TECH OZRIC

MAGAZINE

Volume:6 Issue No:1

ADVANCING KNOWLEDGE THROUGH TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

KGISL INSTITUTE OF TECHNOLOGY, COIMBATORE – 641035

TECH OZRIC MAGAZINE

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DEPARTMENT OF INFORMATION TECHNOLOGY

VISION

To produce Competent Graduates suitable for Industry and Organization in the field of Information Technology by providing industry embedded learning with social responsibility.

MISSION

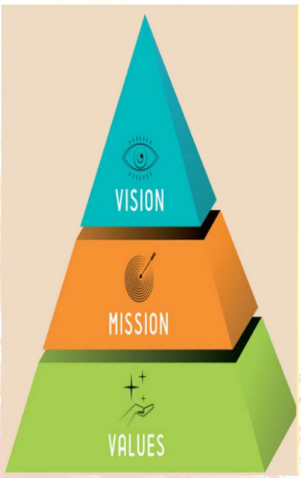
MD-1: To accomplish an effective teaching learning process through innovative practices for empowering the graduates to face societal challenges.

MD-2: To enhance the proficiency of faculty members across various domains of information technology through skill development programs.

MD-3: To nurture IT professionals through the provision of essential infrastructure and facilities for effective learning.

MD-4: To attain research excellence in the field of information technology by instilling the values of self-directed learning and fostering creative thinking through collaborative partnerships with institutes and industries.

MD-5: To foster holistic student growth by engaging them in cocurricular and extracurricular activities.



PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)

PEO1: Demonstrate technical competence with analytical and critical thinking to understand and meet the diversified requirements of industry, academia and research.

PEO2: Exhibit technical leadership, team skills and entrepreneurship skills to provide business solutions to real world problems.

PEO3: Work in multidisciplinary industries with social and environmental responsibility, work ethics and adaptability to address complex engineering and social problems.

PEO4: Pursue lifelong learning, use cutting edge technologies and involve in applied research to design optimal solutions.: Exhibit technical leadership, team skills and entrepreneurship skills to provide business solutions to real world problems.

PROGRAM SPECIFIC OUTCOMES (PSO'S)

PSO1: Develop and deploy software applications using advanced programming languages, data structures, and algorithms to address real-world IT challenges in areas such as system design, web development, and mobile computing.

PSO2: Design and manage IT-based business solutions by leveraging cloud computing, data analytics, and automation tools, demonstrating entrepreneurial capabilities in the IT services and product development sectors.

PSO3: Adapt to the dynamic IT industry by ethically embracing advancements such as artificial intelligence, cybersecurity, and blockchain, while contributing responsibly to societal, environmental, and organizational IT needs.

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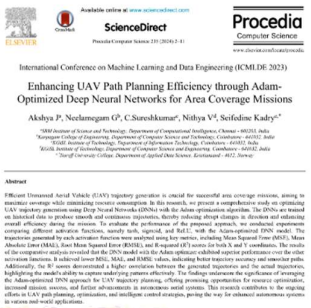
FACULTY ACHIEVEMENT: INTERNATIONAL CONFERENCE PUBLICATION



Mr. C. Sureshkumar, Assistant Professor of Information Technology, has showcased his research excellence by publishing a paper at the *International Conference on Machine Learning and Data Engineering* in August 2024. His work reflects a strong commitment to innovation in emerging technologies and highlights the academic strength of the department. This accomplishment stands as an inspiration for aspiring researchers and reinforces the department's focus on quality research and scholarly contributions.

Faculty Mentorship in National Level Hackathon

Dr. Rajasekaran, Associate Professor, Department of Information Technology, played a pivotal role in guiding and mentoring a student team for RPC 2024, a distinguished National Level Hackathon organized at SJBIT College of Technology, Bangalore. Under his mentorship, the team explored innovative solutions, refined their technical skills, and gained firsthand experience in addressing real-time industry challenges.

