SOCIETY FOR PROGRESSIVE LEARNING & RESEARCH

UMPSA

UNIVERSITI MALAYSIA PAHANG
AL-SULTAN ABDULLAH

PROCEEDINGS OF THE

International Conference on Innovations in Computing, Automation, Engineering and Applied Sciences

ICICAEAS2025

13-14 DECEMBER 2025

ORGANIZED BY

SOCIETY FOR PROGRESSIVE LEARNING AND RESEARCH (SPLR), INDIA

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UNIVERSITI MALAYSIA PAHANG AL-SULTAN ABDULLAH, MALAYSIA

Edited by: Dr. Manish Dwivedi
Ms. Kanishka Singh

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INTERNATIONAL CONFERENCE

ON

INNOVATIONS IN COMPUTING, AUTOMATION, ENGINEERING AND APPLIED SCIENCES

Organized by

Society for Progressive Learning and Research (SPLR)

In collaboration with

Universiti Malaysia Pahang AI-Sultan Abdullah, Malaysia

ICICAEAS 2025

13th and 14th December 2025

The Proceedings of the ICICAEAS2025

Convener

Dr. Nor Hasmaliana Abdul Manas

University Malaysia Pahang, AI-Sultan Adullah, Malaysia

Dr. Manish Dwivedi

Society for Progressive Learning and Research, India

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The Ohio State University, USA

INTERNATIONAL CONFERENCE ON INNOVATIONS IN COMPUTING, AUTOMATION, ENGINEERING AND APPLIED SCIENCES

Organized by

Society for Progressive Learning and Research (SPLR) in collaboration with Universiti Malaysia Pahang AI-Sultan Abdullah, Malaysia

Abstract Book Edited by

Dr. Manish Dwivedi
Society for Progressive Learning and Research, India

Kanishka Singh

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About the Conference

The International Conference on Innovations in Computing, Automation, Engineering, and Applied & Medical Sciences provides a global platform for academicians, researchers, industry experts, and practitioners to exchange cutting-edge knowledge and transformative ideas shaping the future of science and technology. The conference focuses on emerging trends in computational intelligence, smart automation, advanced engineering solutions, and multidisciplinary applications that address real-world challenges in healthcare, medicine, and allied sciences. With an emphasis on innovation and collaboration, the event encourages interdisciplinary dialogue, fosters research partnerships, and promotes the translation of scientific advancements into practical solutions. Keynote lectures, technical sessions, poster presentations, and panel discussions allow participants to showcase their work, gain insights into recent developments, and explore future directions in their respective fields. The conference ultimately aims to inspire novel approaches, accelerate technological progress, and enhance the global research ecosystem across computing, engineering, applied sciences, and life science domains.

About the Society for Progressive Learning and Research, India

We are a community of educators, researchers, professionals, and learners committed to creating transformative educational experiences. By integrating progressive methodologies, technology, and interdisciplinary approaches, we aim to make education accessible, engaging, and impactful.

About University Malaysia Pahang Al-Sultan Abdullah (UMPSA)

About UMPSA: University Malaysia Pahang Al-Sultan Abdullah (UMPSA), Ranked #1 among Malaysian Technical Universities and #8 in Malaysian Public Universities, is a leading engineering and technology institution known for innovation, global collaborations, and impactful research. It offers international dual-degree programmes and partners with industries to produce skilled, future-ready graduates.

KEYNOTE SPEAKERS

Mr. Padmanabhan Venkiteela

Senior Enterprise Integration Architect | Trellix | Texas, USA

Mr. Sai Nikhil Donthi

Cloud Automation Specialist, Houston, TX, USA

Mr. Jeevan Bandharapu

Data Scientist | Agentic AI, AIOps & Observability | Bellevue, Washington, USA

Mr. Ravi Jaiswal

System Analyst & QAD ERP Consultant, USA

Ms. Shruti Worlikar

Sr. Manager, Data Specialist SA, Amazon Web Services, Aldie, VA, USA

Mr. Naga Sai Mrunal Vuppala
Senior Software Engineer, Humana Inc. USA

Mr. Prahlad Chowdhury
Solution Architect, Fujitsu, MI, USA

Mr. Jaykumar A. Maheshkar

Cloud and AI engineering leader, USA

Mr. Priyank Tailor

Data Scientist & Researcher | Credit Risk, Fraud Detection, Financial AI & Compliance, New Jersey, USA

Mr. Yashwardhan Rathi

Data Platform Engineer | Building Scalable, Secure Cloud Infrastructure Solutions, Truist, Atlanta, Georgia, USA

Dr. Rakeshnag Dasari

Sr DevSecOps/AI/MLOps Engineer, AB Technologies Inc, New Jersey, USA

Mr. Hemang Upadhyay

Strategic Product Leader | Driving Digital Product Innovation at LG Electronics, New Jersey, USA

Ms. Muskaan (Pearl) Juneja

Solutions Delivery Analyst at HOLT CAT & Co-founder of Wiseversity, Texas, USA

Mr. Darshan Kumar Prajapati

Network Engineer, LAN/WAN setup and troubleshooting, Edison, NJ, USA

Ms. Shrutika Mokashi

Business Intelligence Developer – ASSA ABLOY Americas, Connecticut, USA

Mr. Pavan Kumar Rajagopal Prakashkumar

Sr. Principal Consultant, Houston, Texas, USA

Mr. Abhijit Ubale

Sr. Snowflake Data/ ML/ AI EngineerSr. Snowflake Data/ ML/ AI Engineer Progressive Insurance, Tampa, Florida, USA

Mr. Siva Vanama

Sr. DevOps Engineer / SRE Architect, JP Morgan, Florida, USA

Mr. Rama Krishna Kumar L.

IT Principal | Creator of Syda | Cigna-Evernorth Services Inc, USA

Mr. Edidiong Elijah Akpan

Researcher, AI/ML in Health Care, University of Louisiana at Lafayette, USA)

Mr. Sri Kolagani

Director, CRM Engineering @ Elastic, Dallas, TX, USA

Ms. Shalmali Joshi

Senior Data Science Solutions Consultant@Elevance Health, Atlanta, Georgia, USA

Mr. Harsh Parnerkar

Software Developer, JP Morgan Chase & Co., Plano, Texas, USA

Mr. Sujeet Tiwari

IT Professional, USA

Mr. Soumik Das

Senior Software Architect,
Dallas TX, USA

Mr. Vijaya Kumar

Senior Data Engineer / ETL Developer, USA

Mr. Pankaj Arora

Healthcare Supply Chain Leader at Deloitte, USA

Mr. Hemadri Ravilla

Salesforce Technical Lead, USA

Mr. Sanjay Das

Associate Manager in Quality Assurance Testing, USA

Mr. Sai Rupesh Kagga

Sr. Full Stack Java Developer, New York City, USA

Mr. Vijaya Reddy

Software Professionals, USA

Mr. Sandeep Kumar

Principal Software Engineer, North Carolina, USA

Expert Judges of the ICICAEAS2025 Sessions

1. Srilatha Samala

Affiliation : Jira Reporting Lead, Apex IT Services, Princeton, NJ

Niche : IT service management (ITSM), and DevOps automation, Agile, ITSM, and CI/CD pipelines, Jira Architectures.

2. Mukesh Reddy Dhanagari

Affiliation : Manager, Software Development & Engineering, Charles Schwab, USA

Niche : NoSQL Database Engineering, High-Performance Data Architectures and Modeling, and Financial Technology (FinTech), database optimization, indexing strategies, and production scalability

3. Vikas Nagaraj

Affiliation : MTS at Advanced Micro Device(AMD), San Jose, California, USA

Niche : semiconductor design verification, Design-for-Test (DFT), and GPU hardware validation, specialising in ensuring first-time-right silicon for high-performance computing, graphics, and AI accelerators

4. Sandeep Reddy Gundla

Affiliation: Lead Software Engineer, MACYS Inc, GA, USA

Niche : AI-Driven Cloud Modernization Architect: Transforming Legacy Enterprise Systems into Scalable, Event-Driven Platforms for Retail, Telecom & Finance,5G OSS orchestration via event-driven Azure/Kafka architectures.

5. Pradeep Rao Vennamaneni

Affiliation : Staff Software Engineer, Inovalon, USA

Niche: Financial Services: Real-time fraud detection APIs for card networks (Visa/Mastercard integrations); AI-driven loan underwriting with FICO score enrichment.Healthcare Tech: Remote patient monitoring with NLP-powered HER

6. Ramanan Hariharan

Affiliation: Principal Engineering Manager, Security and Resiliency, Microsoft, Mountain View, USA.

Niche: Information Security, Identity and Access Management, AI in security, Resiliency and distributed systems

7. Zahir Sayyed

Affiliation: Software Engineer, Jamesburg, New Jersey, USA.

Niche : Cloud-native software engineering, bridging the gap between microservices, AI-driven automation, and scalable enterprise platforms, cloud-native transformations,

8. Ashutosh Chandra Jha

Affiliation: Network Security Engineer, NewYork, USA.

Niche : Ultra-Low-Latency Network Security Architect for AI-Driven Financial Trading: Designing Secure, High-Performance Network Infrastructures for Global Firms and AI Compute Clusters"

9. Kawaljeet Singh Chadha

Affiliation : Business systems analyst at Fidelity, USA

Niche : Transforming Healthcare & Insurance Data into Actionable Intelligence Through Advanced Analytics, Regulatory-Compliant Governance, and Agile Business Process Optimisation

10. Pramod Gannavarapu

Affiliation : Compunnel Software Group Inc., NJ, USA

Niche : Enterprise Identity Infrastructure, Access Governance, and Secure Hybrid Cloud Operations Across Regulated Sectors, real-time monitoring, seamless, secure digital transformation

11. Sridhar Rangu

Affiliation : Senior Project / Program Manager, CVS thru XSell, USA

Niche: AI-powered digital transformations through the cloud ecosystem, CRM strategy, technical architecture, and operational modernization,Health Cloud, Service Cloud Voice, Einstein Co-Pilot, DevOps, and Agile/SAFe methodologies.

12. Santosh Durgam

Affiliation : Manager of software engineering, Morningstar Investments LLC, Chicago, Illinois, USA.

Niche : Data-Driven Product Engineering, Machine Learning Integration, and Scalable Team Architecture , Data product performance.

13. Mr. Rajesh Kumar (Vice President (Engineering Team Lead), Citi, Texas, USA)

(17 years of experience in application research and development, Project Management, Financial product Management, and leadership. Expertise in the Payments domain, Cloud System designing, and migration from On-Prem to Private and Hybrid Cloud.)

14. Mr. Abdul Salam Abdul Karim (Automotive electronics and ADAS engineering expert, USA)

(Abdul Salam A is an automotive electronics and ADAS engineering expert with more than 20 years of experience in EV systems, functional safety, embedded hardware design, and safety-critical ECU development. He has served in technical leadership roles at Ford, Marelli, Magna Electronics, Takata/Joyson, L&T Technology Services, and Ashok Leyland,

contributing to advanced driver assistance, intelligent lighting, and high-reliability automotive controllers.)

15. Supriya Gandhari (Data Engineer, Austin, Texas, USA)

(Data Engineer with over 6 years of experience designing and optimizing large-scale data systems. With 3 years of hands-on expertise in the Consumer Packaged Goods (CPG) industry, worked on building data platforms that power demand forecasting, supply chain optimization, and AI-driven analytics.)

16. Mr. Kishore Hebbar (Senior Software Engineer, ICE, Atlanta, USA)

(Kishore Hebbar is a Senior Software Engineer specializing in modernizing financial systems through cloud-native microservices, AI/ML, and real-time data streaming architectures. With over 17 years of experience in Software Development FinTech, he has led critical modernization initiatives across legacy mainframe platforms, enabling scalable digital transformation in mortgage and banking domains)

17. Ajay Prasad (IT infrastructure operations manager, Apple, San Francisco, USA)

(An IT infrastructure specialist, technologist, problem solver, solution provider, and leader who possesses the ability to grasp intricate technologies and effectively communicate them to the business in understandable ways.

With 24+ years of IT experience, I am a seasoned professional in the management of hybrid cloud environments. Throughout my career, I have successfully overseen large server farms, handled scalable distributed systems and storage, and thrived in fast-paced environments that needed ultra-low latency. Additionally, I have excelled in presales and spearheaded numerous mission-critical projects.)

18. Mr. Shaurya Shounik (Investment Analyst at Partners Group, New York, USA)

(Shaurya is an investment professional specialising in Special Situations and Restructuring for a global private markets investor. He is based out of New York City and got his Master's in Finance from Brandeis University.)

19. Bhumit Dhandhukiya (Security Operations Analyst & Architect Expert, Toronto, ON)

(Certified and results-driven Security Operations Analyst & Systems Administrator with 9+ years of experience in cybersecurity, cloud platforms, IT infrastructure, incident response, and vulnerability management)

20. Mr. Jayanth (Software Engineer, USA)

(Software development and applied AI/ML across finance, insurance, and automotive domains. Expertise in **AI for risk mitigation**, anomaly detection, and large-scale data analytics pipelines)

Session Chair of the ICICAEAS2025 Sessions

Dr. Srikar Velakapudi

Civil and Environmental Engineer @ Bobbitt, Raleigh, North Carolina, USA

Srikar Velagapudi, Ph.D., is a Civil and Environmental Engineer at Bobbitt in Raleigh, North Carolina (USA), with over nine years of experience designing and managing stormwater management features, erosion and sediment control plans, and hydrologic and hydraulic analysis for a diverse range of commercial, industrial, public, and critical infrastructure projects.

His research background includes extensive work on air quality monitoring, particulate matter analysis, and pollution prevention assessments. He managed large-scale datasets, developed chemical identification software, and applied advanced techniques such as positive matrix factorization and GIS-based modeling for environmental risk assessment and source apportionment.

Mr. Sandip Patel

Salesforce Architect, United Techno Solutions, Georgia, USA

He is a Salesforce Architect with over 13 years of experience delivering enterprise-grade digital transformation across industries, including Healthcare, Financial Services, Automotive, and Nonprofit. He is 11-times Salesforce certified and deeply experienced in AI-driven workflow automation, intelligent agent design, and sustainable enterprise architectures.

