Report on Capacity Building Program 08 FEBRUARY - 29 MARCH 2025

SSBT'S COLLEGE OF ENGINEERING & TECHNOLOGY

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About the Program

Recognizing the importance of preparing professionals in cutting-edge fields, SSBT's College of Engineering & Technology, Bambhori, Jalgaon, has taken proactive steps to ensure its faculty members' continuous professional development to meet the modern era's demands.

As part of this initiative, the institute organized a capacity-building program focused on Artificial Intelligence (AI) to align with its commitment to staying at the forefront of technological advancements. This program, scheduled from February 8, 2025, to March 29, 2025, reinforces the institute's dedication to embracing emerging technologies and integrating them into academic and research endeavors.

Senior faculty members served as resource persons, while all faculty members participated enthusiastically, fostering a collaborative environment of peer learning.

Objectives

Outcomes



The objectives of the program are as follows:

- 1. Empowering faculty members with cutting-edge technologies
- 2. Developing a culture of shared learning among faculty members
- Inculcating creativity, critical thinking, communication, and cooperation among faculty members
- Equip faculty with fundamental and advanced AI knowledge to integrate into their teaching and research.



The outcomes of the program are as follows:

- Enriching curriculum with cutting-edge technologies
- 2. Motivating students for creativity, critical thinking, communication, and cooperation
- 3. Engaging faculty to apply Engg. knowledge in societal, environmental & sustainable issues
- 4. Gain a strong theoretical and practical foundation in AI and its applications.

In the program, 96 faculty members from all departments attended the sessions.

Al in Chemical Process Technology Date: 08 Feb. 2025



Dr. Vijay Ramkrishna Diware Associate Professor in Chemical Engineering

Artificial Intelligence (AI) is transforming chemical process technology by enhancing efficiency, accuracy, and sustainability across various stages of chemical production. The integration of AI techniques, including machine learning, neural networks, and optimization algorithms, into chemical process design, control, and optimization. Al-driven models are being utilized for predictive maintenance, real-time process monitoring, and fault detection, significantly reducing downtime and operational costs. Additionally, AI facilitates the discovery of novel materials and catalysts through highthroughput screening and data-driven insights, accelerating innovation in the chemical industry. The application of AI in process simulation and optimization enables the development of more sustainable and energy- efficient processes, global environmental goals. aligning with Despite the promising advancements, challenges such as data quality, model interpretability, and integration with existing systems remain. The recent advancements, case studies, and future directions for AI in chemical process technology, emphasizing its potential to transform the industry towards smarter, safer, and more sustainable operations.

Artificial Intelligence in Chemical Process Control

Date: 08 Feb. 2025



Dr. S. A. Thakur Associate Professor in Chemical Engineering

The chemical industry is undergoing a significant transformation with the integration of Artificial Intelligence (AI). Traditional chemical process control systems, reliant on PID controllers, sometimes face challenges in managing complex systems and adapting to disturbances. AI techniques, including machine learning and deep learning, offer robust solutions by effectively these complexities. Machine learning enables handling predictive maintenance, optimizes operating conditions, and detects faults in real-time, while deep learning enhances control strategies through Nonlinear Model Predictive Control (NMPC). The integration of AI leads to increased efficiency, improved safety, and enhanced product quality, ultimately reducing operational costs. With advancements in edge computing and digital twins, the future of AI in process control holds promise for faster response times and optimization. However, addressing better challenges like model interpretability, data security, and ethical considerations is crucial for successful implementation. AI is pivotal in driving the industry's digital transformation toward sustainable practices and will be a game-changer for the industry.

Precision Farming Using Al Drones Date: 08 Feb. 2025



Dr. Amol Chandrakant Wani Assistant Professor in First Year Engineering

The integration of artificial intelligence (AI) and drone technology is transforming traditional agricultural practices into a data-driven, efficient, and sustainable approach known as precision farming. AI-powered drones are revolutionizing agriculture by enabling farmers to monitor and manage crops with unprecedented accuracy. These drones are equipped with advanced sensors and imaging technologies that capture high-resolution data on crop health, soil conditions, and weather patterns. Through machine learning algorithms, this data is analyzed to provide actionable insights, such as identifying pest infestations, detecting nutrient deficiencies, and optimizing irrigation schedules. By precisely targeting areas that require attention, farmers can significantly reduce resource wastage, increase crop yields, and lower operational costs. Furthermore, real-time monitoring helps in early detection of plant diseases, minimizing losses and ensuring timely interventions.

