

Vol. 1 | DEC., 2024

अनुसंधानम्

शोध-संग्रह



Science | Technology | Engineering | Innovation

VIPS

योग: कर्मसु कौशलम्
IN PURSUIT OF PERFECTION

SCHOOL OF ENGINEERING & TECHNOLOGY

VIVEKANANDA INSTITUTE OF PROFESSIONAL STUDIES - TECHNICAL CAMPUS



अपना जीवन एक लक्ष्य पर निर्धारित करो।
अपने पूरे शरीर को उस एक लक्ष्य से भर दो ।
और हर दूसरे विचार को अपनी जिन्दगी से निकाल दो।
यही सफलता की कुंजी है।

– स्वामी विवेकानंद

Editorial Board

Editor-in-Chief:

- Dr. Deepak Tiwari
Dean Research, VSE&T (VIPS-TC)

Associate Editor:

- Dr. Dimple Tiwari
Assistant Professor, VSE&T (VIPS-TC)
- Ms. Surabhi Rastogi
Assistant Professor, VSE&T (VIPS-TC)

Designing

- Mr. Rajkumar Sharma
VIPS-TC
-

About the School of Engineering and Technology (VIPS-TC)

We train the engineers of tomorrow, equipping them with the advanced skill sets and knowledge to lead a technological revolution and bring about change.

We power the next generation with the sound knowledge of AI, ML, Data Science, IIoT, Applied Mathematics, and Cyber Security so they can soar the skies with limitless possibilities. Our ingenious teaching techniques, core philosophies, and problem-solving approach help students develop a conquering mindset. Imbibing the vision of Swami Vivekananda, VSE &T empowers the students with knowledge and encourages them to tap into perfection within. Our focus is to hone intelligence, enhance capabilities, and establish a change through a holistic approach and advance science.

School of Engineering & Technology Offers:

B.Tech:

- Computer Science & Engineering
 - Artificial Intelligence & Machine Learning
 - Artificial Intelligence & Data Science
 - Industrial Internet of Things
 - VLSI - Design & Technology
 - Computer Science & Engineering (Cyber Security)
 - Computer Science & Applied Mathematics
-

From The Chairman's Desk

उद्यमेन हि सिध्यन्ति कार्याणि न मनोरथैः। न हि सुप्तस्य सिंहस्य प्रविशन्ति मुखे मृगाः॥
अर्थात्, उद्यम से ही कार्य पूर्ण होते हैं, केवल इच्छा करने से नहीं। सोते हुए शेर के मुख में मृग
स्वयं प्रवेश नहीं करते हैं।

We want an education by which character is formed, strength of mind is increased and intellect is expanded by which one can stand on one's feet,” said Swami Vivekananda. It is in pursuit of this dream of Swami Ji, that the foundation of STRENGTH India Educational Society was laid and thereafter, Vivekananda Institute of Professional Studies- Technical Campus (VIPS-TC) was established in 2000.

Even as a sapling, its roots were firm, for they were energized by Swamiji's teachings. Today, VIPS has grown into a banyan tree, nestling sixteen courses. We continue to stand with determination, moral sight, and strength of mind to create capable and ethical human beings with infinite power, infinite knowledge, and indomitable positive energy.

To impart training to the students in this direction, we provide innovative pedagogies to encapsulate the prescribed curriculum along with consistency, thereby focusing on the holistic growth of every student at VIPS-TC

Message from Vice Chairman's Desk

Research and innovation are driving progress in every field, from science and technology to healthcare and education. Through research, we uncover new knowledge, solve complex problems, and improve quality of life. Innovation, on the other hand, is the practical application of this knowledge, leading to the creation of new products, services, or processes that push boundaries and create value.

As we continue to invest in research, we not only discover groundbreaking solutions to the challenges we face today, but we also lay the foundation for a more sustainable and prosperous future. Innovation is what enables us to translate research into real-world impact, driving economic growth, enhancing social well-being, and addressing critical global challenges.

About Director General (VSE&T and VSIT, VIPS-TC)



Dr. (Mrs.) Amita Dev, Former Vice-Chancellor of Indira Gandhi Delhi Technical University for Women (IGDTUW), Government of Delhi, exemplifies True Leadership, Exceptional Administration, and Passionate Research. With over three decades of experience, she has made significant strides in Deep Neural Networks, Speech Processing, Speech Modelling, Speech Recognition, and Speech Synthesis. Her extensive Research and Innovation in these fields have set a benchmark in quality teaching and administration. Dr. Dev's illustrious career includes the publication of over 140

research papers in renowned international and national journals and conference proceedings.

Investing in research not only helps us solve the problems of today but also builds a foundation for a brighter tomorrow. Innovation takes this knowledge and transforms it into tangible impact, driving economic development, improving lives, and addressing global challenges.

CONTENT

S. No.	Name of the outcomes	Page No.
1	Research Article Publication	01-12
2	International Scopus Indexed Conference	13-20
3	Patent	21-22
4	Research Outcomes by Student	23-25

Author: Dr. Deepak Tiwari (Sole)

Department: Applied Science & Humanities

Journal Name: Journal of Thermal Analysis and Calorimetry

Journal Matrix:

- **Indexing:** SCIE
- **Impact Factor:** 3.0
- **Quartile:** Q2



Paper Title: Improved evacuated and compound parabolic collector-driven ORC/VCR system: a thermodynamic analysis

Abstract: This research paper figures out thermal performance analysis for vapor compression refrigeration (VCR) driven by the organic Rankine cycle (ORC) implementing MATLAB software. The ORC system is powered by improved evacuated tubes and compound parabolic collectors. The paper evaluates the overall exergetic efficiency and coefficient of performance using the working fluid Pentane/R245fa. The result of the present paper indicates that optimum COP of 0.75 and exergetic efficiency of 28% is obtained at 340 K of collector output temperatures, 0.1/0.9 of fractional mass of the working fluid, and 285, 300 K for VCR condenser and evaporator temperature, respectively. Sensitivity analysis pointed out that condenser temperature was the most impactful parameter for both exergetic efficiency and COP owing to higher F-value 'of 156.06' and '89.28,' respectively. Further, collector output temperature and fractional mass of the working fluid were the least impactful parameters owing to lower F-value '1.95' and '1.02' for exergetic efficiency and COP, respectively.

DOI: <https://doi.org/10.1007/s10973-024-13350-x>

Author: Dr. Deepak Tiwari

Department: Applied Science & Humanities

Journal Name: Energy and Buildings

Journal Matrix:

- **Indexing:** SCIE
- **Impact Factor:** 6.6
- **Quartile:** Q1



Paper Title: Multi-response optimization in the ORC-VCR system using the EDAS Method

Abstract: The study performs multi-dimensional decision-making using the Evaluation of Distance from Average Solution (EDAS) with improved entropy weighting applied to figure out the best configuration for the ORC-VCR arrangement from a thermo-economic and environmental perspective. It is intended to maintain the operation of ORC-VCR's complete energy efficiency alongside producing minimal environmental impact. Besides EDAS, grey relational analysis has been conducted for an effective and precise determination of non-naïve operation controls. Moreover, objectively a novel cross-judgemental analysis has been implemented to measure the difference in opinion (DIO) between grey relational analysis and EDAS. The study has concluded in 30 % improvement in the desirability score of optimal operational setting for the ORC-VCR arrangement through EDAS. Judgemental analysis has proved the significance of EDAS from the perspective of a popular method like grey relational analysis, projecting a < 10 %.

DIO: <https://doi.org/10.1016/j.enbuild.2024.114281>

Author: Dr. Shikha Jain

Department: Computer Science & Engineering

Journal Name: Evolving Systems

Journal Matrix:

- Indexing: SCIE
- Impact Factor: 2.7
- Quartile: Q2



Paper Title: A domain knowledge infused gated network using integrated sentiment prediction framework for aspect-based sentiment analysis

Abstract: Aspect-Based Sentiment Analysis (ABSA) targets sentiments on specific aspects in reviews, offering more granularity than overall sentiment analysis. Challenges in ABSA include handling implicit sentiments, varying expressions, linguistic nuances, and ensuring robust predictions across domains. Addressing these is crucial for extracting meaningful insights from customer reviews and enhancing products or services. Aiming at these concerns, this paper proposes an Enhanced Knowledge Infused Graph-Gated BERT (EKIG-GBERT) model for ABSA in customer-related program reviews. This innovative approach integrates a Dynamic Sentiment-specific Knowledge Graph (DSSKG) and Knowledge graph-enhanced BERT model with Gated Domain Graph Convolutional Network (KG-BERT-GDGCN) to capture intricate sentiment-aspect relationships. The methodology begins with data pre-processing, including tokenization and noise reduction, followed by domain-specific knowledge infusion via DSSKG. The approach leverages KG-BERT for advanced aspect extraction, enhancing the model's capacity to capture subtle emotional nuances in textual data. Aspect extraction is performed at multiple levels like term, category, implicit, entity, and attribute that leverages the KG-BERT model for comprehensive sentiment representation. Additionally, a structured graph seamlessly integrates affective information from DSSKG and KG-BERT, forming an affective adjacency matrix that encapsulates nuanced emotional connections among words in a sentence. The integrated sentiment prediction framework fuses features from DSSKG and KG-BERT using the GDGCN model. Processing through densely connected layers, dropout, and batch normalization ensures effective regularization, resulting in a robust model that leverages information from multiple sources for improved sentiment analysis. Experimental evaluations using four SemEval datasets (i.e., Rest14 task 4, Lap14 task 4, Res15 task 12, Res16 task 5) demonstrate that the EKIG-GBERT model significantly outperforms existing ABSA methods. The EKIG-GBERT model achieved an accuracy of 97.5% on the Rest14 task 4, 98.5% on Lap14 task 4, 94% on Res15 task 12, and 92% on Res16 task 5. Additionally, the confusion matrix analysis further confirmed its superior performance in distinguishing between various sentiment aspects. These results underscore the model's robustness and reliability in the ABSA prediction tasks.