SOCIETY FOR PROGRESSIVE LEARNING AND RESEARCH

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About Society for Progressive Learning and Research (SPLR)

Society for Progressive Learning and Research (SPLR) stands as a foremost non-profit professional association, operating under the India Trust Act (1882), dedicated to fostering research, development, and the advancement of life sciences, social sciences, engineering and technology. Our organization's primary focus is to promote and facilitate research progress, prioritizing innovation, and nurturing a platform that supports the growth and evolution of these fields.

SPLR has successfully organized impactful events, including the *National Conference on Recent Trends in Biotechnology (Feb 2024)*, a *Workshop on Basics of Bioinformatics and their Application in Protein Mining (June 2024)*, a *One-Week FDP cum Professional Development Program on IPR and Patent Filing in collaboration with CSIR-IMMT (2024)*, *International Conference on Applications and Innovations of Science and Technology in Industry (October 2024), International Conference on Innovation in Science and Technology for Resilient Future (July 2025)* and the recently concluded *International Conference on Multidisciplinary Research & AI for Sustainability (September 2025)*. Through these initiatives, SPLR has built strong connections within the global academic and research community.

As one of the most promising and upcoming societies, we boast a global membership drawn from universities, industries, hospitals, research institutes, and educational institutions, positioning us as a diverse hub for professional expertise and collaborations worldwide. The Society serves as a charitable membership organization catering to researchers passionate about exploring new horizons in the form of collaborations and research.

Feel free to write back to join or to give your valuable suggestions, on sforplar@gmail.com.

MESSAGES

Prof. Arun Mohan Sherry,

Director,

Indian Institute of Information Technology,
Lucknow, India

It gives me immense pleasure to extend my warm greetings and best wishes to the organizers, distinguished speakers, researchers, and participants of the International Conference on Innovations in Computing, Automation, Engineering and Applied Sciences (ICAEAS 2025).

In today's rapidly evolving digital era, the convergence of computing, automation, artificial intelligence, and applied sciences is shaping the future of industry, research, and societal development. Conferences such as ICAEAS 2025 play a pivotal role in bringing together global scholars and practitioners to exchange knowledge, foster collaborations, and inspire breakthrough ideas that contribute to technological advancement and inclusive growth.

I am confident that this conference will provide a vibrant platform for presenting high-quality research, innovative solutions, and impactful applications across multidisciplinary domains. I commend the efforts of the organizing committee for creating such an enriching academic avenue and for promoting scholarly excellence through international collaboration.

My best wishes for the grand success of ICAEAS 2025. I am honored to join the event as the Chief Guest and look forward to the insightful deliberations and outcomes that will emerge from this gathering of brilliant minds.

Prof. Arun Mohan Sherry

Dr. Nor Hasmaliana Abdul Manas

University Malaysia Pahang, AI-Sultan Adullah, Malaysia

On behalf of Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA), it is my great pleasure to welcome all participants to the *International Conference on Innovations in Computing, Automation, Engineering and Applied Sciences (ICICAEAS2025)*. We are honoured to collaborate with the Society for Progressive Learning and Research (SPLR) in bringing together a global community of researchers, industry experts, and practitioners to exchange knowledge and advance emerging technologies.

This conference reflects UMPSA's commitment to fostering impactful research, interdisciplinary collaboration, and innovation-driven solutions that address current and future societal needs. The themes highlighted in ICICAEAS2025—ranging from artificial intelligence, automation, cybersecurity, engineering, and applied sciences—are aligned with our institutional mission to drive technological excellence, support national priorities, and develop talent capable of shaping a sustainable future.

The abstracts compiled in this book showcase the diversity and depth of scholarly contributions presented at the conference. They represent the collective efforts of dedicated researchers whose work advances new frontiers and strengthens the global research ecosystem. We trust that these ideas will inspire meaningful discourse, spark new collaborations, and catalyse further breakthroughs.

UMPSA extends its appreciation to all authors, speakers, reviewers, and organizing committee members for their hard work and commitment. We also thank our international participants for enriching this conference with their perspectives and expertise.

We wish everyone a productive, engaging, and inspiring conference experience.

Dr. Nor Hasmaliana Abdul Manas
Convenor, ICICAEAS2025

Dr. Manish Dwivedi
Society for Progressive Learning and Research, India

It gives me immense pleasure to extend my warm greetings to all participants of the International Conference on Innovations in Computing, Automation, Engineering and Applied Sciences, organized by the **Society for Progressive Learning and Research (SPLR)** in collaboration with **Universiti Malaysia Pahang Al-Sultan Abdullah, Malaysia**. This conference represents a significant platform for researchers, academicians, industry professionals, and students from across the globe to come together and exchange cutting-edge ideas that are shaping the future of technology and scientific advancement.

In an era marked by rapid digital transformation and global challenges, innovation has become the driving force behind sustainable progress. Computing technologies, artificial intelligence, automation, and applied engineering solutions are redefining how industries operate, how societies function, and how knowledge systems evolve. This conference provides a valuable opportunity to explore these emerging domains, present breakthrough research, and foster interdisciplinary collaborations that can lead to meaningful real-world impact.

The collaborative event of SPLR and Universiti Malaysia Pahang Al-Sultan Abdullah underscores a shared commitment to advancing academic excellence, promoting research culture, and encouraging global knowledge-sharing.

I am confident that the deliberations, keynote sessions, technical presentations, and interactive discussions during this conference will spark new insights, generate impactful ideas, and contribute to the advancement of computing, engineering, and applied sciences.

I extend my best wishes to all the participants for a productive and intellectually stimulating conference. May this event inspire continued innovation and successful collaborations in the years to come.

Dr. Manish Dwivedi
SPLR, India

PROGRAMME SCHEDULE

International Conference on
INNOVATIONS IN COMPUTING, AUTOMATION, ENGINEERING AND APPLIED SCIENCES

13-14 December 2025, Jointly Organized by

Society for Progressive Learning and Research (SPLR)
&
Universiti Malaysia Pahang Al-Sultan Abdullah, Malaysia

PROGRAMME SCHEDULE

ICICAEAS2025: Day 1: December 13th, 2025
Mode: ZOOM

Link: ***https://us05web.zoom.us/j/81919145761***
Meeting ID: 819 1914 5761
Passcode: 168461

***All the timings are in IST**

08:15 AM – 09:00 AM	**Inauguration**
08:15 AM – 08:30 AM	Online connecting of Speakers and Delegates
08:30 AM – 08:35 AM	About ICICAEAS2025 and Host Society, India **Dr Manish Dwivedi** Society for Progressive Learning and Research, India
08:35 AM – 08:40 AM	About Host Institute: **Dr. Nor Hasmaliana Abdul Manas**, University Malaysia Pahang Al-Sultan Abdullah, Malaysia
08:40 AM – 08:50 AM	Inaugural Address and Abstract Book Release **Chief Guest: Prof. (Dr.) Arun Mohan Sherry,** Director, Indian Institute of Information Technology, Lucknow, India

08:50 AM – 09:40 AM	Technical Session I
Session Chair - Dr. Srikar Velakapudi Civil and Environmental Engineer, Bobbitt, Raleigh, North Carolina, USA	
08:50 AM – 09:00 AM	**Keynote Lecture 1** **Mr. Prahlad Chowdhury** Solution Architect, Fujitsu, MI, USA **Title: "**Digital Manufacturing & Sustainability: How the Industry Moved in the Last 10 Years"
09:00 AM – 09:10 AM	**Keynote Lecture 2** **Mr. Soumik Das** Senior Software Architect, Dallas TX **Topic:** "Best Practices for Migrating Monolithic Applications to Microservices on Cloud Platforms**"**
09:10 AM – 09:20 AM	**Keynote Lecture 3** **Mr. Sai Nikhil Donthi** Cloud Automation Specialist, Houston, TX, USA **Topic:** " Optimizing Cloud Cost and Compliance in Azure DevOps Pipelines for Industrial Applications**"**
09:20 AM – 09:30 AM	**Keynote Lecture 4** **Mr. Jeevan Bandharapu** Data Scientist | Agentic AI, AIOps & Observability | Bellevue, Washington, USA **Topic: "**The Next Era of Autonomy: Building AI Systems That Heal, Adapt, and Sustain Themselves**"**
09:30 AM – 09:40 AM	**Keynote Lecture 5** **Ms. Shruti Worlikar** Sr. Manager, Data Specialist SA, Amazon Web Services, Aldie, VA, USA **Topic: "**From Reactive to Proactive: Leveraging AWS Analytics for Optimized Natural Disaster Response and Effective Resource Allocation**"**
09:40 AM – 11:20 AM	**Technical Session II**
Session Chair - Dr. Nor Hasmaliana Abdul Manas, University Malaysia Pahang Al-Sultan Abdullah, Malaysia	
09:40 AM – 09:50 AM	**Keynote Lecture 6** **Mr. Ravi Jaiswal** System Analyst & QAD ERP Consultant, USA **Title**: Digital Twins in ERP – Simulating Production Line Optimization Before Implementation
09:50 AM – 10:00 AM	**Keynote Lecture 7** **Mr. Darshan Kumar Prajapati** (Network Engineer, LAN/WAN setup and troubleshooting, Edison, NJ, USA) **Title:** AI-Driven BGP Optimization: A Framework for Dynamic Path Rewriting
10:00 AM – 10:10 AM	**Keynote Lecture 8** **Mr. Naga Sai Mrunal Vuppala** Senior Software Engineer, Humana Inc. USA **Title :** "The Future of Health-Tech: Distributed Intelligence, Predictive Automation, and Human-Centered AI"
10:10 AM – 10:20 AM	**Keynote Lecture 9** **Mr. Jaykumar A. Maheshkar** Cloud and AI engineering leader, USA

	Title: **"**Intelligent Operations: Integrating Agentic AI with DevOps and SRE for Scalable Root Cause Analysis"
10:20 AM – 10:30 AM	**Keynote Lecture 10** **Dr. Liza Md Salleh** Universiti Teknologi Malaysia **Title**: From Research to Commercialisation :Developing Evidence-Based Functional Food Products
10:30 AM – 10:40 AM	**Keynote Lecture 11** **Mr. Abhijit Ubale** (Sr. Snowflake Data/ ML/ AI EngineerSr. Snowflake Data/ ML/ AI Engineer Progressive Insurance, Tampa, Florida, USA) **Title**: Federated Machine Learning Framework for Privacy-Preserving Analysis
10:38 AM – 10:46 AM	**Keynote Lecture 12** **Mr. Rama Krishna Kumar L.** (IT Principal | Creator of Syda | Cigna-Evernorth Services Inc, USA) **Title:** Solving Real-World AI Challenges with Synthetic Data: Insights from Industry
10:46 AM – 10:54 AM	**Keynote Lecture 13** **Mr. Priyank Tailor** Data Scientist & Researcher | Credit Risk, Fraud Detection, Financial AI & Compliance, New Jersey, USA **Title:** Generative AI and RAG in Finance: Turning Noisy Data into Real-Time Decisions
10:54 AM – 11:02 AM	**Keynote Lecture 14** **Mr. Padmanabhan Venkiteela,** Senior Enterprise Integration Architect | Trellix | Texas, USA **Topic:** "Agentic AI and the Future of Enterprise Automation**"**
11:02 AM – 11:10 AM	**Keynote Lecture 15** **Dr. Manish Dwivedi** Amity Institute of Biotechnology, Amity University, Lucknow, India **Title:** Recent Advances in AI and computational approaches in membrane protein dynamics
11:10 AM – 11:20 AM	
11:20 AM – 12:00PM	**Technical Session III | Oral Presentations by Researchers (Competitive)**
Session Chair: Dr. Imran Hussain, Integral University, India **Session Judges:** **Srilatha Samala,** Jira Reporting Lead, Apex IT Services, Princeton, NJ **Mukesh Reddy Dhanagari,** Manager, Software Development & Engineering, Charles Schwab, USA **Vikas Nagaraj,** MTS at Advanced Micro Device (AMD), San Jose, California, USA	
11:20 AM – 11:25 AM	**OP01:** Enhancing Device Applications through Electrical Characterisation of Compound Semiconductors **Author: Dr. Aditi Sharma**
11:25 AM – 11:30 AM	**OP02:** Performance Analysis of Automotive Exhaust Manifolds Using CFD Techniques **Author: Naveen Kumar[1], Balasa Munesh[1]*, R Bharath[1]*, P Rajesh**
11:30 AM – 11:35 AM	**OP03:** Evaluate Several Deep Learning Algorithms for Facial Recognition **Author: Dr. Harsha V. Patil***

11:35 AM – 11:40 AM	**OP04:** Analyzing Refactoring Strategies for Handling Code Smells using Python Programming **Author: Ritika Maini[1], Navdeep kaur[2*], Amandeep kaur[3*]**
11:40 AM – 11:45 AM	**OP05:** Burnouts in the Medical Profession by Management of Drug Abuse Patients **Author: Muneer Ahmad[1] and Javvid Muzamil[2]**
11:45 AM – 11:50 AM	**OP06:** Sweat-Based Troponin Detection as an Early Indicator of Myocardial Infarction **Author: Arup Ratan Biswas[*1], Krishanu Chatterjee[2], and Chiranjib Bhowmick[3]**
11:50 AM – 11:55 AM	**OP07:** Role of Digital Twin in Healthcare **Author: Dr. Parul Verma**
11:55 AM – 12:00 PM	**OP08:** Application of Artificial Intelligence in Electric Vehicles **Author: Dr. Praveen Kumar Sharma**
12:00 PM – 12:45 PM	**Technical Session IV : Oral Presentations by Researchers (Competitive)**
Session Chair : Dr. S. P. Singh, SPLR, India **Session Judges:** **Sandeep Reddy Gundla,** Lead Software Engineer, MACYS Inc, GA, USA **Pradeep Rao Vennamaneni,** Staff Software Engineer, Inovalon, USA **Ramanan Hariharan,** Principal Engineering Manager, Security and Resiliency, Microsoft, Mountain View, USA	
12:00 PM – 12:05 PM	**OP09:** Early Identification of Psychological Disorders Using AI: Technical Opportunities and Ethical Considerations **Author: Dr. Saroj Sangeetha G**
12:05 PM – 12:10 PM	**OP10:** A Comprehensive Review of Quantum-Resistant Cryptography: Current Algorithms and Future Directions **Author: Dr. Shahnaz Fatima**
12:10 PM – 12:15 PM	**OP11:** AI for justice and healthcare: Advantage research and legal education **Author: Ms. Pratibha Thakur**
12:15 PM – 12:20 PM	**OP12:** Turning Mound into Medicine: In vitro Anti- Breast Cancer Potential of Termite Mound Soil **Author: Shaikh Uzma Naaz , Dr. Manojkumar Z. Chopda**
12:20 PM – 12:25 PM	**OP13:** AI-Enabled ESG (Environmental, Social & Governance) Reporting and Sustainable Business **Author: Dr Sonali Srivastava**
12:25 PM – 12:30 PM	**OP14:** Intelligent Automation Framework for Next-Generation Engineering Systems Using Machine Learning **Author: Dr Parul Singh**
12:30 PM – 12:35 PM	**OP15:** Geospatial Analysis of LULC Change and Soil Erosion Risk in the Yamuna River Basin **Author: Pooja Malik and Nisha Kumari**
12:35 PM – 12:40 PM	**OP16:** A Multi-Metric Evaluation Framework for Enhancing Supervised Learning Models in Liver Disease Prediction

