



Since 1983

Dr. Vishwanath Karad

**MIT WORLD PEACE
UNIVERSITY** | PUNE

TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

FACULTY PUBLICATION

RESEARCH PAPERS

September-2025

TITLE:

Enhanced Pedestrian Detection for Autonomous Vehicles Using Multi-localized Feature

AUTHOR :

A., Pattanaik, Abhipsa; A., Unkal, Amrapali; I., Jagtap, Isha; D., Sangeetha, D.; S.R., Mugunthan, S. R.

JOURNAL NAME:

Communications in Computer and Information Science (2538 CCIS)

DETAILS:

Published on 31 August 2025



ABSTRACT:

Pedestrian detection plays a vital task in numerous computer vision applications, particularly in autonomous driving systems. These systems heavily depend on the perception module, which must be both high-performing and efficient in order to make accurate decisions in real-time with low delay. Prioritizing the prevention of collisions with pedestrians is vital in every autonomous driving system. As a result, pedestrian detection is a fundamental component of the perception modules in these systems. Recent years have seen a rapid development of the pedestrian detection system, which aims to alleviate difficulties caused by changes in illumination, scale, appearance, blur, and occlusion. However, existing techniques does not support all the challenges simultaneously with better accuracy in real-time. The proposed human detection algorithm addresses these challenges by utilizing scale generation architecture, which fuses features such as the histogram of oriented gradients (HOG) with non-maximum suppression (NMS), local binary patterns (LBP), local ternary patterns (LTP), and the gaussian mixture model (GMM). The scale generation architecture model supports the detection of humans at various scales. The HOG model, in conjunction with NMS, LBP, and LTP, extracts gradient edge features and fine-grained texture features, which support the pedestrian detection in a variety of appearances and illuminations. GMM improves feature performance by providing more useful information. We feed these features into the support vector machine (SVM) with a radial basis function (RBF) kernel to detect the pedestrian. We validate the proposed pedestrian detection system on more challenging state-of-the-art databases, namely INRIA and Caltech, achieving an average accuracy of 97.05% with real-time support that takes 0.12s to detect the pedestrian.

Link: https://doi.org/10.1007/978-3-031-98138-8_8



TITLE:

Lung Cancer Detection and Analysis Using
Machine Learning

AUTHOR :

S.S., Joshi, Sanskruti S.; J., Bhagat, Janhavi; A.,
Kulkarni, Ambarish; S., Sharma, Shambhawi;
S.M., Mali, S. M.

JOURNAL NAME:

Communications in Computer and Information
Science (2621 CCIS)

DETAILS:

Published on 1 September 2025



ABSTRACT:

Lung diseases, such as pneumonia and lung opacity, contribute significantly to morbidity, mortality worldwide. Early detection and accurate classification of these conditions through medical imaging plays decisive role in patient outcomes. In this work, we propose a ML- based approach to classify lung X-ray images into three categories: normal, lung opacities, and viral pneumonia. We trained the model using Convolutional Neural Network (CNN) using the InceptionV3 architecture, with an accuracy of 91%. ML model was trained using an ImageDataGenerator for data augmentation and evaluated on a separate test set. Performance metrics such as accuracy, loss, and confusion matrices were used to measure the model's effectiveness. Our results demonstrate that the proposed method achieved high accuracy in classifying lung X-ray images. Additionally, we discuss the importance of these results with reference to medical diagnostics and outline potential future work to upgrade the model's performance. By integrating this model into a diagnostic framework, healthcare professionals can leverage it for rapid and accurate identification of lung conditions. This has the potential to assist in early intervention, reduce misdiagnoses, and ultimately contribute to better.

Link: https://doi.org/10.1007/978-3-032-00793-3_2





TITLE:

Social Media and Stress Detection: A Machine Learning Approach

AUTHOR :

R., Kamble, Rutuja; P., Borhade, Piyush; U.,
Garud, Urjita; S.M., Mali, S. M.

JOURNAL NAME:

Communications in Computer and Information
Science (2621 CCIS)

DETAILS:

Published on 1 September 2025



ABSTRACT:

Social media has now become a focal point in many lives, and with it, so do the aspects that machine learning is focused on. One such is the detection of stress, which has been practiced using natural language and machine learning models processing techniques on Reddit posts. Researchers have applied machine learning to classify posts as stressful or non-stressful to identify inferred stress indicators in text found in social media. Indeed, machine learning algorithms effectively identify stress levels via analyzing the language and sentiment expressed in these posts. Beyond just stress detection, machine learning has also been in use to identify extremist ideation, filter radicalized content, and detect hate speech on social media platforms. The detection of rumors and fake news on social media has been further enhanced by deep learning models, in general, integrating machine learning techniques with social media analysis has opened doors for automated detection and classification of various psychological and behavioral aspects, contributing to a deeper understanding of user interactions and content dissemination on these platforms.

Link: https://doi.org/10.1007/978-3-032-00793-3_8





TITLE:

Sentiment Analysis of Political Party Unveiling
Insights from Big Data

AUTHOR :

M.M., Bapat, Mayuri M.; S., Karade, Shreya;
A.S., Nagane, Aniket Suresh

JOURNAL NAME:

Communications in Computer and Information
Science (2621 CCIS)

DETAILS:

Published on 1 September 2025



ABSTRACT:

Sentiment analysis is critical for analyzing public sentiment, especially in the context of political discourse on social media platforms such as Twitter. This study delves into the intricacies of sentiment analysis methodologies within political conversations, employing diverse techniques to draw insights from large datasets. The study covers data preprocessing, encompassing handling missing values, text preprocessing techniques, and data splitting for robust model training and evaluation. Key phases include TF-IDF vectorization for numerical feature representation, label encoding for categorical variables, tokenization for text normalization, and sentiment classification using sentiment analysis tools like VADER and SentimentIntensityAnalyzer from NLTK. The approach combines Min-Max scaling for data standardization, logistic regression for sentiment prediction, and rigorous correlation analysis to determine the links between variables. The results show that the approach is successful, with logistic regression obtaining an impressive 92% accuracy in sentiment identification. The sentiment split displays the percentage of positive tweets (23.20%), negative tweets (7.33%), and neutral tweets (69.46%). Furthermore, a comparison with an alternate dataset using logistic regression revealed a 59% difference in accuracy. The sentiment distribution in this dataset reveals 59.03% of positive tweets, 18.66% of negative tweets, and 22.32% of neutral tweets. This demonstrates whether model performance varies depending on the dataset used. These findings highlight the significance of dataset selection and model assessment in sentiment analysis, demonstrating how various datasets can result in variable accuracy levels and sentiment distributions. Our research focuses on sentiment analysis of huge data from political parties to discover positive, negative, and neutral tweets.

Link: https://doi.org/10.1007/978-3-032-00793-3_10



TITLE:

Supermarket Sales Prediction Using Linear Regression: A Case Study Approach

AUTHOR :

A., Bokhare, Anuja; O., Pawaskar, Ojas; K., Bhatia, Kriti; T.M., Reddy, Tirupathi Mandala

JOURNAL NAME:

Communications in Computer and Information Science (2538 CCIS)

DETAILS:

Published on 31 August 2025



ABSTRACT:

Machine learning has been a subject going through exceptional examination across various enterprises and luckily, organizations are getting step by step more mindful of the different ways to deal with to take care of their issues. The customary methodology of deals and showcasing objectives at this point doesn't help the organizations, to adapt up to the speed of the serious market, as they are done with no experience with clients' buying designs. Major changes can be found in the area of deals and promoting because of Machine Learning headways. In this paper, the business dataset of supermarkets and attempt to examine how it can create later on and furthermore what are the fundamental advances that should have been taken for its improvement and consumer loyalty. This will be continued in a step-by-step investigation report from the recorded information and its implementation in the future. The study includes an extensive examination of sales prediction, employing Machine Learning techniques such as Linear Regression, as detailed in the research.

Link: https://doi.org/10.1007/978-3-031-98138-8_16



TITLE:

Exploring the macroeconomic drivers to electric vehicles sales in India- A panel data-based approach

AUTHOR :

V., Singh, Vijeta; V.S., Nerlekar, Varsha Shriram;
null

JOURNAL NAME:

Transport Policy (174)

DETAILS:

Published on 22 September 2025



ABSTRACT:

India has committed to achieving net-zero emissions by 2070, and promoting non-fossil fuel-based transport mechanisms is one of the key ways to accomplish this goal. In this context, electric vehicles (EVs) can make a positive contribution to reducing air pollution and mitigating greenhouse gas (GHG) emissions. India has a dynamic electric vehicle (EV) market, and the Economic Survey for 2023 predicts that India's EV market will experience a 49 % compounded annual growth rate (CAGR) between 2022 and 2030. The present study aims to investigate the macroeconomic determinants driving EV sales in India. Using panel data from 19 states/union territories (UTs) for two-wheeler EVs between 2015 and 2021 and applying the dynamic panel and two-stage least squares (2SLS) estimators, the study concluded that state net domestic product (SNDP) per capita, number of bank branches, per capita power availability, and presence of EV policy had a positive impact on two-wheeler EV sales while higher motor spirit consumption and inflation had a negative bearing on the two-wheeler EV sales. Based on the empirical results obtained, policy implications have been discussed.

Link: <https://doi.org/10.1016/j.tranpol.2025.103818>



TITLE:

Enhancing breast cancer treatment with Bauhinia variegata capped copper oxide nanoparticles: A sustainable chemistry approach

AUTHOR :

P., More-Adate, Pallavi; A.A., Kale, Anup Atul; A.T., Pawar, Anil T.; A.A., Tagalpallewar, Amol Ambadas; null; A.M., Baheti, Akshay M.

JOURNAL NAME:

Sustainable Chemistry for Climate Action (Vol.-7)

DETAILS:

Published on 12 August 2025



ABSTRACT:

Background:Breast cancer remains one of the leading causes of death among Asian females, highlighting an urgent quest for effective long-term treatment strategies.

Aim of the study:The present research work deals with sustainable synthesis, characterization, and evaluation of Bauhinia variegata L. capped copper oxide nanoparticles (BVCuONPs).

Methodology:Bauhinia variegata L. aqueous leaf extract was used as an encapsulating and reducing agent in copper oxide nanoparticle synthesis. The fabricated nanoparticles were examined with Transmission Electron Microscopy, Field Emission Scanning Electron Microscopy, and UV-visible absorption spectroscopy. MCF-7, MDA-MB-231 and MCF-10A cells were used to evaluate the anti-proliferative potential and selectivity of the nanoparticles. In addition, the chick chorioallantoic membrane assay was used to evaluate the anti-angiogenic characteristics. Cell migration assay and mitochondrial membrane potential assay were also performed along with gene expression analysis.

Results: Spectroscopic investigation confirmed the fabrication of copper oxide nanoparticles with the highest absorption peak at 353 nm. Field Emission Scanning Electron Microscopy and Transmission Electron microscopy showed uniformly distributed nanoparticles with sizes ranging from 31–63 nm and an average of 47 nm. BVCuONPs caused cell cycle arrest at the G1 and G2/M phase, promoted mitochondrial membrane depolarisation, and exhibited potent anti-proliferative effects against MCF-7 and MDA-MB-231 cell lines. The nanoparticles significantly inhibited cellular migration (42.38 %) and reduced vascularization (53.73 %), indicating anti-angiogenic potential. Furthermore, these nanoparticles generated reactive oxygen species (ROS) leading to DNA damage and trigger the stress response pathway by activating p53.

Conclusion: These green-synthesized copper nanoparticles demonstrated strong potential as targeted anticancer agents by activating p53 and triggering apoptosis. Their efficacy further encourages exploration in combination therapies, which should be validated through systematic in-vivo studies.

Link: <https://doi.org/10.1016/j.scca.2025.100109>





TITLE:

Voice-based user interface for hands-free data entry and automation at workplaces

AUTHOR :

D., Harihar, Daiwiik; V., Shrivastava, Vedansh; P., Talele, Pratvina; A.S., Jahagirdar, Aditi S.

JOURNAL NAME:

MethodsX (Vol.-15)

DETAILS:

Published on 28 August 2025



ABSTRACT:

The increasing demand for hands-free interaction in modern workplaces has led to the development of Voice-Based User Interfaces (VUIs) that enhance accessibility, efficiency and automation. This research presents the Voice-Based User Interface for Hands-Free Data Entry and Automation at Workplaces. The system enables real-time speech-to-text transcription, allowing users to interact with workplace applications without manual input, making it intuitive, user-friendly and capable of enhancing efficiency and convenience in various workplace scenarios. Through extensive testing and evaluation, the study demonstrates the practicality and benefits of the Voice-Based User Interface for hands-free data entry and automation.

Methodology Overview: Utilized WIT.AI API for speech-to-text transcription.

- Implemented chunking, caching, and concurrency control to optimize processing.

- Evaluated performance using Word Error Rate (WER), Levenshtein Distance and Cosine Similarity on real world datasets. The system proves to be upto 88.8% accurate in recognizing spoken commands and efficiently converting them into text with best performance achieved when the audio was divided into 7 optimal chunks. Cosine Similarity for these chunks is more accurate than that of sizeable file and approximately 2. Moreover, the integration of real-time updates across different domains (educational, legal, medical) and data synchronization enhances productivity and usability. In conclusion, the Voice-Based User Interface offers a viable solution for hands-free data entry and automation at workplaces.