His consistent encouragement and expert insights helped the students enhance their problem-solving abilities, creativity, and teamwork—key competencies essential for today's rapidly evolving technological landscape. Participation in such high-impact competitions not only boosted the students' confidence but also strengthened the department's commitment to fostering research, innovation, and experiential learning.

IT RIOTZ – ASSOCIATION INAUGURATION

The Department of Information Technology proudly inaugurated its student association, "IT RIOTZ," on 02.09.2024. The event was graced by an inspiring keynote address from Dr. Karthikeyan Saminathan, Founder & CEO of AI Quantalytics and Director of AI & Software Development at Mine, Bengaluru. His insightful

talk motivated students to explore emerging technologies and embrace innovation-driven learning.

The successful inauguration was meticulously coordinated by Ms. T. Deivapraba and Ms. Shirley Josephine Mary, whose dedicated efforts ensured the smooth planning and execution of the program. The event marked a vibrant beginning to a year filled with activities aimed at enhancing student engagement, technical skills, and collaborative growth.

THE RISE OF EDGE AI: TRANSFORMING THE FUTURE OF INTELLIGENT COMPUTING

By P.Sornambal

Introduction

As the demand for real-time data processing grows across industries, traditional cloud-based systems face limitations in latency, bandwidth usage, and security. To overcome these challenges, a new technological paradigm—**Edge AI**—is rapidly gaining prominence. By combining the power of artificial intelligence with edge computing, Edge AI enables devices to process data locally, delivering faster insights and enhanced user experiences.

What Is Edge AI?

Edge AI refers to the deployment of artificial intelligence algorithms directly on edge devices such as smartphones, IoT sensors, drones, autonomous vehicles, and industrial machinery. Instead of sending all data to the cloud for processing, these devices analyze information on-site, allowing faster decision-making and reducing network dependency.

Why Is Edge AI Becoming Important?

1. **Ultra-Low Latency:**
   Applications like autonomous driving, healthcare monitoring, and industrial automation require split-second decisions. Edge AI drastically reduces the delay caused by cloud communication.
2. **Enhanced Privacy & Security:**
   Sensitive data—such as medical records or video surveillance—can be processed locally, minimizing the risk of data breaches during transmission.
3. **Reduced Bandwidth Consumption:**
   By filtering and processing data at the source, only essential information is sent to the cloud, reducing network overload.

4. **Greater Reliability:**
   Even during network interruptions, edge devices can continue operating independently, ensuring uninterrupted service.

Applications of Edge AI

1. **Smart Healthcare:**
   Wearable devices can continuously monitor vital signs and detect anomalies (like irregular heartbeats) in real-time, enabling proactive medical intervention.
2. **Smart Cities:**
   Edge-based video analytics help in intelligent traffic control, public safety monitoring, and environmental tracking.
3. **Industry 4.0:**
   Manufacturing systems use Edge AI for predictive maintenance, quality inspection, and robotics automation, significantly improving efficiency and reducing downtime.
4. **Agriculture:**
   Smart drones and sensors analyze soil conditions, crop health, and pest patterns, helping farmers make data-driven decisions.
5. **Retail:**
   Intelligent shelf systems track inventory, analyze customer behavior, and support cashier-less checkout solutions.

Challenges in Edge AI Deployment

Despite its advantages, Edge AI faces certain challenges:

- **Resource Constraints:** Edge devices have limited CPU, memory, and storage compared to cloud servers.
- **Model Optimization:** AI models must be compressed and optimized to run efficiently on small devices.
- **Standardization Issues:** Lack of uniform frameworks and standards slows down widespread adoption.
- **Security Risks:** Edge devices can be vulnerable to physical tampering and cyberattacks.

The Future of Edge AI

Edge AI is poised to revolutionize almost every sector. The integration of **5G**, **tinyML**, and **next-generation IoT devices** will accelerate its adoption. As AI algorithms become more lightweight and hardware becomes more powerful, Edge AI will evolve into a dominant computing model, enabling a world where devices think and act with intelligence—instantly and autonomously.