DOI: <https://doi.org/10.1007/s12530-024-09625-1>

Author: Dr. Dharmender

Department: Applied Science & Humanities

Journal Name: Journal of Vibration Engineering & Technologies

Publishing model

Journal Matrix:

- **Indexing:** SCIE
- **Impact Factor:** 2.1
- **Quartile:** Q2



Paper Title: A Comparative Study of Wear Debris and Vibration-Based Gear Damage Detection Methods Applied to Mild Wear in a Spur Gear System.

Abstract: Mild wear in gear transmission systems accounts for 41% of the gear flank surface failure mechanisms. Vibration detection parameters and wear debris methods are widely used for the condition monitoring of gear transmission systems experiencing mild wear. In this study an attempt has been made to predict the effectiveness of wear debris damage detection and vibration parameters in estimating the mild wear progressive failure which is a precursor of breakdown. The vibration parameters root mean square (RMS), kurtosis, crest factor, energy ratio (ER), FM0, and correlation coefficient of residual signal (CCR) are obtained from the time-averaged vibration data for two sets of run-to-failure experiments for the EN24 steel spur gear system. Each of these experiments are performed at a constant speed (1200 RPM) and torque (40 Nm). Wear debris monitoring is performed online. The ER and FM0 have been found to consistently increase after 140 h, indicating initiation of progressive failure. The RMS and CCR values are found to be inconsistent in indicating initiation of failure. The kurtosis and crest factor parameters possessed constant behavior with respect to time. The number of wear debris particles changes at 110 h and 160 h respectively, showing the initiating and limiting values before the occurrence of severe wear for the first set of the experiment; similarly, 110 h and 140 h for the second set of experiment. Overall, it is found that the wear debris method could effectively predict the failure mechanism much earlier in comparison to parallelly obtained vibration indicators ER and FM0.

DOI: <https://doi.org/10.1007/s42417-024-01573-z>

Author: Dr. Deepti Chopra

Department: Computer Science & Engineering

Journal Name: Nanotechnology Perceptions

Journal Matrix:

- **Indexing:** Scopus
- **Cite Score:** 0.4



Paper Title: Quantum Algorithms In NLP: Redefining Language Processing Paradigms

Abstract: The advent of quantum computing has led to increase in computational capabilities, leading to exponential speedups for problems that takes lot of time when solved using classical computing. Natural Language Processing (NLP), an application of artificial intelligence is concerned with enabling machines to understand, interpret, and generate human language. We may speed up the implementation of Natural Language Processing tasks by the integration of quantum algorithms. This paper shows the impact of quantum computing on NLP, explaining how quantum algorithms play an important role in redefining traditional language processing paradigms. This paper discusses various quantum algorithms applied to NLP, including quantum machine learning approaches for text classification, clustering, and sentiment analysis, as well as quantum inspired neural networks for advanced language modeling. This paper discusses novel quantum NLP models, such as quantum variational algorithms and quantum enhanced transformers, which promise significant improvements in speed, accuracy, and contextual understanding. This paper also addresses the limitations and challenges of quantum NLP, including the current state of quantum hardware, noise issues, and the need for robust quantum programming frameworks. It aims to provide a comprehensive overview of how quantum algorithms are revolutionizing NLP and what the future holds for this emerging interdisciplinary field

DOI: <https://doi.org/10.62441/nano-ntp.vi.2612>

Author: Dr. Mudita Nagpal
Department: Applied Science & Humanities
Journal Name: Water Science and Technology
Journal Matrix:



- **Indexing:** SCIE
- **Impact Factor:** 2.4
- **Quartile:** Q1
- **Type:** Open Access

Paper Title: Optimizing wastewater treatment through artificial intelligence: recent advances and future prospects

Abstract: Artificial intelligence (AI) is increasingly being applied to wastewater treatment to enhance efficiency, improve processes, and optimize resource utilization. This review focuses on objectives, advantages, outputs, and major findings of various AI models in the three key aspects: the prediction of removal efficiency for both organic and inorganic pollutants, real-time monitoring of essential water quality parameters (such as pH, COD, BOD, turbidity, TDS, and conductivity), and fault detection in the processes and equipment integral to wastewater treatment. The prediction accuracy (R² value) of AI technologies for pollutant removal has been reported to vary between 0.64 and 1.00. A critical aspect explored in this review is the cost-effectiveness of implementing AI systems in wastewater treatment. Numerous countries and municipalities are actively engaging in pilot projects and demonstrations to assess the feasibility and effectiveness of AI applications in wastewater treatment. Notably, the review highlights successful outcomes from these initiatives across diverse geographical contexts, showcasing the adaptability and positive impact of AI in revolutionizing wastewater treatment on a global scale. Further, insights on the ethical considerations and potential future directions for the use of AI in wastewater treatment plants have also been provided.

DOI: <https://doi.org/10.2166/wst.2024.259>

Author: Dr. Mudita Nagpal
Department: Applied Science & Humanities
Journal Name: Ionics
Journal Matrix:



- **Indexing:** SCIE
- **Impact Factor:** 2.4
- **Quartile:** 5.3

Paper Title: Nanomaterials as fluorescent sensor and colorimetric sensor for toxic Hg(II) ion: A review

Abstract: Mercury ion (Hg(II) ion) is one of the most toxic heavy metal ions with widespread contamination in nature. Due to its severe toxicity, it has become a serious threat to human health and environment as well. Over the past years, various conventional techniques have been reported for detecting Hg(II) ion. These techniques are expensive and time consuming. The challenge is to develop novel methods for detecting Hg(II) ion, which are more efficient and cost effective. In the recent years, researchers have focused on developing nanomaterial-based ion sensors. These materials have proved to be efficient alternative in the speciation and detection of Hg(II) ion. This review sheds light on the two important nanomaterial-based sensors for Hg(II) ion: Fluorescent sensors and Colorimetric sensors. Such sensors involve pristine and functionalized nanomaterials like gold nanoparticles (NPs), Fe₃O₄ NPs, carbon dots, quantum dots, etc.

DOI: <https://doi.org/10.1007/s11581-024-05757-1>

Author: Dr. Mudita Nagpal
Department: Applied Science & Humanities
Journal Name: Letters in Applied NanoBioScience

Journal Matrix:

- **Indexing:** Scopus
- **Impact Factor:**
- **Quartile:** Q4

Paper Title: A Comprehensive Review of Natural and Surfactant Modified Zeolites and Their Applications

Abstract: The present review provides an overview of the fundamentals and diverse applications of zeolites as reported in recent literature. Zeolites are crystalline microporous oxide materials with welldefined pores of molecular dimensions within their structure. Natural zeolites have garnered significant attention for their extensive environmental remediation and restoration applications. They are utilized as effective cation exchangers for removing pollutants from industrial wastewater and radioactive contaminants from nuclear power plant waters. Additionally, zeolites exhibit capabilities in decomposing indoor air ozone and enhancing peroxide bleaching of thermal-mechanical pulp, contributing to air and water quality improvement efforts. The review also sheds light on biomedical applications that harness natural and synthetic zeolites, highlighting their potential in diverse medical contexts. Overall, this review encapsulates the multifaceted nature of zeolites and their significant contributions across environmental, industrial, and biomedical domains.

DOI: [10.33263/LIANBS134.188](https://doi.org/10.33263/LIANBS134.188)

Author: Dr. Mudita Nagpal
Department: Applied Science & Humanities
Journal Name: BioNanoScience

Journal Matrix:

- **Indexing:** ESCI
- **Quartile:** Q3



Paper Title: Application of Biosurfactants in the Green Synthesis of Inorganic Nanoparticles

Abstract: Inorganic nanoparticles (NPs) have been increasingly utilized across various fields due to their unique properties and versatile applications. They offer small size, enhanced tunability, permeability, surface functionalization and are more stable in comparison to organic materials. They have gained widespread attention for their application in therapeutic and diagnostic systems for drug delivery, imaging, sensing and biomedical implants. There are several chemical methods for synthesizing inorganic nanoparticles. These methods involve the use of chemical surfactants like Sodium dodecyl sulphate (SDS), Sodium dodecylbenzene sulfonate (SDBS) and Cetyltrimethylammonium bromide (CTAB) as reducing, stabilizing and capping agents. However, these chemicals are hazardous and produce toxic byproducts posing risks to health and the environment. Green nanoparticle synthesis involves adopting sustainable and eco-friendly techniques to produce nanoparticles, aiming to decrease the environmental footprint of the process. Biosurfactants are amphiphilic compounds produced by microorganisms, plants, or animals. They are derived from renewable resources and are biodegradable. This makes the synthesis process more environmentally friendly and reduces the potential harmful impact on ecosystems. Biosurfactants can act as environmentally benign precursors, reducing agents and help in stabilizing the nanoparticles. In this paper, we have reviewed the recent studies in the green synthesis of inorganic nanoparticles using bio-surfactants. Further, parameters which affect the formation of NPs while using biosurfactants have been discussed. In addition, emergence of machine learning and other computational tools for nanoparticle formation have been explored. The challenges and the future perspectives in this direction have also been highlighted.

