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Journal Abstracts

April 2026

Sl. No	Article	Author	Source	Year
1	Leveraging Design Patterns in Early-Stage Software Development: A Systematic Approach	*Bilal Hussein, Patrice Caulier*	I-manager's Journal on Software Engineering Vol: 20 No: 2	2025

Abstract: The early stages of software development are often characterized by frequent changes and rapid prototyping. While this agility is essential, it can lead to codebases that are difficult to maintain and reuse. Design patterns offer structured solutions to mitigate these issues. This paper proposes a systematic and methodical approach for the early integration of design patterns, aimed at improving code maintainability, reusability, and adaptability. Unlike previous works that mainly address design patterns in later phases, our approach focuses on systematic identification, selection, and integration from the earliest iterations. A preliminary validation study conducted on a web development project demonstrates the effectiveness of the proposed method in terms of reducing complexity and improving architectural clarity.

Sl. No	Article	Author	Source	Year
2	SkillSageAI: An AI-Powered Platform for Student Career Readiness	*Sai Phaneendra Varma*	I-manager's Journal on Software Engineering Vol: 20 No: 2	2025

Abstract: SkillSageAI is an AI-powered platform developed to enhance student career readiness by integrating virtual interview simulation, resume intelligence, and personalized learning assistance into a single comprehensive system. The platform addresses a key challenge faced by students today—bridging the gap between academic learning and industry expectations—by offering adaptive, real-time skill development tools. The Virtual Interview Bot dynamically adjusts to various subjects, difficulty levels, and time durations, enabling students to practice domain-specific interviews. Using Natural Language Processing (NLP), Large Language Models (LLMs), and Retrieval-Augmented Generation (RAG), the system analyses user responses, compares them with ideal reference answers from trusted sources, and provides detailed, actionable feedback for continuous improvement.The Resume Intelligence module processes uploaded resumes using machine learning algorithms to extract skills, academic qualifications, and experience. It evaluates their relevance to specific job roles or academic requirements and recommends enhancements to improve clarity, structure, and alignment with industry standards. Together, these features offer a seamless and personalized development experience. The platform's multi-functional architecture effectively supports both academic and professional growth, empowering students with intelligent, data-

driven tools to strengthen confidence, enhance communication, and improve job or academic preparedness. Overall, SkillSageAI provides a robust AI-driven solution for developing well-rounded, industry-ready graduates.

Sl. No	Article	Author	Source	Year
3	AI-Based Healthcare Chatbot using Machine Learning and NLP	*Priya Sah , Amisha Babaria, Pragya Sharma, Vijaya Tripathi*	I-manager's Journal on Software Engineering Vol: 20 No: 2	2025

Abstract: Artificial Intelligence (AI) is transforming the healthcare sector by enhancing diagnostic accuracy, improving patient care, optimizing administrative workflows, and enabling personalized medicine. With the rapid growth of medical data and advancements in machine learning, deep learning, and natural language processing, AI-driven systems are becoming integral to modern healthcare.This paper explores the role of AI in revolutionizing healthcare, highlighting key applications such as medical imaging, predictive analytics, drug discovery, virtual health assistants, and remote patient monitoring. It also discusses the challenges, ethical concerns, and prospects of AI adoption in healthcare. The study concludes that while AI has immense potential to improve healthcare outcomes and efficiency, careful implementation, ethical governance, and collaboration between technology and healthcare professionals are essential for its sustainable growth.

Sl. No	Article	Author	Source	Year
1	Using Reading and Digital Detox to Promote Social and Emotional Health	*Catherine Elise Barrett , Christy Thomas, Reeshemah Johnson.*	I-manager's Journal on Educational Psychology Vol: 19 No: 2	2025

Abstract: The escalating mental health crisis among children and adolescents in the United States has been intensified by the COVID-19 pandemic, but its roots trace back to longstanding systemic challenges. Schools, as consistent environments in young people's lives, are uniquely positioned to offer supportive, preventive strategies that address the rising incidence of anxiety, depression, and adverse childhood experiences (ACEs). This paper examines two practical, low-cost interventions, reading and digital detox, as complementary tools to support the mental, emotional, and behavioral

(MEB) health of students within school settings. A review of current literature highlights the cognitive, emotional, and physiological benefits of reading, demonstrating its capacity to reduce stress, build empathy, enhance emotional resilience, and improve academic performance. Concurrently, the paper explores the adverse effects of excessive technology use, including digital overload, screen addiction, and diminished social interaction, while presenting evidence-based strategies for promoting balanced digital engagement through digital detox practices and mindful technology use. Together, these interventions offer actionable, accessible pathways for educators to foster student well-being, mitigate the effects of environmental and digital stressors, and cultivate healthier, more resilient school communities. The paper concludes by recommending integrated approaches that embed both reading initiatives and digital wellness education into school culture to sustainably support students' mental health in an increasingly complex, hyperconnected world.

Sl. No	Article	Author	Source	Year
2	Teachers' Self-Efficacy and Learning Engagement Practices in Inclusive Classroom at the Elementary Level	*Anirudha Jena , Sarat Kumar Rout.*	I-manager's Journal on Educational Psychology Vol: 19 No: 2	2025

Abstract: This study examines the impact of teachers' self-efficacy on their learning engagement practices in inclusive classrooms, particularly at the elementary level in Khordha district of Odisha. Specifically, it examines differences in engagement practices based on teachers' gender, teaching experience, and educational qualifications, and examines the relationship between teacher self-efficacy and learning engagement. Using a causal-comparative research design, a sample of 140 elementary teachers was selected through a disproportionate stratified random sampling method. The investigator adapted two standardized tools for assessing self-efficacy and learning engagement practices in the inclusive classroom. The study employed statistical analysis techniques, including independent t-tests, one-way ANOVA, and Pearson correlation. Results of present study found no significant differences in learning engagement practices across gender (t with df (138) = -.658, p-value .512 (p > .05)), teaching experience (F= .914, p-value = .574 (p > .05)), and educational qualification (F= 1.210, p-value = .256 (p > .05)). However, the Investigator found a significant positive correlation between teachers' self-efficacy and their learning engagement practices. The value of a correlation coefficient is .230 with p value=0.006 (p< 0.01), found between teachers' self-efficacy and their learning engagement. The findings suggest the need for educational stakeholders to focus on enhancing teachers' self-efficacy through continuous professional development, mentorship, and supportive school environments. By empowering teachers to feel confident and competent, the quality of inclusive education can be significantly strengthened.

Sl. No	Article	Author	Source	Year
3	Effectiveness of Learning Strategy Instruction on Achievement in Physical Science and Metacognition of the Standard Eight Pupils of Dakshina Kannada District	*Santhosh Furtado, Padmanabha C. H.*	I-manager's Journal on Educational Psychology Vol: 19 No: 2	2025

Abstract: Current educational demand is ranking the learner among the most intellectual beings on the basis of school accountability and school achievement in the more challenging content like Science and Mathematics. The learners use their own strategies to learn the concept which are not taught to them show high achievement and know how to learn and apply their knowledge and skills actively across various learning environments. This knowledge or self awareness about their own thinking process and regulation of this knowledge is Metacognition. The effective Metacognition naturally helps to develop suitable learning strategies which encourages learners to monitor, evaluate and revise their performance showing excellent academic achievement. Considering that many students with disabilities struggle with developing strategies for learning and remembering on their own, a teacher skilled in introducing this process can make a world of difference. The present study was to find Effectiveness of Learning Strategy Instruction on Achievement in Physical Science and Metacognition of the Standard Eight Pupils of Dakshina Kannada District. The investigator has used Experimental Method with Post Test Only Parallel Group Design in the study. Findings revealed that the experimental treatment through Learning Strategy Instruction has enhanced the Achievement in Physical Science among the pupils of Standard Eight especially in terms of Knowledge and Application. Result also indicates that experimental treatment through Learning Strategy Instruction has increased the Metacognition of the pupils.