	Author: Mr. Ashish Vishvakarma
12:40 PM – 12:45 PM	**OP17:** Enhancing IoT Security Through Blockchain-Based Authentication Mechanisms **Author: Dr. Nidhi Srivastava**
12:45 PM – 01:20 PM	**Technical Session V (Oral Presentation)**
Session Chair: Dr. Manish Dwivedi, Amity University, India **Session Judges:** **Zahir Sayyed,** Software Engineer, Jamesburg, New Jersey, USA. **Ashutosh Chandra Jha,** Network Security Engineer, NewYork, USA **Kawaljeet Singh Chadha,** Business systems analyst at Fidelity, USA	
12:45 PM – 12:50 PM	**OP18:**Computational Prediction of Antimicrobial and Antibiofilm Activities of Phage-Derived Endolysins Targeting Acinetobacter baumannii **Author: Abhishek Nandy & Aditi Singh**
12:50 PM – 12:55 PM	**OP19:** Spatio Temporal Variation of Air Quality of Delhi-NCR (2021-2024): A Multi City Comparison of Pollution Trends **Author: Roopal a and Nisha Kumari**
12:55 PM – 01:00 PM	**OP20:** Computational Investigation of Blood Flow in Renal Artery using Finite Element Analysis and Artificial Intelligence **Author: D. Gautham**
01:05 PM – 01:10 PM	**OP21:** AI-Based Early Stroke Risk Prediction Using Wearable Sensors. **Author: Ridhima Sehgal**
01:10 PM – 01:15 PM	**OP22:** Advanced Machine Learning Algorithms for predictive Modelling in Complex System: Integrating Mathematical Optimization and Statistical Methods for Enhanced Decision making **Author: Dr Madhu Gopinath, Debmalya Mukherjee, L SOWJANYA UPADHYAYULA, DR.BALBIR KAUR, Vennila Ramasamy, Dr B. Lavanya, Mohammed Abdullah Shareef**
12:50 PM – 12:55 PM	**OP23:** Exploring India's Data Science Landscape: Job Roles, Enrolment Trends, Public Perceptions, and Learning Needs **Author: Oshin Swapneel Macwan , Dr Umeshkannan**
12:55 PM – 01:00 PM	**OP24:** AI-Driven Diagnosis and Analysis for the Clinical Interpretation of Genetic Disorders **Author: Vaanya Srivastav, Manish Dwivedi**
01:10 PM – 01:15 PM	**OP25:** Human-Centric Personalisation in Generative AI with Foundation Models **Author: Dr. Archana Sahai**
01:15 PM – 01:20 PM	**OP26:** Docking Study of Morus alba Bioactive Compounds Against SAP Proteins of Candida albicans **Author: Ayushi Pandey, Abhishek Nandy , Aditi Singh**
***************************END OF THE DAY : 01 ************************************	

ICICAEAS2025: Day 2: December 14th, 2025

Mode: ZOOM

Link: ***https://us05web.zoom.us/j/81919145761***
Meeting ID: 819 1914 5761
Passcode: 168461

08:10 AM – 08:30 AM	Joining of Speakers and Delegates
08:30 AM – 09:00 AM	**Technical Session I**
Session Chair: Sandip Patel, Salesforce Architect, United Techno Solutions, Georgia, USA	
08:30 AM – 08:40 AM	**Keynote Lecture 16** **Dr. Rakeshnag Dasari** (Sr. AI Ops /Sr. DevSecOps Lead/ Platform Architect, New Jersey, USA) **Topic: "**Observability-Driven AI: Ensuring Trust and Performance in MLOps Pipelines"
08:40 AM – 08:50 AM	**Keynote Lecture 17** **Dr. Aditi Singh** Amity University Uttar Pradesh, Lucknow Campus Title: "Revolutionising Bacteriophage Research: The Transformative Role of Machine Learning in Discovery and Therapeutic Application"
08:50 AM – 09:00 AM	**Keynote Lecture 18** **Mr. Yashwardhan Rathi** Data Platform Engineer | Building Scalable, Secure Cloud Infrastructure Solutions, Truist, Atlanta, Georgia, USA **Title** : Scanning-as-a-service: Building data governance across hybrid cloud
09:00 AM – 09:10 AM	**Keynote Lecture 19** **Mr. Hemang Upadhyay** (Strategic Product Leader | Driving Digital Product Innovation at LG Electronics, New Jersey, USA) **Title :** Moving Beyond the Pilot: Scaling Agentic AI and LLM Agents for Enterprise-Wide Transformation
09:10 AM – 09:20 AM	**Keynote Lecture 20** **Ms. Muskaan (Pearl) Juneja** (Solutions Delivery Analyst at HOLT CAT & Co-founder of Wiseversity, Texas, USA) **Title:** AI-Driven Career Transformation: Preparing the Future Workforce Through Data, Automation & Digital Learning
09:20 AM – 10:20 AM	**Technical Session II**
Session Chair: Dr. Alok Chauhan, Professor, School of Computer Science Engineering, VIT University, India	
09:20 AM – 09:40 AM	**Keynote Lecture 21** **Ms. Shrutika Mokashi,** Business Intelligence Developer – ASSA ABLOY Americas, Connecticut, USA **Topic: "**Psychosocial Digital Twins: Soft Computing Models for Worker Emotion, Stress, and Human Behavior in Smart Factories**"**
09:40 AM – 09:50 AM	**Keynote Lecture 22** **Mr. Siva Vanama** Sr. DevOps Engineer / SRE Architect, JP Morgan, Florida, USA

	Title :"AI-Driven Cloud Infrastructure: Transforming DevOps and Enterprise Architecture for the Next Generation"
09:50 AM – 10:00 AM	**Keynote Lecture 23** **Mr. Edidong Elijah Akpan** Researcher, AI/ML in health care university of louisiana at Lafayette USA **Topic:** Towards fair and trustworthy medical imaging AI: A Glaucoma Progression Benchmark on RNFLT Maps
10:00 AM – 10:10 AM	**Keynote Lecture 24** **Mr. Sri Kolagani** Director, CRM Engineering @Elastic,Dallas, TX, USA **Title:** "Building cost-efficient AI agents For enterprise SaaS: Infrastructure, Economics, and Operational Excellence
10:10 AM – 10:20 AM	**Keynote Abstract** **Mr. Pavan Kumar Rajagopal Prakashkumar,** Sr. Principal Consultant, Houston, Texas, USA **Title:** An overview of Oracle AI and Agents for Fusion ERP
10:20 AM – 11:50 AM	**Technical Session III**
Session Chair: Dr. Sujeet P. Singh, Amity University, India	
10:20 AM – 10:30 AM	**Keynote Lecture 25** **Ms. Shalmali Joshi** Advanced Analytics Consultant@Elevance Health, Atlanta, Georgia, USA **Title:** Snowflake as a Sensor: Application in Healthcare Case Outreach management
10:40 AM – 10:50 AM	**Keynote Lecture 26** **Mr. Sujeet Tiwari** IT Professional, USA **Title:** Automation-Driven Digital Transformation Blueprint: Migrating Legacy QA to AI-Augmented Pipelines
10:50 AM – 11:00 AM	**Keynote Lecture 27** **Mr. Pankaj Arora** **Title:** Dock-to-Data Alignment: Real-Time Over-Shipment Processing for Smarter, Faster Healthcare Supply Chains
11:00 AM – 11:10 AM	**Keynote Lecture 28** **Mr. Harsh Parnerkar** Software Developer, JP Morgan Chase & Co., Plano, Texas, USA **Title:** Evaluating Event-Driven Architecture Approaches for Real-Time Risk Detection and Control in Financial Platforms
11:10 AM – 11:18 AM	**Keynote Lecture 29** **Mr. Hemadri Ravilla** **Title:** Reimagining Customer Service with Agentforce: The AI-Powered Future of Support
11:18 AM – 11:26 AM	**Keynote Lecture 30** **Mr. Sai Rupesh Kagga** Sr. Full Stack Java Developer, Pennsylvania, USA **Title:** Federated AI for Secure and Scalable Clinical Diagnostics From Architecture to Real-World Deployment.
11:26 AM – 11:34AM	**Keynote Lecture 31** **Mr. Sanjay Das** Associate Manager in Quality Assurance Testing, USA

	Title: Top 10 QA Mistakes in Financial systems - And how to avoid them
11:34 AM – 11:42 AM	**Keynote Abstract 32** **Mr. Vijaya Kumar Reddy** **Title:** Skills of the Future Data Engineer
11:42 AM – 11:50 AM	**Keynote Abstract 33** **Mr. Sandeep Kumar** **Title:** Reinventing Enterprise Operations Through Intelligent Orchestration.
11:50 AM – 12:20 AM	**Technical Session IV**
Session Chair – Dr. Ravi Deshwal, Professor, SRM University, India **Session Judges:** **Pramod Gannavarapu,** Compunnel Software Group Inc., NJ, USA **Sridhar Rangu,** Senior Project / Program Manager, CVS thru XSell, USA **Santosh Durgam,** Manager of software engineering, Morningstar Investments LLC, Chicago, Illinois, USA	
11:50 AM – 11:55 AM	**OP27:** A Scalable and Secure Cloud Framework for Cost-Efficient Data Science Workflows Using Automated Pipelines and Distributed Machine Learning. **Author: Ms. LIKHITHA. G**
11:55 AM – 12:00 PM	**OP28:** AI-Assisted prediction of vaccine candidates against pathogens **Author: Pratiksha Dubey, Manish Dwivedi**
12:00 PM – 12:05 PM	**OP29:** Comparative evaluation of Biofertilizers on Diosgenin levels in Tribulus terrestris roots through HPLC analysis **Author: Shakila Parvin J , Vijaya T**
12:05 PM – 12:10 PM	**OP-30:** Artificial Intelligence-Driven Identification of Biomarkers for Theragnostic Applications **Author: Vaishnavi Vohra, Manish Dwivedi**
12:10 PM – 12:15 PM	**OP31** Naive Reverse Nearest Neighbor Clustering for Large-Scale Spatial Data **Author: Chebolu Tarun, Alok Chauhan**
12:15 PM – 12:20 PM	**OP32:** Role of Modern Technology in Wildlife Tracking and Conservation of India **Author: Prem Kumar Patel**
12:20 PM – 12:50 PM	**Technical Session V**
Session Chair : Dr. Swadha Singh, Scientist, Friedman Brain Institute, New York **Session Judges:** **Mr. Rajesh Kumar,** Vice President (Engineering Team Lead), Citi, Texas, USA **Mr. Abdul Salam Abdul Karim,** Automotive electronics and ADAS engineering expert, USA **Supriya Gandhari**, Data Engineer, Austin, Texas, USA	
12:20 PM – 12:25 PM	**OP-33:**Optimized CNN Approach for Plant Leaf Disease Detection **Author: Anant Dev Shukla , Manish Dwivedi**
12:25 PM – 12:30 PM	**OP-34:** Pharmacognostical evaluation of phytoconstituents present in Grewia asiatica leaves extract **Author: Shalu Saini , Dr. Yogita Dobhal , Dr. Shammi Ratra Chaddha**
12:30 PM – 12:35 PM	**OP-35:** Deep Learning–Based Diagnosis and Progression Analysis in Alzheimer's Disease. **Author: Naavya Kakkar, Manish Dwivedi**
12:40 PM – 12:45 PM	**OP-36 :**Tissue Engineering: The Next Frontier in Medicine

	Author: Prisha
12:45 PM – 12:50 PM	**OP-37:** AI-Powered Smart Urban Safety Surveillance System Using Real-Time Video Analytics **Author: Khushi Gupta, Dr. Namrata Nagpal, Dr. Meenakshi Srivastava**
12:50 PM – 01:20 PM	**Technical Session VI**
Session Chair : Dr. Liza Md Salleh, Universiti Teknologi Malaysia **Session Judges:** **Mr. Kishore Hebbar,** Senior Software Engineer, ICE, Atlanta, USA **Ajay Prasad,** IT infrastructure operations manager, Apple, San Francisco, USA **Mr. Shaurya Shounik,** Investment Analyst at Partners Group, New York, USA	
12:50 PM – 12:55 PM	**OP-38:**In Silico Analysis and Protein–Protein Docking of Bacteriocins from Bifidobacterium and Lactobacillus Species Against Virulence Proteins of Helicobacter pylori **Author: Saumya Giri , Abhishek Nandy, Aditi Singh**
12:55 PM – 01:00 PM	**OP-39:** Role of Machine learning in the identification of AMR genes **Author: Kaatyayni Rohilla, Manish Dwivedi**
01:00 PM – 01:05 PM	**OP-40:** Molecular Encapsulation of *Saussurea lappa* Through Beta-Cyclodextrin **Author: Krishantinee Gobi, Nor Hasmaliana Abdul Manas**
01:05 PM – 01:10 PM	**OP-41:** AI-Based Cybersecurity Threat Detection System Using Hybrid Machine Learning and Deep Learning Models **Authors: Nikita Dwivedi, Namrata Nagpal, Meenakshi Srivastava**
01:10 PM – 01:15 PM	**OP-42:** An Analytical model of Anisotropic Strange Quark Compact Star **Author: Samir Sarkar**
01:15 PM – 01:20 PM	**OP-43:** Artificial Intelligence in Healthcare: Applications, Trends, and Challenges **Author: Sandeep Kaur***
01:20 PM – 01:25 PM	**OP44:** Phylogenetic Characterization of Monkeypox Virus Using MEGA, Clustal Omega, and BLAST-Based Sequence Analysis **Author: Torsha Das**
01:25 PM – 01:30 PM	**OP-45:** Prediction of Target Genes & GO (Gene Ontology) Analysis associated with Monkeypox **Author: Anika Pandey**
Poster Session (01:30 PM – 01:51 PM)	
Session Chair : Prof. (Dr) Aditi Singh, Amity Institute of Biotechnology, Amity University, India **Session Judges:** **Mr. Bhumit Dhandhukiya,** Security Operations Analyst & Architect Expert, Toronto, ON **Mr. Jayanth,** Software Engineer, USA	
01:30 PM – 01:33 PM	**PP-01:** Isolation and Profiling of Bioactive Compounds from Herbal Plant: Echinops niveus **Author: Panshul Sharma, Nitin Verma**
01:33 PM – 01:36 PM	**PP-02:** Tumor Segmentation Using Reinforcement Learning-Based K-Means Clustering **Author: Pooja Singh**