DOI: <https://doi.org/10.1007/s12668-024-01628-1>

Author: Dr. Monika Bansal

Department: Computer Science & Engineering

Journal Name: Data Mining and Knowledge Discovery

Journal Matrix:

- **Indexing:** SCIE
- **Impact Factor:** 2.8
- **Quartile:** Q1



Paper Title: Statistical methods utilizing structural properties of time-evolving networks for event detection

Abstract: With the advancement of technology, real-world networks have become vulnerable to many attacks such as cyber-crimes, terrorist attacks, and financial frauds. Accuracy and scalability are the two principal but contrary characteristics for algorithms detecting such attacks (or events) in these time-varying networks. However, existing approaches confirm to either of these two prerequisites. Hence, we propose two algorithms designated as GraphAnomaly and GraphAnomaly-CS, both satisfying these two requirements together. Given a stream of time-evolving real-world network edges, the proposed algorithms first extract the local structure of network graphs by identifying the relationship between egonets and their properties, and then use this information in Chi-square statistics to discover (1) anomalous time-points at which many network nodes deviate from their normal behavior and (2) those nodes and features that majorly contribute to the change. The proposed algorithms are (a) accurate: upto 7 to 12% more accurate than state-of-the-art methods; (b) speedy: process millions of edges within a few minutes; (c) scalable: scale linearly with the number of edges and nodes in the network graph; (d) theoretically sound: providing theoretical guarantees on the false positive probability of algorithms; We show theoretically and experimentally that the proposed algorithms successfully detect anomalies in time-evolving edge streams. We have selected six baselines, five evaluation metrics, and six real-world network datasets from three different network classes for empirical analysis. The experimental results show that both algorithms are efficient at detecting anomalies in networks that reduce false positives and false negatives in the results, especially in successive time-points. Furthermore, algorithms discover the maximum number of critical events from real-world networks, demonstrating their effectiveness over baselines.

DOI: <https://doi.org/10.1007/s10618-024-01060-9>

Author: Dr. Sandhya Tarwani

Department: Computer Science & Engineering

Journal Name: International Journal of System Assurance

Engineering and Management

Journal Matrix:

- **Indexing:** Scopus
- **Cite Score:** 4.3
- **Quartile:** Q2



Paper Title: Determination of optimum refactoring sequence for maximizing the maintainability of object-oriented systems using machine learning algorithms

Abstract: Refactoring is a technique for changing internal attributes without affecting external ones in an optimized manner. Bad smells in the source code can cause various issues, increasing the need for refactoring. In this study, prioritization of classes is initially performed using a newly proposed metric called the Quality Decline Factor (QDF), which considers an appropriate ratio of software metrics along with eleven detected types of bad smells. Next, these bad smells are addressed by applying refactoring techniques, and changes in the metrics are observed. Subsequently, machine learning algorithms are used to assign weights to each metric, leading to the proposal of another new metric, the Total Refactoring Index (TRI). TRI combines the assigned weights and the effects of metric changes to determine the optimal refactoring sequence. The results indicate that the Decision Tree Forest algorithm is the most suitable for determining the refactoring sequence. After applying this technique, a 94.9% reduction in effort was observed. This study would benefit software maintainers by providing predefined sequences, allowing them to focus only on the code sections with the highest concentration of bad smells, thus completing projects within real-time constraints.

DOI: <https://doi.org/10.1007/s13198-024-02639-7>

Author: Dr. Mohd Atif Wahid
Department: Applied Science & Humanities
Journal Name: Diyala Journal of Engg Sciences
Journal Matrix:

- **Indexing:** Scopus
- **Cite Score:** 0.6
- **Quartile:** Q3



Paper Title: A Comparative Investigation on Powder Mixed EDM Machining of steel alloys with multi objective optimization using fuzzy topsis method

Abstract: The current work offers a comparative study that examined the effects of various process parameters, such as dielectric fluid, current (IP), pulse on time (TON), and different conductive powder particles mixed dielectric fluids, on electrical discharge machining (EDM) of AISI 1040, En31, and HCHCr steels, respectively. The findings indicate that adding conductive particles to the dielectric medium during the powder-mixed EDM (PMEDM) process enhances energy distribution across the spark gap, thereby improving material removal capacity and the surface characteristics of the machined surfaces. Experimental results show that the concentration of powder particles has the most significant impact on surface roughness (Ra) and tool wear rate (TWR), while the most critical factor affecting the material removal rate (MRR) is the current (IP). Additionally, increasing the IP and TON leads to the formation of continuous, thick cracks and a thin white coating on the EDMed surface, as evidenced by scanning electron microscopy (SEM) images of the surface morphology. The study also employs a multi-optimization technique using the Fuzzy-based TOPSIS method to investigate the cumulative effects of the control parameters on performance indicators, namely Ra, MRR, and TWR. In experimental run 8 i.e. moderate IP (5 A), higher TON (180 μ s), and higher concentration of copper powder (10 g/l) mixed in EDM oil while machining of AISI 1040, the optimal results i.e. Ra is 5.983 μ m, MRR is 27.243 mm³/min, and TWR is 0.775 mm³/min were obtained, respectively.

DOI: <https://doi.org/10.24237/djes.2024.17402>

Author: Dr. Praveen Chaurasia
Department: Electronics Engineering
Journal Name: Physica Scripta
Journal Matrix:

- **Indexing:** SCIE
- **Impact Factor:** 2.6
- **Quartile:** Q2



Paper Title: Quad-band dual-port MIMO microstrip antenna with double integrated circularly polarized bands for 4G/5G wireless applications

Abstract: A quad-band two-port MIMO antenna is presented with four operating bands at 2.4, 3.5, 5.8, and 8.2 GHz to serve WLAN, 4G LTE, 5G & ITU applications, respectively. The wide impedance bandwidth of 13.33% (2.28–2.60 GHz), 21.62% (2.98–3.74 GHz), 8.9% (5.58–6.10 GHz) and 4.8% (8.00–8.44 GHz) is achieved at respective operating bands. The antenna also provides circular polarization at 3.5 GHz and 5.8 GHz. It is fabricated on FR4 substrate of 50 × 76 × 1.6 mm³ dimensions. The isolation between both ports is below 28 dB within all four operating bands. The radiation efficiency is about 90% in the first two bands whereas it is about 75% in the remaining two bands. The presented MIMO antenna shows better radiation characteristics along with satisfactory diversity performance. Experimental results of the fabricated prototype validate the simulated results.

DOI: <https://iopscience.iop.org/article/10.1088/1402-4896/ad6ec0>

Author: Ms. Nishi Jain

Department: Computer Science & Engineering

Journal Name: Journal of Energy Resources Technology

Journal Matrix:

- **Indexing:** SCIE
- **Impact Factor:** 2.1
- **Quartile:** Q1



Paper Title: Downdraft Gasification for Biogas Production: The Role of Artificial Production: The Role of Artificial Intelligence

Abstract: Artificial intelligence (AI) can help improve many areas of waste management and biogas generation. The world has reached a state where waste generation is increasing daily, while an effective waste management system is essential for the sustainable development of a country. AI could be of great use in optimizing the waste management scheme by technical differentiation of all sorts and recycling techniques. AI can contribute to the improvement of waste segmentation, recycling, and disposal. Thus, by assessing availability and composition, AI can easily contribute to the selection of the most suitable feedstock for biogas generation. This paper will discuss the optimization of gasifier design, an important part of biogas production, to enhance gasification efficiency for more efficient syngas production. Several gains accrue from AI applications, and among them is the selection of feedstocks and gasifiers optimal for more efficient and sustainable waste management and use in the production of biogas systems. This review paper identifies the potential application areas in either waste management practices or biogas production and puts forward ways in which AI can be used in these areas.

DOI: <https://doi.org/10.1115/1.4066059>

Author: Dr. Adeel Hashmi

Department: Computer Science & Engineering

Journal Name: Engineering Proceedings

Journal Matrix:

- **Indexing:** Scopus
- **Cite Score:** 0.7
- **Quartile:** Q4



Paper Title: GreenConnect: A Cutting-Edge Optical Sensor Based Gardening Automation System

Abstract: IoT-based garden automation “Green Connect” is a system that automates and tracks numerous gardening-related operations using internet-connected sensors and devices. Benefits of this technology include enhanced plant growth, improved watering schedules, and remote monitoring and management of plants. The system is made up of numerous parts, including irrigation systems, temperature sensors, humidity sensors, and soil moisture sensors, all of which are linked to a central hub. In order to automate the watering, lighting, and other environmental conditions of the garden, the microcontroller gathers and analyses the data from the sensors. The development of an IoT-based garden automation system is covered in this article, along with the design of the system architecture, component selection, optical sensor and device integration. The experiment's findings demonstrate that the system was able to improve the garden's growth conditions, leading to better plant health and yield. According to the study, IoT-based garden automation has the ability to completely change how we think about gardening by making it simpler and more effective to grow plants in a range of settings. By remotely managing the water pump and keeping track of the soil moisture in the garden, this study integrates the IoT into the irrigation system for gardens.

