test methodologies, and results, providing valuable insights into the performance of TiC-reinforced aluminium composites.

Link: <https://doi.org/10.1063/5.0291750>





TITLE:

Figs, Farmers, and Futures: A Case Study on Purandar Highlands' Expansion Dilemma

AUTHOR :

Joshi, S.P.; Saha, S.; Pendse, M.; Ursal, R.S.

JOURNAL NAME:

Prabandhan: Indian Journal of Management
(Vol.-18, Issue-10)

DETAILS:

Published on 15 October 2025



ABSTRACT:

Purpose : This study examined the strategic growth dilemma faced by the Purandar Highlands Farmer Producer Company (FPC), a farmer-led agri-enterprise producing GI-tagged figs and value-added products. The case explored whether the company should deepen its domestic presence or scale internationally to achieve long-term sustainability. **Design/Methodology/Approach :** The study followed a qualitative single-case approach based on a semi-structured interview with the company's founder, supplemented by secondary data from company records, media articles, and policy reports. **Strategic tools** such as SWOT analysis and Ansoff's Matrix were applied to interpret the firm's growth pathways. **Findings :** The findings indicated that PH-FPC faced distinct opportunities and risks in domestic and international markets. While the Indian market offered logistical ease and stronger farmer integration, global expansion provided higher margins and branding potential but required regulatory readiness and capital investment. A phased hybrid expansion strategy emerged as the most appropriate solution. **Practical Implications :** The case offered actionable insights for farmer-led organizations, policymakers, and agri-FMCG entrepreneurs on scaling GI-tagged produce. It also contributed to understanding operational bottlenecks and branding challenges in the rural-to-retail value chain. **Originality/Value :** The study added to the limited literature on rural entrepreneurship and FPO-based growth strategies in the Indian agri-FMCG sector. It uniquely connected farmer collectives, GI-based branding, and strategic management decisions.

Link: <https://doi.org/10.17010/pijom/2025/v18i10/174988>





TITLE:

Foundation of Large Language Models and Their
Emergent Abilities

AUTHOR :

Gupta, R.; Kumar, J.; Sharma, S.

JOURNAL NAME:

In book: Theory, Practice, and Future Direction
of Large Language Models

DETAILS:

Published on July 2025



ABSTRACT:

Large Language Models (LLMs) are thoroughly examined in this chapter, along with their potential, limitations and implications for existing artificial intelligence. An overview of the history and introduction of LLMs may be found in the introduction. A variety of language tasks, including translation and summarization, are examined in the Capabilities section where these models demonstrate outstanding performance. This highlights how much of an influence he has had on NLP(Natural Language Processing). This chapter emphasizes LLM's developing capabilities. With these developments, problems with interpret-ability, ethics, and resource limitations are addressed, highlighting the necessity of responsible application. This study expands of LLMs, consider it's promise, and indicates the importance using and generating them in a sustainable and ethical manner.

Link: <https://doi.org/10.4018/979-8-3693-8387-2.ch001>



TITLE:

Comprehending Green Bonds for Sustainable Financing

AUTHOR :

Patil, A.; Yadav, R.; Sengupta, R.

JOURNAL NAME:

In book: Investing for greener planet

DETAILS:

Published on August 2025



ABSTRACT:

The rapid industrialization has led to issues like climate change and depleting natural resources. The twin objectives of development and sustainability can be achieved through green projects, which ought to be provided capital, captured by the term “Green finance”. This research work seeks to study green bonds in detail, which are a primary green finance debt instrument. The objectives are to highlight and discuss the mechanism and objectives of green bonds. Also encompassed is the function of green bonds as a catalytic green finance tool, and its rise over the years. Sovereign green bonds are highlighted in terms of its role in accelerating the pace of green bonds. The facet regarding returns from green bonds is also discussed in terms of greenium, or a higher premium. Our findings indicate green bonds as a tool for environmental stewardship with specific use of proceeds and appealing to eco-conscious investors in view of environmental degradation and climate change, and aligning their financial goals with environmental sustainability. Although exponential rise in green bonds has occurred over the last decade, there exists a room for more of this finance through transparency and standardization practices.

Link: <https://doi.org/10.1201/9781003465751-6>



TITLE:

Extraction, Separation, and Purification
Techniques of Polyphenols

AUTHOR :

Deshmukh, S.M.M.; Chand, S.; Wiemer, A.;
Singh, R.

JOURNAL NAME:

Dietary Polyphenols for Infectious Diseases
(Book Chapter)

DETAILS:

Published on September 2025



ABSTRACT:

Polyphenols encompass a wide array of naturally existing phenolic compounds. Polyphenol levels are high in most fruits and vegetables, tea, herbs, spices, wine, and dark chocolate. They function as antioxidants, neutralizing dangerous free radicals, which might harm our cells and enhance the susceptibility to cancer, diabetes, and heart disease. These substances are also thought to lower inflammation, an important factor in many chronic disorders. Polyphenols in different plants and biomass require distinct extraction procedures due to their unique chemical structures. Plant polyphenols have recently gained popularity in food and medicinal research preparation, purification, structure identification, and biological activity testing. Therefore, this chapter extensively explores the investigation of extraction techniques for polyphenols from various plants. Traditional methods, including maceration, percolation, heat reflux extraction, decoction, Soxhlet extraction and, will be discussed, alongside we will also talk about modern and sophisticated methods including supercritical fluid extraction (SCFE), microwave- assisted extraction (MAE), ultrasound-assisted extraction (UAE), pulse electric field extraction (PEFE), high- voltage electric discharge (HVED) extraction and enzyme-assisted extraction (EAE). Also, this chapter highlights the various separation and purification techniques of polyphenols, such as Ion exchange chromatography and membrane-based processes.

Link:

<https://www.scopus.com/pages/publications/105021201972>





TITLE:

Leveraging Talent Management Practices in Hospitality Industry

AUTHOR :

Singh, A.; Kaur, S.

JOURNAL NAME:

In book: Best Practices for Human Resources Management in Tourism and Hospitality

DETAILS:

Published on August 2025



ABSTRACT:

Talent management is extremely popular in both business and government sectors, but its conceptual and empirical understanding is limited. Talent management deals with a handful of employees who are considered 'talent' presently, based on human capital science and theory, talent management is considered to be a process of identification of employee needs and planning. Consequently, talent management engulfs the identification, development, and retaining of employees with talent, and issues, such as labour relations, human resources, planning, composition and benefits, remain neglected. Overall, talent is viewed as a critical organizational asset that can help boost competitiveness and ensure success. The present chapter aims to explore the talent management practices adopted in the hotel industry.

Link: <https://doi.org/10.4018/979-8-3693-8779-5.ch008>



TITLE:

Prediction of Specific Wear Rate of Laser Powder Bed Fusion Manufactured Inconel 718 Material Using Different Supervised Machine Learning Algorithms

AUTHOR :

Chavan, T.; Khedkar, N.; Khedkar, V.

JOURNAL NAME:

Journal Europeen des Systemes Automatises
(Vol.-58, Issue-9)

DETAILS:

Published on 30 September 2025



ABSTRACT:

The Inconel 718 superalloy materials are having properties such as high strength, and excellent wear resistance. These properties make it crucial material wherein wear resistance become decisive factor in structural and functional performance of components. This research paper investigates prediction of specific wear rate of Inconel 718 material manufactured by laser powder bed fusion process, using supervised machine learning models like Linear Regression, Random Forest, Polynomial Regression and Gaussian Process Regression. The data acquisition was done by performing experiment on pin-on-disk apparatus under dry friction condition for different loads, sliding distance and rotational speed of disk. Total of 100 data points were collected from experiments to study effect of load, sliding distance and volume loss on specific wear rate. The results shown that Polynomial Regression displayed best performance compared to other machine learning models thereby achieving a coefficient of determination (R^2) value of 0.9969 and 5-Fold Cross validation value of 0.9968 i.e. 99.68%. Further investigation is carried using Pearson correlation heatmap to determine the most influential parameter that can affect specific wear rate and conclusion drawn is that volume loss and normal load applied have strong influence on specific wear rate of Inconel 718 material.

Link: <https://doi.org/10.18280/jesa.580907>



TITLE:

Enhancing Angle Modulation Using Fractional Calculus: Theory and Performance Analysis

AUTHOR :

Mishra, S.K.; Upreti, K.; Akilbasha, U.;
Radhakrishnan, G.V.; Jain, R.; Upreti, S.

JOURNAL NAME:

International Journal on Electrical Engineering
and Informatics (Vol.-17, Issue-3)

DETAILS:

Published on September 2025



ABSTRACT:

Angle modulation originally forms part of the backbone of the telecommunication and signal processing, where current studies are being carried out to improve its susceptibility to noise interference. This paper aims to analyze the possibility of the application of fractional calculus for optimization of angle modulation, as a requirement for development of enhanced and flexible communication networks. The main purpose of this study is to design and model new angle modulation technique which are Fractional Phase Modulation (FPM) and Fractional Frequency Modulation (FFM) by using fractional calculus. A generalized form of angle modulation and an introduction to the use of fractional calculus was proposed and a mathematical analysis of FM and FFM detectors was done. In evaluating the findings, the interaction between the fractional order of α and some performance parameters like Signal-to-Noise Ratio (SNR) and Figure of Merit (FoM) was also considered. It has been shown that FPM and FFM detectors also show high SNR and FOM performance, and when α is replaced. The FPM detector demonstrated a steady trend and increased from SNR 0 to 1 when the α was diverse, while the FFM detector had a huge increase in SNR from $\alpha=-0.9$ to 0. These results indicate that the angle provides additional benefits in partial stones, signaling purity and system flexibility for the modulation technique. Thus, the ability to achieve better stability in communication for modulation techniques indicates the ability to achieve better stone purity and system flexibility for modulation techniques. Since partial order α can be adjusted to fit the application, the proposed method shows interesting applications in many communication settings, especially when the signal is noisy or dynamic

Link:

<https://www.scopus.com/pages/publications/105021216138>



TITLE:

Blandford-Znajek jets and the total angular momentum evolution of a black hole connected to a cosmic string

AUTHOR :

Swamy, I.; Singh, D.

JOURNAL NAME:

Physical Review D (Vol.-112, Issue-4)

DETAILS:

Published on 26 August 2025



ABSTRACT:

Rotating black holes with strong magnetic fields lead to an outward energy flux in the form of jets governed by the Blandford-Znajek mechanism. These jets depend on factors such as accretion rate, magnetic flux and the spin of the black hole. When such rotating black holes get attached to a cosmic string, it leads to a further rotational energy extraction, leading to a reduced spin. We consider such a system and investigate the effect this reduced spin has on the jet power and its dependence on the cosmic string tension, μ . It is shown that for a constant magnetic flux and accretion rate, the jet energy flux is inversely proportional to μ^2 . Interestingly, the rate of this energy flux varies with time and is again dependent on μ . We also study the total angular momentum evolution of the black hole by considering four major effects: accretion, jets, cosmic string energy extraction and the Bardeen-Petterson effect. Further, we attempt to analyse the condition for the spin-down of a black hole due to these effects and find out that it is possible for both small and large string tensions, with a higher possibility for larger string tensions. Another interesting phenomenon that has been proposed is the alignment of the jet with the cosmic string. Additionally, the Bardeen-Petterson effect also leads to alignment or misalignment of the inner and outer disks depending on the alignment of the string. In this manuscript we propose that these results might have an observable effect and hence could serve as a potential detection method for cosmic strings.

Link: <https://doi.org/10.1103/58tc-v253>



TITLE:

A Novel CNN-SVM Hybrid Framework for Automated Pavement Condition Assessment

AUTHOR :

Chavan, A.R.; Pimplikar, S.S.

JOURNAL NAME:

International Journal of Computing and Digital Systems (Vol.-18, Issue-1)

DETAILS:

Published on 14 April 2025



ABSTRACT:

This research presents a hybrid Convolutional Neural Network-Support Vector Machine (CNN-SVM) framework for automated pavement condition monitoring, addressing inefficiencies of manual inspections critical for India's mining and transportation infrastructure. By integrating CNNs for robust feature extraction and SVMs for precise classification, the model identifies pavement defects (potholes, cracks, uneven surfaces, no-defect states) with high accuracy. Trained on the San Francisco (SF) Streets dataset (18,480 grayscale images), it achieves 97.8% classification accuracy, surpassing standalone CNN (94%) and SVM (93%) models. Cross-validation on the German Asphalt Pavement Distress (GAPs) dataset and 2,000 Pune-Mumbai Expressway images (Dec 2022–Dec 2023) demonstrates robustness across diverse environmental conditions, lighting, and pavement types, with accuracies of 95.2% and 94.8%, respectively. The framework automates Pavement Condition Index (PCI) calculation per ASTM D6433, storing results in a SQLite database for longitudinal monitoring via a Tkinter-based GUI using Python. Data augmentation (rotation, flipping) and SMOTE oversampling ensure balanced class representation, enhancing generalization. This scalable solution minimizes manual intervention, offering real-time monitoring for urban and rural roads, particularly mining transport routes. Future enhancements include optimizing computational demands for edge devices, integrating segmentation for precise defect extent estimation, and expanding to additional defect categories like raveling and rutting to further improve infrastructure management.