Link: <https://doi.org/10.1016/j.mex.2025.103596>





TITLE:

AI-powered automated hydroponic system for smart agriculture

AUTHOR :

P.T., Baraskar, Prof Trupti; V., Khatri, Viren; P., Kolhe, Parimal; M., Katyarmal, Mitheelesh; S., Khedekar, Shaunak

JOURNAL NAME:

MethodsX (Vol.-15)

DETAILS:

Published on August 2025



ABSTRACT:

This research presents an AI-powered automated hydroponic system designed to enhance the efficiency and sustainability of modern agriculture. The system integrates real-time environmental monitoring, automated nutrient management, and AI-based disease detection to optimize plant growth and minimize manual intervention. An ESP32 microcontroller collects data from specialized sensors measuring Total Dissolved Solids (TDS), pH, temperature, and light intensity. Data is wirelessly transmitted via MQTT to an EMQX broker, subsequently processed by an ExpressJS backend, and stored in a Firebase Realtime Database. A NextJS web application provides a user-friendly dashboard for visualization, alerts, and remote control. Automation is achieved using relay-controlled peristaltic and water pumps that adjust nutrient dosing and circulation based on sensor readings. A camera module captures plant images, which are analyzed by a CNN model running on a separate AI server to detect common spinach diseases like Anthracnose and Downy Mildew, enabling early intervention. This integrated system combines IoT, cloud data management, automation, and AI-based visual inspection to offer a comprehensive solution for precision hydroponic farming. Evaluation demonstrates high accuracy in disease detection, robust system performance, and significant potential for improving crop health, yield, and reducing manual labor in diverse agricultural settings. The system, along with its full codebase, has been made publicly available to promote reproducibility.

- Automated Precision Hydroponics: Combines real-time environmental monitoring, automated nutrient management, and AI-powered disease detection for optimized spinach cultivation.
- Reproducible and Scalable Method: Provides a detailed, step-by-step protocol for constructing and operating the system, adaptable to various hydroponic setups and crop types.
- Sustainable and Efficient Agriculture: Minimizes resource consumption, reduces manual labour, and promotes environmentally friendly practices.

Link: <https://doi.org/10.1016/j.mex.2025.103579>



TITLE:

An efficient dual space curriculum learning approach for speech emotion recognition

AUTHOR :

R.B., Karani, Ruhina B.; S.S., Desai, Sharmishta Suhas

JOURNAL NAME:

Signal, Image and Video Processing (Vol.-19, Issue-13)

DETAILS:

Published on 18 September 2025



ABSTRACT:

Speech Emotion Recognition (SER) is a crucial task in human-computer interaction, enabling intelligent systems to interpret and respond to human emotions effectively. While deep learning techniques have shown promise in SER, they often require high computational resources and prolonged training times. Moreover, there remains room for improvement in training efficiency. To address these issues, this study introduces novel curriculum learning (CL) approaches, including Dual-Space Curriculum Learning (DSCL), Task Space Curriculum Learning (TSCL), and Input Space Curriculum Learning (ISCL), aimed at improving accuracy while reducing training time. Experiments were conducted on three benchmark datasets: Toronto Emotional Speech Set (TESS), Ryerson Audio-Visual Database of Emotional Speech and Song (RAVDESS), and Surrey Audio-Visual Expressed Emotion (SAVEE), demonstrating notable improvements over both traditional deep learning approaches and state-of-the-art methods. The DSCL approach achieved accuracies of 99.71%, 86.11%, and 75.01% on TESS, RAVDESS, and SAVEE, respectively, surpassing existing state-of-the-art techniques. Additionally, DSCL improved accuracy by 0.87%, 5.44%, and 3.79% compared to the traditional deep learning approach. Furthermore, DSCL significantly reduced training time by 52.66%, 49.03%, and 3.60% for TESS, RAVDESS, and SAVEE, respectively. The ISCL and TSCL approaches also demonstrated competitive accuracy, further validating the effectiveness of curriculum-based training.

Link: <https://doi.org/10.1007/s11760-025-04796-z>



TITLE:

Modelling and optimization of natural deep eutectic solvent-assisted extraction for carotenoids targeting lutein for developing food additives from used marigold flowers

AUTHOR :

Atharva Joshi, Aarya Kunnure, Abhishek Aghamkar, Amisha Garg, Tejaswini Pachpor, Nithya N. Kutt

JOURNAL NAME:

LWT (Vol.-233)

DETAILS:

Published on October 2025



ABSTRACT:

Natural deep eutectic solvents (NADES) have proved their potential as a green technology for extracting phytochemicals in recent times. Different NADES combinations with various molar ratios of choline chloride as a hydrogen bond acceptor (HBA) and glucose/tartaric acid as a hydrogen bond donor (HBD) were screened for better extraction efficiency of carotenoids from a rich source-dried marigold flower. The highest carotenoid content of 549.68 $\mu\text{g}/\text{mg}$ dry weight (DW) was observed in choline chloride: glucose (3:1) combination. Process optimization using Taguchi's model and response surface methodology (Box-Behnken design) was further employed to identify the optimal process parameters, viz., ultrasonication time as 35 min, incubation temperature as 25 $^{\circ}\text{C}$, and incubation time as 2 h; a significant increase in carotenoid yield of 971.31 $\mu\text{g}/\text{mg}$ DW of floral biomass was observed. Stability studies showed that carotenoids were stable in the dark and at a storage temperature of -20°C . High performance liquid chromatography analysis revealed the presence of lutein as a major compound in the selected NADES system. Lastly, food safety studies of marigold floral NADES-based extracts were investigated. Antimicrobial and antioxidant activity studies of selected extracts revealed optimal properties indicating their potential to be formulated into food colorants and nutraceuticals.

Link: <https://doi.org/10.1016/j.lwt.2025.118549>



TITLE:

Applying the transfer learning models on the dataset on the effect of diseases on Nagvel-betel (Piper betle) leaves

AUTHOR :

M.D., Gayakwad, Milind D.; R.R., Joshi, Rahul Raghvendra; T., Patil, Tulshihar; P., Talele, Pratvina; G.S., Waghale, Gurunath S.; R.G., Pawar, Rajendra G.; N., Poonia, Nidhi; S., Kadam, Sachin; P.S., Paygude, Priyanka S.

JOURNAL NAME:

Data in Brief (Vol.-62)

DETAILS:

Published on August 2025



ABSTRACT:

The dataset of Betel leaves includes 4156 leaves affected by various diseases. These diseases include Leaf Spot, Powdery Mildew, Anthracnose, Bacterial Blight, Cercospora Leaf Spot, Sooty Mold, Downy Mildew, Wilt Disease, Rust Disease, Mosaic Virus, Black Rot, Root Rot, Stem Canker, Leaf Curl Disease, and Fusarium Wilt. The camera is used to collect high-resolution images to ensure the exact detection of the images to detect diseases. The resolution of the photos was 3000×4000 , consuming approximately 3 mb. The data set covers a wide range of diseases, and many samples were collected under each category. The dataset is saved using a hierarchical data structure, as the name of the folder indicates the label or category of the image. The reuse and recreation of this type of dataset are ensured by mapping the name of the disease with the apparent characters of the disease on the leaves. The experiment was performed using Vision Transformer Models to check the robustness of the dataset. The result of the classification report states that the range of accuracy varies from 0.7 to 0.9.

Link: <https://doi.org/10.1016/j.dib.2025.111987>



TITLE:

Electroless nickel plated Nb₂O₅ via autocatalytic deposition, an efficacious platform for photocatalytic hydrogen production via water splitting

AUTHOR :

P.N., Birla, Priyanka N.; S.S., Arbuj, Sudhir Sahebrao; R., Chauhan, Ratna; M.D., Shinde, Manish Dipakrao; S.B., Rane, Sunit B.; S.W., Gosawi, Suresh W.; B.B., Kale, Bharat Bhanudas

JOURNAL NAME:

International Journal of Hydrogen Energy (vol.-172)

DETAILS:

Published on 26 September 2025



ABSTRACT:

This work presents a novel and simple yet efficient protocol of facile electroless Ni coating forming Ni@Nb₂O₅ heterojunction (Schottky barrier) to promote photocatalytic H₂ evolution. The structural morphological and chemical compositional examinations exhibit generation of orthorhombic nanostructured Nb₂O₅ which is uniformly spattered with Ni nanostructures with an average size of ~5 nm. The optical study exhibits %Ni loading dependent red shift in the band gap along with optimal vacancy defects. For nanostructured 0.3 wt% Ni@Nb₂O₅ sample, when employed as a photocatalyst in H₂ production via water splitting, the optimal hydrogen evolution reaction (HER) rate of 1900 $\mu\text{mol g}^{-1} \text{h}^{-1}$ is achieved which is at par with available reports and is ~6 times greater than pristine Nb₂O₅. This kind of augmentation in H₂ evolution under visible light instigates from superlative light absorption due to existence of Schottky junction at the border of Ni and Nb₂O₅ surfaces transferring photogenerated electrons from Nb₂O₅ to Ni executes escalated H₂ generation through water splitting.

Link: <https://doi.org/10.1016/j.ijhydene.2025.151210>



TITLE:

Inverse 3D 'lab-on-a-chip' polymeric microfilms for selective capture of circulating tumor cells from patients' blood

AUTHOR :

R., Gupta, Rituja; S.S., Andhari, Saloni S.; S., Nandi, Semonti; T., Deshpande, Tanvi; N.R., Kale, Narendra R.; C.D., Bobade, Chandrashekar D.; G., Aland, Gourishankar; S., Jayant, Sreeja; A.A., Bharde, Atul A.; A., Vasudevan, Aravindan

JOURNAL NAME:

Lab on a Chip (Vol.-25, Issue-19)

DETAILS:

Published on August 2025



ABSTRACT:

Engineering inverse 3D polymeric microfilms with controlled spatial hierarchy is highly challenging and important at the crossroads of biology and materials science due to their potential in enhancing selective cell surface interactions such as in cell adhesion and growth. Protein-modified inverse 3D polymeric microfilms could thus similarly promote selective cell capture and adhesion. We report the fabrication of inverse 3D polymeric microfilms using composite polymeric-bioligand conjugated films for enhanced capture of circulating tumor cells (CTCs) from cancer patients' blood. The microfilms were designed using functionalized poly(lactic acid) (PLA) and poly(lactic-co-glycolic acid) (PLGA), mediated with ligand transferrin. Protein immobilization on the films was achieved by conjugating transferrin (Tf), collagen (Co), and bovine serum albumin (BSA) for promoting cellular adhesion and capture. The films were evaluated using scanning electron microscopy (SEM), infrared spectroscopy (ATR-IR) and contact angle (θ) measurements, and demonstrated micropores ranging from 18–26 μm . Confocal laser scanning microscopy (CLSM) revealed enhanced cell attachment on the polymeric-blend microfilms evidencing enhanced cell adhesion, capture, and further the ability to proliferate in the 3D space. The inverse 3D polymeric microfilms demonstrated an 80% cell capture efficiency using cultured cancer cells. In a clinical utility, the CTC capturing efficiency was comparable with OncoDiscover® CTC enumeration technology. The inverse 3D polymeric microfilms present a novel 'lab-on-a-chip' platform to enable enumeration of CTCs for monitoring minimal residual disease (MRD), progress of metastasis, response to treatment, and finally early detection of relapse.

Link: <https://doi.org/10.1039/D4LC01105H>





TITLE:

Future Trends in Emerging Technologies in Fungal Biotechnology

AUTHOR :

S., Chaudhari, Shradha; S.S., Tambe, Siddhi S.; B., Nair, Bhavi; P., Joshi, Parth; P.A., Satish, Polshettiwar Arunrao

JOURNAL NAME:

Fungal biotechnology

DETAILS:

Published on 2025



ABSTRACT:

Fungal biotechnology is experiencing rapid advancements, driven by emerging technologies poised to revolutionize various sectors, including drug discovery, health care, and environmental solutions. Emerging technologies, such as synthetic biology, CRISPR-based genome editing to unlock novel fungal metabolites, and systems biology, are expanding our ability to manipulate fungal genomes for industrial, medical, and environmental applications. Integrating artificial intelligence (AI) and machine learning (ML) for predictive modeling and strain optimization is revolutionizing the discovery of novel fungal metabolites and bioactive compounds. Trends in bioinformatics and omics technologies enhance our understanding of fungal diversity, metabolism, and ecological roles while enabling more efficient bioengineering approaches. Future directions in fungal biotechnology include the development of sustainable biomanufacturing processes, focusing on using fungi for biofuels, bioplastics, and waste management through bioremediation. The field of mycomaterials highlights the potential of fungi in producing biodegradable materials for the packaging, textile, and construction industries. In contrast, in medicine, fungi are key players in producing novel antibiotics, immunosuppressants, and anticancer agents, with the possibility of tailoring their metabolic pathways for improved yields and effectiveness.