01:36 PM – 01:39 PM	**PP-03:** Quality Management in the Software Industry **Author: Vikash Kumar**
01:39 PM – 01:42 PM	**PP-04:** Augmented Reality (AR) in fashion marketing **Author: Shikha**
01:42 PM – 01:45 PM	**PP-05:** Impact of Arrhenius Activation Energy on Gyrotactic Stability in a Photosynthesis-Driven Triple-Taxis MHD Nanofluid through a Porous Medium **Author: A Selvaraj and Gayathri V**
01:45 PM – 01:48 PM	**PP-06:** Poly 3, 4 ethylenedioxythiophene as cathode in an electrolytic cell – A case study **Author: Srijita Chatterjee, Vansh Ashwarya , Asoke Kumar Pal , Chiranjib Bhowmik , Arup Ratan Biswas ,Krishanu Chatterjee**
01:48 PM – 01:51PM	**PP-07:** Advancements in Fraud Detection Using Machine Learning: A Review of Fake Account Detection and E-Commerce Fraud Detection **Author: Abhishek Kumar**
01:51 PM – 02:20 PM	**Valedictory Session and Award Announcement**
01:51 PM – 02:00PM	ICMRAIS 2025 Awards Announcement
02:00 PM – 02:10 PM	Results Announcement of Oral Presentation
02:10 PM – 02:20 PM	Vote of Thanks and End of Program **Dr Sujeet P. Singh, SPLR**
********** **END OF THE DAY 02** **********	

KEYNOTE SPEAKERS ABSTRACTS

Keynote Lecture-1

Agentic AI and the Future of Enterprise Automation.

Padmanabhan Venkiteela

Senior Enterprise Integration Architect | Trellix | Texas, USA

Abstract

Agentic AI represents the next major evolution in enterprise automation, moving organisations beyond traditional rule-based workflows toward autonomous, goal-driven systems capable of reasoning, planning, and acting independently. This keynote explores how agentic architectures, powered by Large Language Models and the emerging Model Context Protocol (MCP), are redefining multi-cloud orchestration, enterprise integrations, and cross-system decision automation. The Enterprise Agentic Architecture Framework (EAAF) is introduced as a holistic model that unifies agent layers, secure tool-use, interoperability, integration platforms, governance controls, and continuous feedback loops. Real-world scenarios including SAP BTP-Boomi-Salesforce flows, multi-agent collaboration, and autonomous cloud optimisation across AWS, Azure, GCP, and OCI illustrate measurable gains in efficiency, resilience, and operational scalability. The session also highlights strategic trends toward self-healing systems, autonomous supply chains, and enterprise-wide agent marketplaces, positioning agentic AI as a transformative force for the next decade of digital innovation

Keynote Lecture-2

Best Practices for Migrating Monolithic Applications to Microservices on Cloud Platforms

Soumik Das

Senior Software Architect, Dallas TX

Abstract

Many enterprises still run their most critical workloads on monolithic systems that cannot keep pace with today's demand for rapid change, resilience, and global scale. This session, from the perspective of a legacy modernization software architect, distills practical best practices for transforming monolithic applications into cloud-hosted microservices without disrupting the business. Attendees will learn how to assess and decompose legacy systems using domain-driven design, apply patterns such as the strangler fig for incremental migration, and leverage container platforms and managed cloud services effectively. The session also covers organizational readiness, DevSecOps, and common pitfalls around data, observability, and "monoliths of microservices." By the end, participants will have a concrete roadmap and decision framework they can use to plan and execute their own modernization journeys

Keynote Lecture-3

Optimizing Cloud Cost and Compliance in Azure DevOps Pipelines for Industrial Applications

Sai Nikhil Donthi

Cloud Automation Specialist, Houston, TX, USA

Abstract

Industrial organizations are rapidly adopting Azure to modernize operations, yet rising cloud costs and strict regulatory requirements create significant challenges. This paper presents a practical approach to optimizing costs and various tools available to monitor and control costs with recommendations ensuring compliance within Azure DevOps pipelines for industrial environments. It highlights how automated governance, policy-driven controls, and continuous monitoring can be embedded directly into CI/CD workflows to prevent misconfigurations and enforce standards. By integrating Azure Policy, Cost Management, Blueprints, and Infrastructure-as-Code practices, the framework enables teams to maintain cost efficiency, strengthen security, and support audit readiness. The study demonstrates that well-designed DevOps pipelines can evolve into a strategic mechanism for sustainable cloud operations, helping industrial organizations accelerate delivery while meeting regulatory and financial expectations.

Keynote Lecture-4

The Next Era of Autonomy: Building AI Systems That Heal, Adapt, and Sustain Themselves

Jeevan Bandharapu [1]

[1]Data Scientist, Agentic AI, AIOps & Observability, Bellevue, Washington, USA

Abstract

Autonomous AI is becoming foundational to modern computing, engineering, and applied scientific systems, yet most operational environments remain reactive, failure-prone, and resource-intensive. As scale and complexity increase, traditional monitoring and rule-based automation struggle to keep pace with system drift, performance volatility, and sustainability demands. This keynote examines the nextstage of intelligent operations: AI systems engineered to anticipate instability, respond with calibrated and explainable actions, and maintain performance with minimal human intervention. The session presents a unified framework for building such systems through predictive reliability scoring, multi-layer drift and anomaly detection, explainability-driven decision pathways, and energy-proportional scaling strategies. It discusses how KPI-windowed health models and confidence-based remediation can transform legacy infrastructures into adaptive, self-maintaining environments capable of consistent and resilient operation across diverse workloads. By integrating reliability engineering, sustainable computing, and autonomous control principles, the talk outlines a forward-looking approach for organizations seeking to enhance uptime, reduce operational waste, and build trustworthy, self-governing AI ecosystems ready for the next decade of digital transformation.

Keynote Lecture-5

From Reactive to Proactive: Leveraging AWS Analytics for Optimised Natural Disaster Response and Effective Resource Allocation

Shruti Worlikar

Sr. Manager, Data Specialist SA, Amazon Web Services, Aldie, VA, USA

Abstract

Natural disasters are becoming increasingly frequent and severe due to climate change and rapid urbanization, demanding innovative approaches to emergency resource allocation. This research investigates how Amazon Web Services (AWS) analytics can transform disaster response from reactive scrambling to proactive, data-driven optimization. Through qualitative analysis of secondary data sources, we examine AWS's role in the four phases of disaster management: mitigation, preparedness, response, and recovery. Our findings reveal that AWS-based solutions achieve recovery times under 15 minutes compared to 4-24 hours for traditional methods, while enabling continuous data backup versus scheduled approaches. The integrated AWS ecosystem—leveraging Amazon S3, Redshift, QuickSight, Lambda, SNS, and Location Service—provides geospatial assessment, real-time data analysis, visualization, and automated notifications. Results demonstrate that AWS analytics can forecast resource demands, optimize allocation strategies, and significantly enhance emergency response effectiveness. This study contributes practical insights for emergency management professionals, demonstrating how cloud analytics can save lives, reduce damage, and improve relief

Keynote Lecture-6

Digital Twins in ERP – Simulating Production Line Optimization Before Implementation

Ravi Jaiswal

System Analyst & QAD ERP Consultant, USA

Abstract

Digital Twins incorporated with ERP systems allow manufacturers to virtually simulate, evaluate, and enhance production processes prior to implementing physical modifications on the shop floor. By utilizing real-time master data from ERP—including routings, cycle times, work-center capacities, and demand patterns—digital twins generate highly precise simulations that accurately represent actual operational constraints. This research illustrates how ERP-integrated digital twins can be employed to detect bottlenecks, assess process modifications, and forecast the effects of equipment or scheduling adjustments without jeopardizing outage or disrupting production. Through a case study involving an automotive components manufacturer, we demonstrate how simulation scenarios resulted in an 18% increase in throughput, a 22% decrease in cycle time, and prevented superfluous capital expenditure on new machinery. The findings highlight the importance of digital twins as a strategic decision-support instrument, facilitating data-driven optimization and expediting ongoing improvement initiatives within manufacturing environments governed by ERP systems.

Keynote Lecture-7

Recent advances in AI and computational approaches in membrane protein dynamics

Dr. Manish Dwivedi
Amity Institute of Biotechnology, Amity University, Lucknow, India
Email: mdwivedi@lko.amity.edu

Abstract

Membrane proteins play essential roles in cellular communication, transport, and signal transduction, yet their structural complexity and dynamic behaviour present significant challenges to experimental characterisation. Recent advances in artificial intelligence (AI) Computational modelling has transformed the study of membrane protein dynamics, enabling high-resolution insights into their conformational landscapes, functional transitions, and interactions with lipids, ligands, and other biomolecules. Machine learning–driven predictions of secondary and tertiary structures, combined with enhanced molecular dynamics (MD) simulations, have dramatically improved our ability to capture rare events, long-timescale motions, and transient intermediate states that are often inaccessible through traditional biophysical methods. AI-integrated MD frameworks, such as deep-learning- assisted force-field optimization, adaptive sampling, and generative modelling, further enhance the accuracy and efficiency of simulating complex membrane environments. Additionally, computational docking, free-energy calculations, and data-driven network analyses enable the systematic exploration of protein–protein and protein–lipid interactions, providing mechanistic insights into activation pathways and regulatory mechanisms. These approaches are increasingly valuable for drug discovery, particularly for G protein-coupled receptors (GPCRs), ion channels, and transporters, which represent major therapeutic targets but have historically been difficult to study. The integration of AI-based structural prediction tools with scalable simulations and experimental data has opened new directions for understanding membrane protein function at multiple spatial and temporal scales. Overall, AI and computational strategies are redefining the landscape of membrane protein research, offering powerful platforms for elucidating dynamic phenomena and accelerating the development of innovative therapeutic interventions.

Keywords: Membrane proteins, artificial intelligence, computational modelling, drug discovery, therapeutic.

Keynote Lecture-8

The Future of Health-Tech: Distributed Intelligence, Predictive Automation, and Human-Centred AI.

Naga Sai Mrunal Vuppala

Senior Software Engineer, Humana Inc. USA

Abstract

The health-insurance ecosystem is undergoing a massive transformation driven by AI, distributed computing, and real-time data automation. This keynote examines how emerging architectures, built on distributed intelligence, predictive analytics, and secure AI ecosystems, are transforming the way payers process claims, manage prior authorisations, and deliver member-centric experiences. The session highlights practical frameworks for applying machine learning to eligibility verification, utilization management, denial prediction, and large-scale EDI workflows. Drawing from real-world implementations across enterprise insurers, the talk demonstrates how intelligent automation reduces administrative waste, accelerates decision-making, and improves care outcomes. By combining responsible AI design with scalable engineering, the future of health-tech will enable systems that are not only faster and smarter, but aligned with trust, transparency, and patient impact.

Keynote Lecture-9

Intelligent Operations: Integrating Agentic AI with DevOps and SRE for Scalable Root Cause Analysis

Jaykumar A. Maheshkar

Cloud and AI engineering leader, USA

Abstract

The rapid evolution of cloud-native architectures, microservices, and distributed systems has intensified operational complexity, making efficient incident detection and root cause analysis (RCA) a critical challenge for modern enterprises. Traditional DevOps and Site Reliability Engineering (SRE) practices leverage automation, observability, and resilience engineering; however, they remain limited when processing the scale, heterogeneity, and dynamism of contemporary production environments. Artificial Intelligence (AI) has become a game-changer by improving operational workflows with predictive analytics, anomaly detection, and smart alerting. Building on these advancements, **Agentic AI**—autonomous, task-oriented AI agents capable of reasoning, decision-making, and interacting across systems—represents the next frontier for operational excellence. Agentic AI systems can continuously ingest telemetry across logs, metrics, traces, network behaviors, and deployment changes; analyze causal relationships; and autonomously recommend or execute remediation. When deployed across hybrid and multi-cloud ecosystems, agentic architectures strengthen DevOps pipelines, enhance SRE reliability objectives, and significantly reduce Mean Time to Detect (MTTD) and Mean Time to Resolve (MTTR). This abstract outlines the convergence of AI, cloud engineering, DevOps automation, and SRE principles to design self-governing, production-grade RCA frameworks, ultimately enabling organizations to achieve resilient, scalable, and intelligent operational ecosystems.