The scalability and versatility of AI drones make them ideal for both small-scale farms and large agricultural enterprises. Their ability to access remote and challenging terrains further enhances farm management capabilities. As climate change and population growth put pressure on global food security, the adoption of precision farming through AI drones is emerging as a vital solution for sustainable agriculture. This technological revolution holds the potential to reshape the agricultural landscape, fostering a smarter, greener, and more productive future.

Al in Finance: Driving Innovation and Efficiency Date: 08 Feb. 2025



Dr. Richa A. Modiyani Associate Professor in Business Administration

Artificial Intelligence (AI) is revolutionizing finance, making processes faster, smarter, and more efficient. It automates routine processes, enhances decisionmaking, and strengthens security. Machine learning plays a crucial role in credit risk assessments, allowing financial institutions to evaluate borrowers with greater precision. Robo-advisors provide personalized investment strategies, making wealth management more accessible. AI-powered chatbots offer instant customer support, improving engagement and satisfaction. Predictive analytics enables financial firms to anticipate market trends, optimize portfolios, and enhance risk management. Al-driven fraud detection systems analyze vast datasets to identify suspicious transactions, ensuring financial security. Compliance monitoring tools help organizations adhere to regulatory requirements seamlessly. Natural Language Processing (NLP) improves document processing, sentiment analysis, and customer interactions. The growing adoption of AI is making financial services more innovative, cost-effective, and inclusive. With advancements in AI, financial institutions can offer personalized, data-driven solutions, leading to a smarter and more responsive industry. The future of finance is AI-powered, enabling greater accessibility, security, and efficiency.

Fault Analysis of the Power System and AI Techniques Date: 08 Feb. 2025



Dr. Suhas M Shembekar Associate Professor in Electrical Engineering

The electric power system consists of three main components: generating stations, transmission lines, and distribution networks. Transmission lines connect generating stations to regional or grid systems, while distribution systems deliver electricity to end users. As power demands grow, these systems have become more interconnected, requiring stable and efficient operation through reliable protection measures. The transmission network plays a vital role in delivering high-voltage electricity from generators to substations. However, due to exposure to environmental conditions, transmission lines are most prone to faults, which can affect system stability and user supply. Faults are essentially breakdowns in the electrical system and often occur in overhead transmission lines. Fault analysis is crucial for configuring relays, selecting switchgear, and ensuring operational stability. Since the power system is dynamic—changing with the addition or removal of components—regular fault studies are necessary. This research aims to analyze various faults and their impact on transmission lines.

Role of AI in Semiconductor

Date: 08 Feb. 2025



Dr. M. P. Deshmukh Professor in E & TC Engineering

Artificial Intelligence (AI) is transforming the semiconductor industry by optimizing design, manufacturing, testing, and supply chain management. Aldriven techniques such as machine learning, deep learning, and predictive analytics enhance efficiency, reduce costs, and improve the performance of semiconductor devices. In chip design, AI accelerates the development process by automating circuit layout, optimizing power consumption, and predicting potential failures. AI-powered Electronic Design Automation (EDA) tools enable rapid prototyping and reduce time-to-market. In semiconductor manufacturing, AI enhances process control by analyzing vast datasets to detect defects, optimize yield, and improve production efficiency. Predictive maintenance using Al minimizes equipment downtime, ensuring smooth and cost-effective fabrication.AI also plays a crucial role in semiconductor testing and quality assurance by identifying anomalies and improving fault detection accuracy. Additionally, AI-driven supply chain management optimizes inventory, predicts demand, and enhances logistics, reducing delays and material wastage.Furthermore, Al-powered semiconductor chips are enabling advancements in edge computing, IoT devices, and high-performance computing. The synergy between AI and semiconductors is fostering innovation in fields such as autonomous systems, healthcare, and 5G communications. In conclusion, AI is a key enabler of progress in the semiconductor industry, driving efficiency, innovation, and intelligence across the entire ecosystem.

Al-Optimized Hybrid Turbochargers Date: 15 Feb. 2025



Dr. K. Shrivatstava Associate Professor in Mechanical Engineering

The AI-Optimized Hybrid Turbocharger is a breakthrough in car technology. Conventional turbochargers improve engine power by pressurizing air and forcing it into the combustion chamber, but they suffer from limitations such as turbo lag, added maintenance, and wear. The hybrid turbocharger overcomes these problems by adding an electric motor-generator unit (MGU) between the turbine and compressor. With this technology, energy is recovered during over boost and also offers instant boost at low speeds, greatly lessening turbo lag. The system, however, is subject to limitations, especially in power electronics, including thermal management, high-frequency switching losses, and control complexity. Mechanical parameters such as exhaust mass flow rate and temperature also affect performance. The future belongs to AI-driven smart turbochargers based on sensors and real-time information, which optimizes efficiency in real time. This is in line with overall tech trends such as IoT, AI/ML, and automation, which revolutionize engine functions. This work highlights the capabilities of intelligent systems in pushing boundaries beyond conventional limitations, leading to smarter and more efficient engines. The program welcomes people to join in exploring these developments, creating a closer link between theory and innovation."The real laboratory is the mind, where behind illusions we discover the laws of truth." - Jagadish Chandra Bose.