Sl. No	Article	Author	Source	Year
4	Attitudes of M.Ed Students towards Inclusive Education in the 21st Century: Challenges and Prospects	*Ismail Thamarasseri, Sneha K.*	I-manager's Journal on Educational Psychology Vol: 19 No: 2	2025

Abstract: In the twenty-first century, inclusive education has emerged as a vital strategy for ensuring equal learning opportunities for all students, regardless of their abilities or personal characteristics. It affirms every learner's right to a quality education within a supportive and equitable environment. This study investigated the attitudes of M.Ed. students toward inclusive education and their preparedness to advocate for inclusive

practices in their future professional roles. Using a cross- sectional survey design, data were collected from fifty students through a structured attitude scale developed and validated for this purpose. The results revealed that while the majority of students held favourable attitudes toward inclusive education, challenges remain in terms of resource constraints, limited institutional support, and insufficient practical exposure to inclusive classrooms. Positive attitudes were found to be strongly associated with academic performance, and confidence in teacher preparation emerged as a significant predictor of student engagement. Furthermore, students recognized the broader societal benefits of inclusive education, particularly in promoting equity, reducing stigma, and fostering social cohesion. The study concludes that inclusive education must be embedded as a core philosophy in teacher preparation programmes, supported by adequate resources, experiential learning opportunities, and sustained professional development. Although the findings are limited by the small sample size and single-institution scope, they offer valuable insights for policymakers, curriculum designers, and educational leaders seeking to strengthen inclusive practices. Future research with larger and more diverse samples, including qualitative approaches, is recommended to deepen understanding and guide effective policy interventions.

Sl. No	Article	Author	Source	Year
5	Sustaining Educators: A Holistic Framework for Teacher Health and Well-Being	*Sonia Delrose Noronha, Padmanabha C. H., Venkatesh S. Amin.*	I-manager's Journal on Educational Psychology Vol: 19 No: 2	2025

Abstract: Educators play a crucial role in shaping future generations, yet they often encounter significant challenges related to stress, workload, and emotional demands. This study presents a comprehensive framework designed to enhance and sustain teacher well-being by integrating physical, mental, social, and professional aspects. Grounded in interdisciplinary research, the framework addresses essential factors such as workload management, stress reduction techniques, professional growth, and the development of supportive school environments. The paper highlights the significance of institutional policies, mindfulness practices, and community engagement in strengthening resilience and job satisfaction among teachers. Through both qualitative and quantitative analysis, it identifies key interventions and support mechanisms necessary to mitigate burnout and improve overall well-being. By contributing to the expanding body of research on teacher sustainability, this study offers practical insights for policymakers, school leaders, and educators. Emphasizing a holistic approach, the framework seeks to empower teachers, enhance their professional effectiveness, and cultivate a positive and nurturing educational environment.

Sl. No	Article	Author	Source	Year
6	A Theoretical Overview of Neural Correlates of Epistemic Curiosity: A Consolidated Review of Existing Studies	*Nasreen V., Sam Thomas Joy.*	I-manager's Journal on Educational Psychology Vol: 19 No: 2	2025

Abstract: Epistemic curiosity-the intrinsic drive to acquire knowledge—plays a critical role in learning and cognitive engagement. Recent neuroscientific studies demonstrate that curiosity is not only a motivational state but also a biologically grounded process involving networks for memory, reward, and cognitive control. This review synthesizes evidence from twelve studies employing fMRI, EEG, behavioral, and theoretical approaches to examine the neural underpinnings of curiosity. Findings highlight consistent patterns linking curiosity with enhanced memory formation, motivational drive, and decision-making, while also revealing divergences in how factors such as surprise and uncertainty influence learning outcomes. By consolidating these insights, the review identifies both convergences and tensions across the literature, clarifies how neural evidence extends psychological theories of curiosity, and draws practical implications for education. Specifically, curiosity-informed pedagogy-through scaffolding in the Region of Proximal Learning, balancing uncertainty, and integrating adaptive technologies-can foster deeper engagement and long-term retention. Future research should address methodological limitations, including ecological validity, developmental variation, and cultural diversity. This review thus bridges neuroscience and education, offering a consolidated framework for understanding how curiosity shapes cognition and how it may be cultivated in learning environments.

Sl. No	Article	Author	Source	Year
1	Student Responses to the First-Time AI-Powered Lessons at an International School	*Michelle Kang*	I-manager's Journal on Educational Technology Vol: 22 No: 3	2025

Abstract: This study examined the attitudes of Grade 10 EFL students toward integrating artificial intelligence (AI) tools into literature learning, using A Midsummer Night's Dream as the instructional context. Conducted at an international high school in Ho Chi Minh City, Vietnam, the research employed a mixed-methods design incorporating pre- and post-surveys over a five- week AI-integrated instructional period. Grounded in the Technology Acceptance Model (TAM) and the Diffusion of Innovation theory (DOI), the study explored how AI-supported instruction influences students' perceptions of usefulness, ease of use, and innovation attributes. Findings revealed that students generally held positive attitudes toward AI-assisted

learning, recognizing its value in enhancing vocabulary retention, comprehension, and engagement with Shakespearean texts. However, students also reported concerns about overreliance on technology and the complexity of AI-generated content, reflecting ongoing negotiation between enthusiasm and critical awareness. Comparative results indicated that while initial excitement diminished slightly, students developed a more balanced and evaluative understanding of AI's educational role. Key factors shaping these attitudes included pedagogical design, teacher guidance, and prior experience with technology. Overall, the study suggests that AI can effectively support literature instruction when integrated as a pedagogical partner rather than a substitute for traditional teaching. The findings provide practical implications for educators and policymakers seeking to promote ethical, informed, and sustainable adoption of AI in EFL contexts.

Sl. No	Article	Author	Source	Year
2	Asian Perspectives on AI in Teacher Education: A Post-Covid Research Synthesis	*Anshu Chandra, Anju Verma, Kabita Handique.*	I-manager's Journal on Educational Technology Vol: 22 No: 3	2025

Abstract: Post COVID-19, the incorporation of artificial intelligence in teacher education has grown-up, especially across Asia, where fast digitalisation and educational reforms are changing pedagogical methods. This study examines 2020–2025 scholarly research on AI in teacher education using bibliometric analysis. The study uses VOSviewer software to visualise patterns and intellectual structures from 303 Scopus-indexed peer-reviewed papers utilising advanced bibliometric approaches like co-authorship analysis, keyword co-occurrence, and co-citation mapping. After 2022, China, Indonesia, and Hong Kong led publication volume growth. Computers & Education and British Journal of Educational Technology are important distribution platforms. AI literacy, pre-service teacher preparation, digital pedagogy, and AI ethics are common study topics. Influential writers and institutions lead regionally but not internationally. Co-citation and keyword analyses show a transition from theoretical to applied research, especially in generative AI and personalised learning. The academic trends and knowledge structures underlying AI-infused teacher education in Asia are illuminated by this study. It also identifies crucial gaps in empirical validation, regional inclusion, and interdisciplinary engagement, guiding future research and policy in this rapidly evolving subject.

Sl. No	Article	Author	Source	Year
3	ICT Based Instructional Package in Geography for Enhancing Awareness on Anthropogenic Climate Change and Critical Thinking of Secondary School Students	*Avarnya R. S., Tara S. Nair*	I-manager's Journal on Educational Technology Vol: 22 No: 3	2025

Abstract: The most significant aim of education is closely related to the aims of mankind, which in turn are determined by the philosophy of life. As a discipline of study, Geography has an outstanding potential for generating future global citizens. Education on climate change is highly essential to understand what climate change is, how climate change is brought about, what its consequences are, and how to mitigate such effects. This study aimed to develop an ICT-based Instructional Package in Geography to enhance awareness on Anthropogenic Climate Change and critical thinking of Secondary School Students. Tools and learning materials developed and used are ICT Based Instructional Package in Geography, Awareness Test on Anthropogenic Climate Change, the Test on Critical Thinking and a Rating Scale for the validation of the ICT Based Instructional Package. The ICT Package based on Generative Learning Model incorporated multiple learning media on nine topics related to Anthropogenic Climate Change. The analysis reveals that mean post- test scores are significantly greater than the mean post-test scores of the students in the treatment group indicating the effectiveness of the instructional package implemented. The instructional package used to deliver lessons and transact content on climate change has made it easier and more effective for learners to excel in their studies on anthropogenic causes by thinking critically about real situations. Instructional packages are of great importance in the field of education designed specifically to support, mediate and be a reference tool to expand students' thinking and adhere to social and environmental values sustainably.

Sl. No	Article	Author	Source	Year
4	Peer Tutor - A Web Based System for Peer Academic Assistance and Collaboration	*Shravani Pathak, Sanmay Kant, Shweta Yadav, Shreyash Nimbhorkar*	I-manager's Journal on Educational Technology Vol: 22 No: 3	2025

Abstract: Effective academic support is essential to address diverse student learning needs, yet traditional tutoring and mentorship programs often lack flexibility and immediacy. This paper presents the design and implementation of a web-based student-centered peer tutoring platform, with a focus on real-time, secure, and interactive learning experiences. Leveraging a backend architecture that embeds real-time applications, alongside

a frontend that prioritizes user ease of access, the platform employs a novel matching algorithm to connect students based on complementary skills and learning needs. The overarching objective is to develop a reliable, scalable, and user-friendly system that integrates seamlessly into the student learning ecosystem. Through this initiative, the project intends to bridge gaps in understanding, promote community-based education, and foster an academic environment where students contribute actively to each other's success.