Keynote Lecture-10

From Research to Commercialisation: Developing Evidence-Based Functional Food Products

Dr Liza Md Salleh

Universiti Teknologi Malaysia

Abstract

This presentation highlights the development of high-value herbal products through the integration of green processing technologies and modern biotechnological research. The work focuses on Swietenia mahagoni (Tunjuk Langit) and Johor pineapple as natural sources of bioactive compounds for health supplements and skincare innovations. The seeds of Swietenia mahagoni, rich in flavonoids, saponins, and alkaloids, exhibit strong antidiabetic activity of up to 94%, supporting the development of GoSwiet Softgel, produced using Supercritical CO_2 Extraction to ensure high purity, selectivity, and solvent-free extracts. Meanwhile, bioactive components from pineapple, particularly bromelain, are extracted using Subcritical Water Extraction (SWE) to formulate the Anaquin skincare series. This gentle, eco-friendly technology preserves enzymatic activity, enhances product efficacy, and supports sustainable production. Collectively, these innovations transform agricultural resources into premium nutraceutical and cosmetic products, strengthen local economic value, and align with global sustainability goals (SDG 1 & SDG 13). The outcomes demonstrate a successful integration of research, entrepreneurship, and community development through safe, effective, and environmentally responsible herbal product innovation. Keywords high-value herbal products, Supercritical CO_2 Extraction, Subcritical Water Extraction, bioactive components, sustainable production.

Keynote Lecture-11

Federated Machine Learning Framework for Privacy-Preserving Analysis

Abhijit Ubale

Sr. Snowflake Data/ ML/ AI EngineerSr. Snowflake Data/ ML/ AI Engineer Progressive Insurance, Tampa, Florida, USA

Abstract

This framework is a production-ready, config-driven federated learning platform built on Snowflake Snowpark that enables privacy-preserving collaborative analytics across industries. It lets participating organizations (hospitals, banks, retailers, universities) train shared machine learning models without exchanging raw data—each site runs local training, applies differential privacy and gradient clipping, then sends secure model updates to a central coordinator. The coordinator aggregates updates with secure aggregation, tracks privacy budgets (ε/δ), stores artifacts and metrics in Snowflake, and supports model lifecycle management via a model registry. YAML-driven domain configs make setup reproducible and extensible for healthcare, finance, retail, and education. The design emphasizes regulatory compliance (FERPA/HIPAA/GDPR), fairness monitoring, and operational scalability through Snowpark's server-side execution. Target users include data scientists, IT teams, and researchers who need collaborative, auditable, and privacy-aware ML across organizational boundaries.

Keynote Lecture-12

Solving Real-World AI Challenges with Synthetic Data: Insights from Industry

Rama Krishna Kumar L.

IT Principal | Creator of Syda | Cigna-Evernorth Services Inc, USA

Abstract

Artificial Intelligence is often limited not by models or computing power, but by data. In enterprise environments, real-world data is frequently restricted due to privacy, regulatory constraints, and limited accessibility—leading to stalled innovation and unvalidated AI solutions. This keynote explores how synthetic data is emerging as a strategic enabler to overcome these barriers. Using examples from large-scale industry implementations, we will discuss how synthetic datasets can simulate realistic scenarios, accelerate model development, support safe experimentation, and improve generalisation without exposing sensitive information. Attendees will gain insights into practical methods for generating synthetic data and how it can be applied in research, prototyping, and testing. The session aims to connect academic curiosity with enterprise realities, empowering future engineers and researchers to approach AI challenges with a data-first innovation mindset.

Keynote Lecture-13

Generative AI and RAG in Finance: Turning Noisy Data into Real-Time Decisions

Priyank Tailor

Data Scientist & Researcher | Credit Risk, Fraud Detection, Financial AI & Compliance, New Jersey, USA

Abstract

This keynote explores how generative AI and Retrieval-Augmented Generation (RAG) can transform noisy financial information into clear, real-time insights for decision-makers. Building on recent research in market analysis, earnings-call sentiment, and unstructured financial text, the talk focuses on practical techniques rather than heavy theory. It explains how a RAG system combines retrieval, vector search, and large language models to produce accurate, grounded responses while reducing hallucinations. Attendees will see how RAG workflows can be applied to financial news, SEC filings, social sentiment, and event-driven analysis. The session is designed for a broad audience and emphasizes intuitive explanations, examples, and architecture patterns that can be adapted to other domains beyond finance.

Keynote Lecture-14

Digital Manufacturing & Sustainability: How the Industry Moved in the Last 10 Years

Prahlad Chowdhury

Solution Architect, Fujitsu, MI, USA

Abstract

Over the past decade, digital manufacturing has undergone a significant transformation, driven by rapid advancements in automation, data analytics, and connected production systems. These innovations have not only enhanced operational efficiency but also strengthened the industry's commitment to sustainability. The integration of digital twins, industrial IoT, and AI-enabled optimisation has reduced waste, improved energy management, and enabled predictive maintenance, thereby lowering carbon footprints across manufacturing sectors. Additive manufacturing has further contributed by minimising material consumption and enabling localised production. At the same time, sustainability frameworks and regulatory pressures have encouraged manufacturers to adopt circular economy principles and transparent lifecycle assessment practices. As a result, digital manufacturing has evolved into a strategic enabler of environmental stewardship, supporting long-term resource efficiency and cleaner production processes. Collectively, these developments illustrate how technology-driven approaches have reshaped the industry's path toward sustainable and resilient manufacturing.

Keynote Lecture-15

AI-Driven BGP Optimisation: A Framework for Dynamic Path Rewriting

Darshan Kumar Prajapati

Network Engineer, LAN/WAN setup and troubleshooting, Edison, NJ, USA

Abstract

Border Gateway Protocol (BGP), the de facto inter-domain routing protocol for the global internet, remains largely dependent on static policy-based configurations that frequently result in suboptimal cross-continental path selection. These inefficiencies manifest as increased latency, packet loss, and substantial unnecessary transit costs due to the protocol's limited awareness of real-time network conditions and application requirements. This presentation introduces a novel framework for AI-driven BGP path rewriting that leverages machine learning to dynamically optimize inter-domain routing decisions. Our approach integrates three key innovations: (1) predictive analytics for forecasting path performance using historical and real-time data, (2) multi-objective optimization balancing latency, cost, and reliability metrics, and (3) a path rewriting mechanism that intelligently manipulates BGP attributes to influence routing decisions. Through simulation-based evaluation, our framework demonstrates a 32% reduction in latency, 28% decrease in transit costs, and 45% faster convergence during path failure scenarios compared to conventional BGP implementations. The proposed system addresses significant gaps in current BGP operations, particularly the economic impact of suboptimal peering decisions and the technical limitations of reactive path selection mechanisms. We further identify emerging research avenues in decentralized internet infrastructure and quantum-resistant routing protocols that build upon our work.

Keynote Lecture-16

Observability-Driven AI: Ensuring Trust and Performance in MLOps Pipelines

Dr. Rakeshnag Dasari

Sr DevSecOps/AI/MLOps Engineer, AB Technologies Inc, New Jersey, USA

Abstract

Modern enterprises increasingly rely on AI and machine learning to drive innovation, but success in production demands more than automated pipelines—it requires deep, continuous visibility into every model, dataset, and decision. Observability-driven AI is emerging as a critical evolution of MLOps, turning monitoring from a reactive safeguard into a strategic capability for resilience and performance. This keynote explains why observability is the foundation of trustworthy AI systems, especially as organizations face risks such as data drift, model degradation, and explainability gaps in complex, real-world environments. It will show how embedding observability throughout the ML lifecycle—from experimentation to large-scale deployment—enables faster diagnosis, proactive governance, and collaboration between data, engineering, and business teams. The session will also highlight cloud-native tools, open frameworks, and explainability techniques that help enterprises build transparent, compliant, and resilient AI, ensuring that AI investments deliver durable value with confidence and trust.

Keynote Lecture-17

.Revolutionising Bacteriophage Research: The Transformative Role of Machine Learning in Discovery and Therapeutic Application

Dr. Aditi Singh

Professor, Amity Institute of Biotechnology, Amity University Lucknow Campus,

Gomti Nagar Extension, Lucknow - 226028 (INDIA).

Correspondence Email: singh.aditi00@gmail.com

Abstract

Bacteriophages (phages), viruses that selectively infect bacteria, are re-emerging as critical tools to combat antibiotic resistance and as precision modulators of the microbiome. However, the vast phage sequence space (>10^6 unique contigs in public databases and counting), their extreme genetic diversity, and the labor-intensive nature of wet-lab validation have historically hindered rapid discovery and deployment. Machine learning (ML) has emerged as a powerful accelerator across the entire phage research pipeline. In phage discovery, deep learning models trained on genomic and metagenomic datasets (e.g., convolutional neural networks and transformers) now predict phage sequences, distinguish temperate from lytic lifestyles, and identify viral contigs in uncultured samples with >95 % accuracy, dramatically reducing false positives compared to rule-based tools. Protein languagemodels and graph neural networks further enable functional annotation of hypothetical proteins, prediction of host range at the strain level, and reconstruction of phage–bacterium interaction networks from limited data. ML also enhances phage engineering and cocktail design. Reinforcement learning and generative models optimize depolymerases, endolysins, and CRISPR spacers for broader spectrum or resistance evolution. AlphaFold-driven structure prediction combined with docking simulations accelerates identification of receptor-binding proteins, guiding rational tail-fiber swapping. In clinical applications, ensemble models integrating genomic, proteomic, and patient metadata predict therapeutic efficacy and safety, supporting personalized phage therapy. Recent benchmarks show ML-guided approaches can shorten phage candidate identification from months to hours and increase successful host lysis prediction accuracy by 20–40 % over traditional methods. As datasets grow through global initiatives (e.g., Phage Directory, IMG/VR), continual learning and foundation models trained specifically on virome data promise even greater gains. By bridging massive sequence data with predictive power, machine learning is transforming bacteriophage research from an empirical, low-throughput discipline into a predictive, scalable science poised to deliver next-generation antimicrobial solutions.

Keywords: Bacteriophage discovery, Machine learning, Phage therapy, Host range prediction,

Viral genomic

Keynote Lecture-18

Scanning-as-a-service: Building data governance across hybrid cloud

Yashwardhan Rathi

Data Platform Engineer | Building Scalable, Secure Cloud Infrastructure Solutions, Truist, Atlanta, Georgia, USA

Abstract

Deploying enterprise-wide data classification across hybrid cloud environments requires balancing governance requirements with technical scalability. This session shares lessons from building scanning-as-a-service infrastructure that processes 4+ petabytes across 1,000+ applications, covering architecture decisions, multi-cloud challenges, and evolving from compliance-driven scans to integrated data governance pipelines. Who should attend: Data engineers building governance solutions, platform engineers managing multi-cloud infrastructure, and data leaders implementing classification or compliance initiatives. Attendees working in regulated industries or managing enterprise-scale data pipelines will gain practical insights from real-world hybrid cloud deployment challenges

Keynote Lecture-19

Moving Beyond the Pilot: Scaling Agentic AI and LLM Agents for Enterprise-Wide Transformation

Hemang Upadhyay

Strategic Product Leader | Driving Digital Product Innovation at LG Electronics, New Jersey, USA

Abstract

The majority of companies struggle to transition from generative AI experiments to scalable, quantifiable enterprise value. This session provides a strategic and practical roadmap for achieving genuine enterprise transformation using rule-free AI agents. We will address the critical challenges of implementation, specifically how to integrate GenAI and LLM agents into existing ecosystems (CMS, ERP, CRM) while maintaining trust, compliance, and demonstrable ROI. The talk will detail a phased approach, encompassing preparation, agent orchestration, and governance to guide product leaders and architects beyond the pilot stage. Attendees will gain actionable insights on leveraging industry-standard tools and methodologies to build autonomic, context-aware digital workforces. This session focuses on the translation of AI experimentation into measurable enterprise value, providing the essential frameworks for responsible and efficient growth of LLM agents within large organisations.

Keynote Lecture 20

AI-Driven Career Transformation: Preparing the Future Workforce Through Data, Automation & Digital Learning

Muskaan (Pearl) Juneja

Solutions Delivery Analyst at HOLT CAT & Co-founder of Wiseversity, Texas, USA

Abstract

The world of work is changing faster than most of us ever imagined. In the last few years, I've seen students, professionals, and even entire teams struggle with one common challenge: how do we keep up when technology keeps evolving? As someone who works at the intersection of data, AI, and real-world solution delivery, I've learned that the future isn't about replacing people, it's about empowering them. In this keynote, I share how AI, automation, and data-driven decision-making are transforming careers and creating opportunities for anyone willing to adapt. Drawing from my experiences at HOLT CAT, where we solve complex business problems using analytics and scalable digital systems, and from mentoring thousands through Wiseversity, I'll break down what truly drives career transformation today. We'll explore a simple but powerful framework: mindset, skillset, and toolset, that helps individuals stay relevant and grow in an AI-first world. I'll also share real examples of people who changed their trajectories by embracing digital learning and AI-powered tools

Keynote Lecture-21

Psychosocial Digital Twins: Soft Computing Models for Worker Emotion, Stress, and Human Behaviour in Smart Factories

Shrutika Mokashi

Business Intelligence Developer – ASSA ABLOY Americas, Connecticut, USA

Abstract

As industries move toward adaptive and human-centric automation, understanding the emotional and behavioural states of workers has become critical for both safety and performance. This keynote introduces *Psychosocial Digital Twins (PDTs),* virtual models that replicate not only physical processes but also human stress, mood, fatigue, and decision behavior. Using soft computing techniques such as fuzzy logic, neuro-fuzzy inference, and fuzzy cognitive maps, PDTs help interpret ambiguous psycho-physiological data and model worker states under uncertainty. The talk presents a practical and forward-looking roadmap for integrating psychosocial modeling into IoT-enabled smart factories, enabling organizations to create emotionally aware, ethically aligned, and resilient Industry 5.0 ecosystems.

Keynote Lecture-22

AI-Driven Cloud Infrastructure: Transforming DevOps and Enterprise Architecture for the Next Generation

Siva Vanama

Sr. DevOps Engineer / SRE Architect, JP Morgan, Florida, USA

Abstract

This keynote explores how AI and machine learning are revolutionising cloud infrastructure, DevOps, and enterprise architecture. The session will cover real-world applications of AI-driven automation in cloud orchestration, intelligent monitoring, and scalable platform engineering. Attendees will learn about the latest trends in AIOps, including predictive scaling, anomaly detection, and self-healing systems, and how these innovations are reshaping the future of IT operations. The talk will also highlight best practices for integrating AI into DevOps pipelines and enterprise architecture, enabling organisations to achieve greater efficiency, resilience, and innovation. If time permits, case studies from large-scale deployments will be shared, offering actionable insights for researchers, practitioners, and industry leaders.