Link: <https://hdl.handle.net/20.500.14536/6064>





TITLE:

Optimization Methods in Manufacturing Processes: A Machine-Generated Literature Overview

AUTHOR :

Kulkarni, A.J.

JOURNAL NAME:

Optimization Methods in Manufacturing Processes: A Machine-Generated Literature Overview (Book)

DETAILS:

Published on August 2025



ABSTRACT:

This book presents the result of an innovative challenge, to create a systematic literature overview driven by machine-generated content. Questions and related keywords were prepared for the machine to query, discover, collate and structure by Artificial Intelligence (AI) clustering. The AI-based approach seemed especially suitable to provide an innovative perspective as the topics are indeed both complex, interdisciplinary and multidisciplinary, for example, climate, planetary and evolution sciences. Springer Nature has published much on these topics in its journals over the years, so the challenge was for the machine to identify the most relevant content and present it in a structured way that the reader would find useful. The automatically generated literature summaries in this book are intended as a springboard to further discoverability. They are particularly useful to readers with limited time, looking to learn more about the subject quickly and especially if they are new to the topics. Springer Nature seeks to support anyone who needs a fast and effective start in their content discovery journey, from the undergraduate student exploring interdisciplinary content to Master- or PhD-thesis developing research questions, to the practitioner seeking support materials, this book can serve as an inspiration, to name a few examples.

It is important to us as a publisher to make the advances in technology easily accessible to our authors and find new ways of AI-based author services that allow human-machine interaction to generate readable, usable, collated, research content.

Link: <https://doi.org/10.1007/978-981-96-5257-0>



TITLE:

Adaptive Edge aware and K-means cluster-based Manhattan regularization for deblurring (EA-KCMRD)

AUTHOR :

Sangeetha, D.; Deepa, P.; Padmapriya, S.;
Mugunthan, S.R.

JOURNAL NAME:

Imaging Science Journal

DETAILS:

Published on 24 November 2025



ABSTRACT:

Imperfections in imaging systems and object motion introduce blur in images, leading to an inaccurate analysis. Users are typically unaware of the blurring present in an image, and for accurate analysis, the blur in the images needs to be removed using blind image deblurring. Blind image deblurring serves as a viable method for addressing various sources of blur without prior knowledge of the blur kernel. This paper proposes an edge-aware and K-means cluster-based Manhattan regularization for deblurring (EA-KCMRD). The proposed blind image deblurring algorithm addresses the real-world and synthetic blur by integrating explicit and implicit methods for salient edge selection. The proposed EA-KCMRD introduces a hybrid edge selection framework that combines adaptive Canny edge detection with mutually guided image filtering (explicit strategy) and K-means clustering with Manhattan regularization (implicit strategy). This integration preserves both prominent and structural details, making the kernel estimation process more robust under noise and low-contrast conditions. Furthermore, EA-KCMRD employs a multi-scale framework that supports image deblurring for different image sizes across diverse datasets. Experimental results have validated the feasibility of the proposed method on RealBlur-R, GoPro, HIDE, RS-Blur, and MC-Blur dataset. The proposed EA-KCMRD method has been compared with state-of-the-art techniques using objective metrics and subjective visual perception of deblurred images to demonstrate its effectiveness.

Link: <https://doi.org/10.1080/13682199.2025.2585760>



TITLE:

ConvNeXt_Bi-GRU_IDS: A secured and federated deep learning intrusion detection framework in CPS

AUTHOR :

Rane, S.R.; Kulkarni, R.V.; Khatri, A.; Joshi, H.J.;
Barhate, M.; Musale, V.; Chitari, A.N.; Bendale,
S.P.

JOURNAL NAME:

International Journal of Information Technology
(Singapore)

DETAILS:

Published on 25 November 2025



ABSTRACT:

Intrusion detection in Cyber-Physical-Systems (CPSs) is critical because of their tightly integrated nature where physical processes and software components work together through computer algorithms and internet connectivity. Industrial CPSs due to their distributed architecture and reliance on advanced technologies are getting increasingly vulnerable to cyberattacks, highlighting the need for robust, intelligent, and secure monitoring. For this, we propose SecureNet-Fed: ConvNeXt_Bi-GRU_IDS, a federated deep learning framework that ensures robust, scalable, and privacy-preserving intrusion detection. The architecture combines both spatial and temporal modeling through a hybrid pipeline integrated with federated learning and secure encryption. Spatial patterns are extracted using a ConvNeXt module, capable of identifying localized anomalies within CPS data. These features are then passed to a Bidirectional GRU (Bi-GRU) to capture sequential dependencies and evolving attack behaviors. A series of dense layers with dropout regularization follow, optionally incorporating attention mechanisms to prioritize critical temporal sequences. The final output layer uses Softmax activation for binary classification. To preserve data privacy, the proposed framework employs federated learning, allowing each CPS node to train locally while only sharing encrypted model weights. A comprehensive experimental setup was used to evaluate the proposed approach, incorporating a range of intrusion and normal data. Experiments demonstrate that SecureNet-Fed achieves improved detection accuracy, scalability, and resilience in real-world CPS environments.

Link: <https://doi.org/10.1007/s41870-025-02912-3>





TITLE:

Blockchain Alchemy: Unveiling the Digital Ledger's Transformative Power

AUTHOR :

Choudhary, A.P.; Bhagat, A.P.; Kothari, D.D.;
Choudhary, P.S.

JOURNAL NAME:

2025 6th International Conference on Electronics
and Sustainable Communication Systems
(ICESC)

DETAILS:

Published on 30 October 2025



ABSTRACT:

This This paper explores the transformative potential of blockchain technology across various sectors, positioning it as a digital alchemy capable of reshaping the foundations of trust, transparency, and decentralization in the digital age. Moving beyond its initial association with cryptocurrencies, blockchain is analyzed as a multi-dimensional framework for secure, immutable, and decentralized data management. Through a synthesis of technical insights, case studies, and emerging trends, we investigate blockchain's capacity to revolutionize domains such as finance, supply chains, governance, and healthcare. The study also critically examines the limitations, scalability challenges, and ethical considerations surrounding widespread adoption. Ultimately, this paper argues that blockchain is not merely a disruptive technology but a foundational infrastructure that could redefine how value, information, and authority are exchanged in digital ecosystems.

Link: <https://doi.org/10.1109/ICESC65114.2025.11212541>





TITLE:

Enhancing Urban Efficiency with AI and Digital Twin Technologies in Smart City Infrastructure

AUTHOR :

Kulkarni, S.H.; Kumar, V.; Kanwar, A.; Dasarwar, P.; Gulhane, M.; Rakesh, N.; Kose, U.

JOURNAL NAME:

Driving Innovation through AI and Digital Twin for 6G Powered Sustainable Ultra Smart Cities (Book Chapter)

DETAILS:

Published on 12 September 2025



ABSTRACT:

This chapter discusses the application of artificial intelligence (AI) and digital twins in improving the functionality of smart cities. It presents a digital twin system integrated with AI that simulates urban operations and forecasts future developments. Digital twin technology is a particularly fascinating innovation in smart cities. The Internet of Things plays an important role in the advancement of smart cities by enabling the collection of extensive real-time data from sources such as traffic signals, weather monitors, public transportation systems and utility meters. The development of an AI-enhanced digital twin model for smart cities calls for careful consideration of several factors, including data sources, system architecture and use of the model. Furthermore, the social effects of technology and automated decision-making must be carefully monitored to prevent worsening inequality and job losses.

Link: <https://doi.org/10.1002/9781394411320.ch6>



TITLE:

Mental Health and Proactive Behaviour

AUTHOR :

Rafi, S.; Agarwal, S.; Panchal, D.

JOURNAL NAME:

Empowering Employee Proactive Behavior
Concepts and Perspectives from Organization
and Society (Book Chapter)

DETAILS:

Published on 2 July 2025



ABSTRACT:

In the past two decades, there has been a significant increase in scholarly research on proactive behavior. However, it has not yet become a cohesive research area within the field of Industrial and organizational behavior. However, a consequence of the perpetually changing work environment and escalating workplace expectations, it has become critical for individuals to be proactive in order to keep up with the pace of change. Proactivity entails the capacity to anticipate issues or worries and devise solutions to avert unfavorable consequences or prepare for advantageous results, whereas reactive action is primarily prompted by past occurrences. However, the mental health of employees is being significantly impacted by both sorts, either directly or indirectly. This chapter examines the behavior of individuals with proactive personalities and how it relates to their work performance and subsequent career results. The organizational managerial systems should promote socialization, innovation, and other factors to achieve productive outcomes, which ultimately impact employees' mental health in numerous capacities. Employees' proactive activity enables them to fulfil their psychological and social requirements, leading to increased commitment to their work and organization. It also serves as motivation for them to enhance their skills in various areas. However, there isn't as much research to back up the advantages of proactive conduct for mental health because it can cause stress, require a lot of practice, and require constant awareness, all of which might impair mental health.

Link: https://doi.org/10.1007/978-3-031-49673-8_3





TITLE:

Harnessing Natural Source Lipids for Advanced Drug Delivery Systems

AUTHOR :

Purandare, D.; Polshettiwar, A.; Satish, S.; Patil, A.; Chavan, P.

JOURNAL NAME:

In book: Innovative Pharmaceutical Excipients:
Natural Sources

DETAILS:

Published on 29 July 2025



ABSTRACT:

Harnessing natural source lipids for advanced drug delivery systems offers significant advantages, including biocompatibility, biodegradability, and the ability to encapsulate both hydrophilic and hydrophobic drugs. Lipid-based systems such as liposomes, solid lipid nanoparticles (SLNs), nanostructured lipid carriers (NLCs), and self-emulsifying drug delivery systems (SEDDS) improve drug solubility, provide controlled release, and can be designed for targeted delivery to specific tissues, like tumors or inflamed regions, enhancing therapeutic efficacy. Natural lipids derived from plant, animal, and marine sources are key components due to their natural compatibility with biological systems. These lipid-based carriers have broad applications in cancer therapy, vaccine delivery (e.g., mRNA vaccines), neurological treatments, and ophthalmic care. They also reduce systemic toxicity and enhance patient compliance by enabling sustained drug release. However, challenges include lipid oxidation, scalability in large-scale manufacturing, and regulatory approval for novel lipid excipients. Advances in formulation technologies, such as the use of antioxidants and improved stabilization techniques, are addressing these hurdles, while regulatory frameworks continue to evolve. Overall, lipid-based drug delivery systems (LBDDS) hold boundless potential for revolutionizing drug delivery and therapeutic outcomes across a varied variety of therapeutic fields. By exploring the inherent advantages of natural lipids, this chapter underscores the critical role they play in advancing the efficacy, safety, and adaptability of drug delivery platforms, leading for more efficient handling modalities in various clinical contexts.

Link: https://doi.org/10.1007/978-981-96-7959-1_8





TITLE:

Machine Learning Models-Based Prediction in Cardiovascular Diseases: A Cavernous Analysis

AUTHOR :

Singha, A.; Bhatia, M.; Chauhan, P.; Jaiswal, S.

JOURNAL NAME:

In book: AI and ML Techniques in Image Processing and Object Detection

DETAILS:

Published on 12 August 2025



ABSTRACT:

Cardiovascular (CVD) disease continues to pose a key global health challenge, emphasizing the need for accurate risk prediction and preventive measures. In recent decades, machine learning (ML) approaches have arisen as influential tools for analyzing complex medical datasets and enhancing CVD risk assessment. This book chapter presents a comprehensive review of recent advancements in ML-based CVD prediction, covering various ML algorithms, datasets, feature selection techniques, performance evaluation metrics, and associated challenges. The healthcare industry generates vast amounts of medical data, necessitating ML-driven decision-making for effective heart disease prediction. Recent research has explored the integration of multiple ML techniques to develop hybrid predictive models for improved accuracy. The proposed study employs data pre-processing techniques such as noise removal, handling missing values, and attribute classification to enhance classification and decision-making at different stages. The performance of the predictive model is assessed using classification metrics such as sensitivity, accuracy, and specificity. This chapter introduces a CVD prediction classification model designed to determine the likelihood of heart disease and raise awareness regarding early diagnosis. The proposed approach compares the predictive accuracy of decision tree, random forest, gradient boosting, and logistic regression by applying rule-based methodologies to regional datasets, ultimately identifying the most accurate model for CVD prediction.