Edge AI and Its Benefits

Date: 15 Feb. 2025



Dr. D. K. Kirange Associate Professor in Computer Engineering

Edge AI refers to artificial intelligence algorithms that run on local edge devices, such as smartphones, IoT sensors, drones, and autonomous vehicles, rather than relying on cloud computing. This technology processes data near the source of generation, reducing latency and enhancing efficiency. One of the key benefits of Edge AI is low latency, as data is processed locally without needing to be sent to the cloud, enabling real-time decision-making. This is crucial for applications such as self-driving cars, industrial automation, and healthcare monitoring systems. Data privacy and security are also improved since sensitive information remains on the device rather than being transmitted over networks, reducing the risk of cyber threats. Additionally, bandwidth efficiency is enhanced, as only necessary insights are sent to cloud storage, reducing internet usage. Edge AI also enhances reliability, ensuring systems function even when network connectivity is weak or unavailable. This is especially useful in remote locations or critical applications like disaster response. Furthermore, Edge AI enables energy-efficient computing, as it minimizes the need for constant cloud communication, reducing power consumption. This makes it suitable for battery-operated devices. Overall, Edge AI is transforming industries by enabling faster, smarter, and more secure AIdriven applications.

Revolutionizing Structural analysis with AI

Date: 15 Feb. 2025



Dr. Farooq Ismail Chavan Associate Professor in Civil Engineering

The field of structural analysis is undergoing a remarkable transformation with the integration of artificial intelligence (AI). Traditional methods, often reliant on manual calculations and simplified assumptions, are being augmented by AI's ability to process vast amounts of data and uncover complex patterns. This paper explores how AI-driven techniques are revolutionizing structural analysis by enhancing accuracy, efficiency, and decision-making processes. By leveraging machine learning algorithms and advanced data analytics, AI enables engineers to predict structural behavior under diverse conditions, identify potential vulnerabilities, and optimize designs for safety and efficiency. Innovations such as

generative models, neural networks, and real-time monitoring systems empower engineers to go beyond traditional boundaries, facilitating dynamic analyses and adaptive solutions. This transformation not only improves the reliability of structural analysis but also accelerates project timelines and reduces costs. From designing resilient infrastructure to assessing aging structures, AI is becoming an indispensable tool in modern engineering. By merging human expertise with AI's computational power, this revolution paves the way for smarter, safer, and more sustainable infrastructure for the future.

Transformative Impact of Deep Learning on Cybersecurity

Date: 15 Feb. 2025



Dr. Sandip S. Patil Associate Professor in First Year Engineering

The rapid evolution of cyber threats necessitates advanced and adaptive security solutions, making deep learning a cornerstone in modern cybersecurity strategies. Leveraging neural networks, deep learning excels in identifying sophisticated attack patterns, anomalies, and malware in vast datasets. Applications include threat detection, network intrusion analysis, phishing prevention, and automated vulnerability assessments. Additionally, deep learning enhances behavioral analytics, enabling the detection of insider threats and ransomware activities. However, challenges such as adversarial attacks, data scarcity, and explainability persist. Future advancements, including adversarial training and federated learning, promise to fortify its effectiveness. This work explores the transformative impact of deep learning on cybersecurity, addressing current limitations and prospective innovations.

Al in Automobile Date: 15 Feb. 2025



Dr. Dipak Talele Assistant Professor in Mechanical Engineering

Artificial Intelligence (AI) is revolutionizing the automobile industry by enhancing safety, efficiency, and the overall driving experience. One of the most significant advancements is the development of autonomous vehicles, which rely on AI to process data from sensors, cameras, and GPS to navigate roads, detect obstacles, and makdriving decisions without human intervention. AI also powers advanced driver-assistance systems (ADAS) such as automatic emergency braking, lanekeeping assist, adaptive cruise control, and parking assistance. These tecologies reduce the risk of accidents and make driving more comfortable and secure. Furthermore, AI is used in predictive maintenance by analyzing vehicle performance data to detect potential issues before they become serious problems. This helps in reducing downtime and maintenance costs. In-car AI systems also enhance user experience through voice recognition, personalized settings, and smart infotainment systems that learn user preferences. Manufacturers are integrating AI into production lines to improve efficiency and quality control using robotics and data analytics. As AI continues to evolve, its role in shaping the future of mobility becomes increasingly significant. With ongoing innovation, AI is expected to make automobiles safer, more intelligent, and environmentally friendly, paving the way toward a smarter transportation ecosystem.