Keynote Lecture-23

Towards Fair and Trustworthy Medical Imaging AI: A Glaucoma Progression Benchmark on RNFLT Maps

Edidiong Elijah Akpan

Researcher, AI/ML in Health Care, University of Louisiana at Lafayette, USA

Abstract

Glaucoma is a leading cause of irreversible blindness worldwide, and predicting which patients will progress remains difficult, especially in underrepresented populations. This keynote introduces TAC-RNFLT-Bench, a fairness-aware benchmark for glaucoma progression prediction using retinal nerve fibre layer thickness (RNFLT) maps derived from optical coherence tomography (OCT). We systematically evaluate ImageNet-pretrained convolutional neural networks and a logistic-regression baseline under severe class imbalance (~9% progressors), using class-weighted training, Youden-optimised decision thresholds, and race-stratified performance analysis. Beyond aggregate AUC, we quantify fairness through equal-opportunity gaps, subgroup sensitivity/specificity, and calibration behaviour (Brier score and reliability curves). Our findings illustrate how threshold selection and data imbalance can amplify or obscure bias in small demographic subgroups. I will discuss methodological lessons for building fairer medical imaging models, including robust evaluation under data scarcity, transparent subgroup reporting, and the limits of fairness claims on single-site datasets. Finally, I will outline future directions toward multimodal, federated, and clinically deployable AI systems for ophthalmology and broader healthcare.

Keynote Lecture-24

Building Cost-Efficient AI Agents for Enterprise SaaS: Infrastructure, Economics, and Operational Excellence

Sri Kolagani

Director, CRM Engineering @ Elastic, Dallas, TX, USA

Abstract

Generative AI adoption in enterprise SaaS has reached critical mass, yet only 39% of organisations report meaningful financial impact from their deployments. This disjuncture between pilot success and production scalability reflects fundamental challenges in architectural design, operational governance, and economic optimisation. This keynote examines how organisations can construct AI agent systems that operate efficiently across customer acquisition, retention, and support workflows whilst maintaining strict cost and energy constraints. Drawing on infrastructure patterns from cloud-scale deployments, we will explore domain-specific agent architectures that reduce computational overhead by up to 60%, cost management strategies that align agent deployment with business outcomes, and observability frameworks that enable safe autonomous operation at scale. We conclude by synthesising these findings into a practical roadmap for CRM and customer operations teams implementing agentic systems in increasingly competitive SaaS environments.

Keynote Lecture-25

Snowflake as a Sensor: Application in Healthcare Case Outreach Management

Shalmali Joshi

Advanced Analytics Consultant@Elevance Health, Atlanta, Georgia, USA

Abstract

The relationship between healthcare providers and members has become more critical over time with the advancement of healthcare and the multiple types of coverage available to healthcare members. Currently, it is vital that healthcare providers reach out to members in an effective way throughout their engagement term. The stages of these engagement terms are before inpatient hospitalization, while inpatient hospitalization care and then outpatient care to be done later. This tracking of member outreach is called Member Case outreach management. In the ever-changing world of healthcare data science, it's important to track the data related to case management effectively. Clinically, this data supports claims, billing, policy development, cost of care calculation as well as key clinical insights. Key clinical insights like percentage of members engaged in each healthcare program are necessary to understand how well or not the program is faring. Modern cloud computing tools like Snowflake have been powerhouses of case management data over the years. Snowflake is uniquely known for its modern cloud - native architecture and more seamless integration. Healthcare professionals, doctors and data scientists alike, need to derive insights from previous or existing case management data to aid better future healthcare case management.

Keynote Lecture-26

Automation-Driven Digital Transformation Blueprint: Migrating Legacy QA to AI-Augmented Pipelines

Sujeet Tiwari

IT Professional, USA

Abstract

Industries are going digital because new technologies enable quicker and more successful software delivery. Conventional Quality Assurance (QA) systems, although, pose a very important challenge because of manual testing, test scripts that are both high-maintenance and slow regressions. This paper will provide a roadmap towards the switch to AI-enhanced automation pipelines and will demonstrate the tangible advantages of AI integration. The migration transforms into a 70 percent cycle time cut in regression, which used to take 90 days, and automation coverage of 10 percent up to 80-90. AI, as well, saves 50 percent of the handwork in testing, optimizes the supply of test cases, and saves 30 percent of defect escapes. An AI-based solution is more efficient, covers more tests, and has high-quality software. The most important recommendations to achieve a successful migration are to complete an evaluation of the current QA processes, establish the baseline metrics, and start with the pilot program in order to scale the automation. As AI progresses further, it is expected to become commonplace to have full autonomous test generation and predictive quality analytics, which will provide faster and more accurate testing results. Companies implementing AI-motivated QA pipelines will be able to gain a competitive advantage by improving the efficiency of their testing, achieving higher quality of their products, and shortening the time-to-market.

Keynote Lecture-27

Dock-to-Data Alignment: Real-Time Over-Shipment Processing for Smarter, Faster Healthcare Supply Chains

Pankaj Arora

Healthcare Supply Chain Leader at Deloitte, USA

Abstract

Over-shipments in the healthcare supply chain often create operational bottlenecks that disrupt receiving workflows, delay invoice reconciliation, and reduce supply chain efficiency across large healthcare networks. Traditionally, receivers cannot process quantities exceeding the purchase order (PO) without waiting for a buyer update or requester approval, which causes excess items to accumulate at the dock and introduces unnecessary administrative delays. This paper presents a streamlined over-shipment management solution that allows receivers to immediately accept delivered quantities while initiating automated notifications to both the requestor and the PO buyer. The requester is prompted to determine whether the additional items are needed, while the buyer is required to update the PO irrespective of acceptance or return decisions. This ensures accurate alignment of PO, Receipt, and Invoice for three-way match compliance and timely supplier payment. In cases where the over-shipped quantity must be returned, the updated PO enables the return transaction to be created without financial discrepancies. By removing the dependency on pre-receipt approval and eliminating dock-level buildup, this solution enhances operational flow from the moment items arrive at the facility. The result is improved system accuracy, reduced manual workload, faster financial reconciliation, and a scalable process that supports high-volume, multisite healthcare organizations. This approach demonstrates significant value in optimizing healthcare supply chain performance across receiving, inventory, purchasing, and accounts payable functions.

Keynote Lecture-28

Evaluating Event-Driven Architecture Approaches for Real-Time Risk Detection and Control in Financial Platforms

Harsh Parnerkar

Software Developer, JP Morgan Chase & Co., Plano, Texas, USA

Abstract

Event-driven architectures (EDAs) are reshaping financial risk analytics by moving from traditional batch workflows to real-time monitoring. This session presents a comparative view of a Kafka–Flink pipeline alongside Temporal Risk Graphs (TRGs), Adaptive Model Orchestration (AMO), and Privacy-Preserving Stream Processing (P2SP). Together, these approaches cut detection latency by 85%–90% compared with batch systems and raise fraud-detection accuracy and recall to 0.91 and 0.87. They also reduce false positives by 40%, maintain balanced accuracy, and improve customer experience. The system supports 100,000 events per second while keeping p99 latency under 200 ms and meeting a 99.95% SLA. These results show that EDAs can deliver speed, accuracy, and accountability while addressing persistent challenges such as micro-batch anomalies, model-drift adaptation, and cross-domain integration in financial risk environments.

Keynote Lecture-29

Reimagining Customer Service with Agentforce: The AI-Powered Future of Support

Hemadri Ravilla

Salesforce Technical Lead, USA

Abstract

Customer expectations are evolving rapidly, and AI is reshaping how service organizations keep pace. This keynote explores how Salesforce Agentforce empowers teams with autonomous AI agents, real-time data, and trusted CRM intelligence to deliver faster, more personalized support. Attendees will learn how Agentforce streamlines case resolution, automates complex processes, and augments human agents to focus on higher-value interactions. Highlighting practical use cases and future trends, this session offers a clear view of how AI and humans can work together to create efficient, customer-centric service operations—and how Agentforce positions organizations for the next era of intelligent support.

Keynote Lecture-30

Federated AI for Secure and Scalable Clinical Diagnostics From Architecture to Real-World Deployment

Sai Rupesh Kagga
Sr. Full Stack Java Developer, New York City, USA

Abstract

Federated learning provides a practical way to enhance clinical diagnostics while keeping sensitive patient data securely within each organization. This keynote will explore how federated models can be designed, trained, and deployed in real healthcare settings, with a focus on security, interoperability, and scalability. We will review key architectural patterns that enable distributed learning across hospitals, laboratories, and clinical platforms. The session will also discuss how standards such as FHIR and HL7 can streamline data exchange and maintain consistency during model development. Important considerations for production deployment, including security measures, audit mechanisms, and workflow integration, will be highlighted. Real-world examples will illustrate how distributed model development can be incorporated into existing clinical systems, supported by cloud-native components. Attendees will gain practical insights into implementing federated learning responsibly at scale, improving diagnostic accuracy, and enhancing operational efficiency in modern healthcare environments.

Keynote Lecture 31

Top 10 QA Mistakes in Financial Systems - And how to avoid them

Sanjay Das
Associate Manager in Quality Assurance Testing, USA

Abstract

Quality Assurance (QA) in financial systems presents unique challenges due to strict regulatory requirements, high-volume data processing, and the potential for significant financial and reputational impact when failures occur. This presentation will illustrate the ten most common QA mistakes observed across banking, retirement, insurance, and trading platforms—ranging from incomplete test coverage and poor data quality to environment mismatches, automation gaps, and inadequate regression strategies. Through real-world examples drawn from mission-critical financial applications, the article highlights how these issues lead to production defects, compliance risks, and operational disruptions. Each mistake is paired with actionable, industry-proven solutions. The goal is to provide technology leaders, QA professionals, and compliance stakeholders with a practical blueprint for strengthening reliability, reducing production incidents, and ensuring the robustness of financial software systems in an increasingly digital and regulated landscape.

Keynote Lecture 32

Skills of the Future Data Engineer

Mr. Vijaya Reddy

Abstract

As organizations increasingly rely on data-driven decision-making, the role of the data engineer is rapidly evolving beyond traditional ETL development into a strategic, cloud-native discipline. The future data engineer is expected to design intelligent, automated, and scalable data platforms that power real-time analytics and artificial intelligence.

This session explores the key technical, architectural, and business skills required for the next generation of data engineers. It covers essential competencies in cloud platforms, distributed data processing, streaming architectures, DataOps and CI/CD automation, data security and governance, and AI-assisted data engineering. The talk also highlights the growing importance of domain knowledge, collaboration, and problem-solving skills as data engineers take on a more business-centric role. Attendees will gain a clear understanding of how the data engineering skillset is transforming, what skills to focus on for long-term career growth, and how to stay relevant in an era of real-time data, automation, and intelligent analytics

Keynote Lecture 33

Reinventing Enterprise Operations Through Intelligent Orchestration

Mr. Sandeep Kumar

Principal Software Engineer, North Carolina, USA)

Abstract

As digital enterprises confront rising complexity, traditional rule-based automation is no longer sufficient to deliver agility, resilience, and intelligence at scale. This keynote explores the shift from process automation to intelligent orchestration, where AI-driven decisioning, dynamic workflows, and continuous learning redefine how organizations operate.

Keynote Lecture 34

Integrating Vision Transformers and Rough Set Theory for Enhanced Breast Cancer Diagnosis through Histopathological Image Analysis

Dr. Meenakshi Srivastava
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Abstract

Breast cancer diagnosis is a critical area in medical imaging that has traditionally relied on convolutional neural networks (CNNs) for image analysis. This paper introduces a novel framework for breast cancer diagnosis that leverages Vision Transformers (ViTs) and Rough Set Theory (RST) to achieve superior performance compared to CNNs. The proposed methodology involves a comprehensive process starting from data acquisition and preprocessing, feature extraction using ViTs, feature reduction using RST, model training and evaluation, and clinical deployment. The ViTs are pre-trained on extensive histopathological image datasets, demonstrating exceptional accuracy even with limited training data. The integration of RST further enhances the model's performance by selecting the most informative features and reducing dimensionality. The resulting system achieves an impressive accuracy rate of 96% on a dataset of 250 histopathological images, surpassing human accuracy scores set at 91%. This research signifies a groundbreaking approach to breast cancer diagnosis, offering improved detection, precise image analysis, and enhanced staging capabilities, ultimately contributing to more effective and tailored treatment strategies.

Keywords - Computer vision, Histopathological images, Medical image analysis, Rough Set Theory (RST), Image Classification, Feature Extraction, Feature Reduction.

Keynote Lecture 35

An overview of Oracle AI and Agents for Fusion ERP

Mr. Pavan Kumar Rajagopal Prakashkumar
Sr. Principal Consultant, Houston, Texas, USA

Abstract

Aim: The aim of the paper is to examine how AI agents within Oracle AI Agent Studio can be integrated into Oracle's ERP systems to enhance intelligent business process automation, improve system responsiveness, and optimize overall business operations.
Methods: The paper focuses on the design, deployment, and management of AI agents residing in Oracle Agent Studio and their role in ERP module operand process optimization. It discusses implementations of agentic AI within Oracle Fusion Cloud Applications across finance, HR, and operations.
Results: The study finds that AI agents support advanced workflow automation, contextual decision-making, and problem-solving, which help reduce user workload and improve system responsiveness. The paper also highlights automated audit log creation, compliance workflows, and automated stakeholder prompts as key functional benefits.

Conclusion: The paper concludes that integrating AI agents into ERP systems enhances responsiveness, openness, and operational efficiency, aligning with the author's perspective on practical implementation, system scalability, and the evolving role of Artificial Intelligence in ERP systems.

Recommendations: The author recommends the integration of AI agents within ERP systems to further optimize workflow automation, improve decision-making processes, and support more efficient business operations.