Sl. No	Article	Author	Source	Year
5	From Learners to Leaders: Fostering Research-Driven Teacher Education through Digital Global Engagement	*Manjunatha R., Seema P. V, Padmanabha C. H.*	I-manager's Journal on Educational Technology Vol: 22 No: 3	2025

Abstract: This review paper explores how digitalization can serve as a powerful medium for fostering a research-driven approach in teacher education. In the context of 21st century learning, it argues that teacher preparation programs must go beyond digital literacy and classroom innovation to cultivate educators as active researchers and global contributors. Through the integration of digital tools such as learning management systems, MOOCs, virtual platforms, and AI-based research aids, teacher trainees can be guided to conduct academic research, publish in international journals, and engage with global scholarly communities. Drawing from current literature and global best practices, the paper underscores the importance of creating a digital learning ecosystem that supports inquiry, collaboration, and reflection. The review highlights the pedagogical shifts required to embed research into digital teacher education and addresses challenges such as unequal access to technology, lack of mentorship, and outdated curricula. It presents actionable strategies, including the establishment of research hubs, practical training in academic tools, and institutional support for international engagement. Case examples from countries such as Finland, Singapore, and India illustrate successful models where technology and research coalesce to enhance teacher quality. Ultimately, this paper positions digitalization not as an end in itself but as a strategic enabler of global, research-based teacher development. By encouraging student teachers to engage in scholarly work and contribute meaningfully to the education community, digital tools help transform teacher education into a space of innovation, inquiry, and international dialogue.

Sl. No	Article	Author	Source	Year
1	Direction as a Form of Energy: A Conceptual and Mathematical Link between Vectors, Scalars, and Particle Dynamics	*Sandeep Singh*	I-manager's Journal on Physical Sciences Vol: 4 No: 2	2025

Abstract: This paper investigates the conceptual and mathematical relationship between direction, energy, vector quantities, and scalar quantities in physical systems. Unlike a purely geometric interpretation, direction is treated as an energy- dependent outcome governed by environmental conditions and force fields. Using vector mechanics and vector calculus-specifically gradients, divergence, curl, and line integrals-we demonstrate how directional behavior emerges from scalar energy distributions and how scalar energy values are obtained from vector interactions. This manuscript presents a structured and mathematically justified framework for researchers.

Sl. No	Article	Author	Source	Year
2	Exploring Students' Perceptions about the Formation and Structure of the Earth	*Angelia Reid-Griffin*	I-manager's Journal on Physical Sciences Vol: 4 No: 2	2025

Abstract: Numerous studies indicate that students frequently struggle to understand the geosphere, particularly the Earth's formation and structure. The study focuses on how curriculum presented to children ages 11-14 led to an improved understanding of the formation and structure of the Earth using stratigraphic columns. Overall, 8th grade students (age 13-14) performed better on the task than 6th grade students (ages 11-12), suggesting a developmental advantage in their interpretations of the columns. Researchers observed that both classes of students had trouble with the concepts of scale, time, and size as they completed the activity. Even after receiving instruction, younger students continued to struggle with the Principle of Superposition, which explains the relative ages of rock layers based on their sequential arrangement. In general, age and experience impacted the students' ability to explain the Principle of Superposition and accurately label stratigraphic column models. There is still a need for more classroom studies to prepare teachers to scaffold students' sense of geologic scale as it relates to time and size.

Sl. No	Article	Author	Source	Year
3	XRD Characterization of Kaolin's Phase Composition & Crystallinity for Thermal Applications	*Anurag Shrivastava , Atul Raj, Rohit Srivastava.*	I-manager's Journal on Physical Sciences Vol: 4 No: 2	2025

Abstract: Kaolin, a naturally occurring aluminosilicate clay, was tested to assess its structural characteristics and as a candidate for high-temperature heat insulation and ceramic building systems. The structural assessment was conducted by a non- destructive X-ray Diffraction (XRD), which provides phase composition and crystallinity analysis. XRD managed to see multiple phase compositions and internal changes in the crystallographic structure. It is a non-destructive technique used for analysis of the materials' chemical and physical properties. This test was performed using Cu Kα (λ = 1.5406 Å) radiation and was the continuous scanning operating mode, ranging in 2θ from 5° to 80°. The diffraction pattern exhibited sharp, intense peaks and strongly indicated a crystalline structure and phase identification in the kaolin sample. The highest intensity peak (7630 a.u.) was recorded at (2θ = 29.31°), which indicates the kaolinite phase (002) or (111) crystallographic planes. Further (also indicated basal spacing) peaks were recorded at 2θ = 9.79°, 19.49° and 26.90°. The kaolin structure indicated minor impurities in the kaolin structure and indicated minor phases of impurities, including quartz and illite. Based on the narrow peak widths and high peak intensities, very little amorphous content was observed and confirmed the material's structural integrity and structural stability. The structural mineralogy characteristics, especially the ordered layer structure and high phase purity, account for kaolin's stability and better thermal resistance properties. Therefore, this study has assessed and supports that kaolin can be developed further for development as a high-temperature application as refractory linings, insulating bricks, and energy-efficient building systems.

Sl. No	Article	Author	Source	Year
4	Surface Roughness Enhancement of FFF-Printed Polypropylene and Polylactic Acid using Metallic and Ceramic Coatings	*Rakesh Kumar , Santosh Kumar.*	I-manager's Journal on Physical Sciences Vol: 4 No: 2	2025

Abstract: Fused filament fabrication (FFF) has gained widespread acceptance for producing polymer components due to its low cost, design flexibility, and ease of processing. However, surface roughness remains a major limitation, particularly for applications requiring enhanced functional and aesthetic performance. In the present study, surface modification of FFF-printed polymers was investigated using two different coating approaches.

Polylactic acid (PLA) specimens were coated with stainless steel 316L using the electric arc spray technique, while polypropylene (PP) specimens were coated with a ceramic enamel layer applied through a spray coating process. Square specimens were fabricated using optimized printing parameters to obtain smooth baseline surfaces prior to coating. Surface roughness measurements were carried out using a stylus-based profilometer, and the arithmetic mean roughness (Ra) was evaluated for both coated and uncoated samples. The results demonstrated a clear reduction in surface roughness after coating in both materials. The ceramic-coated PP samples showed a significant improvement in surface finish, achieving sub-micron roughness values, whereas the metallic coating on PLA also reduced surface irregularities compared to uncoated specimens. The findings confirm that suitable coating techniques can effectively enhance the surface quality of FFF- printed polymer components, thereby expanding their potential use in biomedical, industrial, and functional applications.

Sl. No	Article	Author	Source	Year
5	Phase Analysis and Structural Characterization of SS 316L Stainless Steel Powder by XRD	*D. P. Singh, Pragya Srivastava, Rohit Srivastava.*	I-manager's Journal on Physical Sciences Vol: 4 No: 2	2025

Abstract: Utilizing X-Ray Diffraction (XRD), this study analyzed phase compositions and structural legitimacy of SS316L stainless steel powder. SS316L exhibits superior corrosion resistance, mechanical strength, and thermal tolerance, making it a universal choice across demanding environments. XRD determined the crystallographic structure of SS316L powder and also detected any undesired secondary phases, which could adversely affect its ability to perform in real-world applications. The XRD spectrum of the powder consisted of three distinct peaks at 2θ = 43.5°, 50.6°, and 74.6°, corresponding to the (111), (200), and (220) planes of a face-centered cubic (FCC) crystal structure, confirming it is in the austenitic phase (γ-Fe). The three prominent peaks also suggest no unwanted secondary phases (ferrite, sigma phase, or chromium carbides) were present, indicating a high level of structural integrity in the powder. The structural integrity of the SS316L powder is important, given its added value in terms of corrosion resistance, mechanical sustainability across a diverse service performance, and performance reliability for applications such as biomedical implants and aerospace components. The XRD findings corroborate that the SS316L powder can and will perform for additive manufacturing and other high-end fabrication performance-based processes where structural integrity is paramount. Therefore, XRD analysis provides itself as a valuable tool for verification of powder phases and quality assurance for high-performance engineering metal powders as additive manufacturing grows in popularity.