Performance Analysis of Solar Power Generation Using Data Science and AI

Date: 15 Feb. 2025



Dr. Vijay Deshmukh Associate Professor in E &Tc Engineering

The future of solar power generation is looking incredibly bright, driven by advances in technology, growing global demand for clean energy, and supportive policies aimed at combating climate change. Classical methods to check performance typically involve manual calculations, simple statistical analysis, and rule-of-thumb models to assess solar panel performance.Data science and AI techniques involve using machine learning, statistical models, and advanced algorithms to analyse large datasets from solar power systems. This data can include solar panel performance, weather conditions, power output, and other variables.AI models can predict future energy generation, optimize system performance, and recommend maintenance schedules. Several factors that make optimizing solar energy systems crucial, Such as Optimizing Energy Output, Predictive Maintenance, Maximizing Return on Investment (ROI), integrating with Smart Grids etc.Particle swarm optimization (PSO) is one of the artificial intelligence (AI) techniques that can be used to find approximate solutions to extremely difficult or impossible numeric maximization and minimization problems. PSO is an AI technique that can approximate solutions to exceedingly challenging parameters AI and Data Science offer a much more powerful, predictive, and scalable approach to solar power performance analysis. However, they come with higher initial costs, complexity, and the need for specialized expertise.

Wearable Electronics and AI Date: 08 March 2025



Dr. P. H. Zope Associate Professor in Computer Engineering

Wearable electronics are lightweight, compact devices worn on the body that integrate sensors, wireless connectivity, and user interfaces. With the integration of Artificial Intelligence (AI) and flexible electronics, these devices are becoming more intelligent, adaptive, and comfortable. Applications span healthcare (e.g., ECG monitors, smart hearing aids), fitness (e.g., Fitbits, sleep trackers), entertainment (e.g., smart glasses, AI earbuds), industrial and military use (e.g., smart helmets, AR headsets), and fashion and safety (e.g., smart clothing, GPS wearables). Technologically, wearables are driven by sensor-based tracking, wireless communication (Bluetooth, Wi-Fi, NFC), energy harvesting (solar, body heat), and flexible/stretchable electronics made from nanomaterials and elastomers. However, these devices presents challenges. Hardware issues include designing miniaturization, heat, battery life, and durability, while software must handle realtime data processing and seamless connectivity. User comfort, aesthetics, and data privacy are also key concerns, along with affordability and interoperability in the market.A notable innovation is smart glasses for the visually impaired, built with Raspberry Pi Pico W and an Arducam camera, using AI to interpret and read aloud printed text. Additionally, AI-driven tools like Synopsys.ai and ChipGPT are streamlining electronic design, pushing the boundaries of what wearable technology can achieve in everyday life.

Industry 4.0: Artificial intelligence Date: 08 March 2025



Dr. Karhe R.R. Assistant Professor in Electrical Engineering

Industry 4.0 represents the fourth industrial revolution, marked by the integration of advanced technologies into manufacturing and production processes. Among these technologies, artificial intelligence (AI) plays a transformative role, enabling smarter, more efficient, and adaptive industrial systems. AI in Industry 4.0 leverages machine learning, computer vision, and natural language processing to analyze massive amounts of data generated by connected devices and machines, commonly known as the Internet of Things (IoT). This analysis drives predictive maintenance, improving machinery uptime by anticipating failures before they occur. AI-powered systems also enhance supply chain management, optimizing inventory levels, and reducing waste. Robotics, enhanced by AI, allows machines to perform complex tasks with precision and adaptability, such as quality control inspections or assembly line adjustments. Autonomous decision-making systems problem-solving, reducing enable real-time human intervention and errors.Additionally, AI facilitates mass customization, allowing manufacturers to tailor products to individual customer preferences without sacrificing efficiency. Smart factories equipped with AI also promote sustainability by monitoring energy consumption and minimizing resource usage. The integration of AI in Industry 4.0 fosters innovation, increases productivity, and helps companies maintain a competitive edge. However, it also poses challenges like workforce adaptation, ethical concerns, and cyber security risks, requiring thoughtful implementation and regulation.