Moreover, as climate change exacerbates environmental pressures, fungi's ability to adapt to extreme conditions presents opportunities for developing climate-resilient agricultural practices. This chapter will explore the role of fungi in carbon sequestration, as biofertilizers, and as biocontrol agents to reduce chemical inputs in agriculture. Emerging technologies like metagenomics, single-cell analysis, and nanotechnology are the frontier of fungal applications, promising a future where fungi play a crucial role in sustainable solutions for global challenges.

Link:

<https://www.taylorfrancis.com/chapters/edit/10.1201/9781003594840-21/future-trends-emerging-technologies-fungal-biotechnology-shradha-chaudhari-bhavi-nair-siddhi-tambe-parth-joshi-satish->



TITLE:

Development of a Stability-Indicating RP-HPLC Method for the Quantification of Tolperisone Hydrochloride and Diclofenac Sodium Impurities in Drug Substances and in Combination: Implementation of Analytical Quality by Design and Degradation Kinetics

AUTHOR :

V., Mohite, Vikas; V.P., Choudhari, Vishnu P.;
V.S., Gharge, Vikram S.

JOURNAL NAME:

Separation Science Plus (Vol.-8, Issue-9)

DETAILS:

Published on 10 September 2025



ABSTRACT:

Tolperisone hydrochloride and Diclofenac sodium are formulated for the treatment of musculoskeletal conditions due to their complementary muscle relaxant and anti-inflammatory actions. Accurate impurity profiling in such formulations is essential for ensuring drug stability, safety, and regulatory compliance. Traditional analytical methods often lack sustainability and robustness. Reverse phase high-performance liquid chromatography remains a central tool in impurity analysis, but integrating Quality by Design strategies is still under development. This study aims to develop a novel, sustainable RP-HPLC method for impurity profiling of tolperisone hydrochloride and diclofenac sodium tablets using Quality by Design approach. Chromatographic separation was achieved using a C18 Inertsil column (250 × 4.6 mm, 5 μm). Quality by Design was employed to optimize key parameters pH and mobile phase composition, ensuring method robustness. A kinetic study of tolperisone hydrochloride degradation under basic conditions was also conducted. The method demonstrated high resolution, precision, and reproducibility across batches. Impurities were effectively separated and quantified. Kinetic analysis indicated that tolperisone hydrochloride degradation follows second-order kinetics under basic conditions. This Quality by Design optimized, environmentally conscious RP-HPLC offers a reliable, scalable solution for impurity profiling in complex formulations. It supports improved pharmaceutical quality control while aligning with sustainability and regulatory standards.

Link: <https://doi.org/10.1002/sscp.70107>



TITLE:

Impurity profiling of the strontium ranelate using stability indicating UPLC method and structural elucidation of degradants by LC-MS-TOF with the greenness assessment

AUTHOR :

A., Swami, Arti; A., Shastri, Aarti; V.P., Choudhari, Vishnu P.

JOURNAL NAME:

Journal of Applied Pharmaceutical Science (Vol.-15, Issue-9)

DETAILS:

Published on 5 August 2025



ABSTRACT:

Strontium ranelate (STR) is an antiosteoporosis agent utilized to form new bone and inhibit bone resorption. STR also activates calcium-sensing receptors, which convert pre-osteoblasts to osteoblasts, promoting bone synthesis, as demonstrated in previous studies. In this study, the objective was to establish a validated, stability-indicating ultra-performance liquid chromatography (UPLC) method for the identification and quantification of impurities in STR under accelerated degradation conditions. The method was optimized employing an ACQUITY photodiode array UPLC C18 BEH (2.1 x 100 mm, 1.7 μ m) at room temperature, with a flow rate of 0.2 ml/minutes and sample injection volume of 2 μ l. The mobile phase consisted of Ammonium acetate buffer pH 3.0 adjusted with Glacial Acetic acid: Methanol in a 90:10 % v/v ratio, detected at 323 nm. Stress-testing study of STR was carried out through thermal, photolytic, hydrolytic, and oxidative conditions. The method's greenness was estimated by using three tools including AGREEprep, ComplexGAPI, and analytical ecoscale where the method was found to be environmentally sustainable. Hydrolytic, oxidative, and thermal stability studies indicate moderate stability for STR, while the drug resists photolytic degradation. Two degradation products were identified by LC-MS with m/z 299.02 and 222.96. Linear calibration from 10 to 60 μ g/ml, assay value 100.21 %w/w. The limit of detection and limit of quantification are 1.078 and 3.267 μ g/ml. The optimized UPLC method was selective, precise, and accurate for the determination of STR in the presence of impurities and degradation products which will be useful for quality control in pharmaceutical industries.

Link: <https://dx.doi.org/10.7324/JAPS.2025.234119>



TITLE:

Design, Synthesis, and Biological Evaluation of Novel 3-Substituted-5-(3,4-dimethoxy-phenyl)-3H-[1,3,4]oxadiazole-2-Thione Derivatives as Anticancer Agents

AUTHOR :

R.V., Gadhave, Ranjit Vinayak; S.B., Shelke, Sanket Bhimrao; A., Biswas, Aniket; M.A., Shastri, Mayuresh Abhay; A.D., Pachauri, Asawari D.; Y.S., Ozarde, Yogita Sachin

JOURNAL NAME:

Chemical Methodologies (Vol.-9, Issue-9)

DETAILS:

Published on September 2025



ABSTRACT:

This study involved designing and synthesis of 3-substituted-5-(3,4-dimethoxy-phenyl)-3H-[1,3,4]oxadiazole-2-thione derivatives for interaction with EGFR (receptor tyrosine kinase), which plays a role in cancer cell growth. Molecular docking was performed on EGFR receptors using crystal structures with PDB IDs 4WD5 and 2J6M. The combination of hydrogen bonding, hydrophobic, and ionic interactions confirmed the robust nature of the ligand-protein binding. Docking scores for compounds ranged from 6.6 to 8.0 kcal/mol. The compound PODA-21 in this series had the best docking scores of 7.9 and 8.0 kcal/mol, which are greater than the reference drug gefitinib (7.0 and 6.0 kcal/mol) for PDB IDs 4WD5 and 2J6M respectively. The PreADMET study results confirmed good pharmacokinetic and toxicity profile. Ligand interaction with amino acid residues LYS A:745 and MET A:793, shared by reference standard and designed ligands, is vital for the binding affinity and for EGFR inhibition. The synthesized compounds were evaluated (MTT assay and Cell Apoptosis assay) against MCF-7 cell lines, including those resistant to EGFR inhibitors. The MTT assay and cell apoptosis assay showed that samples PODA-21 ("IC₅₀" 50.51±1.64 µg/mL) and AODA-13 ("IC₅₀" 43.00±1.02 µg/mL) exhibited moderate activity when compared to reference standard and molecular docking study came aligned with the biological results. The synthesized compounds displayed optimum biological activity; therefore, these can be treated as lead nuclei for further structural modification.

Link: <https://doi.org/10.48309/chemm.2025.517109.1937>



TITLE:

Synthesis and characterization of fenofibrate–atorvastatin calcium cocrystals with Para-Aminobenzoic Acid as a Coformer: Design, formulation, and evaluation

AUTHOR :

A.B., Kuchekar, A. B.; A., Chavan, Anirudha;
P.R., Inamdar, Poonam R.; A.R., Gawade,
Ashwini R.

JOURNAL NAME:

Journal of Applied Pharmaceutical Science (Vol.-
15, Issue-9)

DETAILS:

Published on 5 August 2025



ABSTRACT:

This study aimed to improve the dissolution profile of two poorly soluble drugs, atorvastatin calcium and fenofibrate, through cocrystallization via carefully selected coformers. Five different coformers were screened via a molecular docking approach with the PyRx virtual screening tool. Binding energy and hydrogen bond formation data identified para-aminobenzoic acid (PABA) as the most suitable coformer for cocrystal formation. The cocrystallization process was carried out via the liquid-assisted grinding method. The resulting cocrystals were characterized via Fourier transform infrared (FT-IR), powder X-ray diffraction (PXRD), differential scanning calorimetry (DSC), and scanning electron microscope (SEM) techniques. A detailed evaluation of fenofibrate, atorvastatin calcium, and fenofibrate–atorvastatin calcium-PABA multidrug cocrystals revealed improved solubility compared with that of the pure drugs. Characterization through FT-IR confirmed interactions between the drugs and the coformer, whereas PXRD, DSC, and SEM analyses supported the formation of a distinct crystalline phase. An in vitro dissolution study demonstrated a significant increase in the dissolution rate of the cocrystals. The findings concluded that cocrystals prepared with PABA via the liquid-assisted grinding method successfully improved the solubility of atorvastatin calcium and fenofibrate, providing a promising approach to address the challenges associated with poorly soluble drugs. The novelty lies in the strategic combination of two lipid-lowering agents into a single multicomponent crystal system, offering improved solubility, dissolution rate, and potential bioavailability compared to their standalone forms. This work pioneers the application of pharmaceutical cocrystallization for dual-drug delivery in dyslipidemia management, offering a promising platform for fixed-dose combination therapies with enhanced patient compliance and therapeutic synergy.

Link: <https://dx.doi.org/10.7324/JAPS.2025.231811>



TITLE:

Synthesis of A356 Matrix Hybrid Nanocomposites: Microstructural, Mechanical and Tribological Characterization

AUTHOR :

S., Shinde, Shriyash; S.B., Barve, Shivprakash B.

JOURNAL NAME:

Transactions of the Indian Institute of Metals
(vol.-78, Issue-9)

DETAILS:

Published on 26 August 2025



ABSTRACT:

In recent years, the increasing performance requirements of growing engineering systems have driven the need for advanced materials with superior strength-to-weight ratios. By incorporating lightweight metal matrix composites into crucial parts, substantial fuel consumption and related emission reductions may be accomplished, supporting sustainable engineering methods. This study reports fabrication of A356 matrix hybrid nanocomposites reinforced with varying weight percentages (1–5 wt.%) of boron carbide (B₄C) and a fixed 1 wt.% zirconium dioxide (ZrO₂) via ultrasonic vibrations assisted two-step stir casting. The microstructure, mechanical properties, and tribological performance of the A356–B₄C–ZrO₂ composites were evaluated. The microstructure analysis revealed well-distributed nano reinforcement particles promoting grain refinement. The microhardness and ultimate tensile strength increased by 50% and 51.7%, respectively, compared to the base matrix. The fractured surfaces of hybrid nanocomposites were examined with a scanning electron microscope to analyze the fracture behaviour. The hybrid nanocomposite exhibited reduced wear rates and friction coefficients compared to the base metal.

Link: <https://doi.org/10.1007/s12666-025-03697-6>



TITLE:

Evaluation of Closely Spaced Infill Wells in
Unconventional Mature Coalbed Methane Field:
A Simulation Approach

AUTHOR :

A.R., More, Anand Raosaheb; S.D., Patwardhan,
S. D.

JOURNAL NAME:

ACS Omega (Vol.-10, Issue-32)

DETAILS:

Published on 6 August 2025



ABSTRACT:

This study presents the work carried out to evaluate the effectiveness of closely spaced infill wells in enhancing recovery from a mature coal bed methane (CBM) field. The primary objective was to assess the potential for increasing gas production rates, accelerating reserve monetization, and improving the overall recovery efficiency in an unconventional reservoir setting. The authors utilized an integrated approach combining core-hole data, geological and geophysical models, historical production performance, and a history-matched dynamic reservoir model to support technical decisions. A finely gridded cellular model was developed for numerical simulation, enabling detailed history matching over the entire production period. This allowed for a reliable evaluation of the infill well impact on reservoir dynamics and the remaining reserves of offset wells originally developed with wider well spacing. The study was applied to a distinct area within a mature CBM field, using data sets available in the public domain. Simulation results showed a strong correlation with the actual pilot infill well performance, validating the methodology. Quantitative outcomes demonstrated the tangible benefits of the infill strategy: a 30% plus increase in peak field gas rate, a 12% plus gain in recovery factor, a 2-fold acceleration in average reservoir pressure depletion, and a 1.5 to 2 times faster recovery of project capital expenditure. These improvements directly translate to more efficient resource utilization and better project economics. The work demonstrates how the application of a simulation-based approach combined with real field data can guide infill drilling strategies in unconventional CBM reservoirs. It offers a technically robust, cost-effective method to optimize late-life field development, while adhering to sound reservoir management principles.

Link: <https://pubs.acs.org/doi/10.1021/acsomega.5c05150>



TITLE:

Prospects of bio-lubricants in the area of tribology

AUTHOR :

S.G., Ghalme, Sachin G.; M.S., Harne, Mahesh S.; S., Thorat, Sandeep

JOURNAL NAME:

Lubricant Technology: Fundamentals and Applications (Book Chapter)

DETAILS:

Published on 2025



ABSTRACT:

Minimizing energy losses and maintaining equipment's integrity are prime concerns in any industrial process, which are dependent on the tribological solutions. In recent years, in line with sustainable development, stringent environmental issues, and minimizing carbon footprints, there is a necessity for exploring renewable and sustainable lubricants known as bio-lubricants. There is a need for the preparation of non-toxic environment-friendly lubricants which will minimize the environmental pollution and offer the desired tribological requirements. Biodegradability and renewability will be two major factors in the coming years in the field of tribological applications. Bio-lubricants generated from organic resources offer superior lubricity along with renewability and biodegradability. This chapter mainly discusses the various types of bio-lubricants that will be non-toxic, environment-friendly, and economical replacement to the present mineral-based lubricants. Attempts have been made to present preparation, characteristics of bio-lubricants, and challenges related to the use of bio-lubricants. This review also explored the drawbacks, future scope, and chemical modifications required for the use of bio-lubricants.