Conclusion

Edge AI represents the next wave of technological innovation, bridging the gap between cloud computing and real-time decision-making. Its ability to provide fast, secure, and efficient data

processing makes it a cornerstone of tomorrow's intelligent systems. For students and aspiring technologists, understanding Edge AI is essential, as it will shape the future of digital transformation.

Digital Twins: Bridging the Physical and Virtual Worlds

By S.Pradeep

Introduction

In today's fast-evolving technological landscape, the concept of **Digital Twins** has emerged as a groundbreaking innovation. A digital twin is a virtual replica of a physical object, process, or system that behaves exactly like its real-world counterpart. From healthcare to smart cities, digital twins are revolutionizing the way we design, monitor, and optimize complex environments.

What Are Digital Twins?

A digital twin is a dynamic, data-driven virtual model created using real-time information from sensors, IoT devices, and analytics systems. It mirrors the behavior, performance, and conditions of the physical entity, allowing engineers, researchers, and decision-makers to simulate outcomes, detect issues, and improve efficiency—without disrupting real-world operations.

How Digital Twins Work

1. **Data Collection:** Sensors embedded in physical systems collect real-time data.
2. **Modeling:** The data is used to build a digital replica using AI, machine learning, and simulation tools.
3. **Analysis:** The digital model predicts performance, identifies anomalies, and simulates future scenarios.
4. **Optimization:** Insights from the digital twin help refine the physical system for better reliability and performance.

Applications Across Industries

1. **Healthcare**
   - Personalized treatment plans through patient-specific digital twins.
   - Simulation of surgeries and organ behavior.
   - Predicting health risks using physiological models.
2. **Manufacturing**
   - Predictive maintenance to reduce downtime.
   - Optimization of assembly lines.
   - Quality control through performance monitoring.

3. **Smart Cities**
    - Traffic flow simulation to reduce congestion.
    - Monitoring energy usage and improving sustainability.
    - Disaster management using predictive models.
4. **Automotive and Aerospace**
    - Designing more efficient engines and aircraft.
    - Real-time monitoring of vehicle performance.
    - Enhancing safety through stress and load simulations.
5. **Energy Sector**
    - Managing power grids.
    - Predicting equipment failures in wind turbines and solar farms.
    - Improving energy distribution efficiency.

Benefits of Digital Twins

- **Improved Efficiency:** Real-time insights help optimize processes.
- **Reduced Costs:** Early detection of system failures saves repair and replacement costs.
- **Enhanced Innovation:** Engineers can test multiple design variations virtually.
- **Greater Accuracy:** Continuous data flow ensures models remain up to date.
- **Informed Decision-Making:** AI-powered predictions enable proactive planning.

Challenges in Adoption

- **High Implementation Costs:** Requires advanced sensors, IoT integration, and data infrastructure.
- **Data Security:** Sensitive real-time data must be protected against cyber threats.
- **Complexity:** Building accurate digital twins demands multidisciplinary expertise.
- **Scalability Issues:** Managing large data volumes can be difficult for small organizations.

The Future of Digital Twins

As technologies such as **5G**, **IoT**, and **Generative AI** advance, digital twins will become more intelligent, autonomous, and accessible. Future systems will be able to self-diagnose, self-correct, and continuously evolve. Digital twins are expected to become central to smart industries, sustainable development, and personalized healthcare, making them a key technology for the next decade.

Conclusion

Digital twins have opened a new era of simulation-driven innovation. By creating a seamless link between the physical and digital worlds, they empower industries to solve complex problems, enhance efficiency, and innovate faster. As adoption grows, digital twins will become a vital part of modern engineering, data science, and intelligent system design.

Art By

S.SOPHIA

RUN BEFORE YOU CRAWL

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