The Power of Fibonacci: Its Role in the Human Body, Financial Markets, and AI Technologies

Date: 08 March 2025



Dr. Prashant Narendrarao Ulhe Assistant Professor in First Year Engineering

The Fibonacci sequence, a mathematical series where each number is the sum of the two preceding ones, underpins harmony and proportion across diverse fields, from nature to advanced technologies. In the human body, Fibonacci ratios manifest in facial symmetry, bone structures, and biological growth patterns. The lengths of fingers and limbs often follow Fibonacci proportions, while DNA and spiral structures like the cochlea exhibit the golden ratio, contributing to natural efficiency and aesthetic appeal. In financial markets, Fibonacci is a cornerstone of technical analysis, helping traders predicts price movements. Tools like Fibonacci retracement and extension identify key levels of support, resistance, and price targets, widely applied in stocks, forex, and cryptocurrency trading. These ratios, such as 23.6%, 38.2%, and 61.8%, reveal human psychological tendencies influencing market behaviour. In artificial intelligence (AI), Fibonacci principles enhance optimization and pattern recognition. Neural networks leverage Fibonacci ratios for better structure and efficiency, while AI algorithms use these patterns to improve predictive analysis in fields like trading and medical imaging. Fibonacci also supports resource optimization and algorithmic trading. The Fibonacci sequence is a universal principle, bridging natural and artificial systems and offering insights into patterns, optimization, and decision-making in biology, finance, and technology.

AI-Driven Finite Element Analysis: Unlocking New Possibilities in Engineering



Dr. Pradeep M Solanki Associate Professor in Mechanical Engineering

Finite Element Analysis (FEA) is a computational technique widely used in engineering and scientific disciplines to solve complex physical problems involving structural mechanics, heat transfer, fluid dynamics, and electromagnetic fields. It works by discretizing a continuous domain into smaller, manageable subdomains, called finite elements, interconnected at discrete points known as nodes. This method enables the approximation of governing equations, allowing for the analysis of stresses, displacements, and other phenomena in a wide range of materials and systems. In recent years, the integration of Artificial Intelligence (AI) into FEA workflows has emerged as a transformative development, enhancing accuracy, efficiency, and problem-solving capabilities. AI techniques, such as machine learning (ML) and neural networks, complement traditional FEA by optimizing mesh generation, reducing computational costs, and improving predictive accuracy for complex, non-linear systems. Furthermore, AI-driven surrogate models are increasingly used to approximate FEA imulations, significantly reducing the time required for iterative design processes and enabling real-time decision-making in engineering applications. This topic explores the fundamentals of FEA, its applications across various domains, and the pivotal role AI plays in revolutionizing traditional FEA methodologies. Key areas discussed include AI's contribution to automated meshing, error estimation, material modelling, and adaptive refinement strategies. By bridging computational mechanics and artificial intelligence, this synergy opens new avenues for innovation in engineering design, analysis, and optimization.

Personalized Medicine and Treatment Model Using AI

Date: 08 March 2025



Dr Atul H Karode Associate Professor in E&TC Engineering

Personalized medicine and treatment design related to artificial intelligence (AI) represents a transformative shift in healthcare, enabling the development of highly tailored treatment strategies based on an individual's genetic, environmental, and lifestyle factors. AI-driven technologies analyse vast genomic datasets to identify disease-associated genetic variations, predict individual responses to drugs, and design targeted interventions, including gene-editing solutions like CRISPR. CRISPR is a technology that allows scientists to modify the DNA of living organisms thus AI can analyse patient data to identify the most suitable treatment options, including drug dosages and therapy treatment. This ensures that treatments are tailored to an individual's unique needs, improving both effectiveness and patient compliance. By integrating machine learning models with combined dataset generated by analysing multiple biological & guot; omics& guot; layers simultaneously called as multi-omics data. AI can uncover complex, complicated biological mechanisms, optimize drug development processes, and enhance clinical decision-making. This approach not only improves treatment effectiveness and reduces adverse side effects. This AI technique generates preventive care through early risk detection and personalized health monitoring. The fusion of AI and genomics is now recent research topic for redefine medical model and thus driving precision medicine from concept to clinical reality.

Copyright and Al Date: 15 March 2025



Dr. Manoj E. Patil Associate Professor in Computer Engineering

As technology rapidly transforms the way we create and share content, understanding how copyright works-especially in the age of Artificial Intelligence—has become more important than ever. This talk, "Copyright and AI," is designed to walk you through the essentials of intellectual property and help you make sense of how copyright laws apply in today's digital world. At its core, intellectual property (IP) is about protecting human creativity-whether it's a book, a piece of software, a painting, or a song. Copyright, in particular, gives creators legal rights over their original work, allowing them to control how it's used and ensuring they're fairly rewarded for their efforts. It's not just about ownership—it's also about encouraging innovation while making room for learning and sharing through "fair use" rules. The types of work are protected, how copyright is registered, how long it lasts, and what happens if someone violates it. But one of the most pressing topics is how copyright law applies to content created by AI.With AI tools now generating code, images, music, and more, questions come up: Who really owns this content? Can an AI be considered the author? As it stands, the answer is no-AI doesn't have legal rights. Instead, the person using or prompting the AI is usually considered the creator. Still, this area is full of grey zones and on-going debates.We'll also look at the legal challenges of digital copyright in general—like piracy and unauthorized sharing and how laws like the IT Act, 2000 are trying to keep up. Real-life examples, such as platforms like Tamil Rockers being banned for copyright violations, help bring these issues into focus.