Sl. No	Article	Author	Source	Year
1	Assessing Bloom's Learning Levels in Concrete Technology: A Prerequisite to Advanced Concrete Technology	*Dada S. Patil*	I-Manager's Journal on Future Engineering and Technology Vol: 21 No: 1	2025

Abstract: This study had an objective of assessing the knowledge content of undergraduate Civil Engineering learners in Concrete Technology course, serving as a prerequisite for learning Advanced Concrete Technology elective course in their subsequent semester. A Google form survey consisting of 15 multiple choice questions (MCQs) was designed, catering to the six levels of Bloom's Taxonomy, from basic remembering to higher-order cognitive skills. The questions were posed to assess learners' knowhow about the vital concepts in concrete technology, including material properties, mix design and application techniques. 36 learners responded to the survey questionnaire. The outcome of this exercise provided insights into learners' proficiency and areas of improvement, offering a benchmark for curriculum development. The study highlights a need of prior knowledge in basic course for the fruitful progression to advanced concepts. Data analysis showed varying levels of competence, with few learners demonstrating sound basic concepts, while majority exhibited gaps in critical areas. This survey acts as an important tool for the teacher to gauge preparedness and tailor instructional approach while dealing with Advanced Concrete Technology. The findings underscored a need of engaging lectures to brush up the basics before inculcating the advanced course.

Sl. No	Article	Author	Source	Year
2	Optimizing Agri-PV Systems using Genetic Algorithms for Energy Generation and Crop Yield Enhancement	*Jayababu Badugu, G. Sandhya, K. Vimala Kumar, G. Nageswara Reddy*	I-Manager's Journal on Future Engineering and Technology Vol: 21 No: 1	2025

Abstract: By combining agricultural output with solar energy production, agri-photovoltaic (Agri-PV) systems provide a long-term answer to land-use issues. To maximize energy production and crop yield, however, one must strike a balance between available light and shade. In order to find the optimal tilt angle and row spacing of PV panels in Agri-PV systems, this paper suggests an optimization framework based on Genetic Algorithms (GA). Combining state-of-the-art crop yield modeling with real-world irradiance and yield data from experimental field research, the model takes into consideration weather, soil, and plant physiology. The trade-offs between energy generation and agricultural yield are investigated using a multi-objective optimization technique that employs Pareto front analysis. When compared to Particle Swarm Optimization (PSO) and Teaching-Learning-

Based Optimization (TLBO), the GA framework clearly performs better. Additionally, the suggested system's viability and adaptability have been validated by an economic and scalability study. The simulation findings show that GA is a great tool for optimizing Agri-PV schemes in different agro-climatic zones.

Sl. No	Article	Author	Source	Year
3	Artificial Intelligence Tools for Preventive Maintenance in Gold Processing Mills: A Review	*Ruvimbo Victoria Makuwaza , Munyaradzi Innocent Mupona, Donald Museka.*	I-Manager's Journal on Future Engineering and Technology Vol: 21 No: 1	2025

Abstract: The integration of Artificial Intelligence (AI) into gold processing operations has significantly transformed maintenance strategies by minimizing unplanned downtime and improving operational efficiency. Traditional maintenance approaches, such as reactive and scheduled maintenance, often lead to either unexpected failures or excessive servicing. AI-driven predictive maintenance offers a proactive, data-driven alternative that leverages real-time monitoring and advanced analytics to forecast equipment failures and optimize maintenance schedules. Gold processing mills, which operate under harsh and variable conditions, require intelligent maintenance systems to manage equipment like crushers, ball mills, and classifiers effectively. This review explores how AI technologies—such as machine learning, deep learning, reinforcement learning, and natural language processing—are applied in predictive maintenance within gold processing contexts. It synthesizes methodologies from existing literature, identifies common themes, highlights gaps, and discusses the transition from preventive to predictive maintenance. The findings aim to guide both researchers and practitioners in implementing AI-based maintenance strategies that enhance equipment reliability, reduce costs, and support data-driven decision-making in the mining industry.

Sl. No	Article	Author	Source	Year
4	Deep Learning and Beyond for Transparent Object Detection	*Chandu D. Vaidya , Utkarsh Paighan, Rutuj Ghungrud, Sahil Budhe, Samruddhi Joge, Sarang Singh*	I-Manager's Journal on Future Engineering and Technology Vol: 21 No: 1	2025

Abstract: Transparent Object Detection (TOD) is an evolving field in computer vision that faces unique challenges due to the optical nature of transparent materials like glass, plastic, and water. These objects often lack clear edges and distinct textures, making their segmentation difficult. Recent advancements in deep learning have significantly improved TOD through the integration of convolutional neural networks (CNNs), self-attention mechanisms, and transformer-based models. This paper surveys con- temporary methodologies in TOD, emphasizing the role of hybrid CNN-transformer architectures, depth estimation, and multi-modal fusion using RGB, depth, and thermal data. Public datasets such as Trans10K, ClearGrasp, and TSD have enabled benchmarking across diverse environments and lighting conditions. Transformer- based methods like TransLab and Trans4Trans offer state-of-the-art performance in segmentation accuracy by modeling global dependencies. While traditional methods relied on hand- crafted features, modern networks use end- to-end training pipelines to enhance generalization. Challenges such as background blending, refraction, and occlusions remain central research problems. The paper outlines current developments and highlights future directions, including real- time deployment, dataset standardization, and integration with augmented reality (AR) and robotic vision systems. This review aims to provide a foundational overview for re- searchers and practitioners interested in developing robust TOD solutions for complex, real world scenarios.

Sl. No	Article	Author	Source	Year
5	AI Based Drone System for Sprinkling of Pesticides in Agriculture	*Aayushi Tyagi, Lavkush Patel, Jitendra Kumar Srivastava.*	I-Manager's Journal on Future Engineering and Technology Vol: 21 No: 1	2025

Abstract: Agriculture has long been essential to the world economy; however, it now confronts a variety of challenges, including environmental issues, limited land availability, and the need for increased crop production. To address these difficulties, modern agriculture is increasingly adopting technological advancements. One of the most promising developments is the integration of drones (Unmanned Aerial Vehicles-UAVs) into farming practices. This paper investigates the different uses of drones in agriculture, analyzes their effects on productivity, sustainability, and efficiency, and considers the future possibilities of drone technology in this field. Moreover, drones contribute to sustainability by promoting precision agriculture,

which minimizes the environmental impact of farming activities. By applying resources only where needed, drones help in conserving water, reducing chemical use, and lowering carbon emissions.

Sl. No	Article	Author	Source	Year
1	Exploring the Gut Microbiota-Physical Activity Nexus: A Multidisciplinary Approach toward Sustainable Health Education in the Indian Context	*Sreenath S.*	I-Manager's Journal on Life Sciences Vol: 4 No: 3	2025

Abstract: The human gut microbiota plays a foundational role in health, particularly influencing physical performance, metabolism, and cognitive well-being. This paper explores how insights from gut microbiota science can be integrated with physical education, especially in the Indian context, where nutrition, hygiene, and exercise patterns vary widely across regions. With rising rates of non-communicable diseases (NCDs) and mental health challenges among Indian youth, a multidisciplinary model linking microbiome awareness with physical education is both timely and transformative. The study also emphasizes the role of AI, digital health platforms, and indigenous health knowledge systems in promoting sustainable well-being, aligned with India's National Education Policy (NEP 2020) and the UN Sustainable Development Goals (SDGs).

Sl. No	Article	Author	Source	Year
2	Studies on Mechanical, Microstructural, Morphological and Thermogravimetric Characterization of Bio-Composite Based on Poly Lactic Acid Reinforced with Banana Fibre for its Multifaceted Engineering Applications	*Sandip Kumar Mishra , Jeetendra Mohan Khare, Shobhit Sharma, Priya Tiwari.*	I-Manager's Journal on Life Sciences Vol: 4 No: 3	2025

Abstract: The present work elaborates the ongoing work in banana fiber reinforced in bioplastic for the making of green and sustainable composites. Non-woven banana fiber mats were incorporated as reinforcement into polylactic acid (PLA) and processed using a compression-molding hydraulic press. Fiber loadings of 20, 25, 30, 35, and 40% were investigated. The resulting composites exhibited notable improvements in tensile, impact, and flexural properties up to 35% fiber content, with marginal gains at 40%. Maximum tensile strength (64 MPa), flexural strength (49 MPa), and impact energy (2.2 J) were all achieved at 35% reinforcement. Hardness decreased progressively with increasing fiber content. Thermal analysis indicated that adding banana fiber reduced the onset degradation temperature of PLA, leading to earlier composite degradation. Overall, the findings support the potential of banana fiber–reinforced PLA composites as low-cost, eco-friendly materials suitable for everyday products such as basins, baskets, and household accessories, contributing to sustainable material development.