Link:

<https://www.taylorfrancis.com/chapters/edit/10.1201/9781003642848-7/prospects-bio-lubricants-area-tribology-sachin-ghalme-mahesh-harne-sandeep-thorat>



TITLE:

Quality of Life and Occurrence of Metabolic Syndrome Among Type 2 Diabetes Patients in South India: A Pilot Study

AUTHOR :

A., Muhseena, Ayishath; M., Swalih, Mohammad; T.P., Varghese, Treasa P.; S., Chand, Sharad

JOURNAL NAME:

Open Cardiovascular Medicine Journal (Vol.-19)

DETAILS:

Published on 12 August 2025



ABSTRACT:

Introduction: Metabolic Syndrome (MetS), a prevalent contributing factor for cardiac complications in patients with diabetes mellitus (DM), adversely affects their quality of life (QoL). The objective of the study was to assess the QoL and the occurrence of MetS among patients with Type 2 DM. **Methods** The cross-sectional study included 191 inpatients aged 25-75 with Type 2 DM, diagnosed for over six months, and on diabetic medications. Patients with Type 1 DM, gestational DM, cognitive impairment, mental retardation, those on ventilator support, and outpatients were excluded. MetS and QoL were evaluated by the International Diabetes Federation (IDF) guidelines and the Audit of Diabetes Dependent Quality of Life Questionnaire (ADDQoL), respectively. **Results** Among the enrolled participants, 44.0% had MetS, with a greater impact observed in females. Type of treatment ($p=0.001$), physical activity ($p<0.00$), body mass index ($p<0.000$), alcohol intake ($p=0.007$), eating habits ($p=0.003$), frequency of exercise ($p<0.00$), smoking ($p=0.007$), waist circumference ($p<0.000$), and hypertension ($p<0.000$) were statistically predominant in those with DM and MetS. Both genders reported a comparable negative impact on QoL domains, with no statistically significant difference in the Average Weighted Impact Score between males and females ($p=0.644$). **Discussion** The high prevalence of MetS among hospitalized Type 2 DM patients highlights a significant yet often overlooked health burden. Its presence was significantly associated with various lifestyle and clinical risk factors. All QoL domains showed a decline, indicating that diabetes and its complications have a negative impact on quality of life. **Conclusion** In conclusion, MetS appears to be very common in patients with DM, and it negatively affects QoL.

Link:

<http://dx.doi.org/10.2174/0118741924376137250808045625>



TITLE:

Applied discrete mathematics in developing efficient cryptographic algorithms for enhancing information security in WSN

AUTHOR :

S.H., Kulkarni, Sanjivani H.; V.V., Deshmukh, Vidya Vijay; R.K., Moje, Ravindra K.; S., Lavate, Santosh; Y., Gandhi, Yatin; N.M., Shelke, Nilesh M.

JOURNAL NAME:

Journal of Discrete Mathematical Sciences and Cryptography (Vol.-28, Issue-5A)

DETAILS:

Published on 30 August 2025



ABSTRACT:

When it comes to Wireless Sensor Systems (WSNs), solid data security is exceptionally vital since sensor hubs can be assaulted in numerous ways. This exposition looks at how discrete arithmetic can be utilized to make compelling cryptographic methods that can be utilized to form WSNs more secure. We see into how thoughts from number hypothesis, combinatorics, and logarithmic structures can be utilized to make cryptographic strategies that work with the uncommon issues that WSNs have, like not having sufficient vitality or computing control, and issues with being able to develop. We propose modern encryption and key administration strategies that utilize discrete scientific strategies to improve the protection, security, and legitimacy of information sent inside WSNs whereas moreover making the leading utilize of computing control and assets. Execution measures like speed of encryption and decoding, energy use, and resistance to common assault courses are utilized to judge the recommended strategies. Our comes about appear that discrete arithmetic could be a solid establishment for making cryptographic strategies that progress information security whereas considering the impediments of WSNs. As a result of this consider, secure communication strategies in WSNs are getting way better. This makes a difference illuminate one of the greatest issues in organize security.

Link: <https://doi.org/10.47974/JDMSC-2173>



TITLE:

Design and implementation of secure cryptographic algorithms for wireless sensor networks in healthcare applications

AUTHOR :

R.S., Kale, Rohini Suhas; A.S., Gaadhe, Ajjay S.;
N.B., Pokale, Navnath B.; P.A., Patil, Prashant
Ashok; P.S., Borkar, Pradnya S.; S.S., Uparkar,
Satyajit S.

JOURNAL NAME:

Journal of Discrete Mathematical Sciences and
Cryptography (Vol.-28, Issue-5)

DETAILS:

Published on 2025



ABSTRACT:

Wireless sensor systems (WSNs) are exceptionally vital for collecting information and following in genuine time in healthcare employments that are changing rapidly. But since healthcare information is private, solid security steps are required to ensure persistent security and make beyond any doubt information exactness. This ponder talks approximately how to form secure cryptographic strategies that work with WSNs in healthcare settings and how to put them into activity. We recommend a light encryption strategy that strikes a adjust between security and the constrained computing control and vitality that are common in WSNs. Our arrange incorporates a good key administration framework that produces beyond any doubt that contact between sensor hubs and with central information servers is secure. We moreover utilize a two-layer encryption framework that employments symmetric and deviated cryptography to secure against numerous sorts of assaults, such as information robbery and tuning in in on discussions. Broad models and real-world utilize in a healthcare setting are used to test the proposed strategies. Execution measures just like the speed of encryption and interpreting, the sum of vitality utilized, and the sum of memory utilized are looked at to appear that our approach works and is effective. The comes about appear that our cryptographic strategies offer a tall level of security whereas still being able to work rapidly and effectively sufficient for real-world healthcare employments. Since of this work, secured WSNs are getting superior, which suggests healthcare frameworks will be more secure and more viable.

Link:

<https://www.scopus.com/pages/publications/105016882153>





TITLE:

Securing the cloud: Comparative analysis of NCS, ERSA, and EHS cryptographic methods

AUTHOR :

A.K., Singha, Anjani Kumar; P.K., Tiwari, Pradeep Kumar; M., Bari, Minakshee; R., Kumar, Rakesh; Mandeep

JOURNAL NAME:

Journal of Discrete Mathematical Sciences and Cryptography (Vol.-28, Issue-5)

DETAILS:

Published on 30 August 2025



ABSTRACT:

The paradigm change from locally located data centers toward the cloud is necessary due to the recent boom in data generated through different social networking platforms, e-commerce websites, and other enterprises. Cryptography is the most effective method for safeguarding the privacy and safety of cloud data. Researchers have created numerous algorithms for cryptography. However, they all have long execution times that are predictable, linear, and memory-intensive. The performance of three cryptographic schemes—Enhanced Homomorphic Scheme (EHS), Enhanced RSA (ERSA) and is Non-Deterministic Cryptographic Scheme (NCS), evaluated using a CPU, focusing on CPU usage, throughput efficiency, and memory consumption. The experiment's outcomes showed that EHS and NCS produced non-deterministic and non-linear run times. Once more, for text and numeric data types, EHS and NCS yielded the lowest throughput and memory consumption when processing data sizes of $7n \times 10^2$ (KB ($\in 1, 2, 4, 10, 20, 40$)). On the other hand, deterministic run-time trends, linear, and ERSA generated predictable results.

Link: <https://doi.org/10.47974/JDMSC-2430>





TITLE:

Blockchain-based secure data sharing and storage system using elliptic curve cryptography

AUTHOR :

S.S., Malwade, Sulakshana Sagar; R.B., Jadhav, Rohini B.; V.J., Jadhav, Veena Janardhan; A.V., Chitre, A. V.; B.A., Neole, Bhumika A.; N.M., Shelke, Nilesh M.

JOURNAL NAME:

Journal of Discrete Mathematical Sciences and Cryptography (Vol.-28, Issue-5)

DETAILS:

Published on 30 August 2025



ABSTRACT:

This article depicts a modern blockchain-based secure way to store and share information that employs elliptic curve cryptography (ECC) to form information more private and secure. As the sum of digital data grows, it gets to be increasingly critical to have solid and successful security measures. Our strategy employs both blockchain innovation and ECC to settle the issues that come with the way information is as a rule put away and shared. The blockchain is an independent record that keeps information secure and outlandish to alter. ECC, on the other hand, scrambles information unequivocally whereas utilizing less computing control than other strategies. This blend not as it were keeps information secure whereas it's being sent and put away, but it too makes it simpler for numerous individuals to share information and control who can see it. A keen contract-based get to control instrument is built into the recommended framework. This lets clients have particular rights and consequently implements security rules. We utilize exhaustive hypothetical and viable tests to see at our system's execution and security. This appears that it is proficient in terms of both how much it costs to run and how secure it is. The comes about appear that our strategy gets tall security with small impact on speed. This makes it a great choice for sharing secure information in numerous settings, such as for financial activities, wellbeing records, and private individual information. This work includes to the field by displaying a new way to make strides information security and protection by combining blockchain and ECC.

Link: <https://doi.org/10.47974/JDMSC-2171>



TITLE:

Efficient cryptographic algorithms for enhancing patient data privacy in medical IoT systems

AUTHOR :

M.R., Kuveskar, Manisha Rajendra; B., Dharaskar, Bhagyashree; S., Bhattacharjee, Srijita; A., Dev, Anoop; M., Gawade, Mayuri; M., Nagpal, Manish

JOURNAL NAME:

Journal of Discrete Mathematical Sciences and Cryptography (Vol.-28, Issue-5A)

DETAILS:

Published on 30 August 2025



ABSTRACT:

Despite the development of Medical Internet of Things (IoT) systems has completely changed the way healthcare is delivered, patient data security and privacy are still major worries. In this work, we suggest a new method to improve patient data privacy by integrating light cryptographic algorithms. AES-128 encryption efficiency and CBC-MAC (CCM) authentication integrity assurance are combined in our proposed hybrid algorithm. With reference to several performance metrics including encryption and decryption speeds, key size, memory footprint, communication overhead, security strength, and energy consumption, we assess this hybrid approach in comparison to two conventional lightweight cryptographic techniques, ChaCha20-Poly1305 and Elliptic Curve Cryptography (ECC). We show by thorough analysis and comparison how well our hybrid approach protects data robustly while minimizing resource limitations that are typical in medical IoT settings. Our results emphasize how important specialized cryptographic solutions are to protect patient privacy in networked healthcare systems.

Link: <https://doi.org/10.47974/JDMSC-2179>





TITLE:

Elliptic curve-based cryptography solutions for strengthening network security in IoT environments

AUTHOR :

S.J., Budhavale, Shilpa Jeevan; L.R., Desai, Latika Rahul; S., Paithane, Sakshi; S.N., Ajani, Samir N.; M.L., Singh, Monisha L.; A.R., Bhagat Patil, Arvind R.

JOURNAL NAME:

Journal of Discrete Mathematical Sciences and Cryptography (Vol.-28, Issue-5A)

DETAILS:

Published on 30 August 2025



ABSTRACT:

Elliptic Curve-Based Cryptography (ECC) may be a solid way to move forward organize security in Web of Things (IoT) settings, where other cryptography strategies regularly come up short. ECC suggests a tall level of security with moderately little key sizes, which is especially important for Internet of Things devices without any assets. This speed cuts down on preparing squander, memory utilize, and control utilize, which makes it culminate for IoT apps that utilize a part of diverse sorts of equipment. By making beyond any doubt there are secure ways to communicate and verify clients, ECC can lower the dangers of data spills and illicit get to. ECC is additionally great at securing private information over gadgets that are connected to each other since it is safe to modern dangers and can be changed to work with distinctive IoT conventions. Utilizing ECC-based arrangements in IoT systems not as it were makes them more secure, but it moreover moves forward speed, making it conceivable to receive secure and adaptable arrangements in settings that are getting more complicated and spread out.