DeepSeek Al Date: 15 March 2025



Dr. K. P. Adhiya Professor in Computer Engineering

The DeepSeek, Chinese startup launched its latest AI models, which it says are on a par or better than industry-leading models in the United States. From its state-of-theart Transformer-based architectures to the efficient Mixture-of-Experts (MoE) frameworks, DeepSeek AI redefines how machines learn, reason, and interact with the world. DeepSeek's groundbreaking technologies, such as DeepSeek-V3 and DeepSeek-R1, are designed to tackle complex tasks like natural language processing, data analysis, and creative content generation, more efficiently and accurately.DeepSeek AI models are designed to scale seamlessly, handling large datasets and adapting to diverse applications. Whether it's analysing medical data for diagnostics or generating personalized educational content, DeepSeek's models deliver tailored solutions with precision. DeepSeek integrates low-latency solutions for real-time applications, such as chatbots, recommendation systems, and autonomous vehicles. This ensures quick and accurate decision-making, even in dynamic environments. DeepSeek AI emphasizes reducing computational costs, improving model interpretability, and enhancing robustness. Its research focuses on making AI more accessible and efficient, paving the way for sustainable and ethical AI deployment.DeepSeek AI's technologies are transforming industries, including: Healthcare: Assisting in diagnostics and personalized treatment plans. Education: Enabling adaptive learning platforms and intelligent tutoring systems. Engineering: Optimizing design processes and predictive maintenance.

Everything is frequency... role of AI in Frequency?



Dr. Kiran S. Patil Associate Professor in First Year Engineering

Frequency, the vibrational energy that permeates all matter, plays a vital role in human life, influencing physical, emotional, and cognitive well-being. The human body, composed of approximately 70% water, is highly receptive to frequencies, as demonstrated by the groundbreaking experiments of Dr. Masaru Emoto. Emoto's research revealed that water's molecular structure changes in response to human emotions and intentions, with positive frequencies forming beautiful, symmetric crystals and negative ones resulting in chaotic patterns. These findings highlight the profound impact of human vibrational energy on the environment and within the body. Uri Geller, a renowned researcher in mind frequency, further explored the effects of mental energy and focused intention on physical systems, showcasing the potential of the human mind to influence matter. Such studies underscore the interconnectedness between frequency and human health, with therapeutic applications ranging from sound healing and brainwave entrainment to meditation and electromagnetic frequency treatments. These practices optimize body functions, improve emotional resilience, and enhance mental clarity. The ability of frequencies to align water molecules within the body emphasizes their critical role in maintaining cellular health and overall vitality. Together, the works of Emoto and Geller demonstrate that understanding and harnessing the power of frequencies can lead to transformative advancements in personal development, healing, and societal well-being, offering a holistic approach to human life. Artificial Intelligence (AI) further amplifies this potential by analysing frequency interactions and developing personalized frequency-based therapies, driving innovative solutions in healthcare and wellbeing. Their results are displayed across various platforms, inspiring further exploration into the limitless potential of frequency as a universal force.

Generative Al in Education Date: 15 March 2025



Dr. Dinesh D. Puri Associate Professor in MCA

Generative AI is revolutionizing education by enhancing both teaching and learning experiences. It enables personalized learning through intelligent tutoring systems that adapt to individual student needs, allowing learners to understand complex concepts at their own pace. Educators benefit from AI by automating timeconsuming tasks such as grading, content creation, and lesson planning, freeing up more time for interactive and creative teaching methods. Al-powered tools like chatbots and virtual assistants provide students with instant feedback and ondemand support, making education more engaging and accessible. A variety of generative AI tools are now essential in academic settings. ChatGPT supports students with writing, idea generation, and simplifying difficult topics. Grammarly and QuillBot help improve writing quality by correcting grammar and refining phrasing. For research, tools like Elicit and Scite assist in discovering academic papers, generating literature reviews, and understanding citation patterns. Jasper aids in content creation, while Notion AI helps organize notes and streamline academic tasks. Brisk Teaching is a specialized AI tool for educators, simplifying lesson planning, creating customized guizzes and assignments, and adjusting reading materials for various comprehension levels. It also tracks student progress and provides feedback, saving valuable time and improving instructional quality. Used responsibly, these tools enhance productivity and foster better learning outcomes.