ABSTRACTS

(ORAL PRESENTATIONS)

OP-01

Enhancing Device Applications through Electrical Characterisation of Compound Semiconductors

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ABSTRACT

This research offers a comprehensive overview of the electrical characterization techniques employed in compound semiconductor studies across various device applications. Compound semiconductors are highly attractive for numerous electrical and optoelectronic devices due to their unique properties. Essential material characteristics such as carrier concentration, mobility, and trap densities are determined through key techniques like deep-level transient spectroscopy, capacitance-voltage profiling, and Hall effect measurements, as highlighted in the abstract. The study also emphasizes the significance of these characterization methods in enhancing device reliability and performance, providing valuable insights for future advancements in compound semiconductor technology. Photoreflectance balance spectroscopy and photoconductivity spectroscopy were employed to characterize semiconductor materials with exceptional precision. Additionally, the ternary Cd1-xZnxTe alloy was investigated to manage its composition for producing lattice-matched substrates, which are crucial for developing Hg1-xCdxTe used in infrared detectors. The composition of CdZnTe samples was determined using band gap energy calculations derived from photoreflectance spectroscopy, which can precisely estimate energy levels in semiconductors.

Keywords: Electrical, Semiconductors, Cdznte, Optoelectronic, Photoreflectance, Spectroscopy

OP-02

Performance Analysis of Automotive Exhaust Manifolds Using CFD Techniques

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Kuppam Engineering College, Kuppam, Andhra Pradesh, India[1]

Abstract

This study investigates the thermal and fluid dynamic performance of a four-cylinder automotive exhaust manifold using Computational Fluid Dynamics (CFD) simulations, conducted with ANSYS 2024 R2. The analysis examines the manifold under various inlet velocities (20–60 m/s) and a constant exhaust gas temperature of 1000 K. Key performance metrics such as pressure distribution, velocity profiles, temperature gradients, and mass flux were evaluated. The results indicate that high-pressure regions are concentrated near the inlet ports, with pressure dropping significantly towards the outlet, leading to efficient exhaust gas evacuation. The temperature distribution remained relatively uniform throughout the manifold, except for slight thermal gradients during transient startup and cooling phases. The thermal analysis identified critical hot spots near the outlet, suggesting potential risks for thermal fatigue. Velocity distribution showed significant increases as the exhaust gases merged at the collector, with high-velocity regions reaching up to 3467 m/s at the outlet. Mass flux analysis demonstrated that the manifold successfully facilitated balanced gas flow from all inlets, confirming good scavenging and minimal recirculation zones. The study highlights the impact of manifold geometry on flow uniformity, thermal management, and overall efficiency. These results support the use of CFD for optimizing exhaust manifold design, ensuring reduced backpressure, improved thermal stability, and enhanced engine performance.

Keywords: thermal analysis, fluid dynamics, pressure distribution, velocity profile, temperature gradient,

OP-03

Evaluate Several Deep Learning Algorithms for Facial Recognition

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Abstract

Biometric recognition software is increasingly important in administrative, security, and commercial systems, including facial recognition, fingerprint scanning, voice identification, and retinal scanning. This research introduces a small, effective deep learning model that outperforms previous models on face recognition benchmarks. The model uses one-shot or few-shot learning to produce accurate feature embeddings, using 'Deepface' and the Multitask Convolutional Neural Network (MTCNN). The FaceNet-512 pretrained model handles feature extraction, face representation, and recognition. The study presents a hyperspectral face recognition/identification (HSIConvNet) algorithm based on improved firefly and CNN, outperforming state-of-the-art (SOTA) HSI face recognition algorithms. Facial expressions are crucial for recognising human features, with real-time applications in non-verbal human behaviour, human-computer interaction, and computer vision.

Keywords- Biometric Recognition, Deep Learning Models, FaceNet-512 & MTCNN, Hyperspectral Face Recognition (HSIConvNet), One-shot/Few-shot Learning

OP-04

Analyzing Refactoring Strategies for Handling Code Smells using Python Programming

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Abstract

This research investigates the presence of code smells in Python programming and evaluates systematic refactoring strategies for their mitigation. Beginning with a comprehensive literature review, the study identifies common code smells and their corresponding corrective methods. Using a dataset of student projects, code smells were detected with the Sourcery tool and then manually refactored. Each instance was analyzed for effectiveness, challenges, and outcomes. Results highlight frequent patterns such as use of string concatenation, nested conditionals, bare exceptions, and inefficient loops, alongside their best-fit refactoring techniques. This integration of theoretical insights and practical case studies contributes to improving code quality, readability, and maintainability in Python development.

OP-05

Burnouts in the Medical Profession by Management of Drug Abuse Patients

Muneer Ahmad[1] and Javvid Muzamil[2]

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[2]Assistant Professor, Department of Medical Oncology, Faculty of Super Specialty Hospital, Government Medical College, Srinagar.

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Abstract

Catastrophic drug abuse is prevailing all over the world and its incidence and prevalence rate is higher in developing countries. Drug menace is a big problem in today's world and it effects morally and spiritually both family and community. Due to chronic stress workload, emotional exhaustion emergency duties of handling both acute and drug abusers, lack of institutional support, electronic record maintaining fatigue, personal medico stress of family, anxiety, depression, family conflict and sometimes suicidal ideas. Sometimes burnout and job stress among medical professionals are significant risk factors for substance misuse and pushes suicidal rate of medicos. Though WHO, AMA and Indian medical association have raised and are raising concerns about mental health crises in healthcare workers and it becomes pivotal to government to come up with a comprehensive approach such as institutional programs like physician health programs (PHPs), cognitive behavioral therapy (CBT), mindfulness, supervised rehabilitation and peer support networks to save the endanger medical fraternity of healthcare's dealing with drug abusers. Objectives: 1) To aware people about drug addiction and its consequences 2) To analyze burnouts in medical profession. Methods: Various drug abuse centers were visited randomly and interview method was used to collect data from medical professionals like doctors, nurses, data entry employees. The study has concluded that drug abuse patients create a burden on medical professionals due to the complex physical, psychological and social issues they present. Medical professionals face emotional stress, time constraints and ethical challenges while dealing with such patients. Effective management demands compassion, patience and specialised training to already overburdened medical systems.

Keywords: Burnouts, mental health, family, medical professionals, rehabilitation

OP-06

Sweat-Based Troponin Detection as an Early Indicator of Myocardial Infarction

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Abstract

Myocardial infarction (MI) is one of the primaries and the leading cause of worldwide morbidity and mortality with uncertainty on the part of the timely diagnosis, which could rather save the lives of millions. Cardiac Troponin, particularly Troponin I and Troponin T are the biomarkers for detecting myocardial injury and their availability in the blood stream is rare until with major cardiac challenges or in case of cardiac injury or during heavy exercises. Routine Troponin detection is majorly done through venous blood system and to date noninvasive technique of detecting the Troponin for early onset of myocardial infarction is ruled out. In this article we propose the innovative design of a machine which can detect the Troponin through sweat. Sweat, being a readily accessible bio-fluid containing low concentrations of proteins, metabolites, and electrolytes may be explored for the early detection of Troponin and can act as an early detection of myocardial infarction. Wearable bio-sensing technologies, involving the microfludic device for sweat collection and channelizing the sweat to be conjugated through the Troponin antibody-chromophore complex and the development of electrochemical sensors are the main take off the device for noninvasive detection of Troponin as a part of the early detection and warning. The innovative planning of device constituting an electrochemical sensor may face the challenge of detection the Troponin due to its scanty concentration in sweat compared to blood stream. Furthermore, inter individual variability in sweat rate, and contamination may affect measurement accuracy. In spite of the challenges of devising an innovative machine, this daunting challenge of detecting the sweat based Troponin as an early detection of myocardial infarction shall act as a warning for the patients to get early medication before a fatal incidence happens. This shall be one of the best innovative instruments saving millions from the jaws of death.

Keywords: Myocardial Infarction (MI), electrochemical sensor, Troponin etc.

OP-07

Role of Digital Twin in Healthcare

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Abstract

Digital Twins are emerging as a transformative technological innovation in the healthcare ecosystem, enabling the creation of real-time, data-driven virtual replicas of patients, medical devices, and clinical environments. By integrating data from electronic health records, IoT sensors, imaging systems, and AI-driven analytics, digital twins support highly personalized medicine, predictive diagnostics, and optimized treatment planning. They allow clinicians to simulate disease progression, test therapeutic interventions, and anticipate patient-specific outcomes with enhanced precision. In hospital management, digital twins improve workflow efficiency, resource allocation, and process optimization. Furthermore, they accelerate medical device development, drug discovery, and clinical research through virtual testing and modeling. Despite challenges related to data privacy, interoperability, and implementation complexity, digital twins hold immense potential to revolutionize modern healthcare by enabling proactive, patient-centric, and evidence-based decision-making.

Keywords: Digital Twins; Healthcare Innovation; Personalized Medicine; Predictive Analytics; Surgical Simulation; Medical Devices; Remote Monitoring; IoT in Healthcare; Hospital Management; Virtual Clinical Trials; Data-Driven Healthcare; Artificial Intelligence in Healthcare.

OP-08

Application of Artificial Intelligence in Electric Vehicles

Dr. Praveen Kumar Sharma

AICTE

Abstract

AI is applied in electric vehicles for improving battery management, enabling autonomous driving, enhancing safety and energy efficiency, and optimizing the overall user experience. Key applications include predictive maintenance to extend component life, personalized cabin settings, and smart navigation that considers charging availability and cost. AI monitors battery health by analyzing temperature, voltage, and current to optimize performance and prevent thermal runaway. AI algorithms process data from sensors (like LiDAR and cameras) to enable real-time decision-making for self-driving and driver-assistance systems. AI improves energy efficiency by optimizing power transmission and other energy-consuming systems. AI is used in manufacturing for tasks like high-precision SMT assembly and to ensure quality control in component mounting.

OP-09

Early Identification of Psychological Disorders Using AI: Technical Opportunities and Ethical Considerations

Dr. Saroj Sangeetha G

Assistant Professor, Department of Psychology, Manikam Ramaswami College of Arts & Science, Madurai, Tamilnadu, India- 625005

Abstract

Artificial Intelligence (AI) is reshaping how we understand and support mental health, especially in the early identification of psychological disorders. Many individuals experience symptoms long before they seek help, often due to stigma, lack of awareness, or limited access to mental-health professionals. Early signs can also be subtle—changes in speech, sleep patterns, facial expressions, or daily behaviour that are easily overlooked even by trained clinicians. AI offers a new way to notice these small shifts by analyzing patterns that humans may miss. Using tools such as machine learning, natural language processing, computer vision, and wearable sensors, AI can detect early indicators of conditions like depression, anxiety, PTSD, ADHD, and schizophrenia. It can observe speech tone, emotional expression, social-media behaviour, and physiological signals to gently flag when someone may be at risk. This creates the possibility of timely support, reduced delays in diagnosis, and more personalized interventions. For communities where mental-health resources are scarce, AI-enabled screening could serve as an accessible first step toward care. At the same time, using AI for psychological assessment brings important ethical challenges. Mental-health data is deeply personal, and concerns about privacy, data misuse, and digital surveillance must be taken seriously. AI systems can also reflect biases present in the data they are trained on, potentially misclassifying or disadvantaging certain cultural or social groups. The lack of transparency behind some AI models makes it difficult for individuals to understand how decisions are made, raising questions about trust and informed consent. While technology can support mental-health care in powerful ways, it should complement, not replace, the empathy, judgment, and insight that only human professionals can offer. Responsible, ethical, and culturally sensitive development is essential to ensure AI truly benefits those who need it most.

OP-10

A Comprehensive Review of Quantum-Resistant Cryptography: Current Algorithms and Future Directions

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Abstract

The rapid advancement of quantum computing poses a significant threat to classical cryptographic systems, particularly those relying on mathematical problems that quantum algorithms can efficiently solve. Consequently, the development and adoption of quantum-resistant, or post-quantum, cryptographic algorithms has emerged as a global priority. This review paper provides a comprehensive examination of the current landscape of quantum-resistant cryptography, focusing on major algorithmic families including lattice-based, hash-based, code-based, multivariate, and isogeny-based schemes. It highlights the fundamental principles, security assumptions, performance characteristics, and implementation challenges associated with each category, with special attention to algorithms standardized or shortlisted by the National Institute of Standards and Technology (NIST). Additionally, the paper discusses migration strategies, industry readiness, and the practical implications of transitioning from classical to post-quantum security systems. Finally, it identifies emerging research trends and future directions essential for ensuring secure communication in the post-quantum era.

Keywords: Quantum-Resistant Cryptography, Post-Quantum Cryptography, Lattice-Based Cryptography,NIST Standards, Quantum Computing.

OP-11

Enhancing IoT Security Through Blockchain-Based Authentication Mechanisms

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Abstract

The rapid evolution of Internet of Things (IoT) applications across healthcare, smart industries, transportation, and home automation has led to the deployment of billions of interconnected devices. While IoT systems promise automation, data-driven insights, and ubiquitous connectivity, they also introduce significant cybersecurity concerns, particularly in the domain of authentication and identity management. Conventional centralized authentication architectures struggle to support large-scale, heterogeneous IoT environments due to issues such as single point of failure, latency, high maintenance requirements, and susceptibility to credential-based attacks. In response, blockchain technology has recently emerged as a promising paradigm for secure and decentralized authentication. This review paper provides a comprehensive analysis of existing blockchain-driven authentication models implemented for IoT security. The study critically examines various blockchain mechanisms—including public, private, and consortium blockchain implementations as well as lightweight consensus algorithms tailored for resource-constrained IoT devices. Research contributions focusing on smart contract-based authentication, distributed identity management, multi-layer authentication, and access-control mechanisms are systematically reviewed to evaluate their performance in terms of scalability, latency, energy consumption, interoperability, and resistance to cyber-attacks. The paper further categorizes authentication approaches based on application domains, such as industrial IoT(IIoT), smart healthcare, vehicular IoT, and smart homes, highlighting the suitability of blockchain across diverse deployment environments. In addition, the review identifies current limitations in blockchain-enabled IoT authentication, including computational overhead, consensus inefficiencies, privacy concerns, and lack of standardized security evaluation benchmarks. Through trend analysis and comparison of state-of-the-art methodologies, this paper highlights evolving directions in the research community and emphasizes the importance of optimizing blockchain architectures for real-time and large-scale IoT operations. The findings aim to support researchers and industry professionals by providing a consolidated understanding of the current landscape and emerging opportunities for strengthening authentication in next-generation IoT networks using blockchain technology

OP-12

Human-Centric Personalisation in Generative AI with Foundation Models

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Abstract

Foundation models have become transformative structures in the field of generative artificial intelligence, enabling scalable customization of digital content across various platforms. Unlike traditional machine learning systems, foundation models utilize large pre-trained knowledge bases and adapt easily to new tasks, providing unmatched flexibility in tailoring outputs to individual user preferences. Their capacity to integrate multimodal data such as text, images, audio, and video opens doors for highly contextualized personalization, where content aligns dynamically with user intent, cultural background, and behavioral patterns. The design of these models allows them to generalize across different domains while maintaining detailed adaptability, making them highly effective in recommendation systems, personalized education, healthcare communication, and targeted marketing. Generative AI driven by foundation models not only boosts relevance and engagement but also promotes inclusivity by accommodating linguistic diversity and accessibility needs. However, personalization raises challenges related to ethics, privacy, and bias mitigation, requiring strong governance frameworks. The relationship between personalization and generative creativity emphasizes the dual role of foundation models as both drivers of innovation and guardians of responsible AI. The integration of foundation models with reinforcement learning, federated learning, and explainable AI is expected to further enhance personalization strategies, ensuring transparency and trust. This overview highlights the critical role of foundation models in shaping the future of generative AI applications, where personalization becomes a fundamental aspect of human-centered digital experiences, including multimodal capabilities, inclusivity, and ethics.