Link: <https://doi.org/10.47974/JDMSC-2156>



TITLE:

Computational Analysis of an AK-47 Bullet
Proximate to Stationary, Moving, and Porous
Wall

AUTHOR :

K.R., Kandula, Krishna Reddy; Y., Parkhi, Y.;
T.B., Gholap, Tanmay B.; D., Sahoo, Devabrata

JOURNAL NAME:

Fluid Dynamics (Vol.-60, Issue-4)

DETAILS:

Published on September 2025



ABSTRACT:

In firearms and ballistics, grasping the interaction between high-speed projectiles and their surroundings is crucial for optimizing trajectory, stability, and accuracy. This study explores the comparison of intricate flow dynamics involved when a bullet, traveling at the Mach number equal to 2, is fired near both a moving object or wall and a stationary wall, particularly in urban warfare scenarios. The proximity to the wall introduces an asymmetry in the pressure distribution across the bullet's body, affecting its flow physics in diverse ways. The present analysis employs Computational Fluid Dynamics to scrutinize the flow field around a 7.82-mm bullet from an AK-47 rifle moving at supersonic speeds near the ground. Computational simulations explore phenomena at various heights from a nearby stationary or moving wall, ranging from the region of nearest influence to a ground distance five times the bullet's diameter. The study encompasses height-to-diameter ratios h/D from 0.5 to 5, shedding light on the overall flow field, the pressure coefficient distributions, and the lift, drag, and moment coefficients. Additionally, the flow field in the wake region is examined. The results highlight the generation of a detached bow shock wave at the bullet's tip, significantly influencing the drag coefficient experienced by the projectile. This study contrasts the effects of a stationary wall at varying proximities to the ground with those of a moving wall at equivalent distances. The comparison highlights change in flow characteristics and various parameters, providing valuable insights into high-speed projectiles in proximity to stationary walls and moving walls simultaneously (h/D) at a Mach number 2 during urban warfare scenarios. Furthermore, a study on the effect of porous wall proximity to the bullet has been conducted, and the shock absorption reduces the momentum. Understanding these phenomena is crucial for optimizing the bullet design and enhancing the effectiveness of missile ballistics in real-world applications.

Link: <https://doi.org/10.1134/S0015462825600944>



TITLE:

Electric Vehicle Battery Cooling Using Phase Change Materials and Nanofluids

AUTHOR :

D.S., Shastri, Dhires S.; M.R., Mahajan,
Mangesh R.; A., Sur, Anirban; V.W., Bhatkar,
Vijay W.

JOURNAL NAME:

International Journal of Heat and Technology
(Vol.-43, Issue-3)

DETAILS:

Published on 30 June 2025



ABSTRACT:

The phase change materials (PCM) and nanomaterials are employed to control overheating, which is the main problem of lithium-ion batteries. Due to its inherently low thermal conductivity, PCM struggles to dissipate heat from battery cells effectively. To address this issue, copper foam was incorporated to enhance its thermal conductivity. The battery temperature management system that utilizes phase change materials and nanomaterials is modeled in three dimensions through computational fluid dynamics (CFD) methodology. ANSYS CFD performed a steady-state thermal analysis with 378,000 nodes and 1.2 million elements based on suitable thermal boundary conditions. Phase change materials (PCMs) demonstrate superior performance compared to traditional cooling methods for keeping battery temperature within safe operational limits. Using passive cooling methods PCM-nanomaterial combinations deliver a low-cost maintenance-free solution which improves thermal efficiency and achieves consistent temperature distribution. This study employs paraffin wax as the phase change material and incorporates Al_2O_3 nanoparticles to act as a nanofluid additive. The selection of paraffin wax for electronic thermal management applications stems from its consistent thermal properties combined with its suitable melting point and substantial latent heat capacity. Experimental results combined with CFD simulations show that battery temperatures stay within the 15°C to 35°C range when using nanomaterials across multiple operating conditions.

Link: <https://doi.org/10.18280/ijht.430317>



TITLE:

A Novel Investigation on p-GaN GATE with and without AlGa_N Back Barrier for AlGa_N/Ga_N High Electron Mobility Transistors

AUTHOR :

A., Arunraja, A.; R., Kishorekumar, R.; D., Sangeetha, D.; R., Dharmaprasanth, R.; K.S., Bharaty, K. S.; A., Balamaniandan, A.

JOURNAL NAME:

Journal of VLSI Circuits and Systems (Vol.-7, Issue-1)

DETAILS:

Published on 3 September 2025



ABSTRACT:

p- GaN layers is relatively matured and controllable, making p-GaN HEMTs the leading structure that is most likely to be commercialized. The analysis of the gate design parameters like transconductance, breakdown voltage, threshold voltage, JFOM and gate turn-on current of p-GaN devices, which determine the on-state characteristics, needs to be investigated. The AlGa_N barrier, p-GaN gate, Ga_N, AlGa_N back barrier, and SiC substrate constitute the structure of p-GAN, which is operated in the E-mode. The use of AlGa_N back barrier reduces the punch-through current. Silicon Carbide (SiC) is used as substrate to have lower lattice mismatch with nitride layer. The transfer characteristics, transconductance, threshold voltage, breakdown voltage and JFOM are analyzed. The device demonstrates a positive threshold voltage that varies linearly with changes in ambient temperature. Additionally, the device featuring an AlGa_N back barrier shows a higher breakdown voltage of 105V, in contrast to the device lacking a back barrier.

Link: <https://vlsijournal.com/index.php/vlsi/article/view/212>



TITLE:

Criminalisation of marital rape in India: a medico-legal analysis

AUTHOR :

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

JOURNAL NAME:

International Journal of Public Law and Policy
(Vol.-11, No.-3)

DETAILS:

Published on 14 July 2025



ABSTRACT:

Marital rape is described as undesired intercourse between a man and his wife acquired by force, coercion, threats of force, physical assault, or when she is incompetent to consent. Marriages with marital rape have considerably more significant rates of sexual aggression, marital discomfort and reduced marital quality and satisfaction. Many marital rape victims are either incapable or scared to oppose their spouses' sexual violence. Victims of marital rape have post-traumatic stress disorder, anxiety, depression, gynaecologic disorder, and terrible physical health impacts. Thus, this paper investigates the laws governing rape in India, with a focus on the status of marital rape, the acknowledgement of marital rape as a crime and an analysis of the perspective of society and judiciary toward marital rape while highlighting the medical consequences faced by the survivors of the marital rape.

Link: <https://doi.org/10.1504/IJPLAP.2025.147232>



TITLE:

Deciphering the Cardiovascular Conundrum of
COVID-19: An In-depth Review

AUTHOR :

S.K., Yadav, Shiv Kumar; S., Chand, Sharad

JOURNAL NAME:

Coronaviruses (Vol.-6, Issue-3)

DETAILS:

Published on 8 November 20 June 2024



ABSTRACT:

The coronavirus disease pandemic raised a notable deal of discussion among scientists and the public, in addition to necessitating the adaptation of healthcare staff for nearly two years. COVID-19 caused various respiratory symptoms and lung damage. In addition, it also played a major role in insulting the circulatory system. The frequency of heart-lung involvement with its inverse relationship with prognosis is highlighted in the review. Direct cardiac involvement (COVID-19 myocarditis) was followed by subsequent cardiac involvement (myocardial damage, myocardial infarction, and arrhythmias). The coronavirus disease vaccination's continual effects, cardiovascular problems, and the way the virus aggravated preexisting cardiovascular illness were ultimately studied in this review.

Link:

<http://dx.doi.org/10.2174/0126667975299242240607103902>



TITLE:

Data mining approach for nutrition score calculation of geriatric patients

AUTHOR :

V.P., Suryawanshi, Vaishali P.; R., Phalnikar, Rashmi

JOURNAL NAME:

International Journal of Medical Engineering and Informatics (Vol.-17, Issue-5)

DETAILS:

Published on 17 September 2025



ABSTRACT:

Due to lack of uniformity in terms of understanding nutrition status, comorbidity types, patient mobility and BMI readings mal-nutrition screening forms cannot be used to correctly comprehend each patient's nutritional status. The goal of this study is to use a data mining approach to understand nutrition screening forms in order to determine the malnutrition status of hospitalised geriatric patients. The evaluation measures are used to indicate the accuracy of the classification algorithms. The research work on nutrition screening form, which is designed using classification algorithms, will help physicians to understand their patient's nutritional status and help in avoiding malnutrition in them.

Link: <https://doi.org/10.1504/IJMEI.2025.148641>



TITLE:

Digital Enigma: Understanding Ethical Dilemmas
in Design and Marketing

AUTHOR :

Manoj Kumar Kamila; Sahil Singh Jasrotia;
Shagun Chib

JOURNAL NAME:

Review of Management Literature (Vol.-3, Issue-
3)

DETAILS:

Published on October 2024



ABSTRACT:

Operating ethically when developing and marketing a product or service is critical. An essential aspect of this process is ensuring that a company's guiding principles and values are congruent with its overarching goals. Concerns span from the veracity of marketing to the preservation of individual privacy to the impact of design on the natural world and human civilization. It also entails taking precautions if a product or advertising campaign has unforeseen repercussions. In today's interdependent and globalized world, it is more important than ever for firms to employ morally acceptable design and marketing tactics to acquire consumer trust and generate beneficial social and environmental benefits. This chapter offers insights for future researchers by offering a conceptual framework in ethics in design and marketing, which can be empirically tested. This study highlights several factors like privacy, manipulation, representation and diversity, accessibility, sustainability, social responsibility, and truth in advertising as important factors leading to ethical concerns in design marketing.

Link: <https://doi.org/10.1108/S2754-586520240000003004>



TITLE:

Impact of payload, speed, and rolling resistance on battery performance in electric vehicles

AUTHOR :

S.S., Gawade, Shashank S.; P.A., Patil, P. A.;
V.K., Bhojwani, Virendra K.; Y.J., Chendake,
Yogesh J.; R.B., Khomane, Ramdas B.

JOURNAL NAME:

Cogent Engineering (Vol.-11, Issue-1)

DETAILS:

Published on 26 September 2025



ABSTRACT:

Electric vehicles (EVs) are increasingly recognized as a sustainable alternative to conventional transportation systems, yet their driving range continues to be constrained by limitations in battery performance. To address this challenge, it is essential to investigate operational factors influencing battery current withdrawal and lifespan in terms of distance coverage. The present study evaluates the combined effects of payload, vehicle velocity, and rolling resistance on battery behavior. Findings demonstrate that average current withdrawal rises consistently with increases in payload, speed, and rolling resistance. A heavier payload intensifies tractive force and motion resistance, leading to higher power demand, which scales proportionally with velocity. Likewise, elevated rolling resistance heightens tire-road interaction, thereby increasing current and power consumption. At lower velocities, variations in current are marginal; however, at higher speeds, the deviations become more pronounced. For constant loading, current withdrawal remains relatively stable during the initial 10 minutes, after which the state of charge (SoC) begins to decline depending on the battery's initial condition. With continued operation, SoC depletion contributes to voltage reduction and greater current demand. A predictive model integrating these observations has been developed and validated experimentally, providing valuable insights for defining the working range and supporting thermal management system design.

Link: <https://doi.org/10.1080/23311916.2025.2560981>



TITLE:

A Study on 'Paanpoi' Water Services for Resilient Society

AUTHOR :

K., Gandhi, Khushi; B., Badve, Bhargavi; S.S.,
Jadhav, Sachin Shivaji; S., Kumar, Saurabh

JOURNAL NAME:

Lecture Notes in Mechanical Engineering

DETAILS:

Published on 16 September 2025



ABSTRACT:

Water is an irreplaceable natural resource which is essential for the existence of life on the planet. It plays a vital role in sanitation and maintaining hygiene especially the areas facing water scarcity. Inadequate access to clean water increases the risk of diseases like cholera and other waterborne illnesses. Reliable water services are essential for ensuring public health in water-stressed areas. In addition, water infrastructure is a crucial component of achieving sustainable development goals and building a resilient future. This study explores, investigates and presents the “Paanpoi” water services. The “Paanpoi” water services are provided through the earthen pots on the streets of urban city Pune, India. The prime objective of the study is to identify and map the stakeholders, lack of hygienic maintenance and shutting down of “Paanpoi” water services. Service design methodology is employed in the study. It consists of exploration, creation and reflection stages. The exploration stage involves service safari for identifying stakeholders, storage and maintenance facility of water services and pain points in the “Paanpoi” water services. It reveals that the primary consumption of “Paanpoi” water services are auto rickshaw drivers and their respective trusts and foundations. The other stakeholders associated with this service are trusts, NGOs, temple management committee, visitors, Municipal corporation, etc. The creation stage involves brainstorming and concept development. The reflection stage presents the re-design of “Paanpoi” water services through a service blueprint. This paper could aid in strategic management of water resources for social workers, NGOs and local governing bodies to gain an understanding of “Paanpoi” water services.

Link: https://link.springer.com/chapter/10.1007/978-981-96-5511-3_14



TITLE:

Nanomedicine approach to Malaria Treatment:
Artesunate-Loaded Solid Lipid Nanoparticles
Development and Evaluation

AUTHOR :

K., Gound, Kiran; P.U., Chandorkar, Purva Uday;
S.C., Jagdale, Swati C.

JOURNAL NAME:

Research Journal of Pharmacy and Technology
(Vol.-18, Issue-8)

DETAILS:

Published on 2 September 2025



ABSTRACT:

Artesunate is a butanedioic acid primarily used as an antimalarial agent. Low bioavailability and poor solubility are the major limitations of Artesunate leading to frequent dosing. The controlled-release dosage form can help in the reduction of dose frequency. Thus the present study aimed to formulate Artesunate solid lipid nanoparticles (Art-SLN) to control the drug release and ultimately lead to a reduction of dosing frequency. Art-SLNs were formulated by solvent injection method and optimized. The drug-excipients compatibility was studied by FT-IR and DSC. Entrapment efficiency, drug loading capacity, particle size analysis, surface morphology, dialysis membrane drug release, and ex-vivo drug release using chick ileum were performed. The FT-IR data revealed proper drug encapsulation within the lipid molecules. The DSC data demonstrated that the Artesunate was converted to its amorphous form suggesting its better solubility. The mean particle size of SLN was observed to be 278.1nm and the ex-vivo drug release from the optimized batch F5 was observed to be 97.5%.