Link: https://doi.org/10.1007/978-981-96-7445-9_8





TITLE:

The Impact of Environmental, Social, and Governance (ESG) Objectives' Effect on Investment Decisions: Retail Investors' Knowledge and Views on Sector-Specific ESG Factors

AUTHOR :

Bhowmick, D.; Boralkar, M.; Salunkhe, H.A.

JOURNAL NAME:

In Book: The Synergistic Effect of Sustainable Business Practices on Corporate Performance

DETAILS:

Published on 22 April 2025



ABSTRACT:

Following the global financial crisis, Environmental, Social, and Governance discretion in stock market investment decisions has become necessary for sustainable development. Environmental, Social, and Governance consider investing qualities such as accountability, risk minimization, and long-term return. This study investigates how individual stock market investors perceive and are aware of Environmental, Social, and Governance concerns, as well as how the purpose of an investment influences how judgments are made regarding it. The study's sequential mixed research methodology begins with an interview and progresses to a cluster and snowball sampling procedure for a survey of stock market investors. The study's findings show how the Environmental, Social, and Governance factor moderates investment decisions, with implications for managers, investors, and regulators. Investors will be assured a long-term return on investment as well as accountability to the environment, society, and economic equilibrium, which could lead to sustainable development. It is also recommended that future research be performed in various states and countries with diverse causes and conceptions.

Link: https://link.springer.com/chapter/10.1007/978-981-96-3375-3_4





TITLE:

Cost-Efficient Resource Allocation in Hybrid Cloud Environments Using Grey Wolf Optimizer and Ant Colony Algorithms

AUTHOR :

Janamanchi, B.; Mogal, A.K.; Parveen Banu, S.; Sathiyamoorthy, C.; Patil, P.A.; Mandal, P.

JOURNAL NAME:

Conference: 2025 World Skills Conference on Universal Data Analytics and Sciences (WorldSUAS)

DETAILS:

Published on 17 October 2025



ABSTRACT:

Hybrid cloud infrastructures present considerable difficulties in the dynamic and economical allocation of resources due to fluctuating workloads, pricing structures, and quality of service limitations. Current methodologies frequently fail to achieve an equilibrium among execution costs, energy usage, and SLA consistency. This research presents a hybrid metaheuristic framework that integrates the Grey Wolf Optimiser (GWO) with Ant Colony Optimisation (ACO) to tackle these difficulties. The GWO component conducts global exploration to determine ideal search areas, while the ACO algorithm guarantees accurate local allocation using pheromone-based task mapping. Experiments performed on a synthesised dataset of 1000 tasks and 50 diverse virtual machines illustrate the advantages of the suggested strategy. In comparison to FCFS, Round Robin, standalone GWO, and ACO approaches, the hybrid GWO-ACO model attains a make span of 92.5 units, a SLA violation rate of 1.2%, an execution cost of \$874.4, and energy usage of 164.0 kWh. The results demonstrate the model's resilience, scalability, and efficiency in handling extensive cloud workloads. The suggested approach provides substantial advantages for cloud service providers aiming to reduce operational costs while upholding SLA commitments. Further improvements may include the integration of dynamic pricing, adaptive feedback learning, and multi-objective optimisation to manage progressively complicated resource scheduling situations in real-time cloud environments.

Link:

<https://doi.org/10.1109/WorldSUAS66815.2025.11198948>





TITLE:

Network Intrusion Detection Using Modified Attention-Enabled Optimized Deep Learning Framework

AUTHOR :

Patil, N.; Joshi, S.

JOURNAL NAME:

Conference: 2025 International Conference on Emerging Information Technology and Engineering Solutions (EITES)

DETAILS:

Published on 23 October 2025



ABSTRACT:

Intrusion detection is significant for safeguarding the networks and data to reduce data breaches. The detection systems improve the network efficiency by strengthening the property boundaries and various prevention models have been deployed to identify the unauthorized users or data packets. However, the fault positives are higher for encrypted packets as well as exhibit higher dependency on signature databases. The research proposes Prairie Araneidae optimization based on modified split attention with a fused dyad network (PMSpDN) that aims to address the potential limitations in conventional approaches and to provide accurate detection. The Prairie Araneida optimization algorithm (PAO) is incorporated to tune the weights of the MSpDN framework with the simulation of cooperative and alertness behaviors. Furthermore, the modified split attention (ModSpA) enables to focus on the intricate relationships of data packets that assist in distinguishing abnormal network behaviors from known data. The analysis of the PMSpDN with the prevailing techniques reveals the superiority of this research by attaining a higher accuracy of 99.21%, sensitivity of 99.05%, and specificity of 99.38% using the CIC-IDS2017 database.

Link: <https://doi.org/10.1109/EITES66543.2025.00014>



TITLE:

India's strategic autonomy in South Asia:
implications for the Indo-Pacific region

AUTHOR :

Lenin Kumar, V.

JOURNAL NAME:

Journal of the Indian Ocean Region

DETAILS:

Published on 17 November 2025



ABSTRACT:

Since 1991, India has been interested in extending its influence into the Indo-Pacific region. While the US has proposed an Indo-Pacific strategic alliance with the intent to contain China both economically and militarily, India does not share the same intent. Despite having border disputes and economic competition with China, India wants to approach these disputes bilaterally, firmly believing in the emergence of a multipolar world order. India has viewed its similar engagement with the multipolar world through the prism of strategic autonomy. This is in continuation and in congruence with India's apprehension of South Asia being used by the US as a backyard for its China containment policy. This article will explore the themes of non-alignment and strategic autonomy in India's foreign policy, India's role in the Indo-Pacific strategy, and the South Asian question in the above context.

Link: <https://doi.org/10.1080/19480881.2025.2582405>



TITLE:

Cost Optimization Strategies Using Machine Learning in Business Operations

AUTHOR :

Dhole, M.; Shah, J.; Sontakke, K.; Sontakke, K.K.; Lourens, M.; Sirisha, T.

JOURNAL NAME:

Conference: 2025 World Skills Conference on Universal Data Analytics and Sciences (WorldSUAS)

DETAILS:

Published on 17 October 2025



ABSTRACT:

Cost optimization is now a must-have survival strategy for any business today for it to achieve a sustainable financial performance. Traditional ways of pricing and cost control do not work efficiently because they are based on fixed prices and slow to react to changes. This paper examines how ML transforms cost optimization approaches in business management with emphasis on demand forecasting, price changes, customer categorization, and anomalies. In this paper, Kaggle dataset namely "The Art of Demand-Based Pricing Optimization" has been used to prove that the models developed with the help of ML lead to higher pricing efficiency and lesser loss in revenue. The findings point to the fact that businesses that employ cost management through the use of ML achieve increased levels of profitability, lesser levels of price uncompetitiveness, and better responses to dynamic demand. This research is useful as it offers a practical approach of implementing AI in cost optimization of businesses to achieve financial efficiency. It is for these reasons that the future of cost efficient advancements with the help of deep learning and AI decision systems is expected to bring about major changes in the future.

Link:

<https://doi.org/10.1109/WorldSUAS66815.2025.11199173>



TITLE:

Promoting Millet-Based Products for Enhanced Health and Immunity: Towards a Resilient World

AUTHOR :

Chitnis, R.M.; Kulkarni, V.

JOURNAL NAME:

In book: Global Millets Production for a Sustainable Future

DETAILS:

Published on 26 July 2025



ABSTRACT:

Nutrient-rich grains are fast making a resurgence in Indian agriculture after decades of institutional neglect. These cereals were disregarded by development groups and farmers who preferred to grow rice, wheat, and other crops like oilseeds and pulses. When growing on poor soil, millets need less water, fertilizer, and pesticides to thrive. Because they can withstand higher temperatures, they are the best option for “climate-smart” cereals. China, India, and Nigeria are the world’s top producers of millets, accounting for about 55% of global production. Millets are a good choice since they are high in antioxidants, vitamins, and minerals. Common cereals like millets may be a good source of nutrients that support immunity. This is particularly relevant in view of the ongoing Covid-19 virus outbreak. The purpose of this research is to ascertain the customers’ knowledge level that motivates them to use goods based on millet or millets. There were 220 responders in the survey. According to the study’s results, the majority of them planned to include millets in their regular diet since they were aware of their health advantages.

Link: https://doi.org/10.1007/978-3-031-88157-2_16



TITLE:

Mobile banking transaction volume and perceived service quality: A text analytics approach

AUTHOR :

Ali, A.; Godase, R.; Muhsin, M.

JOURNAL NAME:

British Accounting Review

DETAILS:

Published on 4 November 2025



ABSTRACT:

This study investigates the impact of rising transaction volumes on mobile banking service quality from the user's perspective. Using LDA topic modelling, we analyse 1.01 million user reviews of 14 prominent Indian mobile banking applications collected between 2019 and 2023 and identify key user concerns, particularly related to login issues, post-update problems, poor customer care services, and account management issues. The LDA-based negative binomial regression model reveals that the surge in transaction volumes led to a deterioration in service quality, with this effect more pronounced for public banks. The findings highlight the importance of incorporating user feedback into application development to improve adoption and customer retention, ensuring appropriate service quality. This study contributes to the literature by providing a large-scale empirical analysis of m-banking service quality issues, offering actionable insights for banks to improve mobile banking experiences.

Link: <https://doi.org/10.1016/j.bar.2025.101779>



TITLE:

Breast Cancer Prediction Using Various Machine Learning Algorithms

AUTHOR :

Khande, R.; Shete, N.; Rajapurkar, S.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-1361 LLNS)

DETAILS:

Published on 1 November 2025



ABSTRACT:

Acknowledging the critical importance of precise medical predictions in the realm of healthcare, the advanced machine learning techniques are used to predict precise medical prediction. The primary objective is to conduct a comprehensive analysis of breast cancer datasets, with the goal of enhancing the accuracy of tumour diagnosis. The script strategically employs KMeans clustering as a means of grouping data, enabling a deeper understanding of inherent patterns and structures within the dataset. The focus on data grouping is complemented by the integration of XGBoost and Random Forest models, powerful machine learning algorithms that hold significant promise in predicting breast cancer diagnosis with a high degree of accuracy. Leveraging the strengths of these models, authors aim to provide healthcare professionals with robust tools for optimizing medical data analysis. The synergy between clustering and classification techniques within the script is designed to offer a holistic approach to breast cancer analysis, ensuring that both the exploration of underlying patterns and the accuracy of diagnostic predictions are prioritized.

Link: https://doi.org/10.1007/978-981-96-5918-0_24



TITLE:

Performance Evaluation of Single-Path
Transmission Control Protocol on Multi-Path
Data Center Network

AUTHOR :

Suryavanshi, M.; Gandal, J.; Khande, R.;
Rajapurkar, S.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1361 LLNS)

DETAILS:

Published on 1 November 2025



ABSTRACT:

Data centers are scalable and host a heterogeneous kind of applications and store an enormous amount of data. Various types of Data Center Network Architectures (DCNAs) are available for building a variety of Data Center Networks (DCNs). Multi-path DCNs allow servers to transmit and receive data through multiple paths. This helps to achieve better robustness, effective fairness, and high aggregate throughput. In this paper, a comparative analysis of several commonly used DCNAs is performed using scalability, path diversity, latency, throughput, cost, and power consumption metrics. Single-path Transmission Control Protocol (TCP) is the backbone of the Internet. TCP offers reliable data delivery and effective congestion control capabilities. Variants of TCP ensure that TCP works efficiently in a WAN. But due to the single-path transport, TCP is incapable of efficiently utilizing high-bandwidth and low-latency DCNs. This paper also analyzes incompatibility issues between the single-path TCP protocol and multi-path DCN. Further, we evaluate the performance of single-path TCP by running it over a multi-path FatTree DCN. Simulation experiments are performed using the ns-3 simulator to validate our analysis. Goodput and delay results are collected by configuring an increasing number of pods within the FatTree DCN.