DOI: <https://doi.org/10.3390/ecsa-11-20436>



Author: Dr. Nisha Chugh
Department: Electronics Engineering
Journal Name: Micro and Nanostructures
Journal Matrix:
 • **Indexing:** SCIE
 • **Impact Factor:** 2.7
 • **Quartile:** Q2

Paper Title: Borophene vertical dopingless Tunnel FET with high- κ dielectric and incorporating gate-drain underlapping technique

Abstract: Tunnel-FETs are ideal for low-power electronic applications, particularly in areas requiring steep subthreshold slope and energy-efficient switching. However, traditional TFETs face major issues, including low ON-current (ION), random dopant fluctuations, and ambipolar conduction, which limit their performance and scalability. To address these issues, this study proposes the novel design of a borophene-based vertical dopingless TFET, incorporating a gate-drain underlapping (GDU) technique. The study employs high- κ dielectrics, specifically HfO₂, to improve electrostatic control within the device. Through extensive analysis and optimisation, the proposed device, featuring a 1nm HfO₂ dielectric, achieves a remarkable subthreshold swing of 8.44mV/dec and an impressive ION of 2.45×10^{-4} A/ μ m at a drain bias of 0.5V. The GDU technique effectively suppresses ambipolar conduction and reduces gate-to-drain capacitance, significantly improving device performance. By leveraging borophene's unique properties and the novel vertical dopingless architecture, this work advances the design of TFETs.

DOI: <https://doi.org/10.1016/j.micrna.2024.208055>

Author: Dr. Vanita Bhardwaj
Department: Applied Science & Humanities
Journal Name: Ionics
Journal Matrix:
 • **Indexing:** SCIE
 • **Impact Factor:** 2.5
 • **Quartile:** 5.3



Paper Title: Effect of different sulphur sources on electro-capacitive, structural, and morphology properties of single-phase rhombohedral nickel sulphide

Abstract: The objective of this paper is to study the effect of distinctive organic sulphur source on electro-catalytic, structural, and morphology characteristics of nickel sulphide. Thiourea (CH₄N₂S), Thioacetamide (CH₃CSNH₂), and L-cysteine (C₃H₇NO₂S) were acted as both sulphur source and capping agent during the synthesis of nickel sulphide. Also, we aim to discuss the mechanism of bond energies of sulphur group during the synthesis of the β -NiS and releasing of sulphur ions from different sulphur sources. There is no change in the pure phase of the synthesised β -NiS because of ammonia. Ammonia reduces the distinct phases like α - β -NiS (composite), α -Ni₃S₂, Ni₃S₄, Ni₁₇S₂, NiS₂, Ni₉S₈, etc., and leads to the pure form of β -NiS. Their impacts on the chemical and physical characteristics of β -NiS such as optical, morphology, vibrational studies, and electro-capacitive performance of the synthesised samples were investigated in detail. In the case of thiourea and thioacetamide, sphere and pseudo-sphere like morphology were found in FESEM and HRTEM images and a cuboid-like structure was obtained, when L-cysteine (C₃H₇NO₂S) was introduced as a sulphur source. Cyclic voltammetry, galvanostatic charging/discharging, and cyclic stability tests were performed in 1 M LiOH hydrous electrolyte to analyse the attainment of electrocatalytic activities of the synthesised sample. Nickel foam, FTO, and carbonaceous material were not used during the fabrication of working electrode. Cuboid β -NiS shows superior electro-catalytic performance; it has a large charge-discharge time and high specific and areal capacity. Cyclic stability of β -NiS is 89.4% when the L-cysteine (C₃H₇NO₂S) is acted as a sulphur source. The above-manifested results indicate that L-cysteine (C₃H₇NO₂S) is the most suitable sulphur source for electro-catalytic performance of nickel sulphide as compared to thiourea and thioacetamide.

DOI: <https://doi.org/10.1007/s11581-024-05648-5>

Author: Dr. Nishtha Kansal

Department: Electronics Engineering

Journal Name: International Journal of Circuit Theory and Application

Journal Matrix:

- **Indexing:** SCIE
- **Impact Factor:** 1.8
- **Quartile:** Q3

WILEY
Online Library

Paper Title: A Wide Range Duty-Cycle PWM Generator Using Oxide-TFTs on a Flexible Substrate

Abstract: This work presents an experimental characterization of a novel clocked regenerative comparator with oxide TFT (a-IGZO) technology on a flexible substrate. The circuit functionality is demonstrated as a wide range duty-cycle PWM signal generator with a triangular input signal. The regenerative latch in the comparator is implemented with diode-load-based inverters. The proposed circuit has shown a linear variation in the duty-cycle from 12% to 84%, when the reference voltage (V_{ref}) is varied from 0.5 to 3.3 V, respectively, in the clocked comparator. Further, a reliable operation is observed up to an input signal frequency of 2 kHz at a supply voltage of 4 V, with a power dissipation of 20 μ W. This circuit would find potential applications in wearable bio-medical and neuromorphic computational systems.

DOI: <https://doi.org/10.1002/cta.4390>

Author: Dr. Sonakshi Vij

Department: Computer Science & Engineering

Journal Name: International Journal of Information Technology

Journal Matrix:

- **Indexing:** Scopus
- **Cite Score:** 6.0
- **Quartile:** Q2

 **Springer**

Paper Title: Exploring WordNet® graphs for text summarization and sentiment analysis in Bengali speech

Abstract: Bengali is a complex and colorful language whose varied dialects and intonations present special difficulties for voice recognition. To better understand the subtleties of the Bengali language, this research study investigates the creation of strong natural language processing (NLP) tools. Specifically, it focuses on sentiment analysis, speech-to-text recognition, and WordNet® graph integration. It looks into Bengali-specific text summarizing strategies that can condense large amounts of material while keeping important details. Novel approaches are proposed to address the linguistic nuances of Bengali text by utilizing machine learning and natural language processing techniques. The usefulness of these methods is illustrated through empirical assessments and case studies, advancing text summarization in the Bengali language. Although there have been substantial advances in each of these fields separately, there is a clear research deficit in the area of complete solutions that deal with the particular difficulties raised by Bengali speech. This report suggests innovative approaches to close this gap. The usefulness and relevance of the suggested approaches are illustrated through empirical assessments and case studies, opening the door for future developments in Bengali natural language processing and adding to the larger field of multilingual NLP research.

DOI: <https://doi.org/10.1007/s41870-024-02285-z>

Author: Dr. Sonal Khurana

Department: Applied Science & Humanities

Journal Name: ASHRAE Journal

Journal Matrix:

- **Indexing:** NA
- **Impact Factor:** NA
- **Quartile:**0.60



Paper Title: Performance of an R-134a Two-Stage Vapor Compression Refrigeration System

Abstract: The increasing demand for efficient cooling technologies has led researchers to explore two-stage vapor compression refrigeration systems (TSVCRS) as an alternative to single-stage systems in high-pressure ratio scenarios where single-stage systems face challenges such as high compressor work, low volumetric efficiency, and elevated discharge temperature, particularly for low-temperature applications (see <https://tinyurl.com/JournalExtras>). To investigate the performance of the TSVCRS, an experimental test facility was designed. The test facility allows the system to operate in both two-stage vapor compression mode and single-stage vapor compression mode by manipulating manual shut-off valves. The performance of the system is examined under the different condenser water temperatures supplied to the condenser.

Author: Dr. Kumar Gautam

Department: Electronics Engineering

Journal Name: Engineering Research Express

Journal Matrix:

- **Indexing:** Scopus
- **Cite Score:**2.2
- **Quartile:** Q2



Paper Title: Enhancing security and randomness in cryptography and non-cryptographic applications with ORNA algorithm.

Abstract: In this paper, we advocate for using PRNGs to generate long sequences of statistically random numbers, also known as pseudorandom numbers. It has several practical applications, including cryptography, weather-based stimulation, procedural environment noise generation in games and casinos, and scientific simulations of real-world problems, like city traffic systems that use it to stimulate cars. One distinctive feature of our approach is the PRNG algorithm we propose; this algorithm has successfully produced statistically sound long-term sequences. The properties of the PRNG are assessed using several statistical methods. Our work presents the Oscillating Random Number Algorithm (ORNA), a new kind of random number generator, and examines both the statistical tests proposed by NIST and the results that ORNA has generated. The following also describes the several preceding algorithms developed, including the Mersenne Twister Algorithm (MT19937) and the Permuted Congruential Algorithm (PCG128), and compares ORNA's graphical efficiency to theirs. In this work, we compared ORNA to MT19937 and PCG128, and found that ORNA excels according to all 16 statistical tests. ORNA has three primary benefits, namely, superior statistical performance, quicker code execution, and simpler code implementation due to the algorithm's reduced complexity.