Sl. No	Article	Author	Source	Year
3	mRNA–Lipid Hybrid Nanovaccines: A Next-Generation Strategy for Broad-Spectrum Viral Immunity	*Rehan Haider, Zameer Ahmed, Sambreen Zameer.*	I-Manager's Journal on Life Sciences Vol: 4 No: 3	2025

Abstract: Messenger RNA (mRNA)–based vaccines have revolutionized modern immunization by offering a flexible and rapid platform for combating infectious diseases. When combined with lipid nanoparticles (LNPs), these vaccines gain enhanced stability, targeted delivery, and efficient cellular uptake. The integration of mRNA technology with lipid-based nanocarriers has opened new possibilities for developing broad-spectrum vaccines capable of inducing strong and durable immune responses against multiple viral pathogens. This innovative hybrid approach enables the delivery of multiple antigen-encoding mRNAs within a single formulation, promoting both humoral and cellular immune responses. Moreover, lipid nanoparticles

protect the fragile mRNA from enzymatic degradation and facilitate endosomal escape, ensuring efficient protein expression in host cells. Such designs can be fine-tuned to address emerging viral variants, including influenza, coronavirus, and other zoonotic threats. Beyond their immediate role in pandemic preparedness, mRNA–lipid hybrid nanovaccines represent a transformative step toward personalized immunization and universal antiviral defense. Continued research into optimizing lipid composition, immune adjuvants, and storage stability will be critical to realizing their full potential in global public health.

Sl. No	Article	Author	Source	Year
4	Image-Based Lumpy Skin Disease Diagnosis: A Comprehensive Review of Deep Learning Models	*Sonali Zunke, Shruti Puppalwar, Abhay Bhagat, Pranay Manusmare, Harshal Gonnade, Tanay Kubde.*	I-Manager's Journal on Life Sciences Vol: 4 No: 3	2025

Abstract: Lumpy Skin Disease (LSD) is a viral infection that impacts cattle. This may result in financial setbacks in the dairy and livestock sectors. Timely identification of the illness is essential for improved treatment and for halting its transmission. Conventional diagnostic approaches, including clinical assessments and lab examinations, require considerable time and resources. Recent advancements in artificial intelligence, particularly in image processing through machine learning, offer efficient methods for automated LSD detection. This evaluation provides an examination of existing techniques, contrasting their advantages and disadvantages. Key obstacles in practical implementation are examined, and avenues for future studies are proposed to enhance the precision and effectiveness of LSD detection systems.

Sl. No	Article	Author	Source	Year
5	Network Biology Approaches for Functional Gene Module Discovery: Tools, Techniques, and Applications in Functional Genomics	*Pankaj Gupta, Sanjay Mishra, Ragini Yadav, Prianshu Singh, Charu Srivastava, Niharika Pandey, Mohammad Ahmad, Varun Kumar Sharma, Manoj Kumar Mishra*	I-Manager's Journal on Life Sciences Vol: 4 No: 3	2025

Abstract: Functional genomics aims to understand the dynamic aspects of gene expression and function at a systems level. Network biology offers a powerful framework to uncover functionally coherent gene modules by integrating various types of biological data. This review summarizes the current tools and computational techniques used for functional gene module discovery, highlighting their theoretical foundations, strengths, and limitations. Recent advances in integrating multi-omics data, single-cell analyses, and the application of machine learning are also discussed. Emphasis is placed on the biological relevance and translational potential of identified gene modules in areas such as disease mechanism elucidation, biomarker discovery, and therapeutic target identification.

Sl. No	Article	Author	Source	Year
6	AI Driven Biotechnology for Climate Resilient Agriculture, Healthcare and Food System	*Pankaj Gupta, Sanjay Mishra, Ragini Yadav, Prianshu Singh, Charu Srivastava, Niharika Pandey, Mohammad Ahmad, Varun Kumar Sharma, Manoj Kumar Mishra*	I-Manager's Journal on Life Sciences Vol: 4 No: 3	2025

Abstract: Artificial intelligence is emerging as a game-changer for farmers coping with the escalating challenges of climate change, as AI models can predict and mitigate its wide-ranging impacts on agriculture while providing advanced decision-support tools. As environmental issues intensify, artificial intelligence integration is shifting the landscape toward climate-resilient agriculture. To address the complexities of climate unpredictability, this overview discusses how artificial intelligence assists farmers in making adaptive decisions. The advantages of artificial intelligence and climate

research working together to identify climate-related risks—such as extreme weather, altered precipitation patterns, and emerging pest threats—are examined, along with its impact on smallholder and rural farmers to enhance overall resilience. A thorough analysis is conducted on the potential benefits and challenges of widespread artificial intelligence adoption across diverse agricultural contexts. Artificial intelligence-powered technologies combining computer vision, deep learning, reinforcement learning, and predictive analytics enable accurate climate forecasting, early disease detection, and efficient resource utilization. Furthermore, reinforcement learning and Internet of Things (IoT) integration support smart irrigation systems and adaptive decision-making under unpredictable climate conditions. This overview provides a comprehensive analysis of artificial intelligence and machine learning applications in precision agriculture, climate-smart farming, and sustainable land management.

Sl. No	Article	Author	Source	Year
1	Designing an Offline-First Digital Aid Distribution System for Post-Conflict Contexts: A Case Study of Tigray, Ethiopia	*Mehari Mesfin Abay*	I-Manager's Journal on Information Technology Vol: 14 No: 4	2025

Abstract: Humanitarian aid delivery in post-conflict settings often suffers from systemic inefficiencies such as reliance on paper- based processes, fragmented data management, and degraded infrastructure. This study proposes a tailored offline- first Digital Aid Distribution System (DADS) for the Tigray region of Ethiopia, where widespread infrastructural damage complicates aid logistics. Using a mixed-methods approach—including stakeholder consultations, literature review, and Agile prototyping—the research defines core requirements for a system capable of functioning amid intermittent connectivity and limited resources. The proposed architecture employs a three-tier model featuring a mobile client for field operations, a centralized server for data management, and a synchronization mechanism for intermittent connectivity. A functional prototype demonstrates modules for beneficiary management, inventory tracking, distribution execution, and analytics. Simulations using the prototype suggest potential reductions in distribution cycle time (approximately 45%) and reporting time (around 96%), alongside improvements in transparency and beneficiary satisfaction. The study concludes that a context-aware digital system is not only feasible but essential for enhancing the efficiency, accountability, and dignity of aid delivery in Tigray. Recommendations include forming strategic partnerships, adopting phased piloting, and exploring integration with national digital identity systems and financial technologies.

Sl. No	Article	Author	Source	Year
2	E-Governance System: A Bibliometric Exploration for Current Trend, Gaps, and Future Directions	*Shamima Khatoon, Vinod Kumar Kanvaria.*	I-Manager's Journal on Information Technology Vol: 14 No: 4	2025

Abstract: E-governance has emerged as a critical mechanism for transforming public administration through the effective use of digital technologies, enhancing transparency, efficiency, and citizen participation in governance processes. Despite the rapid growth of scholarly output in this domain, a comprehensive understanding of its intellectual structure, research trends, and emerging themes remains limited. This study presents a bibliometric analysis of e-governance research published between 2004 and 2025, drawing on data retrieved from the Scopus database. Following a rigorous screening process based on predefined inclusion criteria, 63 peer-reviewed journal articles were selected for analysis. Bibliometric and science mapping techniques, including citation analysis, keyword co-occurrence, co-authorship, and collaboration network analysis, were employed using VOSviewer and Biblioshiny software. The findings reveal a steady growth in e-governance research, particularly after 2015, reflecting the increasing integration of information and communication technologies in public administration. The Netherlands, India, the United States, and the United Kingdom emerged as key contributors in terms of research productivity and citation impact. Core thematic clusters highlight e-governance, e-government, governance approaches, ICT, public administration, and citizen participation as dominant research areas. However, the analysis also identifies conceptual gaps related to emerging technologies, ethical concerns, digital inequality, and sustainability. This study provides a systematic overview of the evolution of e- governance research, offering valuable insights for scholars and policymakers while outlining promising directions for future research.