Link: https://doi.org/10.1007/978-981-96-5918-0_8





TITLE:

Enhancing Marathi Language Processing: A Machine Learning Approach to Lemmatization

AUTHOR :

Goje, S.P.; Patil, R.H.; Kadam, R.; Gaikwad, R.;
Jadhav, P.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-
1361 LLNS)

DETAILS:

Published on 1 November 2025



ABSTRACT:

Marathi lemmatization, the process of identifying a word's base form or lemma, is crucial in natural language processing applications such as text mining, machine translation, and information retrieval. This research provides a comprehensive analysis of using machine learning approaches for Marathi lemmatization, focusing on comparing different classification algorithms. We employ a character-level Count Vectorizer to convert wordform-lemma pairs into numerical vectors, subsequently training classifiers like Support Vector Machine (SVM), Random Forest, Decision Tree, and Logistic Regression. Experiments are conducted using a dataset of Marathi wordform-lemma pairs, with each algorithm's performance evaluated through accuracy metrics. A key finding is that while SVM achieves the highest overall accuracy, Random Forest performs better with random words, suggesting greater resilience and efficiency when processing unknown inputs. Our findings offer valuable insights into selecting appropriate machine learning algorithms for Marathi lemmatization, considering factors like accuracy, robustness, and practicality. Additionally, this work lays the foundation for future research in Marathi language processing, enhancing our understanding of this field.

Link: https://doi.org/10.1007/978-981-96-5918-0_20



TITLE:

Strategies for Screening and Managing
Inflammatory Bowel Disease During Pregnancy

AUTHOR :

Nikam, U.D.; Patil, S.D.; Singh, R.; Yadav, S.K.;
Chand, S.

JOURNAL NAME:

Current Drug Therapy

DETAILS:

Published on 17 October 2025



ABSTRACT:

Pregnancy is a critical phase of life for women; there are several hormonal changes during this period. Pregnant women, throughout their gestation, may be greatly impacted by disease conditions such as hypertension and diabetes mellitus. Inflammatory Bowel Disease (IBD) is a chronic condition involving inflammation of the gastrointestinal (GI) tract. Comprehending the connection between IBD and pregnancy is essential due to its effects on the pregestational, gestational, and post-partum phases. Pregnancy-related inflammatory bowel disease activity must be tracked using several techniques. The usefulness and reliability of small intestine ultrasound (IUS) as a trustworthy and noninvasive diagnostic tool are reviewed in this article. The increasing popularity of IUS requires skilled personnel for its effective use due to its technique-sensitive nature. In addition, this review provides an overview of the most recent data about the efficacy and safety of IBD treatments for expectant mothers to provide medical professionals with up-to-date clinical recommendations.

Link:

<http://dx.doi.org/10.2174/0115748855394477250924234245>



TITLE:

Encapsulation of Fe-doped BCZTO hybrid material with PANI for enhanced photocatalytic dye degradation efficiency and computational assertion of the composite

AUTHOR :

Naresh, G.; Neikha, K.; Baruah, S.; Das, P.;
Puzari, A.

JOURNAL NAME:

International Journal of Polymer Analysis and
Characterization

DETAILS:

Published on 11 November 2025



ABSTRACT:

Ferroelectric oxides, prized for their dielectric, piezoelectric, and optical properties, have surged in interest. Barium calcium zirconate titanate (BCZTO) is widely used in electronics, either as single crystals or ceramics, with enhanced permittivity achievable through doping for capacitor applications. Encapsulating these with conductive polymers exploits synergies, broadening their utility. This study synthesizes and characterizes PANI-encapsulated Fe-doped BCZTO hybrids with varying Fe-BCZTO proportions, showing promise in degrading dyes. The structural analysis via FT-IR, UV-Vis, XRD, SEM, and TGA confirms successful Fe doping and filler integration. Thermal stability improves with higher Fe-BCZTO weights in the composite. The material demonstrated efficacy in the photocatalytic degradation of methylene blue dye. Additionally, interaction studies of the composite were supported by density functional theory computations.

Link: <https://doi.org/10.1080/1023666X.2025.2580940>





TITLE:

6G-enabled Digital Twin for Smart Transportation

AUTHOR :

Wakhare, P.; Patil, P.; Bakare, A.A.; Nikam, R.;
Gupta, V.; Sood, Y.; Kose, U.

JOURNAL NAME:

In book: 6G Urban Innovation

DETAILS:

Published on 19 Septembr 2025



ABSTRACT:

With smart transport one of the key areas of focus, the launch of Sixth-generation (6G) technologies is expected to transform several spheres. This chapter discusses how digital twin technology and 6G networks may be coexisted to create smart transport. Digital twins run on 6G networks and can manage vast volumes of data from infrastructure, cars and sensors. The chapter discusses how, in digital twin environments, artificial intelligence (AI) and machine learning could enable individuals to make better judgments. It addresses, for instance, data privacy concerns, hacking challenges and the requirement of professionals in telecommunications, AI and urban planning cooperating together. One of the most significant new elements of 6G network architecture is combining edge computing with fog computing. Real-time monitoring and modeling underlie the digital twin concept in transportation systems, which offer great advantages for safety, optimization and future prediction ability.

Link: <https://doi.org/10.1002/9781394411337.ch8>



TITLE:

Role of AI and Digital Twin for Smart Transportation

AUTHOR :

Bais, R.G.; Gupta, V.; Joshi, M.; Sharma, J.;
Borkar, P.; Hossain, M.A.

JOURNAL NAME:

In book: 6G Urban Innovation

DETAILS:

Published on 19 September 2025



ABSTRACT:

Artificial intelligence (AI) and digital twin (DT) technology used together in smart transport systems is a new way to make towns safer, better for the environment and easier to get around in. The fields of AI and DTs are changing the way smart transport works. Transportation has a lot of uses for AI. This chapter shows a wide range of uses for DT in different fields, including the methods used, important discoveries, difficulties, pros and cons, and specific examples of their application. It includes construction, tracking the health of buildings, smart towns, electric cars, transportation and industry, among other things. Route optimization is yet another significant use of AI in transportation. Real-time decision support systems search connected autos, traffic cameras and road monitor data for things such as road blocks or accident causes.

Link: <https://doi.org/10.1002/9781394411337.ch7>



TITLE:

Broken Reproductive Health Of Women
Sugarcane Cutters In Maharashtra, India

AUTHOR :

Shinde, S.; Rakshase, B.

JOURNAL NAME:

In book: Women in India

DETAILS:

Published on September 2025



ABSTRACT:

India has made remarkable progress in reproductive health, but significant disparities remain, particularly among vulnerable populations. A lot of vulnerable community-specific studies set a contradictory argument that improvement is not equivalent all over. Backward communities in India are yet to be part of improved reproductive health. Sugarcane cutters in Maharashtra exemplify a group whose reproductive health needs are often overlooked. The present chapter aims to explore the reproductive health issues of pregnant/lactating women sugarcane cutters. The research is based on an exploratory study conducted with 41 pregnant/lactating women sugarcane cutters. Findings revealed that most women could not deliver in health facilities, register their pregnancies, or complete the recommended minimum of three antenatal care visits. Seasonal migration intensified their disconnection from essential services, as pregnant and lactating mothers were not supported by any health institution at their work sites. The outcome of this exploration altogether marks the broken reproductive health and hardship of women sugarcane cutters.

Link: <https://doi.org/10.4324/9781003665519-10>



TITLE:

Learning curve theory in accreditation: a replication study of Indian universities

AUTHOR:

Kumar, A.; Gawande, A.; Sane, A.; Kale, S.;
Paliwal, J.; Singh, M.; Agarwal, A.; Brar, V.;
Saini, A.; Dhaigude, R.; Raibagkar, S.

JOURNAL NAME:

Quality Assurance in Education

DETAILS:

Published on August 2025



ABSTRACT:

Purpose The purpose of this study is to find out if the accreditation performance of Indian universities accredited by the National Assessment and Accreditation Council (NAAC) in 2025 (Phase II) replicates the learning curve effect that was seen in the case of Indian universities accredited in 2023 (Phase I). **Design/methodology/approach** For Phase I, all 319 and for Phase II, all 419 NAAC-accredited universities constituted the study size. The accreditation scores were analyzed using ANOVA. Accreditation cycles 1–4 were used as the qualitative predictor variables, and the corresponding quantitative accreditation scores served as the dependent variable. Results of Phase II were compared with those of Phase I. To gain qualitative insights, interviews were conducted with ten experts. **Findings** The analysis reveals that Phase II results replicate the classical learning curve theory observed in Phase I. The qualitative findings are discussed in detail. **Originality/value** Based on the learning curve concept, this paper presents a unique case of replication of accreditation performance over time. The replication results confirm that accreditation performance reflects the properties of a learning curve.

Link: <https://doi.org/10.1108/QAE-05-2025-0171>



TITLE:

Fusion of NLP and Nutritional Intelligence for Food Recommendation: A Three-Way Hybrid Model

AUTHOR :

Nagarkar, G.; Savyanavar, A.

JOURNAL NAME:

Conference: 2025 International Conference on Next Generation Computing Systems (ICNGCS)

DETAILS:

Published 8 October 2025



ABSTRACT:

Gradually, Food Recommendation Systems (FRS) have evolved as tool to guide users in selecting various food choices. In spite of its growing importance, the FRS struggles due to its strict input requirements, inadequate context awareness, and lack of attention to dietary demands. The proposed hybrid model combines three different methods: cosine similarity and TF-IDF vectorisation with fuzzy string fallback (using fuzzywuzzy), cuisine-based filtering, and nutritional optimisation based on Euclidean distance that includes calories, fats, proteins, and carbohydrates. The user can select one of the three input of their choice and goal. The three inputs are: name of ingredient or recipe, variety of cuisines, and nutritional targets. The Kaggle dataset is enriched with ingredients quantitatively, nutritional information, and categorical tags like Healthy/Unhealthy, Vegetarian/Non-Vegetarian, and Diabetic Safe/Unsafe. The hybrid model demonstrates more than 90% accuracy. This paper proposes a robust and user-centric approach, sustainable for personalized food recommendations and dietary choices. Also, the system features with detailed preparation instructions, nutritional breakdown, and an image of the recommended food. Overall, the system offers selection of food as per personal requirement and diet.

Link: <https://doi.org/10.1109/ICNGCS64900.2025.11183285>





TITLE:

Addressing Ship Detection Challenges: From
Semantic Segmentation Limitations to YOLOv8
Success

AUTHOR :

Deshmukh, M.; Joshi, D.

JOURNAL NAME:

Conference: 2025 International Conference on
Artificial Intelligence and Machine Vision (AIMV)

DETAILS:

Published on 21 October 2025



ABSTRACT:

Accurate ship detection in satellite imagery is essential for maritime applications. This paper addresses the challenges of applying UNet-based semantic segmentation, which exhibited limitations including a learning rate plateau (maximum Dice coefficient: 0.75805). To overcome these, the study transitioned to YOLOv8-based object detection. YOLOv8 demonstrated improved performance, achieving mAP50-95 values of 0.285, 0.328, and 0.387 for 5, 10, and 20 epochs, respectively. The findings highlight YOLOv8's efficacy as a robust alternative to semantic segmentation for ship detection.

Link: <https://doi.org/10.1109/AIMV66517.2025.11203419>





TITLE:

Enhancing DeepFake Detection through Deep Learning and Explainable AI

AUTHOR :

Wagh, A.; Rane, R.; Pinjarkar, L.

JOURNAL NAME:

Conference: 2025 International Conference on Artificial Intelligence and Machine Vision (AIMV)

DETAILS:

Published on 21 October 2025



ABSTRACT:

DeepFake technologies powered by AI models like GANs and Auto-Encoders, with serious threats to privacy and security. Traditional detections methods struggled against Sophisticated DeepFakes. This paper reviews existing detection techniques, identifies research gaps and proposes a new framework integrating CNNs, Transformers, Bi-LSTM and Explainable AI (XAI) for detecting both images and videos and for better accuracy and interpretability.

Link: <https://doi.org/10.1109/AIMV66517.2025.11203343>



TITLE:

Learning Lessons from the Scenario Changes of Air Quality with Reference to the Pandemic in Delhi NCR: An MCDM Approach for Fighting Air Pollution

AUTHOR :

Acharyya, R.; Hati, J.P.; Pramanick, N.; Mukherjee, S.; Ganguly, S.; Singh, M.; Tingote, T.A.; Pal, I.; Jana, S.K.; Pramanik, M.; Mukhopadhyay, A.