DOI: <https://iopscience.iop.org/article/10.1088/2631-8695/ad9139>

Author: Dr Kumar Gautam

Department: Electronics Engineering

Journal Name: IET Quantum Communication

Journal Matrix:

- **Indexing:** Scopus
- **Cite Score:** 6.7



Paper Title: Quantum blockchain: Trends, technologies, and future directions

Abstract: Bengali is a complex and colorful language whose varied dialects and intonations present special difficulties for voice recognition. To better understand the subtleties of the Bengali language, this research study investigates the creation of strong natural language processing (NLP) tools. Specifically, it focuses on sentiment analysis, speech-to-text recognition, and WordNet® graph integration. It looks into Bengali-specific text summarizing strategies that can condense large amounts of material while keeping important details. Novel approaches are proposed to address the linguistic nuances of Bengali text by utilizing machine learning and natural language processing techniques. The usefulness of these methods is illustrated through empirical assessments and case studies, advancing text summarization in the Bengali language. Although there have been substantial advances in each of these fields separately, there is a clear research deficit in the area of complete solutions that deal with the particular difficulties raised by Bengali speech. This report suggests innovative approaches to close this gap. The usefulness and relevance of the suggested approaches are illustrated through empirical assessments and case studies, opening the door for future developments in Bengali natural language processing and adding to the larger field of multilingual NLP research.

DOI: <https://doi.org/10.1007/s41870-024-02285-z>

Author: Dr. Dimple Tiwari

Department: Computer Science & Engineering

Journal Name: Journal of Computer Science

Journal Matrix:

- **Indexing:** Scopus
- **Cite Score:** 1.6
- **Quartile:** Q4



Paper Title: Multivalent Optimizer-Based Hybrid Genetic Algorithm for Task Scheduling in Cloud Applications

Abstract: Cloud computing platforms provide on-demand online services without the need for direct user management. Generally, big clouds distribute functions over multiple data centers at distant locations. The major facilities offered by clouds are based upon virtual machines which provide benefits in terms of low scheduling cost, improved accessibility and availability of cloud services. While transferring the tasks for effective scheduling, the main issue arises due to the domain and characteristics difference of the source machine and the target machine. During network traffic, the challenges are more complex thereby resulting in slow data transfer which leads further issues such as delayed delivery of critical tasks. In order to address the problem of heterogeneity in cloud task, there is a strong requirement of optimal scheme for task scheduling. This research work implements an optimization scheme for scheduling tasks in cloud domains. The offered scheme uses a multivalent optimizer using genetic algorithm termed as Multivalent Optimizer based Genetic Algorithm (MO-GA). It attempts to enhance system performance by transferring the tasks through cloud networks on the basis of resources workload. Therefore, it's very important to apply proper transfer mechanisms for efficient task scheduling in cloud applications. The suggested scheme (MO-GA) ponders various parameters such as system throughput, amount of virtual machines, total number of tasks, speed and capacity. From analytical results, it can be easily identified that our scheme optimizes task scheduling even for large number of tasks efficiently. MO-GA succeeds to achieve optimized tasks' transfer time and get promising results. The scheme is investigated using MATLAB distrusted system for the simulation of the cloud environment. The proposed scheme manage enhancement and optimization of almost 15% over the existing schemes for task transfer.

DOI: <https://doi.org/10.3844/jcssp.2025.223.234>

Author: Dr. Sandhya Tarwani

Department: Computer Science & Engineering

Title: Ensemble Machine Learning Model for Predicting Postpartum Depression Disorder

Title of the proceedings of the Conference: SCOPUS

Name of Conference: 2024 IEEE Region 10 Symposium (TENSYP)

National/International: International

Year of Publication: Nov 2024



Abstract: This study explores the development of an ensemble machine learning (ML) model to predict Postpartum Depression (PPD) disorder, leveraging chi-square test driven feature selection techniques and a diverse array of ML algorithms. Initially, chi-square test is employed to select the most influential features for PPD prediction. From a pool of candidate features, nine key attributes demonstrating the highest association with PPD are identified for model input. Subsequently, eight distinct ML techniques, including K Nearest Neighbors (KNN), Support Vector Machine (SVM), Random Forest (RF), Logistic Regression (LR), Decision Tree (DT), XG Boost (XGB), and Artificial Neural Network (ANN), are applied to develop individual predictive models. Following the training and evaluation of individual models, an ensemble approach is adopted to combine the strengths of multiple algorithms, enhancing prediction accuracy and robustness. The ensemble model aggregates predictions from diverse ML techniques, leveraging their complementary strengths to yield more accurate and reliable predictions of PPD risk. Performance evaluation metrics, such as accuracy, precision, recall, and F1-score, are employed to assess the efficacy of the ensemble model in comparison to individual ML algorithms. The results demonstrate the effectiveness of the ensemble approach in improving prediction accuracy and generalization capability, thereby offering a valuable tool for early identification and intervention in PPD cases. This research contributes to the advancement of predictive modelling in mental health by showcasing the utility of ensemble ML techniques in PPD prediction. The findings underscore the potential of feature selection and ensemble modelling in enhancing the accuracy and effectiveness of PPD risk assessment, thereby facilitating proactive interventions to support maternal mental health.

Paper Link: <https://ieeexplore.ieee.org/document/10752305>

Author: Dr. Sandhya Tarwani

Department: Computer Science & Engineering

Title: A Comparative Analysis of Machine Learning and Deep Learning Approaches in Deepfake Detection

Title of the proceedings of the Conference: SCOPUS

Name of Conference: 2025 IEEE Region 10 Symposium (TENSYP)

National/International: International

Year of Publication: Nov 2024



Abstract: Deepfakes refer to the visual media where the faces, bodily movements have been digitally altered using some software or program, this has proven to be more of a double-edged sword as it also contributes towards content creation and media creation that may be used for positive purposes. To combat this situation, measures to detect deep fake in the media is a credible approach. This work showcases a comparative analysis among 3 Deep Learning as well as 3 Machine Learning algorithms in order to reach a conclusive state of determining the best algorithms that can be implemented for Deepfake detection. For the machine learning algorithms, KNN, SVM and Logistic Regression have been used whereas CNN, TCN and CNN + LSTM have been used for the Deep Learning Algorithm. Detection of deepfakes through these algorithms works by sequentially processing, analyzing and classifying the features on the basis of the dataset fed for the algorithms. The chosen metrics for performing a comparison between each of the algorithms are Accuracy and F1 Score. The development, implementation and comparison of the algorithms was carried out on Google Collab and Jupyter Notebook. Upon comparative analysis of the algorithms between each other, it was found that CNN had the highest accuracy and F1-score of 0.9409 and 0.7225 respectively with KNN being the worst-performing algorithm with an accuracy 0.5770 and F1 score of 0.4088 respectively.

Paper Link: <https://ieeexplore.ieee.org/document/10752209>

Author: Dr. Sandhya Tarwani

Department: Computer Science & Engineering

Title: Real-Time Wrong-Way Vehicle Detection System with Automatic Number Plate Recognition for Enhanced Road Safety

Title of the proceedings of the Conference: SCOPUS

Name of Conference: 2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT)

National/International: International

Year of Publication: Nov 2024



Abstract: In the pursuit of enhancing road safety, the development of real-time detection systems has become imperative. This paper presents a smart approach to wrong-way vehicle detection utilizing computer vision technology for enhanced road safety. The proposed system presents a combination of YOLO for vehicle and license plate detection and OpenCV for license plate recognition, specifically tailored for Indian vehicle number plate dataset. By integrating YOLO's single-pass object detection capabilities, the system achieves real-time performance, in order to take immediate intervention in traffic violations. Utilizing methods such as centroid tracking and 'entry-exit' analysis, the system effectively differentiates between vehicles traveling in correct lanes and those in wrong lanes, enabling immediate enforcement measures. Centroid tracking assigns and tracks centre points of vehicle bounding boxes across frames, ensuring computational efficiency and simplicity in implementation. The 'entry-exit' approach utilizes designated lines in video frames to determine the direction of vehicle movement, leading towards accurate wrong-way detection. Moreover, the system leverages EasyOCR for text extraction, ensuring high accuracy in capturing license plate information. This integration of technologies allows for comprehensive monitoring of traffic patterns and swift identification of violations, contributing to proactive enforcement strategies and improved road safety. Through extensive experimentation on the Indian vehicle number plate YOLO annotated dataset, the proposed system demonstrates robust performance in real-world scenarios, exhibiting high accuracy and reliability in wrong-way vehicle detection and automatic number plate recognition. This research represents a significant advancement in leveraging computer vision for proactive traffic management and underscores the potential of technology in enhancing road safety measures.