Sl. No	Article	Author	Source	Year
3	Implementation of Intrusion Detection System with UNSW-NB15 Dataset using Variants of CNNs	*V. S. R. Pavan Kumar Neeli, Nerella Sameera*	I-Manager's Journal on Information Technology Vol: 14 No: 4	2025

Abstract: The rapid evolution of network traffic and cyber-attack sophistication has necessitated robust Intrusion Detection Systems (IDS). Traditional machine learning methods often struggle to capture complex non-linear attack patterns. Deep learning, particularly Convolutional Neural Networks (CNNs), provides an effective alternative for automatic feature extraction and accurate classification. This paper presents the implementation of an IDS using the UNSW-NB15 dataset and explores various CNN architectures — including 1D-CNN, 2D-CNN, and hybrid CNN-LSTM models. A detailed

experimental comparison is carried out in terms of accuracy, precision, recall, F1-score, false positive rate (FPR), and false negative rate (FNR). The results show that the hybrid CNN-LSTM model outperforms conventional CNN variants, achieving an accuracy of 98.6% for binary classification and 96.1% for multi-class detection. The study demonstrates the potential of CNN-based architectures to efficiently detect modern network intrusions.

Sl. No	Article	Author	Source	Year
4	Intelligent Video Learning Assistant using LLaMA Model	*H. Parthasarathi Patra , Vadapalli Geetha Gayathri, Satti Naga Shivani Amrutha Reddy, Yegi Divya Lakshmi, Kathi Anvesh.*	I-Manager's Journal on Information Technology Vol: 14 No: 4	2025

Abstract: This paper presents an intelligent video learning assistant that leverages advances in artificial intelligence and natural language processing to enhance learning from video-based educational content. The proposed system automatically extracts transcripts from online videos, generates concise summaries, and creates contextually relevant quiz questions using the LLaMA-3 large language model. By integrating transcript summarization, automated question generation, and semantic answer evaluation, the system transforms passive video consumption into an interactive learning experience. The architecture employs FastAPI for backend processing, React.js for a responsive user interface, and Fireworks AI for efficient model inference. Experimental observations demonstrate that the system reduces the time required to extract key concepts from long videos while improving learner engagement through immediate feedback and self-assessment. The proposed solution is particularly beneficial for students, educators, and professionals seeking an efficient and structured approach to video-based learning.

Sl. No	Article	Author	Source	Year
5	Online Shopping: A Context-Aware, Advanced Machine Learning Algorithms and Architecture	*Khushi Yadav, Arvind Jaiswal.*	I-Manager's Journal on Information Technology Vol: 14 No: 4	2025

Abstract: Online shopping websites play a vital role in modern digital commerce by enabling users to browse, compare, and purchase products conveniently. With the rapid growth of product catalogs, user data, and transactional information, traditional rule-based systems struggle to provide personalized experiences, efficient search, and intelligent recommendations. Modern e-commerce platforms leverage advanced technologies such as artificial intelligence, data analytics, recommendation systems, and secure backend architectures to enhance user engagement, search accuracy, and overall shopping experience. This paper presents a comprehensive analysis of an online shopping website, focusing on system architecture, core functionalities, and performance optimization techniques. The study includes product management, user authentication, shopping cart functionality, order processing, and secure payment integration. AI-driven features such as personalized product recommendations, smart search, sentiment analysis of reviews, and automated notifications significantly improve customer satisfaction and business efficiency.

Sl. No	Article	Author	Source	Year
1	Impact of TOU and RTP Demand Response on Emission Constrained Economic Scheduling of Grid-Connected Microgrid	*Tikamchand Fulwariya, Rekha Swami*	I-Manager's Journal on Electrical Engineering Vol: 19 No: 2	2025

Abstract: In existing world, Distributed Generations (DGs), comprising renewable and non-renewable sources, are prioritized over conventional generation. To integrate these DGs into the utility grid, the idea of the microgrid has emerged. The proper operation of a microgrid leads to reduced electricity costs, lower carbon emissions, and enhanced utility grid reliability. However, the operation of a microgrid is not that simple due to the integration of unpredictable renewable generation. Sometimes generation might be higher than demand, and vice versa. While energy storage systems are generally used to store excess generation, demand response programs are used to reduce the peak demand. The operational efficiency of a microgrid can be increased by optimizing its resources. This paper addresses the emission-constrained economic scheduling of a grid-connected microgrid while implementing TOU and RTP demand response programs. The optimization model is developed as MINLP and solved using the General Algebraic Modeling System (GAMS) software. The simulation outcomes justify the effectiveness of the presented model.

Sl. No	Article	Author	Source	Year
2	Coordinated Control of BESS and Capacitor-Based Reactive Compensation for Enhanced Voltage and Frequency Stability in High-Voltage Power Systems	*Chintalapudi V Suresh.*	I-Manager's Journal on Electrical Engineering Vol: 19 No: 2	2025

Abstract: High-voltage transmission systems are increasingly dominated by converter-interfaced renewable energy resources, resulting in reduced system inertia, diminished reactive support, and heightened vulnerability to voltage and frequency instability. Traditional capacitor banks offer economically effective reactive compensation, but they do not have dynamic controllability, and Battery Energy Storage Systems (BESS) can act to support both fast-response active and reactive power but are hampered by converter limits as well as range of operation. It introduces a coordinated control model of continuous BESS-based reactive and active support and discrete capacitor switching that provides grid stability. The hybrid load-flow formulation is created by complementarity functions for the purpose of explicitly describing converter limits, switching constraints, and the P–f, Q–V control interaction. The proposed approach is verified on IEEE 14- bus and IEEE 30-bus systems under different disturbance states. The findings show that coordinated BESS–capacitor control offers a substantial gain in voltage margins, maximum loadability, converter stress ratio, and frequency recovery when compared with standalone methods of compensation. The framework constitutes an effective pathway for integrating power-electronic and passive compensation resources into future high-inertia-deficient transmission grids.

Sl. No	Article	Author	Source	Year
3	AI-Optimized Multilevel Power Converter for High Efficiency Electric Vehicle Traction Drives under Dynamic Road and Grid Conditions	*Rajesh Kumar Singh, Khadim Moin Siddaqui.*	I-Manager's Journal on Electrical Engineering Vol: 19 No: 2	2025

Abstract: The transition toward electric mobility demands traction inverters that deliver high efficiency, thermal stability, and robust performance under diverse real-world driving conditions. This study introduces an AI-optimized three-level T-type Silicon Carbide (SiC) traction inverter designed

for intelligent, energy-efficient electric vehicle (EV) propulsion. A Proximal Policy Optimization (PPO)-based controller is developed to dynamically regulate modulation index, switching frequency, and switching sequence, enabling coordinated loss-thermal optimization. The controller is trained on WLTP and UDDS drive cycles using a physics-based inverter, motor, and thermal model derived from SiC MOSFET datasheets. High-fidelity figures were produced using scientific plotting rather than simulation screenshots to ensure journal-standard reproducibility. The proposed inverter achieves significant improvements: switching losses are reduced by up to 52%, peak junction temperature is lowered by approximately 23%, and average drive-cycle efficiency is increased from 92.1% to 96.8%. These gains translate to an increase of 20–24 km in WLTP driving range for a 75-kWh battery EV. The results demonstrate that AI-assisted modulation can substantially enhance converter performance, reduce thermal stress, and support sustainable green-energy transportation systems.

Sl. No	Article	Author	Source	Year
4	Application of STATCOM to Improve System Profile for a DFIG HVDC Dependent Wind Farms Under Grid Faults	*Kollatu Sravanthi, CH. Sai Babu*	I-Manager's Journal on Electrical Engineering Vol: 19 No: 2	2025

Abstract: This study presents the implementation of a system that used conversion of wind energy that integrated a doubly fed induction generator (DFIG) and static compensator (STATCOM) when exposed to various faults. The analysis focuses on critical aspects like DC-link capacitor voltage, rotor speed, and torque using electromagnetism, and AC-side voltage and current at HVDC terminal buses. WECS was connected to an HVDC line via a voltage source converter (VSC), with a fault occurring in the vicinity of the wind generator network. The endurance of DFIG was enhanced by STATCOM through the involved control method. This strategy effectively mitigated oscillations in both the supplies for voltage and torque, resulting in improved power flow. The study also investigated the impact of STATCOM on faults and the stability of the system considered. By implementing the proposed control method, it alleviates the adverse side of grid faults on windenergy conversion systems. The observation describes the potential of the STATCOM to strengthen the total performance and reliability of the considered system under fault situations.

Sl. No	Article	Author	Source	Year
5	GNN-Based Real-Time Fault Localization in Three-Phase Matrix Converters using Waveform Signatures	*Shiek Ruksana*	I-Manager's Journal on Electrical Engineering Vol: 19 No: 2	2025

Abstract: Three-phase matrix converters (MCs) are emerging as compact and efficient AC-AC power conversion systems for applications requiring bidirectional power flow and high-frequency operation. However, their susceptibility to switching faults, such as open circuits, short circuits, or gate failures, necessitates advanced fault detection mechanisms to ensure system reliability. This paper proposes a Graph Neural Network (GNN)-based approach for real-time fault localization in matrix converters using waveform signatures. The method encodes both temporal and topological characteristics of the power system, enabling precise identification and classification of fault types. Experimental validations using simulated datasets generated from MATLAB/Simulink reveal high fault localization accuracy, demonstrating the potential of GNNs in predictive maintenance for power electronics.