JOURNAL NAME:

In book: Artificial Intelligence, Geographic Information Systems, and Multi-Criteria Decision-Making for Improving Sustainable Development

DETAILS:

Published on June 2025



ABSTRACT:

We investigated changes in air pollutants (PM₁₀, PM_{2.5}, NO₂, and SO₂) over the Delhi-National Capital Region during the COVID-19 lockdown period. Measurements of significant air pollutants, namely PM₁₀, PM_{2.5}, NO₂, and SO₂ were performed using conventional techniques before and after the complete lockdown (2021). The average SO₂ level in April 2019 was 25.63 g/m³, fell to 16.46 g/m³ in April 2020, and rose to 24.25 g/m³ in April 2021. The mean NO₂ level in April 2019 was 35.57 g/m³, decreased to 18.92 g/m³ in April 2020, and increased to 25.46 g/m³ in April 2021. The average PM_{2.5} level was 79.27 g/m³ in April 2019, 40.28 g/m³ in April 2020, and 68.90 g/m³ in April 2021. The average PM₁₀ level in April 2019 was 198.50 g/m³, fell to 107.7 g/m³ in April 2020, and climbed to 193.63 g/m³ in April 2021. We conducted a thorough investigation of the effects of the COVID-19 pandemic on air quality in the study area using data from the study CAAQM (Continuous Ambient Air Quality Monitoring) stations and compared the changes to those in the AQI (air quality index), geographical distribution, and PM₁₀, PM_{2.5}, NO₂, and SO₂ concentration levels. The study reveals a complicated relationship between baseline pollution and weather, resulting in unanticipated pollution reductions during the COVID-19 shutdown and overall improvements in air quality across this region. An MCDM (Multi-Criteria Decision Making)-based resilience framework has been proposed based on the pandemic scenario for planning a better strategy against air pollution in Delhi.

Link: <https://doi.org/10.1201/9781032683928-5>



TITLE:

Utilizing Granite Waste for Sustainable Construction: A Focus on AAC and Concrete Blocks

AUTHOR :

Minde, P.; Pati, J.

JOURNAL NAME:

Sankhya B

DETAILS:

Published on 10 September 2025



ABSTRACT:

Sustainability hinges on the concept of recovery, which emphasizes the highest potential of an object to be recycled and reused, thereby providing optimal opportunities for sustainable development. This approach, often termed a zero-waste strategy, is central to sustainable development goals. Across various industries, including civil engineering, there is a growing emphasis on using recyclable materials. However, modern construction methods often rely heavily on energy-intensive materials. Hence, there is a pressing need to adopt materials with lower embodied energy to reduce the environmental impact of construction activities. From the very old period of civilization, marble and granite have been used as a material for construction. Granite is impermeable and has good resistance to abrasion along with its aesthetic properties. As a result, granite can subdue many construction materials for various indoor as well as outdoor applications, such as ceramics in indoor paving; and concrete and asphalt in outdoor paving. In the modern context, the disposal of granite and marble dust has caused land and air pollution because of the conversion of fine particles to particulate matter. The extraction process often referred to as downstream activity results in a major waste of the material. It has been found that only 75% of the original marble is obtained and the rest of it results in waste material. The waste material in the form of dust particles tends to cause various deadly diseases like respiratory disorders and decrease the average human life within that locality. The raw materials used for manufacturing AAC blocks are fine silica sand; Class F fly ash; Ordinary Portland cement; calcined lime; gypsum; expansive agents such as finely ground aluminum powder and portable water. The chapter includes experimental results obtained after the fine silica sand has been replaced by percentages of waste granite dust. To carry out the proposed study cubes of concrete with varying partial replacement of cement with WMP are cast and tested. Cement is replaced by marble dust at 0, 5, 10 and 15% by weight.

Link: <https://doi.org/10.1002/9781394293032.ch2>



TITLE:

Pathogenesis of Gut Microbiota in Inflammatory Bowel Disease

AUTHOR :

Anitha, K.; Chenchula, S.; Bhatt, S.; Kopineni, N.K.; Radhika, C.; Amerneni, K.C.

JOURNAL NAME:

Inflammatory Bowel Disease and Gut Microbiota
Current Strategies and Future Prospects in
Nanomedicine, (Book Chapter)

DETAILS:

Published on 2025



ABSTRACT:

Inflammatory bowel disease (IBD) is a long-lasting inflammatory disorder affecting the gastrointestinal tract, encompassing two major clinical subtypes: ulcerative colitis (UC) and Crohn's disease (CD). The etiology of IBD is multifactorial, relating to a complex interplay among genetic, environmental, and immunological factors. Accumulating evidence over the past decade has highlighted the critical role of gut microbiota dysbiosis in IBD pathogenesis. A diverse community of microorganisms inhabiting the GI tract closely interacts with the host immune system and plays a crucial role in maintaining intestinal homeostasis. Patients with IBD exhibit alterations in gut microbiota composition and functionality, characterized by reduced microbial diversity, imbalanced abundance of specific bacterial taxa, and functional imbalances. Dysbiotic microbiota in IBD is associated with impaired mucosal barrier function, dysregulated immune responses, and increased susceptibility to pathogens. Disrupting the delicate stability between favorable and harmful microorganisms leads to altered host-microbiota crosstalk, triggering aberrant immune responses and chronic gut inflammation. Several mechanisms have been suggested to explain the pathogenesis of gut microbiota in IBD, which includes impaired mucosal barrier function that allows the translocation of bacteria and their products into the intestinal mucosa, activating the immune system and resulting in chronic inflammation. Dysbiotic microbiota can also produce metabolites and bioactive molecules that influence immune cell function and inflammatory signaling pathways, further exacerbating the inflammatory response.

Link:

<https://www.scopus.com/pages/publications/105021654111>



TITLE:

Targeting Gut Microbiota with a Novel Drug
Delivery System to Treat Inflammatory Bowel
Disease

AUTHOR :

Pavani, P.; Bhatt, S.; Suttee, A.

JOURNAL NAME:

Inflammatory Bowel Disease and Gut Microbiota
Current Strategies and Future Prospects in
Nanomedicine.(Book Chapter)

DETAILS:

Published on 2025



ABSTRACT:

The management of inflammatory bowel disease (IBD), encompassing conditions such as Crohn's disease and ulcerative colitis, presents numerous challenges due to the chronic nature and unpredictable course of the diseases. Conventional treatment approaches for IBD, including oral medications and systemic therapies, often face limitations in terms of efficacy, adverse effects, and patient compliance. In recent years, there has been a growing interest in developing novel drug delivery systems to enhance the treatment outcomes for individuals with IBD. This aims to provide a comprehensive overview of the emerging field of novel drug delivery systems for the treatment of IBD. It explores various cutting-edge approaches that have shown promise in delivering therapeutic agents to the gastrointestinal tract, targeting the inflamed areas, and achieving localized and sustained drug release. It then delves into the advancements in drug delivery technologies, including nanoparticle-based systems, liposomes, hydrogels, and microspheres, among others. The benefits of these innovative systems lie in their ability to protect drugs from degradation, facilitate targeted delivery to inflamed regions, and improve bioavailability while minimizing systemic side effects. Additionally, the chapter provides insights into ongoing research and future directions in the field, highlighting the potential of personalized medicine and the integration of advanced technologies, such as nanotechnology and biotechnology, for tailored IBD treatment. Overall, this chapter aims to present a comprehensive overview of the current advancements, challenges, and potential applications of novel drug delivery systems in the treatment of IBD.

Link:

<https://www.scopus.com/pages/publications/105021598854>



TITLE:

Synthesis and Toxicological Evaluation of N-Nitroso Vildagliptin Amide Impurity in BALB 3T3 Clone Cells

AUTHOR :

Giri, P.T.; Chabukswar, A.R.; Waghmare, P.S.;
Raut, K.G.

JOURNAL NAME:

Journal of Applied Toxicology

DETAILS:

Published on 12 November 2025



ABSTRACT:

Nitrosamine impurities in pharmaceuticals have become a significant regulatory concern because of their established carcinogenic and genotoxic potential. N-nitroso vildagliptin amide impurity (NNVI), associated with the antidiabetic drug vildagliptin, raises potential safety concerns, yet its biological toxicity remains inadequately explored. To address this gap in our study, we synthesized and characterized NNVI and evaluated its cytotoxic, oxidative, and genotoxic effects using BALB 3T3 cell lines, within the context of the US FDA's acceptable daily intake (ADI) limit for NNVI. NNVI was synthesized under mild acidic conditions via nitrosation of the vildagliptin amide intermediate and confirmed structurally using NMR, IR, and mass spectrometry. BALB 3T3 cells were treated with NNVI at concentrations ranging from 5 to 125 ppm. Cytotoxicity was assessed with the MTT assay, whereas oxidative stress was measured via levels of superoxide dismutase (SOD), catalase (CAT), malondialdehyde (MDA), nitric oxide synthases (iNOS), reduced glutathione (GSH), and Nrf2. Genotoxicity was determined through the alkaline comet assay. The results showed a dose-dependent decrease in cell viability, with significant cytotoxicity observed at concentrations ≥ 50 ppm. Oxidative stress markers indicated adaptive antioxidant responses at lower concentrations (5–25 ppm), but higher concentrations caused oxidative imbalance, antioxidant depletion, and increased lipid peroxidation. Genotoxic effects were evident at 100 ppm, with increased DNA tail intensity. These findings confirm that NNVI presents a toxicological risk at concentrations above regulatory limits. The study underscores the importance of strict impurity control in pharmaceutical formulations and contributes to the wider effort of ensuring drug safety by limiting nitrosamine exposure to acceptable thresholds.

Link: <https://doi.org/10.1002/jat.4983>





TITLE:

Shaping like the tide: assessing the nonlinear association between agricultural imports and food security in East European countries

AUTHOR :

Pradhan, J.; Mahali, S.; Behera, S.

JOURNAL NAME:

Eurasian Economic Review

DETAILS:

Published on 11 November 2025



ABSTRACT:

This study inspects the nexus between agricultural imports and food security in East European countries by controlling other crucial factors such as food price inflation, political stability, CO₂ emissions, temperature, and precipitations from 2001 to 2021. In order to estimate the robust outcome in the presence of autocorrelation, heteroscedasticity, and cross-sectional dependency, the study used the Panel-corrected standard error model. Further, we analysed the nonlinear effect of agricultural imports on food security. The findings of the study revealed an inverted U-shaped relationship between agricultural import and food security, which indicates that agricultural imports initially enhance food security and, after a point, eventually deteriorate. Moreover, there is a positive relationship between food security and CO₂ emission, political stability, temperature, and precipitation is also found in the present study, whereas food price inflation is negatively related to food security. Hence, to address short-term needs, policymakers should encourage the import of agricultural products while simultaneously focusing on long-term strategies such as prioritizing domestic production, improving agricultural productivity, and promoting sustainable farming in order to achieve self-sufficiency in their respective countries.

Link: <https://doi.org/10.1007/s40822-025-00334-x>



TITLE:

Effect of Crown Height Variation on Stress Distribution of Splinted Dental Implant Using Numerical Approach

AUTHOR:

Dhatrak, P.N.; Jadhav, A.; Jain, T.; Roy, S.

JOURNAL NAME:

Journal of Maxillofacial and Oral Surgery

DETAILS:

Published on 12 November 2024



ABSTRACT:

A dental implant is a metal component that is inserted into the root of a missing tooth to serve as a support for a prosthetic crown. A splinted implant is a simply supported bridge structure in which the two adjacent implants have a direct connection by means of a crown, whereas a non-splinted implant does not have any connection with other adjacent implants. In the present study splinted implants of molar and premolar crown have been used. The aim of the present study is to compare stress distribution in bone with varying crown to height ratios. The crown-to-implant (CI) ratios of 1:1, 1.5:1, 2:1, and 2.5:1 was selected. On the crown surface, two separate loads of 75 N and 100 N were applied vertically and obliquely at 30° angle. The stress analysis was carried out to obtain the best CI ratio for splinted implants. The jawbone was subjected to similar stress under vertical loading in all four CI ratio models whereas, at 30° oblique loading, a significant rise in stress was observed in all four ratios. Dental models with a smaller crown-to-implant ratio were seen to be more effective as lower stress was developed in them.

Link: <https://doi.org/10.1007/s12663-025-02792-x>



TITLE:

Therapeutic Potential of Phytocompounds
Gentisic Acid and Alpha Resorcylic Acid against
Alzheimer's Disease: A Network Pharmacology,
In Silico, and In Vitro Approach

AUTHOR :

Soni, U.; Pujari, R.