Link: <https://doi.org/10.52711/0974-360X.2025.00521>





TITLE:

Uncovering the retirement planning behaviour of Indian households through expert lenses – a grounded theory approach

AUTHOR :

K.K., Ingale, Kavita Karan; A.R., Paluri, Achuta Ratna

JOURNAL NAME:

Qualitative Research in Financial Markets

DETAILS:

Published on 15 September 2025



ABSTRACT:

Purpose: The purpose of this study is to gain deeper insights into antecedents and impediments related to the retirement planning behaviour of individuals. The investigation attempts to understand multiple realities from an expert's collective assessment drawn from people's experiences, feelings, perceptions and attitudes. **Design/methodology/approach:** Using a grounded theory approach, the study adopts an inductive method to understand social reality. The sub-optimal behaviour associated with retirement planning is examined through interlinkages between various codes capturing the essence of the content using the code co-occurrence model via Maxmaps drawn from MAXQDA software. **Findings:** The study adds value by collectively exploring the drivers, challenges and barriers to retirement planning behaviour through practitioners' experiences. Their assessments of consumer's responses and dispositions enable us to gauge the market for these services. It decodes retirement planning, which is a process of preparing a portfolio for retirement, post-need assessment of the individual. A retirement plan is not any single product but a portfolio of varied products customized to the investor's needs. **Research limitations/implications:** The themes and collective dimensions discovered in the study will help propel the study of retirement planning forward in an interdisciplinary way. **Practical implications:** The results of this study provide valuable inputs for developing and designing policy interventions and guiding practices for optimal retirement planning behaviour. **Social implications:** It has broader implications for managing the fiscal balances, retirement life satisfaction and societal well-being. Addressing the issues raised during the discussion will enable the society to attain ageing with dignity, leading towards sustainable development goals related to health and well-being. **Originality/value:** The study makes a unique contribution to the literature by providing a grounded theory framework drawn from core themes, synthesizing thematic and evaluative codes to investigate retirement planning behaviour.

Link: <https://doi.org/10.1108/QRFM-07-2024-0177>



TITLE:

Recent Advancement and Development of
Biomimetic Heart Valve Prosthesis

AUTHOR :

S., Chaudhari, Siddhi; A., Khade, Aatmaja; V.,
Girase, Vaibhav; P., Dhatrik, Pankaj

JOURNAL NAME:

Journal of Bionic Engineering

DETAILS:

Published on 22 September 2025



ABSTRACT:

Valvular Heart Disease (VHD), including stenosis and regurgitation, is a significant contributor to global cardiovascular morbidity. Current prosthetic solutions mechanical and bioprosthetic heart valves each present major limitation. Mechanical valves require lifelong anticoagulation due to thrombogenicity, while bioprosthetic valves suffer from structural degeneration and limited durability. Polymeric Heart Valves (PHVs) have emerged as promising alternatives, aiming to integrate the mechanical resilience of synthetic materials with the biocompatibility and hemodynamic performance of natural valves. Recent studies have explored advanced polymers such as Polyhedral Oligomeric Silsesquioxane–Polycarbonate–Urea–Urethane (POSS-PCU), Silicone–Polyurethane Urea (SiPUU), and nanocomposites like Polyvinyl Alcohol (PVA) and SIBS for their enhanced thromboresistance, calcification resistance, and long-term mechanical durability. Complementary to material innovation, fabrication methods such as 3D printing, Melt Electrospinning Writing (MEW), and Focused Rotary Jet Spinning (FRJS) offer patient-specific designs and microstructural control. This review systematically compares traditional and next-generation prostheses, examines mechanical and biological performance, and discusses critical design challenges including porosity, thrombogenicity, and leaflet calcification. Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) are highlighted for optimizing design and simulating physiological conditions. By presenting recent preclinical progress and manufacturing strategies, this review outlines a translational roadmap toward clinically viable, biomimetic polymeric heart valves capable of addressing the needs of both adult and pediatric patients. Compared to traditional bioprosthetic tissues, advanced polymers offer better resistance to calcification, reduced thrombogenicity, and tunable mechanical properties.

Link: <https://link.springer.com/article/10.1007/s42235-025-00781-x>



TITLE:

Electrochemical Detection of E. coli Using Polysaccharide Modified ZnO Nanoparticles

AUTHOR :

V.V., Sirdeshmukh, Vedashree V.; L., Sharma, Lokesh; C.K., Tagad, Chandrakant K.; A.A., Kale, Anup Atul

JOURNAL NAME:

2025 IEEE Applied Sensing Conference (APSCON)

DETAILS:

Published on 4 September 2025



ABSTRACT:

Recently, zinc oxide nanoparticles (ZnO) have been explored extensively for various applications in sensing equipment and detection methods due to their desirable characteristics. In the present study, a sensitive and selective immunosensor has been developed for the detection of pathogenic strain of E. coli using polysaccharide-modified ZnO nanoparticles (ZnO-PSs). With varying compositions of Locust bean gum (LBG), chitosan (CS), and LBG-CS composite, ZnO-PSs were prepared by surface modifications and labeled as ZnO-LBG, ZnO-CS, and ZnO-CS-LBG, respectively. Further, synthesized ZnO-PSs were characterized using Fourier transform infrared spectroscopy (FTIR), Scanning electron microscopy, and X-Ray diffraction (XRD) analysis. Subsequently, SPCEs (Screen Printed Carbon electrodes) were modified with multiple samples containing ZnO, ZnO-LBG, ZnO-CS, and ZnO-CS-LBG, respectively, and electrochemical measurements were taken for the detection of E. coli in the concentration range of 1-10 cfu/ml. The study showed the ZnO-CS-LBG composite to be more effective when compared with bare ZnO and other nanocomposites. The employment of LBG in synthesizing the ZnO-PSs composite electrode was found to accelerate the sensitivity of the developed biosensor and depicted a stronger linear response in the range of 1-10 cfu/ml with a coefficient of determination (R^2) value of 0.98.

Link:

<https://doi.org/10.1109/APSCON63569.2025.11144078>





TITLE:

Underground Cable Fault Detection and Monitoring System

AUTHOR :

T., Vaze, Tanishk; B., Kumar, Bikku; N.M., Lokhande, Netra M.; H.D., Zodpe, Harshali D.

JOURNAL NAME:

2025 6th International Conference for Emerging Technology, INCET 2025

DETAILS:

Published on 4 September 2025



ABSTRACT:

In modern utility management, the reliability of underground cable systems is essential for uninterrupted power distribution. However, these systems are vulnerable to faults from environmental conditions, material wear, and accidental damage. Detecting and diagnosing faults can be challenging, as traditional manual inspection methods are often time-consuming and inefficient. This paper presents an underground cable fault detection and monitoring system combining hardware and IoT capabilities. The system utilizes an Arduino Uno microcontroller, GPS NEO 6M module, NodeMCU, and LCD display for real-time feedback. Three series of switches represent cable lines; when a fault is detected (simulated by pressing a switch), an alert is displayed, and the GPS fault location is transmitted to the Arduino Cloud application. This approach can significantly reduce repair times and costs in underground cable networks. The paper details the system architecture, design methodology, and potential applications, highlighting the promise of IoT in enhancing electrical infrastructure reliability

Link: <https://doi.org/10.1109/INCET64471.2025.11140826>





TITLE:

Robotic Systems Integrated with AI for Patient Rehabilitation

AUTHOR :

S.C., Patil, Shilpa C.; A.A., Madankar, Abhishek A.; S.T., Mantri, Shamla T.; M., Gulhane, Monali; S.S., Rahul, S. S.; A., Gupta, Akhil; N., Rakesh, Nitin

JOURNAL NAME:

2025 6th International Conference for Emerging Technology (INCET)

DETAILS:

Published on 4 September 2025



ABSTRACT:

Combining robotic systems with artificial intelligence (AI) could completely change the way patients recover by making treatment plans more personalised, effective, and flexible. Robotic-assisted therapy tools are meant to help people with brain disorders, joint conditions, and physical challenges get better faster. By using AI algorithms in these systems, it is possible to constantly analyse patient-specific data like physical growth and unique movement patterns. This lets the robot make real-time changes to treatment plans. The AI system learns from what the patient says and changes the therapy routines so that the patient recovers as quickly as possible with the least amount of pain or damage. This essay looks at how to create and use robotic systems with AI that are used to help patients recover. Some important parts of the technology are its flexibility to react to a patient's physical and mental state, its use of machine learning to make treatment changes on the fly, and its creation of user interfaces that make it easier for patients to get involved. The paper also talks about problems like making sure the system works well, dealing with safety issues, and finding the right balance between technology and human supervision. As therapy becomes more individualised, AI-powered robotic systems can give a more personalised approach, which can speed up healing and improve patients' quality of life. The results of this study show how important AI is for making robotic therapy work better. In the future, these systems may be an important part of healing methods in healthcare.

Link: <https://doi.org/10.1109/INCET64471.2025.11140272>



TITLE:

Computer simulation of dissimilar metal corrosion of fasteners and its validation by non-destructive testing

AUTHOR :

P.P., Deshpande, Pravin P.; P.A., Kamble, Prafull A.; S.T., Vagge, Shashikant Tukaram; V.S., Kathavate, Vaibhav Sanjay

JOURNAL NAME:

Journal of Solid State Electrochemistry

DETAILS:

Published on 20 September 2025



ABSTRACT:

In this work, we investigated the influence of bolt geometry on the bimetallic corrosion of galvanized steel bolts and low carbon steel plate (in joint/couple state) in acidic (pH) and alkaline (pH) electrolyte solution. The potential and current density distributions as well as metal thickness loss across square, hexagonal, and round bolts with pitch circle diameter (PCD) , , and are simulated using 3D finite element model in COMSOL multiphysics. We have also performed complimentary non-destructive experiments for estimating the metal thickness loss to validate our simulations. It is found that the round shape bolt with PCD positioned with LCS plate exhibits the lowest metal loss in both environments, thus corroborating with the catchment area principle and highlighting the importance of bolt geometry in mitigating the galvanic corrosion. Our simulations are in close agreement with experimental results (i.e., error), thereby confirming the validity of the model. Our work opens ample avenues of bridging multiphysics computation framework with experiments to alleviate galvanic corrosion problem in bolted assemblies of automobile parts further demonstrating the utility of advanced non-destructive techniques for model validation.

Link: <https://link.springer.com/article/10.1007/s10008-025-06446-3>



TITLE:

Investigations of structural, electrical and magnetic characteristics of copper doped nickel-zinc ferrite nanomaterials synthesized by auto-combustion sol-gel technique

AUTHOR :

R.A., Bugad, R. A.; D.V., Rupnar, Damu V.; S.B., Satpal, Sudhakar B.; R.G., Pawar, Ram G.; S.S., Deokar, Satish S.; G.S., Ghodake, Gajanan Sampatrao; P.B., Patil, Pranit B.; D.V., Pinjari, Dipak Vitthal; B.G., Pawar, Bharat Govind

JOURNAL NAME:

Journal of Sol-Gel Science and Technology

DETAILS:

Published on 20 September 2025



ABSTRACT:

Copper doped nickel-zinc ferrites nanoparticles with formula $\text{CuXNi}(0.5\text{-X})\text{Zn}0.5\text{Fe}2\text{O}4$ where, $X = 0.0, 0.1, 0.2$, and 0.3 were successfully synthesized using a facile and rapid sol-gel technique at room temperature. X-ray diffraction studies were performed to assess the crystallinity and phase purity, revealing the formation of well-defined single phase spinel nanostructures. The variation in Cu concentration appeared to influence lattice properties and crystallite sizes, exhibiting as these ions were successfully incorporated into the spinel lattice. The change in grain size with evolving x values reveals that the Cu substitution levels play a pivotal role in the ferrite nanoparticles sintering and growth process. The electrical conduction mechanism in ferrites is predominantly attributed to electron migrating among Fe(II) and Fe(III) ions onto octahedral (B) sites of spinel nanostructures. This route is influenced by the proportions of divalent and trivalent iron ions, which are additionally affected by Cu substitution levels. The regular variation in copper content in nickel zinc ferrite has significant implications for the material's structural, electrical, and magnetic characteristics. Structural changes, especially changes in the lattice constant and particle size, are accompanied by variations in electrical conductivity, which are modulated by the hopping process of mixed-valence iron ions. The magnetic characteristics are further impacted by magnetic interactions between cations onto both tetrahedral (A) and octahedral (B) sites, which are modified by varying the concentration of substituent ions. This work sheds light on how controlled doping may be used to alter the multifunctional attributes of ferrite nanoparticles for possible applications in magnetic, electrical, and catalytic sectors.