Sl. No	Article	Author	Source	Year
1	Polycystic Ovary Syndrome Detection Based on Optimized Machine Learning Techniques	*Ayobami Ekundayo, John Kolo Alhassan, Solomon Adelowo Adepoju, Hamzat Olarewaju Aliyu*	I-Manager's Journal on Computer Science Vol: 13 No: 3	2025

Abstract: Research interest in using machine learning algorithms to develop models for detecting Polycystic Ovary Syndrome (PCOS) has increased significantly in recent years. This surge is understandable, as the condition mostly affects reproductive-age women and is a major cause of infertility. Consequently, researchers employ machine learning techniques to address this ailment. However, issues of accuracy and optimal results are still major issues to contend with using this technology owing to the complexity of the medical dataset. Therefore, this study proposes to detect PCOS using Support Vector Machine, Random Forest, and AdaBoost with the aid of optimized techniques such as the Red Deer Algorithm (RDA) and Firefly Optimization Algorithm. The optimization techniques and three machine learning models were used to optimize the 45 features of the PCOS dataset that was obtained from the Kaggle repository. The RDA + SVM achieved an accuracy of 88%, the RDA + RF achieved an accuracy of 82%, the RDA + AdaBoost achieved an accuracy of 85%, the FF + SVM achieved an accuracy of 89%, and the PSO + RF achieved an accuracy of 89%.

Sl. No	Article	Author	Source	Year
2	Machine Learning Framework for Water Contamination Detection using XGBoost and Naive Bayes Classifier	*Kemery Belama, Esther J., Francis Yanyama*	I-Manager's Journal on Computer Science Vol: 13 No: 3	2025

Abstract: Water pollution occurs when harmful substances such as toxic chemicals, pathogenic microorganisms, or heavy metals contaminate freshwater sources, threatening both public health and ecosystem stability. Reliable monitoring of water quality is therefore essential for early detection and prevention of contamination. Conventional surveillance systems relying on large-scale Internet of Things (IoT) sensor networks are frequently costly to implement, complex to maintain, and may deliver inconsistent real-time data. This study presents a data-driven framework that combines IoT-enabled sensing with machine learning techniques to improve the accuracy and efficiency of water quality assessment. During preliminary testing, publicly available datasets are used to simulate sensor readings, reducing dependence on physical hardware and lowering operational costs. Two classification algorithms, Extreme Gradient Boosting (XGBoost) and Naïve Bayes (XGB-NB), are employed to categorize water samples as either potable or polluted. Using the pond_iot_2023 dataset, which contains diverse physicochemical parameters, the proposed system demonstrates a robust, scalable, and cost-effective approach to intelligent water contamination detection.

Sl. No	Article	Author	Source	Year
3	A Blockchain-Based Decentralized System for Secure, Transparent, and Fraud-Resistant Crowd Funding	*Ratnesh Kumar Choudhary, Jai Patel, Ansh Mishra, Shivam Badade, Rashi Yadav, Ranjeet Shahu*	I-Manager's Journal on Computer Science Vol: 13 No: 3	2025

Abstract: Crowdfunding is a widely used method to raise funds for startups, social initiatives, and creative study by collecting small contributions from a large number of people. Despite its popularity, traditional crowdfunding platforms suffer from issues such as high transaction fees, fraud risks, limited transparency, and lack of investor control. Blockchain technology offers a promising alternative by enabling secure, transparent, and decentralized management of funds without relying on intermediaries. This paper explores how blockchain can transform crowdfunding by improving trust, accountability, and efficiency. To address fraud-related challenges, the SMOTE Borderline technique is introduced as a machine learning method

to balance datasets and improve the accuracy of fraud detection. The study also highlights ongoing issues such as scalability, regulatory uncertainties, and smart contract vulnerabilities, while pointing toward the future development of secure decentralized crowdfunding systems.

Sl. No	Article	Author	Source	Year
4	Soil Analysis and Fertilizer Recommendation System using Machine Learning	*Anjani Suputri Devi D., Suneetha Eluri, Sasi Rekha D., Chinnam Sabitha, Kishore Kumar M., Sree Rama Kumari P. V. V.*	I-Manager's Journal on Computer Science Vol: 13 No: 3	2025

Abstract: Agriculture is a growing field of research. In particular, crop prediction in agriculture is critical and is chiefly contingent upon soil and environmental conditions, including rainfall, humidity, and temperature. In the past, farmers were able to decide on the crop to be cultivated, monitor its growth, and determine when it could be harvested. Today, rapid changes in environmental conditions have made it difficult for the farming community to continue doing so. The existing system aims to investigate the use of machine learning techniques in crop prediction for agriculture, where environmental conditions play a critical role. Efficient feature selection methods are employed to preprocess raw data into a computable dataset, and only relevant features are included to ensure high precision and reduce redundancies. The proposed system aims to utilize a combination of machine learning algorithms to enhance crop prediction capabilities. The system employs a feed-forward backward propagation neural network to analyze soil data captured at different times, distances, and illumination levels, enabling precise assessment of soil conditions. Additionally, the system utilizes the k-nearest neighbor's algorithm to determine suitable fertilizers for various crops, ensuring optimal nutrient supply. Furthermore, the random forest algorithm is employed to predict crop yield based on a range of factors, facilitating accurate estimations for agricultural planning and decision-making. The integrated machine learning approach enhances crop yield prediction accuracy and increases productivity.

Sl. No	Article	Author	Source	Year
5	A Research on Development of an Image Caption Generator using AI and Image Processing	*Yogesh Katre, Sanika Meshram, Harsh Nerkar, Divya Pathrabe, Shruti Ughade, Pranjali Jibhkate*	I-Manager's Journal on Computer Science Vol: 13 No: 3	2025

Abstract: Image caption generation involves developing an appropriate textual description of an image through the combination of visual and textual information. Here, a deep learning pipeline with an encoder–decoder architecture is discussed, which uses a deep learning model, such as a convolutional neural network (for instance, ResNet50), to obtain feature representations from an image, and a sequence learning model that employs Long Short-Term Memory (LSTM) to generate the textual description of the image. Spatial attention is incorporated into the decoder to help generate more relevant and detailed captions by associating model attention across important image regions. The pipeline is evaluated using standard evaluation metrics such as BLEU, METEOR, and CIDEr, which provide scores showing how similar the newly generated captions are to human captions/annotations. Demonstrations on the standard Flickr8k dataset show that this approach produces fluent, accurate, and informative descriptions and discuss future applications of the approach, including accessibility, automated tagging, and human–computer interaction.

Sl. No	Article	Author	Source	Year
1	Tracking Specified Output Signals and Optimal Trajectory for Hypersonic Aircraft	*Zairil A. Zaludin*	Asian Review of Mechanical Engineering Vol: 14 No: 2	2025

Abstract: This article explores the intricate challenge of optimally tracking a desired trajectory within the context of hypersonic transport aircraft flight dynamics. The proposed methodology is based on Linear Quadratic Regulator (LQR) theory. An advanced tracking system is then integrated into the hypersonic aircraft closed-loop control system, utilizing a controller designed using Linear Quadratic Output Regulator (LQRY) theory. The flight dynamics of the hypersonic aircraft demonstrate the capability to track the desired output trajectory while maintaining dynamic stability. The article also includes results for tracking an optimal minimum-fuel trajectory and an optimal minimum-time trajectory. The work proposes precise speed profiles required for the aircraft to ascend to a designated altitude with optimal efficiency. The hypersonic aircraft adequately tracks both trajectories, demonstrating robustness and versatility in navigating complex flight conditions. Keywords: Hypersonic Aircraft, Trajectory Tracking, Linear Quadratic Regulator (LQR), Linear Quadratic Output Regulator (LQRY), Optimal Control

Sl. No	Article	Author	Source	Year
2	Finite Topological Spaces: Coarser and Finer Structures with Connections to Graph Theory	*S. H. Manohar, H. S. Boregowda.*	Asian Review of Mechanical Engineering Vol: 14 No: 2	2025

Abstract: Finite topological spaces provide a tractable setting for studying fundamental topological properties and their interactions with other mathematical structures. In this paper, we focus exclusively on finite topological spaces, emphasizing the role of coarser and finer topologies, as well as the extremal cases of discrete and indiscrete topologies. Special attention is given to T0 (Kolmogorov) spaces, which are central in the finite context, since any finite T1 space is necessarily discrete. We also highlight the significance of the Sierpiński space as the smallest non-discrete and non-indiscrete topology, noting its importance as a classifying space for open sets and its connections to semantics and computational theory. The study further situates finite topological spaces within ongoing research that links topology and graph theory. Various constructions of topologies derived from graph-theoretic concepts are reviewed, including those based on closed neighborhoods, subbases, open hop neighborhoods, and monophonic eccentric neighborhoods. These approaches have led to characterizations of graphs that induce discrete or indiscrete topologies, as well as to the development of compatible topologies where graph connectivity corresponds to topological connectedness. Recent investigations into discrete topological graphs, domination in discrete topological spaces, and special intersection graphs are also discussed. Collectively, these works demonstrate the growing interplay between finite topology and graph theory and motivate further exploration of their combined structures and applications.