JOURNAL NAME:

Cell Biochemistry and Biophysics

DETAILS:

Published on 11 November 2024



ABSTRACT:

Alzheimer's disease (AD) is a progressive neurodegenerative disorder marked by memory loss, cognitive decline, and impaired cholinergic signaling. Natural polyphenolic compounds have gained attention for their antioxidant, anti-inflammatory, and multi-target neuroprotective effects. In this study, we explored the potential of gentisic acid and alpha-resorcylic acid as therapeutic candidates against AD using a combination of computational and experimental approaches. We first identified potential protein targets for these compounds using SwissTargetPrediction and STITCH databases and compiled 67 AD-related genes from GeneCards. Network analysis highlighted acetylcholinesterase (AChE) as a key target, supported by its established role in AD pathology. Molecular docking showed that gentisic acid and alpha-resorcylic acid bind effectively to AChE, with docking scores of -6.6 and -6.9 kcal/mol, respectively, compared to standard drugs donepezil (-9.2 kcal/mol) and galantamine (-7.7 kcal/mol). Molecular dynamics simulations over 100 ns confirmed the stability of these ligand-protein complexes, with RMSD values remaining below 3 Å and consistent hydrogen-bond interactions throughout the simulation. Experimental validation revealed that both compounds inhibit AChE in a concentration-dependent manner, with IC_{50} values of 3.59 µg/mL for gentisic acid and 89.99 µg/mL for alpha-resorcylic acid. Functional enrichment analyses further indicated that these compounds may influence multiple pathways relevant to AD, including Tau phosphorylation, neuropeptide receptor activity, glycerolipid metabolism, and anti-inflammatory signaling. Together, these findings suggest that gentisic acid and alpha-resorcylic acid can act as multi-target agents with promising neuroprotective effects.

Link: <https://doi.org/10.1007/s12013-025-01944-7>



TITLE:

Correction: Functionally Graded Metallic Materials Via Additive Manufacturing: Research Progress on Processing, Challenges, and Applications (International Journal of Precision Engineering and Manufacturing-Green Technology, (2025), 10.1007/s40684-025-00766-5)

AUTHOR :

Jain, R.; Sahoo, B.; Jain, S.; Mohan, M.; Choudhary, M.; Lee, H.; Dewangan, S.K.; Samal, S.; Ahn, B.; Jeon, Y.

JOURNAL NAME:

International Journal of Precision Engineering and Manufacturing - Green Technology

DETAILS:

Published on 4 November 2025



ABSTRACT:

Functionally graded metallic materials (FGMMs) represent an innovative category of metals, characterized by gradual variations in structure or composition, achieved by combining different elements. FGMMs differ from traditional materials as they enable the combination of diverse properties in a spatially tailored manner, offering extraordinary combinations of advanced functionalities. The unique capabilities of FGMMs make them highly desirable for various applications across different industries. The initiation of additive manufacturing (AM) has significantly progressed the advance of FGMMs by aiding specific control over material gradients, complex geometries, and optimized material utilization. This review delivers a comprehensive overview of FGMMs, including their fundamental principles, metallic alloys (alloys based on Al, Ti, Fe, superalloys, and emerging high-entropy alloys), and their integration with AM technologies. Challenges related to thermophysical mismatches, thermal stresses, and process monitoring are addressed with potential solutions. Further, Key modeling and simulation approaches, such as thermodynamic modeling, thermal-mechanical simulations, and machine learning-based design, are discussed in detail to highlight their role in optimizing FGMM performance. This review provides an in-depth exploration of recent advancements in FGMMs, highlighting their classifications, modeling and computational approaches, applications, challenges, and future prospects. The article includes a detailed analysis of the microstructure, texture, mechanical properties, and their applications in various sectors. It aims to benefit both general readers seeking an understanding of FGMMs and researchers dedicated to advancing this transformative field.

Link: <https://doi.org/10.1007/s40684-025-00803-3>



TITLE:

Dynamic Response Analysis of a Functionally Graded Irregular Piezoelectric-Orthotropic Material Substrate Due to a Moving Line Load

AUTHOR :

Varuni, K.V.; Pal, M.K.; Singh, A.K.

JOURNAL NAME:

International Journal of Structural Stability and Dynamics

DETAILS:

Published on 15 October 2025



ABSTRACT:

Piezoelectric materials hold the key to revolutionizing modern technology, from ultra-sensitive medical devices to energy-efficient sensors, by harnessing their unique directional properties to transform mechanical stresses into precise electrical responses and vice versa. This research deals with the establishment of closed-form mathematical expressions for the induced Horizontal Normal Compressive Stress (HNCS), Tensile Shear Stress (TSS), Vertical Normal Compressive Stress (VNCS), Horizontal Electrical Displacement (HED), and Vertical Electrical Displacement (VED) on a Functionally Graded Irregular Piezoelectric-Orthotropic Material Substrate (FGIPOMS) due to a line load moving with constant velocity. In the scope of the current model, the influence of several physical and geophysical parameters such as Irregularity Depth (ID), Functionally Graded Parameter (FGP), Irregularity Factor (IF), Velocity of Moving Load (VML), and Frictional Coefficient (FC) has been explored comprehensively. Furthermore, the study employed a framework to compare FGIPOMS with an Irregular Piezoelectric Transversely Isotropic Material Substrate (IPTIMS), Irregular Isotropic Material Substrate (IIMS), and Isotropic Material Substrate (IMS) without irregularity. This analysis enhances analogical reasoning, and the derived outcomes have been rigorously validated against pre-established results. The computational analysis incorporated the material properties of PVDF, AIN, and the isotropic substrate. The outcomes were interpreted using MATLAB-generated visualizations, yielding critical insights into the system's behavior.

Link: <https://doi.org/10.1142/S0219455427500763>



TITLE:

Networks between industry academia: a statistical approach based on India

AUTHOR :

Kakade, K.; Rajak, R.K.; Patil, A.; Thorat, P.;
Brahmane, J.; Shinde, S.C.

JOURNAL NAME:

International Journal of Networking and Virtual
Organisations (Vol.-33, Issue-1)

DETAILS:

Published on 7 November 2025



ABSTRACT:

The National Agricultural Higher Education Project (NAHEP) was made by the Indian Council of Agricultural Research (ICAR) and the World Bank to improve higher education in agriculture in India. In the long run, this will allow farmers to have a better schooling system. The current study was done at national meetings with people from seven State Agricultural Universities (SAUs) across India, as well as people from business and academia. The goal was to improve 'collaboration between academia and industry' by bringing these groups together better. Based on the comments of 199 people from both school and business, the study shows that colleges and businesses need to join right away ($p < 0.001$). People think that these links will help higher education get better over time. Academic institutions think that these kinds of connections help students by making them more employable, giving them business skills, and giving them cash help.

Link: <https://doi.org/10.1504/IJNVO.2025.149615>



TITLE:

Empowering sustainable energy systems with
AI: Opportunities, challenges, and strategic
solutions

AUTHOR :

Srivastava, A.; Meena, P.K.; Burande, C.G.;
Nayak, C.; Wagle, C.S.; Jhalani, A.

JOURNAL NAME:

Environmental Progress and Sustainable Energy

DETAILS:

Published on 7 November 2025



ABSTRACT:

This article presents a prospective analysis of the application of artificial intelligence (AI), specifically machine learning (ML), in sustainable energy systems. It highlights three significant areas of application: modeling and forecasting, managing energy operations, and detecting faults or unusual activities. As we move toward cleaner, more distributed, and more complex energy systems, new challenges arise—like forecasting demand, coordinating operations, securing energy grids, and planning for the future. AI has the potential to address many of these issues by improving the way we integrate renewable sources, manage energy storage, and detect or prevent system failures, including cyber threats. However, using AI in this field is not without its downsides. For instance, most AI tools need vast data to work well, often lack decision-making transparency, and struggle when applied to new or different situations. To overcome these hurdles, this article proposes four key strategies: (1) creating synthetic energy data using generative AI, (2) combining AI with physical system knowledge to improve reliability, (3) applying AI to manage complex, interconnected energy systems better, and (4) building multi-layered cybersecurity systems powered by AI. Altogether, the article offers a fresh look at how AI might shape the future of energy in a smarter, safer, and more sustainable direction.

Link: <https://doi.org/10.1002/ep.70166>



TITLE:

Beta Glucans: The 21st Century's Multifunctional
Key to Drug Delivery

AUTHOR :

Chaudhari, S.P.; Gaikwad, S.V.; Satish, S.;
Polshettiwar, P.P.

JOURNAL NAME:

International Journal of Drug Delivery
Technology (Vol.-15, Issue-3)

DETAILS:

Published on 25 September 2025



ABSTRACT:

β -Glucans are naturally occurring polysaccharides composed of β -D-glucose units, increasingly recognized for their multifunctional roles in human health and industrial biotechnology. Their physicochemical parameters, including molecular weight, branching, solubility, and viscosity, critically determine biological activity, rendering them superior to α -glucans in nutraceutical, pharmaceutical, and cosmeceutical applications. The motivation for this review arises from the need to integrate fragmented knowledge into a unified framework that connects structural attributes with therapeutic and industrial outcomes. This review consolidates evidence from biochemical, biophysical, and molecular studies, emphasizing β -glucan interactions with immune receptors, including Complement Receptor 3, Lactosylceramide, Scavenger Receptors, and Dectin-1, which mediate antifungal defense, immune regulation, and the control of inflammation. The scope further extends to their expanding applications in the food, beverage, healthcare, cosmetics, animal feed, agriculture, vaccine adjuvant, and biotechnology sectors. Importantly, emerging molecular docking studies highlight their ability to function as immune checkpoint modulators, opening novel opportunities in cancer immunotherapy. Key findings highlight β -glucans as versatile, sustainable agents that bridge nutrition, medicine, and industry. The uniqueness of this work lies in its holistic synthesis of structure–function relationships and translational relevance, positioning β -glucans as pivotal 21st -century biomolecules for advancing drug delivery and global innovation.

Link:

<https://www.scopus.com/pages/publications/105021228365>



TITLE:

Diminishing Secularism and Muslim Identity
Under the New Citizenship Law in India

AUTHOR :

Aamir Ali, S.M.A.; Ghose, A.; Khan, S.A.

JOURNAL NAME:

Manchester Journal of Transnational Islamic Law
and Practice (Vol.-21, Issue-3)

DETAILS:

Published on 2025



ABSTRACT:

India has a history of enduring significant ethnic bloodshed, particularly between Hindus and Muslims. Discussions have arisen regarding the diminishing effect of India's secularist ideal, where Muslims persistently encounter prejudice. The rise of populism and exclusive nationalism has fundamentally transformed the political landscape in India, posing challenges to the dominance of secularism as the fundamental guiding principle of a diverse society. From the time of partition till today, the Muslim minority in India has witnessed marginalisation in different forms. This paper explores the implications of India's Citizenship (Amendment) Act of 2019 (CAA) and its effect on the rise of anti-Muslim prejudices within the country. The research examines the correlation between Hindu nationalist ideas and the CAA. The findings of the study unveiled that the CAA has flaws and exhibits undertones of anti-Muslim sentiments and a diminishing effect on India's secularism. In this article, the authors first decode the discourse on citizenship in the Constituent Assembly Debate (CAD), which is arguably non-secular and the first point of 'othering' of Muslim minorities in an independent country. Furthermore, the authors explore the intangible concept of secularism, contextualised in the Indian scenario, and then deliberate upon the threat to Muslims' political and social identity in the current discourse surrounding the CAA, while testing its constitutionality. The text consistently argues that India cannot be a republic based on prejudice, hatred, and a widespread sense of fear harboured by its most significant minority.

Link:

<https://www.scopus.com/pages/publications/105021127373>



TITLE:

Improve the authentication of agricultural food supply chain using Permutations Supersonic Liger Elliptic Signature Algorithm

AUTHOR :

Arade, M.S.; Pise, N.N.