Link: <https://link.springer.com/article/10.1007/s10971-025-06947-7>



TITLE:

Light Actkr: Lightweight Advanced Encryption Curve Cryptography And Adaptive Truncated Karatsuba Ring-Based Security Framework For Power-Constrained Smart Devices

AUTHOR :

N., Purohit, Neha; S.S., Joshi, Shubhalaxmi Sanjay

JOURNAL NAME:

International Journal of Applied Mathematics
(Vol.-38, Issue-1S)

DETAILS:

Published on July 2025



ABSTRACT:

In the current era, the world is increasingly connected to the internet, influencing high-level security as well as minimal complexity among power-constrained devices. Owing to the constrained nature of smart devices, existing security frameworks have faced certain challenges, including instability, lack of robustness, and inefficiency due to their complex structures. Consequently, the research proposes lightweight advanced encryption curve cryptography and an adaptive truncated Karatsuba ring-based (Light ACTKR) security framework to alleviate the aforementioned limitations among power-constrained smart devices. The proposed secure framework is composed of lightweight advanced encryption curve cryptography (LightAEnC)-based signature algorithm and Lightweight adaptive N-th degree truncated Karatsuba ring (Light ANTKR)-based data encryption algorithms to improve security within the power-constrained smart devices. Moreover, the research adopts a lightweight concept in both algorithms to reduce computational complexity within the power-constrained smart devices and ensure minimal storage capacity. In addition to that, the research introduced advanced secure parameters within the LightAEnC signature algorithm, which possibly enhance security and make it resilient to security threats. According to the merits of the Light ACTKR secure framework, gains 2s of encryption time, 2.060s of decryption time, and 352KB of memory usage at a number of 200 devices in comparison with the current results of the existing literature.

Link: <https://www.scopus.com/pages/publications/105016509047?inward>





TITLE:

Changing workplace demographics: a gig economy and the role of employer branding

AUTHOR :

A., Nagre, Ajay; A.S., Dixit, Aparna Sameer; G., Mude, Girish

JOURNAL NAME:

Employee Relations

DETAILS:

Published on 5 September 2025



ABSTRACT:

Purpose: The gig economy in India has expanded rapidly, particularly in sectors such as food delivery, ride-hailing, and freelancing. This study explores the role of employer branding in engaging gig workers within this evolving labour landscape. It focuses on the lived experiences of on-demand service executives and the development of a context-specific Employer Value Proposition (EVP).

Design/methodology/approach: Adopting an interpretive phenomenological approach, this study used semi-structured interviews with 23 purposively selected gig workers across platform sectors such as delivery and mobility services in urban India. Thematic analysis was employed to identify patterns grounded in employer branding theory and self-determination theory.

Findings: Even in the absence of long-term employment contracts, a strong employer brand emphasizing fairness, recognition, and transparency plays a critical role in fostering engagement and performance. The findings reveal the economic, social, and operational challenges faced by gig workers, and identify the distinct drivers of satisfaction and trust that inform EVP design.

Originality/value: While gig work has received global attention, there remains a significant gap in understanding gig worker expectations and employer branding dynamics in India's platform economy. This study contributes by bridging branding theory with gig work literature and proposing a conceptual EVP framework tailored for platform companies operating in emerging markets.

.Link:

<https://www.sciencedirect.com/org/science/article/abs/pii/S0142545525000362>



TITLE:

A Hybrid Cnn-Lstm-Based Predictive Model For Nutritional Deficiency (In Women's) Detection Using Quantitative Modelling And Deep Feature Learning On Clinical Time-Series Data

AUTHOR :

S.S., Kashid, Shraddha Satish; R.Y., Mali, Ramesh Y.

JOURNAL NAME:

International Journal of Applied Mathematics
(Vol.-38, Issue-1S)

DETAILS:

Published on July 2025



ABSTRACT:

Women who aren't getting enough nutrition is still a public health problem, especially in places with few resources where early diagnosis and treatment are needed to avoid long-term health problems. Using real-life clinical datasets, this study shows a deep learning-based diagnostic framework for automatically finding nutrient deficiencies. Specifically, it looks at Vitamin A and Iron deficiencies in women. A CNN, LSTM network, and a hybrid (CNN-LSTM) model will be designed and tested as part of the proposed method. The dataset went through a lot of preprocessing, feature selection, and transformation to make it work with deep learning architectures. We saw that the CNN-LSTM model was more accurate at classifying things than other models like SVM, KNN, and Naïve Bayes. It got 93.2% for Iron Deficiency and 92.5% for Vitamin A Deficiency. The hybrid model also did a better job of generalising and overfitting, as shown by the training-validation loss curves. The suggested deep learning framework provides a scalable, non-invasive, and highly accurate way to find nutritional deficiencies early on. It can be used in real-time diagnostic systems or built into platforms for monitoring public health.

Link: <https://doi.org/10.12732/ijam.v38i1s.24>





TITLE:

Reconstructing the Truth: Innovative Techniques
in Crime Scene Reconstruction

AUTHOR :

H.S., Ohal, Hemlata S.; null; null; null; null

JOURNAL NAME:

2025 4th International Conference on Advances
in Computing, Communication, Embedded and
Secure Systems (ACCESS)

DETAILS:

Published on 29 August 2025



ABSTRACT:

This research work aims to create a system which assists in the analysis of crime scenes through reconstruction using 3D modeling and simulations. The system will enable police and crime scene investigators to boost their understanding of a crime scene. It improves the ways of analyzing and presenting evidence in courts through the use of various simulations such as bullet trajectory or blood spatter patterns. Moreover, the system enables the users to conduct an additional investigation of the crime scene by navigating the 3D environment. Thus, the purpose of the system is to promote better collaboration among the investigators, forensic experts, and the legal teams in the more effective objective of solving crimes.

Link: <https://doi.org/10.1109/ACCESS65134.2025.11135643>



TITLE:

EEG Signal Slowing and Complexity based
Alzheimer's Disease Identification through
Machine Learning

AUTHOR :

H.S., Ohal, Hemlata S.; S.T., Mantri, Shamla T.

JOURNAL NAME:

2025 4th International Conference on Advances
in Computing, Communication, Embedded and
Secure Systems (ACCESS)

DETAILS:

Published on 29 August 2025



ABSTRACT:

Dementia is a common term used for many neurodegenerative diseases, Alzheimer's Disease (AD) being the most common type of it. This work focuses on the exploration of different features of the EEG signals which can lead to better accuracy using machine learning techniques, particularly with a Support Vector Machine (SVM) classifier. This work studies the EEG signals in to two categories based on its characteristics. First one Slowing down of signals and second as Complexity of signals. For each category, EEG features are extracted and SVM based model is trained thus model 1 is based of slowing down characteristics, model 2 is based on complexity characteristics and model 3 implements the voting classifier to combine the performance of both models. Model 3 gives the best results with accuracy of 94.2 % for AD detection using SVM model.

Link:

<https://doi.org/10.1109/ACCESS65134.2025.11135585>



TITLE:

Physics-informed neural networks for dispersion studies of SH-waves in an initially stressed sandy half-space

AUTHOR :

T.S., Veer, Tanishqa Shivaji; V.K., Kalyani, Vijay Kumar; A., Akilbasha, A.; P.P., Malavadkar, Prashant P.

JOURNAL NAME:

Acta Geophysica

DETAILS:

Published on 13 September 2025



ABSTRACT:

In the present paper, we implement Physics-Informed Neural Networks (PINNs) to study the dispersion of SH-waves in an initially stressed sandy half-space. The traditional numerical methods for simulation studies of seismic wave propagation are computationally expensive. We thus propose the application of PINNs to efficiently solve the governing equations representing SH-wave propagation. In the PINN framework, the governing equation along with the initial and boundary conditions are embedded into the neural network's loss function which is then minimized using Adam's technique to optimize the network. The optimal architecture of the PINN framework is obtained by varying the number of hidden layers and neurons. The loss function values are also calculated at various epochs and presented graphically to analyze the convergence of the method. Further, the PINN framework is then utilized to explore how anisotropy, initial stresses, and the presence of sandiness influence the displacement and velocity of SH-waves and are illustrated graphically. Additionally, a three-dimensional graph is generated to illustrate the displacement of the wave as a function of spatial coordinates x and z , as well as time t . The framework is further applied to simulate SH-wave propagation in anisotropic sedimentary basin. The results demonstrate the PINN's ability to capture anisotropy-induced changes in wave displacement and velocity.

Link: <https://link.springer.com/article/10.1007/s11600-025-01688-1>





TITLE:

Smartphone Sensor Dataset for Online Reading Analysis

AUTHOR :

P., Bhatele, Priyanka; D.M., Bedekar, Dr Mangesh

JOURNAL NAME:

Lecture Notes in Networks and Systems (Vol.-1378 LNNS)

DETAILS:

Published on 31 August 2025



ABSTRACT:

Popularity of smartphones also popularized, reading content using smartphones. Reading using smartphones quite differs from reading using desktop system. Mouse and keyboard are the peripherals associated with the reading in desktop systems. Study of the handling of such devices has led to provide implicit feedback of the content read. Similar study in smartphones to get implicit feedback remains to be a huge gap. Reading using smartphones involves screen gestures like pinch to zoom, tap, scroll, orientation change, and screen capture. User reading behavior and intent can be inferred by screen gestures. Smartphones have sensors like gyroscope and accelerometer that continuously capture data without permissions from the users. To analyze screen gestures, a dataset has been created. Dataset is organized into accelerometer and gyroscope folders. This dataset can act as an input to train, test, and validate, machine learning models to analyze smartphone reading behavior and user intent.

Link: https://doi.org/10.1007/978-981-96-5781-0_1



TITLE:

A Novel Method for Solving Riemann–Liouville Fractional Differential Equations

AUTHOR :

Y.M., Mahatekar, Yogita M.; A.S., Deshpande, Amey S.

JOURNAL NAME:

Mathematical Methods in the Applied Sciences

DETAILS:

Published on 6 September 2025



ABSTRACT:

Riemann–Liouville initial value problems are well-posed for wide class of functions including those which may not be differentiable at the initial point. In the present paper, an efficient numerical tool for solving fractional differential equations containing Riemann–Liouville derivative is developed. Newly proposed method is termed as “Mahatekar–Deshpande predictor–corrector method,” in short “MDPCM.” Fundamental concepts of fractional calculus and numerical analysis are used to derive the convergence analysis and stability analysis of the newly proposed method. New method has been formed using a combination of a very famous decomposition tool, namely, “new iterative method” and Crank–Nikolson method. Firstly, formation of the algorithm of the newly proposed method is done, and then, to check the accuracy and efficiency of the new method, numerous examples are solved. Solutions obtained by the new method are compared with exact solutions, and it has been found that the new algorithm works accurately for solving fractional differential equations with Riemann–Liouville derivative.

Link: <https://doi.org/10.1002/mma.70071>



TITLE:

Synthetic strategies and structure-activity relationships of 2-chloro-tetrahydrocarbazolones: privileged organic scaffolds targeting polyketide synthase 13 for antitubercular activity

AUTHOR :

P.S., Waghmare, Priyanka Sanjay; A.R., Chabukswar, Anuruddha R.; S.S., Bag, Samidha Sameer; P.S., Manka, Pratik Sanjay; S.C., Jagdale, Swati C.

JOURNAL NAME:

Arkivoc (Vol.-2025, Issue-5)

DETAILS:

Published on 16 July 2025



ABSTRACT:

This study explores the potential of tetrahydrocarbazole derivatives as anti-tubercular agents through in silico and in vitro evaluations. A three-step synthetic pathway was developed to access novel 2-chloro-2,3,4,9-

tetrahydro-1H-carbazol-1-one derivatives, utilizing regioselective oxidation and electrophilic chlorination.

Structures were confirmed via IR, NMR, and HRMS, reinforcing the importance of synthetic organic chemistry in medicinal scaffold development. Among the synthesized compounds, 12 exhibited the most potent activity, outperforming standard drugs Isoniazid and Rifampicin.

Link: <https://doi.org/10.24820/ark.5550190.p012.385>



TITLE:

Microforming Stainless Steel Ss304:
Experimental And Numerical Integration;
Микроформовка Нержавеющей Стали Ss304:
Экспериментальное И Численное
Исследование

AUTHOR :

S., Khataavkar, S.; G.M., Kakandikar, Ganesh M.;
O.K., Kulkarni, Omkar K.

JOURNAL NAME:

Russian Journal of Biomechanics (Vol.-29,
Issue-2)

DETAILS:

Published on September 2025



ABSTRACT:

This research investigates the microforming behaviour of SS304 stainless steel, focusing on the influence of rolling direction. Known for its strength and ductility, SS304 is crucial for manufacturing miniaturized components. Experimental analyses involve Nakajima testing on SS304 samples at 0°, 45° and 90° using a universal testing machine, with formability parameters measured using a Sipcon CNC vision measurement system. Parallel numerical simulations with Simufact Forming software generate forming limit curves to predict critical deformation points. Comparative analysis reveals consistent trends in microforming behaviour, highlighting the anisotropic properties of SS304 due to rolling direction. Key findings include critical strain values and microstructural changes during forming, which are essential to optimize microforming processes. The integration of both approaches provides a comprehensive understanding of the formability limits and deformation mechanisms of SS304. This study highlights the significant potential for the advancement of microforming techniques in various industrial applications, particularly those requiring precise miniaturized components, and highlights the importance of combining experimental and numerical methods for a deep understanding of material behaviour.