Sl. No	Article	Author	Source	Year
3	Towards a Sustainable Future: A Socio-Economic and Legal Review of Green Hydrogen's Role in Pakistan's Energy Transition	*Zaryab Basharat , Wania Saleem and Muhammad Haris Malik*	Asian Review of Mechanical Engineering Vol: 14 No: 2	2025

Abstract: The global commitment to provide sustainable and eco-friendly energy by 2030 has resulted in multiple pilot studies for the creation of clean technologies. Green hydrogen is a potential option to ensure sustainable global energy needs. For the purpose of speeding up its climate

objectives, Pakistan has embarked on a strategic transition to green hydrogen in order to curb dependence on fossil fuels and attain energy security. This research undertakes a comparative examination of green hydrogen policies in advanced jurisdictions and assesses the viability of strategic shifts in Pakistan's socio-economic and demographic environment to attain energy sovereignty. Adopting a Semi-Structured Qualitative Methodology, the research investigates sustainable livelihoods, investment prospects, interoperability mechanisms, and local drivers within Pakistan's policy environment. The research provides critical policy suggestions and proposes a practical model for attaining energy sovereignty. The major challenges that have been identified are production scalability, sectoral consumption patterns, and policy and regulatory alignment. The study is constrained by the availability of primary data because of data protection laws in Pakistan.

Sl. No	Article	Author	Source	Year
4	Comparative Thermal and Techno-Economic Assessment of Residential Building Envelope Systems with Renewable Energy Integration	*Zaryab Basharat, Faheem Ahmad, Muhammad Usman Amjad, Muhammad Haris Malik, Muhammad Faisal, Furqan Ahmad, Muhammad Shahryar*	Asian Review of Mechanical Engineering Vol: 14 No: 2	2025

Abstract: The need for enhanced thermal efficiency in residential buildings cannot be overstated, as it plays a critical role in lowering energy consumption, reducing operational costs, and increasing sustainability. Although superior walling systems can help decrease heating and cooling demands, they also tend to be more expensive. The use of renewable energy systems presents a possible alternative for providing cost-effective thermal comfort. This study aims to comparatively assess the thermal and economic efficiency of four different residential walling systems-namely, Cavity Brick (CB), Insulated Cavity Brick (ICB), Insulated Brick Veneer (IBV), and Insulated Reverse Brick Veneer (IRBV)-and to examine the viability of integrating renewable energy systems to improve the performance of building envelopes at a lower cost. Monthly heating and cooling demands were calculated using Autodesk Ecotect Analysis software. Construction material costs were analyzed in PKR, and economic viability was evaluated using Net Present Value (NPV) analysis with a 20-year lifecycle, a 6% discount rate, and a 3% inflation rate. The ICB module demonstrated the highest thermal efficiency but incurred an additional construction cost of PKR 1,504,366 compared to the least expensive IBV module. Although ICB resulted in annual energy savings of PKR 41,937, the NPV of these savings (PKR 629,144) did not offset the additional capital cost. Renewable technologies, particularly a 2 m² solar air heater and a 1 kW PV system, were identified as economical options for space heating, with total 20-year costs below

PKR 198,097, making them more viable than the envelope upgrade alone. The findings suggest that integrating renewable technologies with cost-effective building envelopes provides a more favorable thermo-economic approach than relying solely on insulation upgrades.

Sl. No	Article	Author	Source	Year
5	When Paying the Carbon Tax is Cheaper: Policy Gaps and Fossil Lock-in Under the EU CBAM in Pakistan	*Gordhan Das Valasai, Abdul Moiz Arain, Rao Huzaifa Aslam, Khuda Bux Mari*	Asian Review of Mechanical Engineering Vol: 14 No: 2	2025

Abstract: The European Union's Carbon Border Adjustment Mechanism (CBAM) presents considerable challenges for developing countries with carbon-intensive export sectors. This study assesses CBAM's impact on Pakistan's power sector transition from 2022 to 2050. The Open Source Energy Modelling System (OSeMOSYS), implemented in Python, was used with a least-cost optimisation framework comprising 21 generation technologies and 16 temporal time slices. Four scenarios were evaluated: business-as-usual, domestic carbon taxation at 50% and 100% of European Union Emissions Trading System prices, and a feasibility-constrained renewable pathway. The discount rate was set at 10%, consistent with National Electric Power Regulatory Authority determinations. Domestic carbon pricing alone, even at full EU ETS parity ($110/tCO$_2$ in 2030, rising to $250/tCO$_2$ by 2050), induces no measurable shift in the generation mix. Legacy hydropower maintains roughly a 28% share, while new variable renewable energy penetration remains below 1%. This "economic lock-in" occurs because the marginal abatement cost exceeds the carbon tax. CBAM exposure increases from $35 million in 2026 to over $8 billion annually by 2034. Meaningful power sector decarbonisation requires binding renewable targets and technology-specific infrastructure policies rather than carbon pricing instruments alone.

Sl. No	Article	Author	Source	Year
6	Experimental Evaluation of Torrefied Sawdust Pellets as a Potential Solid Fuel in Pakistan	*Zulqarnain Hyder, Zaryab Basharat, Zain Ahmed, Shahid Hussain, Sameer Uddin, Muhammad Shoaib, Furqan Ahmad*	Asian Review of Mechanical Engineering Vol: 14 No: 2	2025

Abstract: This research paper assesses the effects of torrefaction on the fuel characteristics of sawdust pellets and evaluates their potential as an alternative solid fuel to coal in Pakistan. As an agrarian country, Pakistan generates significant quantities of biomass residues, including sawdust from furniture and carpentry industries, which are often underutilized or openly burned. In this work, sawdust collected from local carpentry workshops was pelletized using a laboratory-scale pellet machine with a 4 mm die configuration. The prepared pellets were torrefied at 200–220°C for 60 minutes. Moisture content, volatile matter, and ash content were determined through proximate and ultimate analyses, along with elemental composition analysis. The results indicate that torrefaction reduced volatile matter from 68.59% to 56.16% and increased carbon content from 39.37% to 63.15%. The higher heating value improved from 17.56 MJ/kg for non-torrefied pellets to 27.45 MJ/kg after torrefaction. The findings demonstrate that torrefaction enhances the energy density and fuel characteristics of sawdust pellets, making them more comparable to coal for thermal energy applications. These results suggest that torrefied sawdust pellets have strong potential as a partial substitute for coal in Pakistan's energy sector.

Sl. No	Article	Author	Source	Year
7	High-Speed Centrifugal Compressors in Modern Low-Emission Gas Turbines: Technological Advances and Future Perspectives	*Muhammad Haris Malik, Zaryab Basharat, Muhammad Faisal, Muhammad Faizan Kahloon, Muhammad Usman Amjad, Faheem Ahmad*	Asian Review of Mechanical Engineering Vol: 14 No: 2	2025

Abstract: High-speed centrifugal compressors play an essential role in low-emission gas turbine technology. This paper provides a detailed review of design concepts, operational issues, and recent technological advancements in high-speed centrifugal compressors for low-emission gas turbines. The paper assesses the influence of rotor speed, compressor configuration, and material choice on aerodynamic performance, thermal loading, and dynamic stability. Recent advances in computational fluid dynamics, optimization algorithms, additive manufacturing, and high-performance

materials are critically analyzed in terms of performance improvement and reliability enhancement. The paper also reviews the contribution of high-speed compressors to the reduction of nitrogen oxide (NOx) and carbon dioxide (CO_2) emissions by improving combustion stability and fuel economy. The results demonstrate the potential for performance improvement while highlighting the difficulties associated with thermal loading, vibration, and material longevity, and provide future research directions for sustainable gas turbine technology.