Role of Al in 5G Date: 15 March 2025



Dr. N.M. Kazi Associate Professor in E&Tc Engineering

The integration of Artificial Intelligence (AI) in 5G networks is revolutionizing the telecommunications industry by enhancing efficiency, reliability, and AI-driven technologies such as machine learning, deep learning, and reinforcement learning are enabling intelligent network automation, resource optimization, and predictive maintenance. Al plays a crucial role in dynamic spectrum management, reducing latency, and improving network security. One of the key applications of AI in 5G is network slicing, where AI algorithms allocate resources efficiently to meet diverse service requirements. AI-powered predictive analytics improve Quality of Service (QoS) by anticipating network congestion and proactively optimizing data flow. Additionally, AI enhances energy efficiency in 5G networks by enabling intelligent power management, reducing operational costs, and supporting sustainable development.AI-driven automation also plays a vital role in real-time decisionmaking for self-healing networks, minimizing downtime and enhancing reliability. In security, AI aids in detecting cyber threats, mitigating fraud, and ensuring data privacy in 5G communications. Furthermore, AI contributes to seamless connectivity for emerging applications such as autonomous vehicles, smart cities, and industrial automation. In conclusion, AI is a key enabler of 5G networks, ensuring enhanced performance,

security, and efficiency, ultimately transforming industries and paving the way for next-generation communication technologies.

Ethical AI Practice in BusinessStrategy Date: 15 March 2025



Dr. M. V. Rawalani Associate Professor in Business Administration

As artificial intelligence (AI) becomes Vital for business operations, the need for ethical AI practices has gained critical importance. Companies are increasingly adopting ethical frameworks to ensure transparency, fairness, accountability, and respect for privacy in AI deployments. Ethical AI practices not only build customer trust but also reduce legal risks and foster responsible innovation. Numerous organizations have distinguished themselves by adopting ethical AI strategies. . IBM has established an AI Ethics Board to oversee responsible AI usage, emphasizing fairness, transparency, and accountability. The Finnish government's Aurora AI initiative demonstrates the importance of governance in public sector AI, creating human-centric AI solutions while maintaining ethical oversight. In the healthcare sector, AstraZeneca has integrated a robust AI governance framework that focuses on data quality and ethics training for employees. Microsoft's Responsible AI Framework sets clear principles, such as fairness and inclusiveness, supported by an AI Ethics Committee to ensure adherence. These case studies highlight that ethical AI practices are essential for sustainable business growth. By fostering transparency, inclusiveness, and accountability, companies can responsibly harness the power of AI while maintaining societal and consumer trust. Adopting these practices enables businesses to emerge as pioneers in responsible technological advancement

Explainable Artificial Intelligence (XAI) Date: 15 March 2025



Dr. Akash Waghmare Associate Professor in Computer Engineering

Explainable Artificial Intelligence (XAI) is the ability for artificial intelligence understandable explanations systems to provide for their decisions, recommendations, or predictions. XAI is a set of methodologies that aim to make AI models more understandable to humans by explaining their inner workings, predictions, and decision-making processes. The Goal of XAI is to describe in detail how or why ML models produce their prediction. The goal of XAI is to make AI systems more interpretable and explainable, helping users, developers, and stakeholders understand how these models work, why they make certain predictions, and how they arrive at their decisions. The Defense Advanced Research Project Agency (DARPA) invented the term "Explainable AI" (XAI). It will be called as "White box" because of explaining the process of the model. It allows users to understand how models reach their conclusions, making them more reliable. Explaining predictions makes users more confident in AI systems, especially when these systems impact critical decisions (e.g., medical diagnosis, criminal sentencing). XAI can help uncover and address biases in AI models, ensuring that decisions are made fairly. Providing explanations enables accountability, ensuring that decisions made by AI models can be traced back and attributed to the system or the developers. AI systems must adhere to ethical standards, and XAI ensures that AI behaviors align with human values and legal norms. Explainable AI (XAI) is a rapidly growing field that seeks to make AI systems more understandable and trustworthy. While there are still challenges in balancing complexity and explainability, but there are potential benefits of XAI which make it a crucial area of research and application.

Generative Al Date: 29 March 2025



Dr. Surendra P. Ramteke Associate Professor in Computer Engineering

Generative AI has evolved rapidly from rule-based systems to sophisticated deep learning models capable of creating realistic images, text, audio, and even code. This evolution stems from advancements in neural networks, particularly Generative Adversarial Networks (GANs) and transformer architectures like GPT. Key technologies powering generative AI include machine learning, deep learning, natural language processing, and diffusion models. These enable systems to learn patterns from large datasets and generate new, meaningful content. Applications of generative AI span diverse fields-from generating synthetic medical data for research to creating artwork, writing essays, designing products, and enhancing virtual assistants. Its role in creative industries and personalized user experiences continues to expand.Numerous case studies highlight its impact. For example, AIgenerated music, virtual try-on systems in e-commerce, and AI-driven game design demonstrate its versatility. However, generative AI raises ethical and societal concerns. Issues like misinformation, copyright infringement, bias, and job displacement require robust policies and governance frameworks. Challenges include ensuring content authenticity, maintaining user trust, and managing the computational cost of training models.