Link:

<https://www.scopus.com/pages/publications/105015538352?inward>





TITLE:

Enhanced Secure Communication in Software-Defined VANETs Using Multifactor Authentication

AUTHOR :

U.K., Raut, Umesh K.; V.S., Jadhav, Vinodkumar S.

JOURNAL NAME:

Lecture Notes in Networks and Systems (1373 LNNS)

DETAILS:

Published on 27 August 2025



ABSTRACT:

In today's interconnected world, the idea of smart city is increasing rapidly, with vehicular ad hoc networks (VANETs) playing a vital role in facilitating smart transportation. In VANETs, vehicles frequently communicate with each other, allowing for real-time data sharing on vehicle location, speed, and road traffic conditions. This real-time data enhances traffic management, improves safety, and supports the overall efficiency of smart city transportation networks. But, due to the nature of open communication for VANETs, the exchange of information between the vehicles is public, and hence, it leads to severe security threats such as man-in-middle attack, replay attack, denial-of-services attack, impersonation attacks. Therefore, there is a need to implement flexible and scalable secure multifactor authentication technique to secure communication between the vehicles. This paper presents a secure multifactor authentication system based on Elliptic Curve Cryptography (ECC) and the Digital Signature Algorithm (DSA) within a software-defined VANET framework. Our proposed method is secure and better compared to existing methods due to its low computation cost, execution time, packet delivery ratio (PDR), and throughput.

Link: https://doi.org/10.1007/978-981-96-5729-2_23





TITLE:

Smart NLP and IoT-Based Desk-Robot

AUTHOR :

P., Talele, Prativina; H., Talele, Harsha; D.,
Deore, Durgesh; S., Patil, Sarthak; A., Mahabal,
Atharva

JOURNAL NAME:

Lecture Notes in Networks and Systems (1383
LNNS)

DETAILS:

Published on 28 August 2025



ABSTRACT:

In today's hectic work settings, productivity optimization is critical. This study presents a novel way to create a smart Desk-Robot specifically designed for workplace support by integrating Internet of Things (IoT) and natural language processing (NLP) technology. By utilizing IoT sensors for contextual awareness and sophisticated natural language processing (NLP) algorithms for smooth human-robot interaction, the suggested solution seeks to optimize workflows and boost productivity. Our goal is to provide a high-performing, user-friendly and affordable solution. When compared to other sensors, the ultrasonic sensor presents unique complications. Because of its IoT connection, the system can sense and adjust to its surroundings, which makes proactive support possible. The suggested smart NLP and IoT-based Desk-Robot offers a smooth and perceptive helper that is suited to contemporary work dynamics, suggesting a viable path forward for increasing office efficiency. Because the system is built on a Raspberry Pi, it is incredibly affordable and reliable. The Music Box is an incredibly flexible tool for setting up interactive distributed music installations since it doesn't require network connectivity to function.

Link: https://doi.org/10.1007/978-981-96-5754-4_18



TITLE:

Performance Assessment of Sagacious E-Powertrain Tiller for Smart Farming

AUTHOR :

R.V., Patil, Rajesh V.

JOURNAL NAME:

Journal of Engineering Science and Technology Review (Vol.-18, Issue-4)

DETAILS:

Published on August 2025



ABSTRACT:

A power tiller, as a hand tractor, is a tool used in agriculture for weeding, cultivating, and other tasks utilized by most farmers who own small farms. Numerous problems with the sitting configuration of power tillers are already present in the market. A detachable rear seating configuration that allows the farmer to sit and easily handle the tiller is one way to combat this. The design and development of the parts for this rear-seating configuration is the primary focus of the effort. It is also decided to add E-Powertrain to our tiller so that low-income farmers could afford power tillers more easily. Therefore, this work contains the computations and simulations required to complete the E-Powertrain's primary components. The brake system for the power tiller's rear seated position is designed in compliance with the requirements established by the Indian ministry of road transport and highways. SolidWorks 2018 workbench is used to model the entire system after the parameters are finalized to verify if any chassis interference. The brake and throttle pedal assembly design and analysis for the backseat seating configuration. The wheel assembly design and analysis for rear seating configuration. This involves simulating the assembly to look for interferences and ensure that it is safe to support any loads that might be applied to it. The preparation of failure mode and effects analysis and design verification plan reports necessitate prior to starting the design of the wheel assembly and brake subsystems. Finalizing the E Powertrain components through computations will allow the tiller to run constantly for a hectare of land. Moreover, packing of each chosen component is required to attain ideal weight distribution. This work successfully developed the smart E-Power tiller's rear seating configuration. The farmer sits comfortably and perform all farming tasks with detachable rear seating arrangement and depending on their needs, farmers can quickly install and disassemble this accessory.

Link:

<https://www.diva-portal.org/smash/record.jsf?pid=diva2:1998213>



TITLE:

Component Connectivity of 3-Ary n -Cubes

AUTHOR :

U., Jagadale, Uday; A.V., Shinde, Amruta V.;
P.P., Malavadkar, Prashant P.

JOURNAL NAME:

International Journal of Foundations of Computer
Science

DETAILS:

Published on September 2025



ABSTRACT:

For an integer $r \geq 2$, the r -component connectivity of a connected graph G , denoted by $ckr(G)$, is the minimum number of vertices whose removal results in a graph with at least r components. In this paper, we extend the result on r -component connectivity of k -ary n -cubes for $k \geq 4$ established by Lv et al. [M. Lv, J. Fan, J. Zhou et al., The reliability of k -ary n -cube based on component connectivity, Comput. J. 65(8) (2022) 2197–2208], to 3-ary n -cubes. We show that the $(r + 1)$ -component connectivity of 3-ary n -cubes is $-1 \ 2r^2 + (2n - 1 \ 2)r + 1$ for integers r and n satisfying $4 \leq r \leq n$.

Link: <https://doi.org/10.1142/S0129054125500297>





TITLE:

Multi-modal Based Sentiment Analysis Web Application Using Flask and Deep Learning Models

AUTHOR :

G., Hariyani, Gulshan; A., Singh, Aniket; P., Patil, Prathamesh; V., Kothari, Virag; P.A., Kale, Preeti A.

JOURNAL NAME:

Communications in Computer and Information Science (2490 CCIS)

DETAILS:

Published 26 August 2025



ABSTRACT:

Nowadays, understanding customer's review has become very crucial for any business to improve their market strategies, customer experience and profitability. Sentiment analysis is one of the techniques that are used majorly in such scenarios. Sentiment analysis is the process in which we identify the sentiments of data in the form of text, audio or visuals and classify them into different classes as positive, negative or neutral. This can be performed based on polarity separation of emotions. This study proposes a solution to perform sentiment analysis in the form of website and proposes a solution by combining sentiment analysis of images captured from webcam and text accepted by user. Various machine learning and deep learning models are used here like DeepFace, NLTK, OpenCV, Haar Cascade Classifier and more. Also, the paper has demonstrated a system design of how to implement it in website format using HTML, CSS and JavaScript and connect to Python using Flask.

Link: https://doi.org/10.1007/978-3-031-90580-3_20





TITLE:

The dark side of leadership: how despotic leadership triggers depression and quiet quitting

AUTHOR :

P., Thakur, Pratibha; S., Srivastava, Sachitaa

JOURNAL NAME:

International Journal of Contemporary Hospitality
Management

DETAILS:

Published on 22 August 2025



ABSTRACT:

Purpose This study explores how despotic leadership affects negative workplace outcomes, including psychological contract violations, moral injury, work-related depression and quiet quitting among employees. By investigating these dynamics, this study aims to illuminate the emotional and psychological costs associated with despotic leadership. **Design/methodology/approach** Data was collected from hotel employees in northern India using convenience sampling. With 359 responses, this study used Smart PLS for hypothesis testing. **Findings** Results show that despotic leadership is strongly linked to moral injury, psychological contract violation and work-related depression, leading to quiet quitting. **Practical implications** This study recommends ethical leadership training, open communication and mental health support to mitigate the effects of despotic leadership. Proactive development of a supportive work environment can help reduce quiet quitting behaviours. **Originality/value** Unlike prior research, this study uniquely examines moral injury and psychological contract violation as mediators, providing a fresh perspective on the pathways linking despotic leadership to quiet quitting. By highlighting underexplored emotional impacts, it offers a novel contribution to leadership literature.

Link: <https://doi.org/10.1108/IJCHM-12-2024-1815>



TITLE:

Percolating insights: a study on coffee purchase behaviour in an emerging economy

AUTHOR :

W., Khan, Waseem; G., Sainger, Garima; M.S., Siddiqui, Mohd Shuaib; B., Mateen, Bushra

JOURNAL NAME:

British Food Journal

DETAILS:

Published on 5 August 2025



ABSTRACT:

Purpose: The consumption of coffee has increased markedly in the last decades. It has become an important part of people's lives, leading to the modernization of the coffee retail sector. This study aims to assess consumer purchase behaviour towards different types of speciality coffee at café in order to formulate effective marketing strategy for the coffee retail sector. **Design/methodology/approach:** The present study is based on primary data, collected from 401 respondents using structured questionnaire. A set of statistical techniques such as descriptive statistics, average growth rate, chi-square test, analysis of variance (ANOVA) and factor analysis has been used to determine the importance of product and market attributes in shaping consumers' buying behaviour towards different types of speciality coffee. **Findings:** The study revealed that espresso and latte have strong consumer demand on a daily basis. Consumers usually prefer to buy coffee within a range of 3 km, emphasizing convenience as a key factor. Additionally, the study revealed that discounts and coupons have a significant impact on the buying decisions of male consumers, who are found to be regular coffee consumers as compared to female. The study also revealed that female consumers tend to spend more on higher-priced coffee types. Quality, freshness and price are significant product attributes, while the availability of private table, music at the café and staff behaviour are critical market attributes that shape coffee purchase behaviour. In addition, consumers who prefer cappuccino tend to spend more compared to those who choose other types of coffee, indicating a premium preference within this segment. The consumption of coffee has increased markedly in the last decades. It has become an important part of people's lives which leads to modernizing the coffee retail sector. This study aims to assess consumer purchase behaviour towards coffee in order to formulate effective marketing strategy for the coffee retail sector.

Link: <https://doi.org/10.1108/BFJ-01-2025-0039>



TITLE:

A comprehensive acoustic analysis of a single expansion chamber reactive muffler

AUTHOR :

S., Kulkarni, Shravani; M.V., Kulkarni, Mahesh
Vasantrao; D.P., Hujare, Deepak P.

JOURNAL NAME:

Building Acoustics

DETAILS:

Published on 30 August 2025



ABSTRACT:

This study explores the acoustic performance of a single-expansion-chamber reactive muffler through theoretical, numerical, and experimental methods, focusing on transmission loss as a measure of noise attenuation. Theoretical analysis employs the Transfer Matrix Method (TMM) to model the sound wave behavior by incorporating geometric parameters and fluid acoustic properties. Numerical simulations using the Finite Element Method (FEM) provide insights into the sound pressure distribution and validate theoretical predictions. Experimental testing in a controlled laboratory environment measures the muffler transmission loss and offers a practical benchmark for comparison. The results revealed a strong correlation between the theoretical, numerical, and experimental data, demonstrating the reliability of these methods. This study identifies critical design parameters that influence noise attenuation and provides guidelines for optimizing muffler performance in automotive applications. This integrated approach offers a comprehensive framework for analyzing and improving the acoustic efficiency of reactive mufflers.

Link: <https://doi.org/10.1177/1351010X251364500>





TITLE:

TinyML4D: Scaling Embedded Machine Learning Education in the Developing World

AUTHOR :

B., Plancher, Brian; S., Buttrich, Sebastian; null; N., Goveas, Neena; L.D., Kazimierski, Laila Daniela; J.A., Lopez-Sotelo, Jesus Alfonso; M., Lukić, Milan; D., Mendez, Diego; R., Nordin, Rosdiadee; null

JOURNAL NAME:

Proceedings of the AAAI 2024 Spring Symposium Series (Vol.-3, Issue-1)

DETAILS:

Published on 20 May 2024



ABSTRACT:

Embedded machine learning (ML) on low-power devices, also known as "TinyML," enables intelligent applications on accessible hardware and fosters collaboration across disciplines to solve real-world problems. Its interdisciplinary and practical nature makes embedded ML education appealing, but barriers remain that limit its accessibility, especially in developing countries. Challenges include limited open-source software, courseware, models, and datasets that can be used with globally accessible heterogeneous hardware. Our vision is that with concerted effort and partnerships between industry and academia, we can overcome such challenges and enable embedded ML education to empower developers and researchers worldwide to build locally relevant AI solutions on low-cost hardware, increasing diversity and sustainability in the field. Towards this aim, we document efforts made by the TinyML4D community to scale embedded ML education globally through open-source curricula and introductory workshops co-created by international educators. We conclude with calls to action to further develop modular and inclusive resources and transform embedded ML into a truly global gateway to embedded AI skills development.

Link: <https://doi.org/10.1609/aaaiss.v3i1.31265>



Published on September 2025

Since 1983



॥ विश्वशान्तिर्ध्रुवं ध्रुवा ॥

FACULTY PUBLICATION

RESEARCH PAPERS