Paper Link: <https://ieeexplore.ieee.org/document/10725591>

Author: Dr. Divya Agarwal

Department: Electronics Engineering

Title: Experimental Study to analyze the zonal financial independence of women using fuzzy logic

Title of the proceedings of the Conference: SCOPUS

Name of Conference: Innovative Computing and Communications. Proceedings of ICICC 2024 Lecture Notes in Networks and Systems

National/International: International

Year of Publication: Oct 2024



Abstract: Gender inequality and discrimination against women are some of the social evils from which our society is suffering from decades. Financial literacy rate in women of India according to records is not good despite certain progress made in last few decades; women still face socio-economic discrimination in the society which hampers their emotional and financial independence. In this research paper, the authors analyze the financial status of women by using fuzzy logic and the data for the same is collected from the official site of government of Indian. During research, it was out found out that there is a significant difference in financial status of women in different zones of the country. The given study can help stakeholders and policymakers to acknowledge the actual position of women in different zones across the nation and develop targeted intervention for the upliftment of females in the Indian society.

Paper Link: https://doi.org/10.1007/978-981-97-4152-6_22

Author: Dr. Divya Agarwal
Department: Electronics Engineering
Title: Deciphering Fitness Application Data Using Machine Learning
Title of the proceedings of the Conference: SCOPUS
Name of Conference: Innovative Computing and Communications.
 Proceedings of ICICC 2024 Lecture Notes in Networks and Systems
National/International: International
Year of Publication: Oct 2024

Abstract: This paper predicts fitness application data of people using two machine learning techniques, linear regression and decision trees. Fitness Tracker collects data pertaining of physical activities such as steps, distance, calories burnt, sleep routine, etc. This paper explores the correlation between the aforementioned physical activities to find out which of the following affects calories burnt the highest. Comparison is done among two popular machine learning algorithms to depict their performance, interpretability, scalability, and applicability to the different datasets. This allows for us to maximize efficiency by reducing the collection of unnecessary data and further discuss suitable machine learning algorithms to implement in fitness devices for better accuracy in readings from fitness applications.

Author: Dr. Divya Agarwal
Department: Electronics Engineering
Title: Non-Invasive Glucometry: A new frontier in Blood Sugar Monitoring
Title of the proceedings of the Conference: SCOPUS
Name of Conference: Innovative Computing and Communications.
 Proceedings of ICICC 2024 Lecture Notes in Networks and Systems
National/International: International
Year of Publication: Oct 2024

Abstract: Diabetes is characterized by insulin resistance, which can cause issues if undetected and mistreated. Regular monitoring of blood glucose levels is necessary to prevent complications. Conventional diabetes checkup relies on invasive blood punctures that can cause calluses and spread infections if not handled meticulously. To address issues of diabetic patients such as painful insertions and discomfort associated with it, recently much work has been done in the field of non-invasive glucometers. The purpose of this research is to develop a near-infrared (NIR at 950 NM) blood glucose monitoring system that is non-invasive and affordable. The device will employ an In-Vitro glucose measurement prototype that detects diffuse reflectance spectra of blood from human fingers and forearms to ensure sensitivity in fluctuating glucose concentrations at a very low cost.

Paper Link: https://doi.org/10.1007/978-981-97-4152-6_40

Author: Dr. Divya Agarwal

Department: Electronics Engineering

Title: Blockchain Security and Privacy using Machine Learning and Internet of Things-A Review

Title of the proceedings of the Conference: SCOPUS

Name of Conference: First International Conference on Pioneering Developments in Computer Science & Digital Technologies (IC2SDT)

National/International: International

Year of Publication: Oct 2024



Abstract: Technology connects the modern world. Countless endpoints, servers, infrastructures, and other services create a complex and fascinating cyber landscape that is always evolving, with new technologies being discovered every day and vulnerabilities being exposed. Blockchain, Internet of Things (IoT), and machine learning (ML) technologies have each developed strong answers to numerous cybersecurity issues in recent years. The creation of smarter safety devices that can automate tasks like resource allocation, anomaly or intrusion detection, and operational scalability has been made possible by ML and the IoT. Blockchain technology and ML both have advantages that can complement one another. While ML enables intelligent decision-making to identify anomalies, scalability, as well as effectiveness in Blockchain networks, blockchain delivers decentralized security and trust for the algorithms and data. This study demonstrates how blockchain technology and ML could work together to support 130 application cases pertaining to cybersecurity. Our research examines the present state of the art and explores cutting-edge advancements in blockchain security and privacy for IoT and ML, focusing on security aspects, challenges, and potential applications.

Paper Link: <https://ieeexplore.ieee.org/abstract/document/10696712>

Author: Dr. Divya Agarwal

Department: Electronics Engineering

Title: Cloud Based Flood Monitoring - A Review

Title of the proceedings of the Conference: SCOPUS

Name of Conference: First International Conference on Pioneering Developments in Computer Science & Digital Technologies (IC2SDT)

National/International: International

Year of Publication: Oct 2024



Abstract: Floods are a major natural disaster; it happens when a usually dry land is overflowed with water. The most common causes of floods are overflowed rivers or streams, heavy rainfall for a long period of time, a failed dam or a rapid ice melt in the mountains. Floods have a significant impact on the communities globally. It causes extreme damage to people, animals, and infrastructure. It affects agriculture causing damage to crops which results in food scarcity. Many people become homeless and have difficulties in sustaining their lives which hampers country's economic growth, leading to poor GDP (Gross Domestic Product). This paper provides a systematic review of work done in field of flood detection and avoidance mechanism using techniques such as Cloud computing (CC) (Saas (Software as a service), Paas (Platform as a service), Iaas (Infrastructure as a service), AWS (Amazon Web Service)), machine learning (CNN (Convolution Neural Networks), KNN (K-nearest neighbors)) and Internet of Things (IoT) [Sensors, NodeMCU, WSNs (Wireless sensor networks), WSANs (Wireless Sensor and Actuators Networks)]. CC is a scalable and secure platform where analysis and processing of real-time data can be done. This paper systematically examines the methodologies and technologies used along with the challenges that are associated with cloud-based flood monitoring system.

Paper Link: 10.1109/IC2SDT62152.2024.10696795

Author: Dr. Vishal Srivastava

Department: Electronics Engineering

Title: Quantum Neural Network (QNN) based Realization of XOR gate Using Systematic Quantum Circuit Based Approach

Title of the proceedings of the Conference: SCOPUS

Name of Conference: 12th International Conference on Internet of Everything, Microwave, Embedded, Communication and Networks (IEMECON)

National/International: International

Year of Publication: Aug 2024



Abstract: Quantum computing offers transformative potential for information processing, promising solutions to complex problems beyond the reach of classical computers. Central to this field is the development of quantum logic gates, the foundational elements of quantum circuits. This work investigates a systematic method for implementing a quantum XOR gate, a critical logic operation, using quantum neural network architectures. Quantum phenomena like superposition and entanglement offer possibilities for substantial progress in areas such as cryptography, simulations, and optimization. Initial findings using QNNs for a classical XOR classification problem show promising accuracy above 90%. Realizing the full potential of quantum computing requires continued advancements in areas like fault-tolerant qubit engineering, high-fidelity gate operations, and scalable circuit design.

Paper Link: <https://ieeexplore.ieee.org/abstract/document/10846119>

Author: Dr. Sonakshi Vij

Department: Computer Science & Engineering

Title: A Systematic Review Highlighting Insights on the Task of Document Classification using Machine Learning Techniques

Title of the proceedings of the Conference: SCOPUS

Name of Conference: ICICC

National/International: International

Year of Publication: 2024



Abstract: This paper reviews the critical role of document classification in the information age, employing machine learning for the automatic categorization of textual and multimodal data. A wide range of applications, from spam analysis to legal document analysis, demonstrate the utility and importance of this technology. Support vector machines which are the current algorithms used face challenges in manual feature extraction and scalability which leads to the emergence of deep learning algorithms like CNNs and RNNs. Although these algorithms propose improved accuracy, there are still issues regarding computational complexity and interpretability. The combination of domain-specific vocabulary improves accuracy; however, the need for specialized corpora sparks doubts about its generalizability. This review provides helpful information for researchers and practitioners, helping the growing field of document classification.

Paper Link: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4946728

Author: Dr. Sonakshi Vij
Department: Computer Science & Engineering
Title: Developing a Book Analyzer for Fiction and Nonfiction Books using Machine Learning based Text Summarization Techniques
Title of the proceedings of the Conference: SCOPUS
Name of Conference: ICICC
National/International: International
Year of Publication: 2024



Scopus'

SSRN

Abstract: The "Book Blender" is an innovative software that uses complex machine learning methods to assist in managing the large quantity of information accessible in this digital era. As there is a vast amount of data, it has become critical to extract the main idea of literary works, whether they are fiction or nonfiction. This application caters to the increasing demand for brief yet insightful summaries of literary texts, providing a helpful solution to the overwhelming volume of data. Summarization, in this context, goes beyond merely reducing texts; it involves creating condensed versions that capture the essence of extensive narratives found in lengthy readings. Our research aims to achieve this objective, utilizing Jules Verne's "Around the World in 80 Days" and James Clear's "Atomic Habits" as our datasets. We employ advanced machine-learning techniques to generate summaries that preserve the essence of these different genres. Our study delves into a comparative analysis of summarization effectiveness across both fictional and non-fictional datasets, using the computation of BLEU, BERT, and ROUGE scores for various machine learning techniques. This empirical exploration lies at the core of our research, shedding light on the adaptability and performance nuances of machine learning models within the diverse landscape of literary genres. As we explore the intersection of literature and technology, the "Book Blender" emerges as a promising development in information processing. It offers an efficient and nuanced approach to extracting key insights from extensive literary works, bridging the gap between the richness of literature and the capabilities of cutting-edge technology.