Looking ahead, generative AI is expected to become more efficient, creative, and accessible, enabling real-time applications and collaborative human-AI creativity. In conclusion, generative AI represents a powerful shift in how we create and interact with digital content.

Building the Future with AI: Applications in Civil Engineering

Date: 29 March 2025



Dr. Sonali Patil Associate Professor in Civil Engineering

Civil engineering is one of the oldest and most important disciplines in human history. It deals with the design, construction, and maintenance of the physical and natural environment, such as buildings, bridges, roads, dams, and airports. Civil engineering projects are complex, large-scale, and often involve multiple challenges. The application of artificial intelligence to Civil engineering practice is gaining attention and excitement as technology continues to develop quickly. AI in civil engineering is the use of AI techniques and technologies to assist, augment, or automate civil engineering tasks and processes, such as analysis, design, construction, and maintenance. Integration of Artificial Intelligence (AI) and Machine Learning (ML) in the field of Civil Engineering marks a transformative shift towards more intelligent infrastructure management Artificial intelligence-based technologies may frequently offer useful options in effectively addressing challenges in civil engineering, as traditional approaches for modeling as well as optimizing building and engineering networks need immense quantities of computational power. Artificial intelligence has been effectively applied to a variety of civil engineering applications, including prediction and risk management. Integrating AI into civil engineering practice offers significant opportunities to enhance efficiency, productivity, and innovation. The application of AI in civil engineering accelerates the move towards smarter, more resilient, and environmentally friendly infrastructures. AI technologies are increasingly becoming integral to civil engineering practice, offering opportunities to improve design, construction, and asset management processes.

Al-Driven Innovation



Dr. Sunita Patil Associate Professor in First Year Engineering

According to a recent survey, artificial intelligence (AI) has rapidly transformed the world around us, with 71% of organizations already using AI. Also, AI use cases have been expanding, and it is now used for automating processes, developing new products and services, and, all in all, gaining a competitive edge across industries. This also applies to the field of innovation. Companies integrating AI into their processes can gain a substantial advantage over their competitors. That's why organizations should pay special attention to AI-driven innovation.

Role of AI in CNC Machining Date: 29 March 2025



Dr. Ajay Ravindra Bhardwaj Associate Professor in Mechanical Engineering

Due to advancement in technology there is a need to study the use of artificial intelligence in computer numerical control (CNC) machining. Artificial intelligence has the ability to enhance the productivity and dimensional accuracy of computer numerical control machine by decision-making, optimizing machining parameters, and forecasting maintenance requirements. Industries may increase production, reduce idle-time, with minimum error by the involvement of artificial intelligence (AI) into CNC machine. Because of this technology CNC machines can now learn from data and make real-time modifications, which results in high production and high quality of fabricated part. This study also compares CNC machine with AI integrated CNC in the development of smart manufacturing while discussing the advantages, disadvantages, and potential applications of artificial intelligence in CNC machineg.

Industrial IoT: Overview & Applications Date: 29 March 2025



Dr. D. B. Sadaphale Associate Professor in Mechanical Engineering

The Industrial Internet of Things (IIoT) represents a transformative evolution in the way industries operate, leveraging connected devices, sensors, and advanced analytics to enhance productivity, efficiency, and safety. Unlike the broader Internet of Things (IoT), which focuses on consumer applications, IIoT is specifically tailored for industrial environments such as manufacturing, energy, transportation, and logistics. By integrating smart technologies with traditional industrial systems, IIoT enables real-time data collection, remote monitoring, predictive maintenance, and automated processes. This convergence of digital and physical systems is laying the foundation for Industry 4.0, reshaping the future of industrial operations. In conclusion, the Industrial Internet of Things is a game-changer for the industrial sector, driving innovation, improving operational efficiency, and enabling smarter decision-making. While IIoT offers immense benefits, including reduced downtime, cost savings, and enhanced safety, it also brings challenges such as cybersecurity risks and data management complexities. As technology continues to advance, the successful implementation of IIoT will depend on strategic planning, robust infrastructure, and a strong focus on security. Embracing IIoT is not just an option but a necessity for industries aiming to remain competitive in an increasingly digital world.

Glimpses







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