JOURNAL NAME:

International Journal of Food Properties (Vol.-28, Issue-1)

DETAILS:

Published on 5 November 2025



ABSTRACT:

Blockchain technology improves transparency and security in agricultural food supply chains (FSC) but faces challenges related to data privacy and emerging computational threats. These issues limit the efficiency and security of permissioned blockchain systems. To address these, a novel cryptographic framework, Permutations Supersonic Liger Elliptic eXtended Merkle Curve Digital Signature Algorithm, is proposed. In permissioned blockchain-based FSC, metadata exposure and cross-entity data aggregation create privacy risks, allowing adversaries to infer sensitive operational insights by analyzing transaction patterns and correlating data fragments across entities. To mitigate this, the Permutations Supersonic Liger Fractal (PSLF) is introduced, which ensures transparent, scalable, and compact proof generation, while preserving metadata privacy and preventing adversaries from reconstructing sensitive insights. Also enforces privacy-preserving protocols to limit data exposure across multiple participants and prevent leakage. Additionally, quantum threats, specifically through Shor's algorithm, threaten the security of cryptographic systems used in FSC. To counter this, the Elliptic eXtended Merkle Curve Digital Signature Algorithm (EXMC-DSA) is presented, which combines quantum-resistant key exchange and signature schemes, ensuring robust security against quantum attacks. This hybrid cryptographic approach ensures both current efficiency and future-proof resilience. As a result, the proposed model outperforms the existing methods in terms of low execution time, low proof generation, and verification time.

Link: <https://doi.org/10.1080/10942912.2025.2559056>



TITLE:

Federated learning framework for predicting multi-drug resistant tuberculosis across regional databases

1

AUTHOR :

Bhute, H.A.; Bhute, A.N.; Waghulde, K.B.; Vasgi, B.P.; Sonar, R.; Deore, S.P.

JOURNAL NAME:

Indian Journal of Tuberculosis

DETAILS:

Published on 17 October 2025



ABSTRACT:

Background: Multi-Drug Resistant Tuberculosis (MDR-TB) is a major public health problem around the world, especially in low- and middle-income countries where quick and accurate testing is needed for effective treatment and control. Traditional ways of diagnosing, like culture-based drug resistance tests and genetic studies, have problems like taking a long time to run, being expensive, and not being easy to get to in places with few resources. While machine learning models that combine genetic and clinical data show promise in predicting MDR-TB, their progress is slowed by worries about data privacy and rules that make it illegal for regional healthcare centres to pool data in one place.

Methods: A study proposed a federated learning framework that would let healthcare organizations work together to create MDR-TB prediction models without sharing actual patient data. By combining genomic and clinical data from different regional sources, the framework performs as well as centralised methods, with an AUC close to 91 % and accuracy close to 89 %. It is important that it protects patient privacy while also taking into account differences between local datasets.

Results: A real-world MDR-TB dataset with whole-genome sequencing and clinical data from several healthcare centres was used to test the system. With accuracy above 88 %, precision and recall numbers above 86 %, and AUC-ROC close to 91 %, the pooled learning model did about as well at predicting the future as a centralised model. Even though the datasets were different, client-wise study showed steady results.

Conclusion: The suggested shared learning approach provides a secure, flexible, and accurate way to predict MDR-TB across multiple area databases. It strikes a good mix between the need for shared data use and strict privacy rules, which encourages more people to use it in managing dangerous diseases. In the future, researchers will look into adding more types of data and making transmission faster and more secure in order to make the model even more reliable and useful in clinical settings.

Link: <https://doi.org/10.1016/j.ijtb.2025.10.006>



TITLE:

A Comprehensive Literature Review on Bamboo
Fibre-Reinforced Composites: Mechanical
Properties, Manufacturing Processes, and
Applications

AUTHOR :

Thakare, D.; Razdan, S.

JOURNAL NAME:

Springer Proceedings in Materials (Vol.-72)

DETAILS:

Published on 30 October 2025



ABSTRACT:

This paper provides an overview of bamboo as a versatile and sustainable material. This work reviews research done into the study of structural, mechanical, and physical characteristics of bamboo composites, along with various methods used for producing them. A review of the existing applications in the furniture, automotive, and construction industries is presented. The review highlights ongoing research, development, and innovation projects aimed at realizing the full potential of bamboo as a green reinforcing material. The gaps in the existing research are identified, which helps the paper serve as a valuable resource for researchers, industry professionals, and policymakers working in the domain of bamboo and its composite materials. The literature review indicated a lack of standardized mechanical properties and need for industry standards. An absence of structural design codes for bamboo composites has been observed. Limited long-term durability studies have found. Need for further research in the area of multi-material composites and optimization of processing techniques is required. Life cycle assessment of bamboo composite products is needed.

Link: https://doi.org/10.1007/978-981-96-5281-5_39



TITLE:

Natural Convection Heat Transfer Through Composite Aluminum Heated Tube

AUTHOR :

Khandelwal, K.; Vijaybhai, S.B.; Nayak, R.C.;
Fidvi, H.; Dash, S.S.; Kulkarni, M.V.

JOURNAL NAME:

Springer Proceedings in Materials (Vol.-72)

DETAILS:

Published on 30 October 2025



ABSTRACT:

In this work, natural convection heat flow from the heated tube to fluid has been presented. The density difference which occurs due to temperature variation is the main cause of the flow of fluid inside the tube. When fluid temperature rises due to surrounding conditions, then fluid starts to rise and the movement of adjacent colder fluid occurs to fill that gap. The natural convection method is commonly used in electronic equipment, where maximum numbers of equipment are placed on a single small board. If proper heat transfer does not happen from that board to the surroundings, then failure of the total system may occur. As the forced convection heat transfer method is not practically feasible for such small boards, the natural convection method is suitable for these cases. Properties of heat flow by the medium through the vertical tube and the method to enhance natural convection heat flow have been offered in this work. The vertical tube is made of composite aluminum (Al-Al Composite tube) which is a non-magnetic material having good thermal conductivity properties. For heat transfer from a heated system, aluminum is preferred because of its high strength-to-weight ratio, lightweight, non-toxic, and better corrosion resistance. The vertical tube is 50 mm in diameter, and its length is 550 mm. Ratio of length to diameter of the arrangement is 11. By controlling external voltage supply to the unit, a constant heat flux is sustained inside the wall of the tube. Internal rings are provided inside the test section having a dimension of 6 mm thickness having a square cross-section. Rings are placed inside the tube with equal spacing between them to enhance heat transfer.

Link: https://doi.org/10.1007/978-981-96-5281-5_45



TITLE:

Design Intervention and Product Diversification
as Sustainable Strategies for Inclusivity of Craft
and Communities: A Case Study of Devrai Art
Village

AUTHOR :

Deshpande, R.; Doshi, S.; Saraf, M.

JOURNAL NAME:

Lecture Notes in Mechanical Engineering

DETAILS:

Published on 27 October 2024



ABSTRACT:

India boasts a diverse array of ethnic cultures and traditional crafts, among which the metal casting technique of Dhokra stands out, primarily practiced by semi-nomadic communities in Madhya Pradesh, Chhattisgarh, and other regions. Dhokra craftsmanship embodies local identity, sustainable practices, contextual knowledge, and community-focused production methods. Historically, artisans received patronage from royalty. However, industrialization has posed challenges leading to a decline in practicing artisans and the relevance of Dhokra products in modern times. Integrating these Dhokra practices and communities into modern urban environments holds significant potential benefits for crafts, their communities and the Indian economy. The evolution of craft over centuries reflects changing societies, technologies, and cultural values. In modern times, design interventions are essential for strategically emphasizing the long-term sustainability of indigenous crafts and artisans. These interventions can be done by modifying materials, tools, product categories, and target consumers, fostering awareness and empowering craftspeople to meet evolving customer preferences while preserving their age-old wisdom and uniqueness. This manuscript aims to underscore the significance of design interventions in Dhokra craft traditions and explore how the craft community could leverage innovative thinking and approaches to develop products, extending the boundaries of craft, revitalizing craft and expanding a wider audience of customers. An in-depth case study of the non-profit Devrai Art Village in Panchgani, Maharashtra, will be conducted using a mixed methods approach, by employing in-depth interviews, photographic documentation and observation. Devrai Art Village, founded in 2008 by Mankadini Mathur, enables Adivasi craftsmen from Gadchiroli and Chhattisgarh, to work hand in hand with artists from JJ College of Arts, crafting distinctive goods that are rare in the market through the use of traditional Dhokra processes.

Link: https://doi.org/10.1007/978-981-96-7316-2_22



TITLE:

Exploring Unconventional and Sustainable Natural Dyes for Traditional Indian Block Prints to Develop Novel Color Variations

AUTHOR :

Deshpande, K.; Bokil, P.

JOURNAL NAME:

Lecture Notes in Mechanical Engineering

DETAILS:

Published on 27 October 2025



ABSTRACT:

Traditionally, Indian wood block-printed textiles use certain natural dyes like Manjishtha, pomegranate rind, Indigo, iron extracts, flame of forest, etc. It offers a delightful palette of Indian, red, yellow ochre, bottle green, indigo blue, gray, and its combinations. However, the palette is limiting, offering limited color variety to the users. A block-printed textile consumer limits the purchase after having one or two block-printed textiles in the wardrobe due to limited color choices. The experiment was conducted to get more color range utilizing techniques of woodblock print to widen the color range of mordant printing. Brighter and wider hues are the main reason humans shifted to synthetic dyes. Expanding the color palette with natural dyes offers multifaceted benefits. It promotes environmental sustainability by reducing reliance on synthetic chemicals, preserving biodiversity, and mitigating pollution. Natural dyes also contribute to cultural preservation, honoring traditional techniques and indigenous knowledge. This paper talks about the experiment conducted toward exploring colors to get brighter, wider choices using natural dyes and its outcome and scope of work, as it is one of the most sustainable textile printing methods. The outcome of the experiment resulted in some interesting hues through unconventional natural dyes through block printing techniques.

Link: https://doi.org/10.1007/978-981-96-7316-2_35





TITLE:

Design and Implementation of a Simplified
Secure File Transfer Protocol (S-SFTP)

AUTHOR :

Balawade, V.; Pai, A.

JOURNAL NAME:

Conference: 2025 Third International
Conference on Networks, Multimedia
and Information Technology
(NMITCON))

DETAILS:

Published on 10 October 2025



ABSTRACT:

The complexity of standard Secure File Transfer Protocol (SFTP) implementations tends to be a barrier for educational environments, as they focus on real-world applications, rather than facilitating the understanding of fundamental network security concepts. This work presents a novel implementation and analysis of a Simplified Secure File Transfer Protocol (S-SFTP), designed specifically as an accessible educational platform for teaching secure data transfer mechanisms through a hands-on implementation. The protocol employs a deliberately streamlined client-server architecture implemented in C++ using basic socket programming, with AES-256-CBC encryption for data security and SHA-256 hashing for integrity verification. This system utilizes a pre-shared key approach and features a modular design with separate components for cryptographic operations and logging, for better code readability. Through extensive performance testing with files with sizes ranging from 1 KB to 100 MB demonstrates that transfer times increase linearly with file size. Network security analysis using packet capture tools confirms successful data encryption during transmission, with the 256 -bit keyspace making traditional bruteforce attacks computationally infeasible. The protocol achieves its primary objective by providing an open-source platform that bridges theoretical network security concepts with practical implementation, enabling learners to directly observe, modify, and understand the effects of implementation choices on secure file transfer mechanisms.

Link:

<https://doi.org/10.1109/NMITCON65824.2025.11188100>





TITLE:

Deep Learning Based Waste Detection:
Evaluating the Evolution of YOLO Architectures
for Smart Waste Management

AUTHOR :

Hingmire, A.; Pujeri, U.

JOURNAL NAME:

Conference: 2025 Third International
Conference on Networks, Multimedia and
Information Technology (NMITCON)

DETAILS:

Published on 10 October 2025



ABSTRACT:

With the increasing global emphasis on sustainable waste management practice, deep learning-based object detection methods have become pivotal in automating waste classification processes. This study presents a comparative analysis of the YOLOv4, YOLOv5, YOLOv7 and YOLOv8 models for waste classification, focusing on key performance indicators such as precision, recall, specificity, and mAP (Mean Average Precision). The result indicates that YOLOv8 shows superior performance with an accuracy of 99.0 %, followed closely by YOLOv7 in speed and accuracy. The study also explores the incremental learning capability of YOLO models, allowing the classifier to incorporate new waste categories-such as e-waste-without catastrophic forgetting of previously learned classes. This highlights the potential of YOLO architectures for the object detection task in the multiclass scenario. The findings support the integration of advanced object detection models into smart waste sorting and recycling systems, contributing to more efficient environmental sustainability practices.

Link:

<https://doi.org/10.1109/NMITCON65824.2025.11188010>



TITLE:

Recycling solar panel waste into concrete:
environmental impact of the process and the
product

AUTHOR :

Jagadale, A.; Shewalkar, V.; Zele, S.;
Gogate, N.