Paper Link: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4938102

Author: Dr. Sonakshi Vij
Department: Computer Science & Engineering
Title: Analyzing cyberbullying behavior in social media using supervised machine learning & natural language processing
Title of the proceedings of the Conference: SCOPUS
Name of Conference: ICICC
National/International: International
Year of Publication: 2024



Scopus'

SSRN

Abstract: Cyberbullying refers to the use of online platforms, such as social media, instant messaging, and online forums, to harass, intimidate, or harm others. Victims of cyberbullying may experience a range of negative consequences, including emotional distress, anxiety, depression, and even suicidal thoughts. Cyberbullying can take various forms, such as spreading rumors, posting hurtful comments or images, or excluding individuals from online groups or communities. It is crucial to detect such activity and take appropriate action related to it. This work focuses on the detection of cyberbullying in hurtful comments on various online platforms such as YouTube, Twitter, and Kaggle. For this purpose, we employed different supervised machine learning methods and analysed their performance. Random Forest, K-Nearest Neighbour, Support Vector Classification, Decision Tree, Gaussian Naïve Bayes, and Logistic Regression models were employed for detection. Through model evaluation, we found that Support Vector Classifier and Logistic Regression are more accurate for cyberbullying detection.

Paper Link: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4938099

Author: Dr. Sonakshi Vij
Department: Computer Science & Engineering
Title: Experimental Study to Analyze the Zonal Financial Independence of Women Using Fuzzy Logic
Title of the proceedings of the Conference: SCOPUS
Name of Conference: ICICC
National/International: International
Year of Publication: 2024

Abstract: Gender inequality and discrimination against women are some of the social evils from which our society is suffering from decades. Financial literacy rate in women of India according to records is not good despite certain progress made in last few decades; women still face socio-economic discrimination in the society which hampers their emotional and financial independence. In this research paper, the authors analyze the financial status of women by using fuzzy logic and the data for the same is collected from the official site of government of Indian. During research, it was out found out that there is a significant difference in financial status of women in different zones of the country. The given study can help stakeholders and policymakers to acknowledge the actual position of women in different zones across the nation and develop targeted intervention for the upliftment of females in the Indian society.

Paper Link: https://link.springer.com/chapter/10.1007/978-981-97-4152-6_22

Author: Dr. Sonakshi Vij
Department: Computer Science & Engineering
Title: Navigating the Impact of COVID-19 on Indian Economies Through a Lens of Sustainability
Title of the proceedings of the Conference: SCOPUS
Name of Conference: Innovative Computing and Communications. ICICC 2024
National/International: International
Year of Publication: 2024

Abstract: Since the COVID-19 pandemic began in March 2020, the global economy has been affected in a variety of ways. The Indian economy was also affected in different ways and faced challenges. To scrutinize this further, the authors conducted a thorough analysis of the many aspects influencing the economy in SARS COVID-19. Furthermore, the authors studied the GDP and HDI of four distinct states that varied in terms of region and economy. Proceeding that, the paper includes the sustainability analysis of the unicorns that were boosted during the pandemic as well as the sentimental analysis as an example of an Indian unicorn.

Paper Link: https://link.springer.com/chapter/10.1007/978-981-97-3588-4_13

Author: Dr. Sonakshi Vij

Department: Computer Science & Engineering

Title: Developing a Sentiment Analysis Model for Online Brand Management and Optimization

Title of the proceedings of the Conference: SCOPUS

Name of Conference: Innovative Computing and Communications. ICICC 2024

National/International: International

Year of Publication: 2024

Abstract: Online brand management is very crucial in today's world with prominent relevance if customer reviews. One of the prime brand optimization techniques include the major fundamental application of Natural Language Processing (NLP), i.e. sentiment analysis. This is prominent when there is abundance of feedback and reviews of customer utilizing the brand services. This paper focuses on the approach of studying and analysing the brand reputation in different business verticals and applying the NLP techniques and classifier models to attain the efficiency. The classifier models that have been trained in this research includes the linear regression, Random Forest Classifier and Gradient Boost Classifier. The two major verticals that have been considered are, namely Transport & Logistics and Finance & Insurance, with reference to diverse datasets being trained on the models. The maximum f1 score of 97.4 has been achieved on the Gradient Boost Classifier making it the most effective model in this research.

Paper Link: https://link.springer.com/chapter/10.1007/978-981-97-3588-4_36

Author: Dr. Adeel Hashmi

Department: Computer Science & Engineering

Title: GreenConnect: a cutting-edge optical sensor based gardening automation system

Title of the proceedings of the Conference: sciforum

Name of Conference: The 11th International Electronic Conference on Sensors and Applications session Smart Agriculture Sensors

National/International: International

Year of Publication: 2024



Abstract: IoT-based garden automation “Green Connect” is a system that automates and tracks numerous gardening-related operations using internet-connected sensors and devices. Benefits of this technology include enhanced plant growth, improved watering schedules, and remote monitoring and management of plants. The system is made up of numerous parts, including irrigation systems, temperature sensors, humidity sensors, and soil moisture sensors, all of which are linked to a central hub. In order to automate the watering, lighting, and other environmental conditions of the garden, the microcontroller gathers and analyses the data from the sensors. The development of an IoT-based garden automation system is covered in this article, along with the design of the system architecture, component selection, optical sensor and device integration. The experiment's findings demonstrate that the system was able to improve the garden's growth conditions, leading to better plant health and yield. According to the study, IoT-based garden automation has the ability to completely change how we think about gardening by making it simpler and more effective to grow plants in a range of settings. By remotely managing the water pump and keeping track of the soil moisture in the garden, this study integrates the IoT into the irrigation system for gardens.

Paper Link: <https://sciforum.net/paper/view/20436>

Dr. Deepak Tiwari**Department:** Applied Science & Humanities**Title of the Invention:** Improved Process for Treatment and Recycling of kitchen wastewater,

Date of filing: 4/10/2024 Application No: 202411069703 (Published).



Office of the Controller General of Patents, Designs & Trade Marks
Department for Promotion of Industry and Internal Trade
Ministry of Commerce & Industry,
Government of India



Application Details	
APPLICATION NUMBER	202411069703
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	14/09/2024
APPLICANT NAME	School of Engineering & Technology, Vivekananda Institute of Professional Studies Technical-Campus
TITLE OF INVENTION	AN IMPROVED PROCESS FOR TREATMENT AND RECYCLING OF KITCHEN WASTEWATER
FIELD OF INVENTION	BIOTECHNOLOGY
E-MAIL (As Per Record)	
ADDITIONAL-EMAIL (As Per Record)	
E-MAIL (UPDATED Online)	
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	--
PUBLICATION DATE (U/S 11A)	04/10/2024

Dr. Deepak Tiwari**Department:** Applied Science & Humanities**Title of the Invention:** A digital accident and crime scene mapping system. Date of filing 11/10/2024. Application No. 202411071542. (Published).

Office of the Controller General of Patents, Designs & Trade Marks
Department for Promotion of Industry and Internal Trade
Ministry of Commerce & Industry,
Government of India



Application Details	
APPLICATION NUMBER	202411071542
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	22/09/2024
APPLICANT NAME	School of Engineering & Technology, Vivekananda Institute of Professional Studies Technical-Campus
TITLE OF INVENTION	A DIGITAL ACCIDENT AND CRIME SCENE MAPPING SYSTEM
FIELD OF INVENTION	COMPUTER SCIENCE
E-MAIL (As Per Record)	
ADDITIONAL-EMAIL (As Per Record)	
E-MAIL (UPDATED Online)	
PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	--

22

Research Article Publication

S. No.	Name of the Student	Title of the Research Article	Indexing and Journal	Category	Impact Factor
1	Mr. Vinyak Soni Branch (AI&DS) Batch (2021-25)	Multi-response Optimization in the ORC-VCR System using the EDAS Method DOI: https://doi.org/10.1016/j.enbuild.2024.114281	SCIE	Q1	6.6
2	Miran Ahmad Siddique; Khushi Sharma Branch (AI&ML) Batch (2022-26)	Optimizing wastewater treatment through artificial intelligence: recent advances and future prospects DOI: https://doi.org/10.2166/wst.2024.259	SCIE		2.5
3	Janhvi Juyal Branch (AI&DS) Batch (2021-25)	Exploring WordNet® graphs for text summarization and sentiment analysis in Bengali speech DIO: https://doi.org/10.1007/s41870-024-02285-z	Scopus	NA	NA

International Conference Publication

S. No.	Name of the Student	Title of the Research Article	Indexing and Journal	Category	Impact Factor
1	Yash Sharma, Vansh Jain, Anand Branch (AI&DS) Batch (2022-26)	Ensemble Machine Learning Model for Predicting Postpartum Depression Disorder https://ieeexplore.ieee.org/document/10752305	SCOPUS	NA	NA
2	Mudit Vashistha, Sarthak Jain, Shubham Pandey, Aryan Pradhan Branch (AI&DS) Batch (2022-26)	A Comparative Analysis of Machine Learning and Deep Learning Approaches in Deepfake Detection https://ieeexplore.ieee.org/document/10752209	SCOPUS	NA	NA