JOURNAL NAME:

Environmental Technology (United Kingdom)

DETAILS:

Published on 2 November 2025



ABSTRACT:

Silicon-based solar photovoltaic (PV) panels are the most widely deployed technology for renewable electricity generation. However, after their 25–30 year service life, large volumes of end-of-life (EoL) panels accumulate, creating significant waste management challenges. Conventional recycling methods are energy-intensive and economically unattractive, leading to landfilling as the most common disposal route. This practice raises environmental concerns due to the potential leaching of toxic metals such as lead (Pb) and zinc (Zn). In this study, we propose a sustainable recycling strategy that incorporates EoL PV panels into concrete production. Aluminium frames and junction boxes were first removed from the panels, and the remaining laminates were shredded and sieved into three size fractions. The intermediate fraction was used as sand replacement in concrete. Heavy metal leaching was evaluated using the Toxicity Characteristic Leaching Procedure (TCLP), while the environmental impacts of landfill disposal and this recycling approach were compared using Life Cycle Assessment (LCA). TCLP results showed that Pb and Zn concentrations in this concrete were below detectable limits, whereas 3.21 mg/L of Pb and 7.34 mg/L of Zn leached from crushed laminates. LCA results indicated that landfilling imposed high environmental burdens, particularly in marine ecotoxicity ($5.36\text{E} + 05 \text{ kg 1,4-DCB}$) and global warming potential ($2.86\text{E} + 03 \text{ kg CO}_2 \text{ eq.}$), while concrete recycling achieved reductions across all 18 impact categories, including a 69.8% decrease in non-carcinogenic human toxicity. These findings demonstrate that incorporating solar waste in concrete effectively immobilizes hazardous metals and offers a sustainable, low-impact recycling route for PV waste, significantly outperforming landfill disposal.

Link: <https://doi.org/10.1080/09593330.2025.2579947>





TITLE:

Unleashing the power of deep learning: A novel approach for defect detection in solid rocket motor

AUTHOR :

Joshi, A.; Joshi, K.; Kute, R.; Jaiswal, S.; Mishra, P.

JOURNAL NAME:

FirePhysChem

DETAILS:

Published on June 2025



ABSTRACT:

High-Energy Materials (HEMs), particularly those integral to solid rocket motors are linchpins of mission success and safety. Detecting defects within a solid rocket motor is challenging but crucial for performance in aerospace and defense. Traditional methods and human inspection are inadequate, prompting the need for innovative defect detection. Our study introduces a deep learning approach, departing from conventional methods. Artificial intelligence-based automation is crucial for addressing the complexities and limitations of traditional defect detection methods. However, existing methods still grapple with challenges, in cases where images are non-defective, the conventional approach involves unnecessary annotation, leading to laborious efforts and computational costs. In some scenarios, low-quality images compromise feature extraction, impacting detection accuracy. To address this, our study introduces a novel approach. We employ a two-step process image classification and subsequent defect detection enhanced by dedicated neural network models. We start by classifying images as defective or non-defective using a unique combination for image classification that leverages the power of the Convolutional Autoencoder (CAE) in conjunction with the Visual Geometry Group Network-19 (VGG-19) architecture (CAE+VGG19). Only when an image is classified as defective, it proceeds to object detection and segmentation by Detectron2. Non-defective images bypass this step, thus saving valuable time and computational costs. This approach, not commonly found in previous studies. Our methodology achieves a remarkable 98 % accuracy in image classification, in defect detection and segmentation, by Detectron2, accuracy exceeds 90 %, ensuring precise localization. This study represents a significant advancement in Solid rocket motors (SRMs) defect detection, providing a precision-driven, efficient, and cost-effective solution.

Link: <https://doi.org/10.1016/j.fpc.2025.06.005>



TITLE:

Will ChatGPT replace libraries? A thematic literature review and recommendation framework

AUTHOR :

Ramteke, S.W.; Daphal, Y.B.; Ankush, S.M.;
Arote, P.P.

JOURNAL NAME:

College and Undergraduate Libraries

DETAILS:

Published on 29 October 2025



ABSTRACT:

Purpose: This study is concerned with the disruptive impact of artificial intelligence (AI) technologies – specifically focusing on OpenAI’s ChatGPT – on human engagement and use of it. It seeks to determine whether these tools pose a danger to the utility and function of traditional libraries and resource centers.

Design/methodology/approach: Analysis is conducted through the lenses of the technological capabilities of AI systems, the socio-institutional roles of libraries, and a content analysis of recent literature. It looks at the ways in which traditional information institutions and AI-driven platforms are changing within a larger digital knowledge ecosystem.

Originality/value: This article takes a balanced approach to the possible implications of these relations between traditional information services and nascent AI technology. The argument is advanced by reiterating the services that libraries alone uniquely render, such as cultural stewardship, egalitarian access, and ethical custodianship.

Findings: ChatGPT and similar AI applications are valuable for providing information and cognitive support, but they do not encompass the full range of functions, social presence, and ethical responsibilities of libraries and resource centers. AI represents an extension rather than a replacement of libraries in the digital age.

Link: <https://doi.org/10.1080/10691316.2025.2576843>



TITLE:

Enhanced mechanical properties of AA7075 alloy through friction stir processing: a review

AUTHOR :

Patil, T.; Washimkar, D.; Pawar, A.; Naidu, M.;
Shinde, S.; Salunkhe, S.

JOURNAL NAME:

Frontiers in Mechanical Engineering (Vol.-11)

DETAILS:

Published on 15 October 2025



ABSTRACT:

A friction stir-based material processing technique for improving the surface and microstructural characteristics of materials is called friction stir processing (FSP). Because FSP involves severe deformation caused by plasticity, material flow, heat transport, and microstructure evolution, it is a multi-physics problem that can be difficult to describe. The performance of the friction stir process is influenced by several factors, including plastic deformation, material flow, temperature, and residual stresses. Enhancing the process requires developing a numerical model that considers these influencing parameters for a specific workpiece material. Lightweight materials such as aluminum alloys offer high specific strength and ductility, making them ideal for applications in the automotive and aerospace industries. Today's industries are primarily interested in metallic alloys that are lightweight and strong. Because of their low weight, aluminum alloys hold a special place in the industry. Much effort is being made to improve the mechanical qualities of aluminum through a surface modification technique called FSP. This study reviews the literature on the FSP of the AA7075 alloy, focusing on the influence of key parameters such as rotational speed, traverse speed, and machining conditions. Modeling and simulations of FSP for material change have not been extensively studied. This study uses ABAQUS/Explicit to create a computationally efficient process model based on the coupled Eulerian–Lagrangian (CEL) formulation to simulate the FSP of aluminum alloy. Tool plunging, dwelling, and stirring phases are all included in the simulation of the full FSP process using the three-dimensional (3D) finite-element model. The impact of tool rotational speed and tool pin profile during the FSP process is assessed using simulations. Comparing the proposed model's computational efficiency to that of other models currently in use for friction stir welding procedures is another way to assess its effectiveness. To validate the model, the FSP experiment is conducted using temperature and process force measurements.

Link: <https://doi.org/10.3389/fmech.2025.1656081>





TITLE:

Application of AI for the betterment of patient care

AUTHOR :

Rai, N.; Inamdar, P.; Raigar, S.

JOURNAL NAME:

AI Frontiers Transforming Health
Agriculture and Education (Book Chapter)

DETAILS:

Published on 1 January 2025



ABSTRACT:

Artificial Intelligence (AI) has become a major pillar in healthcare, revolutionizing the way patient care is unimaginable. Because of the available data, its ability to recognize trends or patterns and make predictions even on data has assisted healthcare professionals with variations of aids that improve the state of diagnosis while reducing the results time, individualizing the treatment, and saving resources within the entire healthcare system (based on Shen, D., et al., 2017). AI have an wide range of technological wonders, such as machine learning (ML) and its acronym deep learning, natural language processing (NLP), and the use of machines. These are all technologies that enhance the care of patients and ensure that the persons providing the care can evaluate, track, and treat patients much better (modified on Rahmani et. al 2021)

Link:

<https://www.scopus.com/pages/publications/105020497838>





TITLE:

Beyond Limits: Redefining Serverless Architecture Bridging AI, Caching, and Quantum Computing

AUTHOR :

Kulkarni, A.; Bedekar, M.; Mantri, S.

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-1441 LNNS)

DETAILS:

Published on 8 October 2025



ABSTRACT:

This paper proposes a novel serverless computing model that addresses critical challenges in current architectures, namely cold start latency, resource inefficiency, and scalability limitations. The research integrates advanced caching mechanisms, intelligent load balancing, and quantum computing techniques to enhance serverless platform performance. Advanced distributed caching with coherence protocols is implemented to mitigate cold start issues. An AI-driven load balancer dynamically allocates resources based on real-time metrics, optimizing resource utilization. The integration of quantum computing algorithms aims to accelerate specific serverless workloads. Simulations and comparative tests demonstrate significant improvements in latency reduction, cost efficiency, scalability, and throughput compared to traditional serverless models. While quantum integration remains largely theoretical, early results suggest potential for substantial performance gains in tasks like function lookups and complex data processing. This research contributes to the evolving landscape of cloud computing, offering insights into optimizing serverless architectures for future applications in edge computing, AI, and data-intensive fields. The proposed model sets a foundation for more efficient, responsive, and scalable cloud solutions.

Link: https://doi.org/10.1007/978-981-96-6938-7_37



TITLE:

Characteristics and deflection dynamics of Airy beam off-shooting solitons: a diffusive-saturable nonlinear Schrödinger framework

AUTHOR :

Abdullah, Z.; Ripai, A.; Eka Putra Sutantyo, T.;
Katti, A.

JOURNAL NAME:

Journal of Optics (India)

DETAILS:

Published on 30 October 2025



ABSTRACT:

Off-shooting solitons generated from the Airy beam in an SBN:60 photorefractive crystal were numerically investigated within the framework of the diffusive-saturable nonlinear Schrödinger equation. This study examines their formation mechanism, dynamical characteristics, deflection behavior, and comparability with conventional spatial solitons. The results show that the formation of off-shooting solitons arises from the interplay between transverse diffraction and photorefractive nonlinearity induced by an external bias field. The incident beam power critically controls localization: low power fails to produce localized structures, intermediate power yields well-defined solitons with widths comparable to those of conventional ones, and high power induces spatial breathing and decay that prevent stable formation. Diffusive nonlinearity, which becomes stronger at higher temperatures, drives transverse deflection whose direction and magnitude depend on the incident beam profile and power. Off-shooting solitons do not form along the central propagation axis but evolve along shifted trajectories, establishing them as a distinct class of spatial solitons in photorefractive crystals.

Link: <https://doi.org/10.1007/s12596-025-02957-4>





TITLE:

Deep Learning in Natural Language Processing

AUTHOR :

Kumari, R.; Das, S.; Singh, R.K.; Thakur, A.

JOURNAL NAME:

Federated Learning for Internet of Vehicles:
IoV Image Processing, Vision and Intelligent
Systems (Volume 2): A H.book of
Computational Linguistics: Artificial Int.in
Natural Language Processing (Book

DETAILS:

Published on January 2025



ABSTRACT:

Natural Language Processing is an emerging research field within the realm of AI which centres around empowering machines with the ability to comprehend, interpret, and produce human language. The field of NLP encompasses a wide range of practical applications, such as facilitating machine translation, analyzing sentiment, recognizing speech, classifying text, and developing question-answering systems. This restatement ensures the avoidance of plagiarism by presenting the information in a unique and original manner. This chapter provides a comprehensive guide to NLP and its various components. Also, Deep Learning (DL) techniques are applied by incorporating architectures and other optimization methods in NLP. It delves into the use of DL for text representation, classification, sequence labelling, and generation, including Language Modelling, Conditional Generation, and Style Transfer. Moreover, it covers the practical applications of Deep Learning in NLP, such as Chatbots and virtual assistants, information retrieval and extraction, text summarization and generation, and sentiment analysis and opinion mining. This chapter highlights the importance of word and sentence embeddings in NLP and their role in representing textual data for machine learning models. It also covers the different types of text classification, such as binary, multi-class, and hierarchical classification, and their respective use cases. Additionally, the chapter utilizes the application of DL for sequence labelling tasks. Furthermore, the chapter discusses the use of Deep Learning for text generation, including language modelling, conditional generation, and style transfer. Overall, this chapter provides readers with a comprehensive guide to the application of DL techniques in NLP, covering both theoretical concepts and practical applications.

Link:

<https://www.scopus.com/pages/publications/105021689955>



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