S. No.	Name of the Student	Title of the Research Article	Indexing and Journal	Category	Impact Factor
3	Krish Gaur, Miran Ahmad Siddique, Krishna Beernally, Nityam Madaan Branch (AI&ML) Batch (2022-26)	Real-Time Wrong-Way Vehicle Detection System with Automatic Number Plate Recognition for Enhanced Road Safety: https://ieeexplore.ieee.org/document/10725591	SCOPUS	NA	NA
4	Yogesh Agarwal, Prisha Gupta Branch (IIOT) Batch (2021-25)	Experimental Study to analyze the zonal financial independence of women using fuzzy logic https://doi.org/10.1007/978-981-97-4152-6_22	SCOPUS	NA	NA
5	Sagar Puniyani, Dhruv Girotra Branch (IIOT) Batch (2021-25)	Deciphering Fitness Application Data Using Machine Learning https://doi.org/10.1007/978-981-97-4152-6_37			
6	Himanshu Lohia, Rishi Singhal, Shlok Bhardwaj Branch (IIOT) Batch (2021-25)	Non-Invasive Glucometry: A new frontier in Blood Sugar Monitoring https://doi.org/10.1007/978-981-97-4152-6_40	SCOPUS		
7	Vidhi Karnwal, Ayush Chaurasia Branch (AI&ML) Batch (2021-25)	Blockchain Security and Privacy using Machine Learning and Internet of Things-A Review https://ieeexplore.ieee.org/abstract/document/10696712	SCOPUS		
8	Anshika Sharma, Vrati, Manayu Yadav Branch (AI&DS) Batch (2021-25)	Cloud Based Flood Monitoring - A Review 10.1109/IC2SDT62152.2024.10696795	SCOPUS		
9	Arnav Sharma, Vriddhi Mittal, Khyati Daksha Branch (AI&DS) Batch (2021-25)	A Systematic Review Highlighting Insights on the Task of Document Classification using Machine Learning Techniques http://dx.doi.org/10.2139/ssrn.4946728	SCOPUS		
10	Akansha Sharma, Apoorav Malik, Branch (AI&DS) Batch (2022-26)	Developing a Book Analyzer for Fiction and Nonfiction Books using Machine Learning based Text Summarization Techniques http://dx.doi.org/10.2139/ssrn.4938102	SCOPUS		

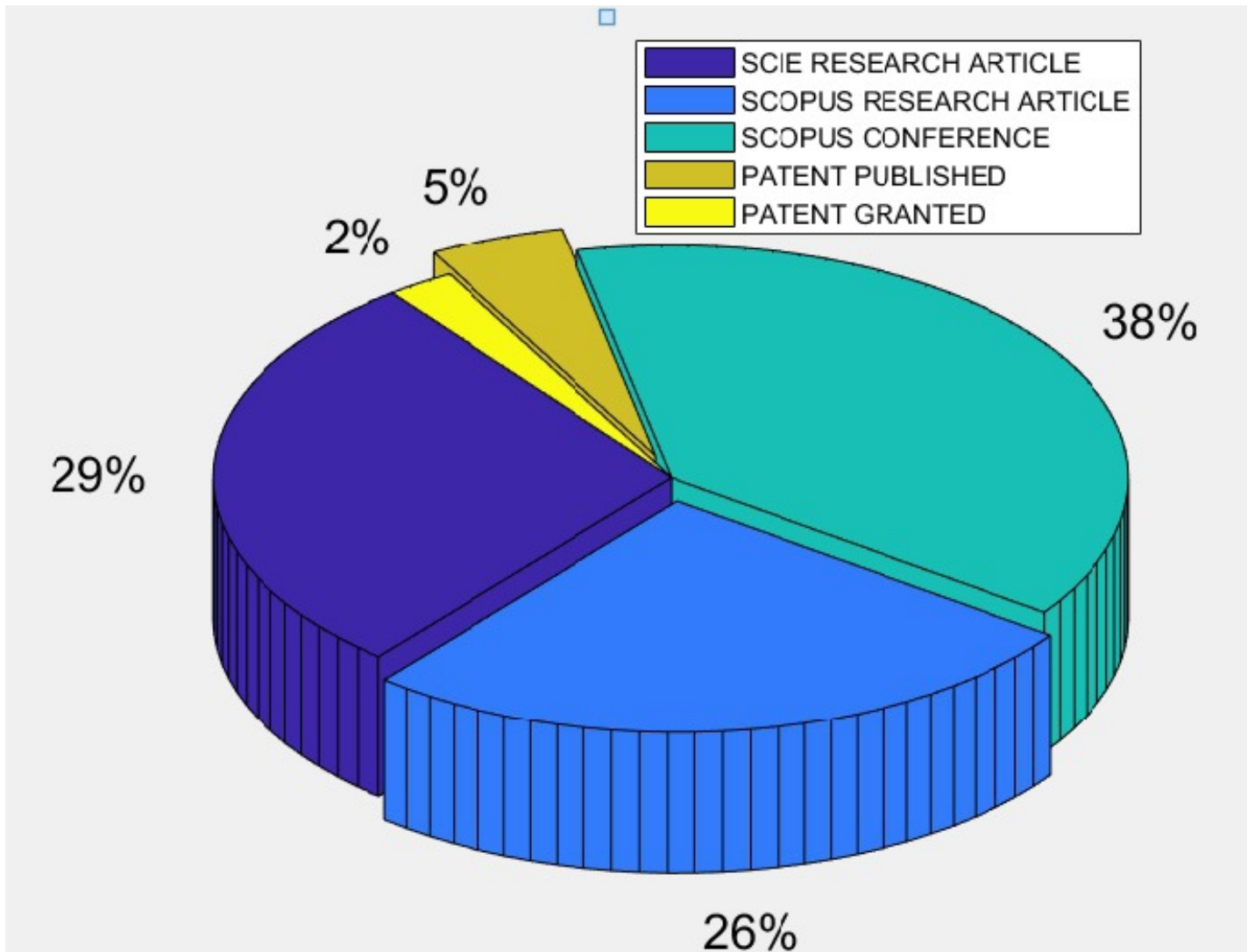
S.	Name of the Student	Title of the Research Article	Indexing	Categ	Impact
11	Vikram Ranjan, Krishna Suthar, Mayank Verma, Suryansh Salaria Branch (AI&DS)	Analyzing cyberbullying behavior in social media using supervised machine learning & natural language processing http://dx.doi.org/10.2139/ssrn.4938099	SCOPUS		
12	Prisha Gupta, Rishi Aggarwal Branch (IIOT) Batch (2021-25)	Experimental Study to Analyze the Zonal Financial Independence of Women Using Fuzzy Logic https://doi.org/10.1007/978-981-97-4152-6_22	SCOPUS		
13	Janhvi Juyal, Arnav Sharma, Vriddhi Mittal Branch (AI&DS) Batch (2022-256)	Navigating the Impact of COVID-19 on Indian Economies Through a Lens of Sustainability https://doi.org/10.1007/978-981-97-3588-4_13	SCOPUS		
14	Mansha Rathee, Prakhar Jain, Ribhav Bhatia Branch (AI&DS) Batch (2021-25)	Developing a Sentiment Analysis Model for Online Brand Management and Optimization https://doi.org/10.1007/978-981-97-3588-4_36	SCOPUS		

Patent done by Student VIPS as Applicant/Inventor

S. No.	Title of the Invention	Application No.	Status	Name of the Student	Date of publication
1	An improved process for the treatment and recycling of kitchen wastewater	202411069703	Published	Vanshika Maheshwari Branch (IIOT) Batch (2022-26)	4/10/2024
2	A digital accident and crime scene mapping system	202411071542	Published	Vinayak Soni Branch (AI&DS) Batch (2021-25)	11/10/2024
3	Solar waste water heater	429667-001	Granted	Raj and Amam Jain Branch (AI&DS) Batch (2023-27)	27/11/2024

Research Outcomes (1st June-31st December, 2024)

S. No.	Particular	Nos.
1	SCI/SCIE Indexed Research Articles Publication	12
2	SCOPUS indexed Research Articles Publication	11
3	Scopus Indexed Conference Research Paper	16
4	Number of Published Patent	02
5	Number of Granted Patent	01





योग: कर्मसु कौशलम्
IN PURSUIT OF PERFECTION



VIVEKANANDA INSTITUTE OF PROFESSIONAL STUDIES - TECHNICAL CAMPUS

Affiliated to GGSIP University,, Approved by AICTE

An ISO 9001:2015 Certified Institution

Grade "A++" Accredited by NAAC

NBA Accredited (MCA), Recognized under Section 2(f) by UGC

AU-Block (Outer Ring Road), Pitampura, Delhi - 110034

Phone No.: +91 11 27343402, 27343403

E-mail: btech.enquiry@vips.edu | Web.: www.vips.edu