Keywords: Foundation Models, Generative AI, Personalization, Multimodal Integration, Ethical, AI

OP-13

AI-Enabled ESG (Environmental, Social & Governance) Reporting and Sustainable Business

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Abstract

In recent years, Environmental, Social, and Governance (ESG) frameworks have emerged as critical benchmarks for evaluating an organization's long-term sustainability, ethical conduct, and societal impact. As global stakeholders regulators, investors, consumers, and supply chain partners demand increased transparency and accountability, organizations face unprecedented pressure to measure, monitor, and report ESG performance with accuracy, consistency, and timeliness. Traditional ESG reporting processes, which rely heavily on manual data collection, qualitative assessments, and fragmented documentation, are insufficient for addressing the scale, speed, and complexity of sustainability demands. In this context, Artificial Intelligence (AI) has become a transformative enabler, offering advanced analytical capabilities, automation potential, and predictive insights that can revolutionize ESG reporting and sustainable business management. This study explores the emerging paradigm of AI-enabled ESG reporting, examining how AI technologies facilitate high- quality sustainability disclosures, enhance decision-making, strengthen regulatory compliance, and drive strategic This study contributes to the existing body of knowledge by synthesizing current AI applications in ESG reporting, analyzing emerging adoption trends, identifying managerial implications, and highlighting future directions. Findings indicate that AI-enabled ESG reporting not only enhances transparency and compliance but also supports integrated thinking, enabling organizations to view sustainability as a strategic pathway for competitive advantage. Through improved data accuracy, predictive insights, and automated workflows, AI helps businesses transition from reactive compliance-driven reporting to proactive sustainability-driven value creation. As global stakeholders increasingly prioritize sustainable development, AI-enabled ESG frameworks will play a central role in shaping the future of corporate governance, operational excellence, investor relations, and long-term organizational resilience. Ultimately, AI-enabled ESG reporting represents a powerful convergence of technology and sustainable management philosophy. It elevates sustainability from a peripheral reporting function to a strategic business capability that drives responsible growth, stakeholder trust, and resilience in an era defined by climate change, social responsibility expectations, and digital transformation. The study concludes that AI-enabled ESG systems are not merely technological tools but foundational components of the next-generation sustainable enterprise, advancing global progress toward collectively shared environmental, social, and governance goals.

Keywords: Artificial Intelligence (AI), Environmental, Social and Governance (ESG), Sustainable Business Management, AI-Enabled Reporting Systems, Predictive Analytics, Responsible AI Governance, Machine Learning for Sustainability

OP-14

.Intelligent Automation Framework for Next-Generation Engineering Systems Using Machine Learning

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Abstract

The convergence of advanced computing, automation, and engineering is revolutionizing industrial and technological landscapes, enabling smarter, faster, and more resilient systems. This research presents an innovative framework that synergizes machine learning with automated engineering processes to optimize performance, enhance decision-making, and enable adaptive control in dynamic environments. By integrating real-time data acquisition, predictive analytics, and autonomous control mechanisms, the framework can detect anomalies, forecast system behavior, and optimize operational parameters with minimal human intervention. A comprehensive case study in smart manufacturing demonstrates the framework's transformative potential: energy consumption was reduced by 15%, production efficiency improved by 20%, and predictive maintenance schedules were optimized, minimizing downtime. The architecture is highly scalable and designed for seamless integration with Industrial Internet of Things (IIoT) ecosystems, facilitating intelligent monitoring and control across distributed systems. Additionally, the framework addresses critical challenges in data security, interoperability, and computational efficiency, ensuring reliable deployment in real-world engineering environments. This research underscores the role of intelligent automation in fostering sustainable, resilient, and adaptive engineering solutions. By bridging computational intelligence with automation technologies, it lays the groundwork for next-generation applications in autonomous robotics, smart grids, aerospace systems, and other complex engineering domains. The study highlights a pathway for transforming conventional engineering workflows into self-optimizing, predictive, and highly responsive systems, demonstrating both theoretical and practical significance.

Keywords: Intelligent Automation, Machine Learning, Smart Manufacturing, Predictive Analytics, Adaptive Control, Industrial IoT (IIoT), Autonomous Systems, Engineering Optimization

OP-15

Geospatial Analysis of LULC Change and Soil Erosion Risk in the Yamuna River Basin

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Abstract

This study investigates Land Use/Land Cover (LULC) dynamics and estimates potential soil erosion across the Yamuna River Basin using geospatial techniques and the Revised Universal Soil Loss Equation (RUSLE) model. The Yamuna Basin, characterized by diverse physiography, intensive agriculture, and rapid urban expansion, is highly vulnerable to soil degradation. To quantify spatial–temporal variations in erosion susceptibility, multi-source satellite data, rainfall records, and soil parameters were integrated within a GIS environment. LULC mapping was carried out to identify major land categories such as agriculture, forest, built-up, wasteland, and water bodies, which significantly influence erosion responses. The RUSLE factors—Rainfall erosivity (R), Soil erodibility (K), Slope length and steepness (LS), Cover management (C), and Conservation practice (P)—were derived using remote sensing datasets, digital elevation models, soil grids, and classified imagery. All spatial processing, including raster computation, map algebra, reclassification, zonal statistics, and layout preparation, was performed in ArcGIS Pro. The model outputs revealed substantial spatial variability in soil loss across the basin for the year 2024. Higher erosion hotspots were concentrated in steep terrain, degraded forest patches, and intensively cultivated regions lacking adequate conservation measures, whereas low soil loss values were observed in dense forested zones and stabilized agricultural fields. The study highlights that significant portions of the basin fall under moderate to high erosion risk, emphasizing the urgent need for targeted soil and water conservation strategies. The integrated GIS–RUSLE approach proved effective in identifying vulnerable zones and can support watershed managers, policymakers, and planners in designing sustainable land management interventions.

OP-16

A Multi-Metric Evaluation Framework for Enhancing Supervised Learning Models in Liver Disease Prediction

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Abstract

Early detection of liver disease is very important because it can help reduce the risk of liver problems. Supervised Machine Learning (ML) models help in predicting liver disease, but their performance depends on how they are evaluated and improved. In this research study, we examine different supervised learning models to understand how accurately they can predict liver disease. in this study, we use multiple evaluation methods, such as precision, recall curves, and K-Fold cross-validation to test the models more effectively, especially when the dataset is unbalanced. Several ML algorithms like Logistic Regression, Random Forest, Support Vector Machine, and Decision Tree are trained using real medical data. Many existing studies rely heavily on a single metric, such as accuracy. Our results show that using different evaluation metrics gives a better understanding of each model's performance and helps improve prediction accuracy. Overall, the study shows that using a combination of evaluation techniques can lead to more reliable Machine learning models for liver disease diagnosis.

Keywords: Liver Disease Prediction, Machine Learning, Cross Validation, Logistic Regression, Random Forest, Supervised Machine Learning

OP-17

AI for Justice And Healthcare: Advancing Research and Legal Education

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Abstract

Artificial intelligence (AI) is increasingly transforming both healthcare and legal systems worldwide. In healthcare, AI supports diagnostic accuracy, predictive analytics, and patient-centered interventions that improve access, efficiency, and outcomes, with Indian state initiatives such as Tamil Nadu's AI-based maternal health program reporting a 12% reduction in high-risk complications. In the legal domain, AI- driven tools enhance access to justice, streamline legal research, and strengthen legal education by providing data-driven insights and innovative pedagogical methods. Integrating AI across healthcare and justice systems presents opportunities to build sustainable, accessible, and equitable solution This study aims to examine the role of AI in advancing healthcare and justice delivery, with a particular focus on its impact on research, legal education, A narrative review of literature was conducted by searching PubMed, Scopus, IEEE Xplore, and legal databases from 2010 to 2024. Inclusion criteria targeted peer-reviewed studies and reports assessing the effectiveness of AI-based applications inhealthcare, legal research, justice delivery, and education. Data were synthesized to identify benefits, challenges, and emerging trends. AI has improved diagnostic precision in healthcare by up to 20%, with Indian projects showing a 15% rise in early cancer detection (ICMR, 2023) and a 12% drop in maternal mortality in Tamil Nadu and Kerala through AI-based risk tools. In Maharashtra, AI-supported TB screening identified high-risk cases 25% faster. In law, AI-powered research improved case analysis efficiency by 30%, with the Supreme Court's SUPACE tool aiding predictive judgment. AI-driven e-learning is also being piloted in law universities in Delhi and Karnataka. Key challenges remain in data privacy, bias, and equitable adoption. Conclusion: AI holds transformative potential in shaping the future of healthcare and justice by improving accessibility, efficiency, and sustainability. Its integration in research and legal education offers innovative opportunities for multidisciplinary growth. A balanced approach that emphasizes ethics, inclusivity, and equitable access is essential to maximize the long-term impact of AI across healthcare and justice sectors.

Keywords: Artificial Intelligence, Healthcare, Justice, Legal Education, Sustainability.

OP-18

Computational Prediction of Antimicrobial and Antibiofilm Activities of Phage-Derived Endolysins Targeting *Acinetobacter baumannii*

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Abstract

Acinetobacter baumannii, a Gram-negative and non-fermenting opportunistic pathogen, has become a major global threat in clinical settings due to its remarkable ability to cause severe hospital-acquired infections and develop multidrug resistance. It is commonly implicated in ventilator-associated pneumonia, bloodstream and urinary tract infections, wound infections, and infections associated with invasive medical devices such as vascular catheters, cerebrospinal fluid shunts, and Foley catheters. A key virulence determinant of *A. baumannii* is its capacity to form robust biofilms, which significantly enhances environmental persistence and antibiotic tolerance.Bacteriophages employ endolysins—cell wall-degrading enzymes released during the lytic cycle—to specifically hydrolyze peptidoglycan and lyse bacterial hosts. These phage-derived lytic proteins and the antimicrobial peptides (AMPs) encoded within them have emerged as promising alternatives to conventional antibiotics, owing to their high specificity, potent bactericidal activity, and reduced likelihood of resistance development. In this study, endolysins specific to *A. baumannii* phages were selected through a comprehensive literature review, and their amino acid sequences were retrieved in FASTA format from the PhaLP database. Using multiple in silico tools, we screened these sequences to identify embedded AMPs and evaluated their predicted antibiofilm, antifungal, cell-penetrating, and cytotoxic properties. Fourteen AMPs were identified across eight endolysins. Among these, eight exhibited predicted antibiofilm activity, nine displayed antifungal potential, five possessed cell-penetrating capabilities, and all were predicted to be non-toxic. Five endolysins with strong antibiofilm potential were further modeled in 3D using SWISS-MODEL (alignment mode), and their structural integrity was validated using the SAVES v6.1 suite. This investigation represents the first comprehensive computational analysis aimed at identifying the therapeutic potential of *A. baumannii* phage-derived endolysins. The findings provide a foundational step toward the development of novel, low-toxicity, antibiofilm agents capable of combating multidrug-resistant *A. baumannii* infections.

Keywords: *Acinetobacter baumannii*, multidrug resistance, antibiofilm activity, antimicrobial peptides, endolysins, in silico analysis

OP-19

Spatio Temporal Variation of Air Quality of Delhi-NCR (2021-2024): A Multi-City Comparison of Pollution Trends

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Abstract

India has emerged as one of the countries grappling with severe air pollution. According to the World Air Quality Report 2024 , published by The Swiss Organisation IQAir , India is the world's 5th most polluted country, with having average AQI (Air Quality Index) of 50.6 µg/m 3 , which is 10 times higher than the WHO's annual PM 2.5 guideline value of 5 µg/m 3 . Air pollution remains one of the most critical environmental challenges in India, with the Delhi–National Capital Region (NCR) consistently ranking among the world's most polluted urban agglomerations. Several cities in NCR like Delhi, Ghaziabad, Noida, and Greater Noida frequently rank among the world's most polluted cities, as confirmed by the 2024 World Air Quality Report. This study provides a comprehensive four-year analysis of air quality trends from 2021 to 2024 across the cities using from CPCB–CAAQMS monitoring stations. Most studies often focus on short-term analysis or single cities. A comprehensive multi-year, multi-city comparison using synchronized CPCB data is limited. This research evaluates temporal variations, annual means, seasonal anomalies, pollution episodes for key pollutants ($PM_{2.5}$, PM_{10}, NO_2, SO_2, CO, and O_3) and also the key contributing factors influencing particulate matter concentrations in the region. The findings indicate persistent exceedances of national and WHO air quality guidelines across all cities, with winter months demonstrating the highest pollution levels due to temperature inversion, biomass burning, and reduced boundary layer height. Despite short-term improvements during monsoons, long- term trends reveal persistent high pollution levels with only marginal decreases in certain years. This four-year analysis provides critical evidence for informed policymaking and long- term air quality management in one of the world's most polluted urban regions.

OP-20

Computational Investigation of Blood Flow in Renal Artery using Finite Element Analysis and Artificial Intelligence

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Abstract

This project presents a computational framework that integrates physics-based simulation with data-driven modelling to efficiently predict hemodynamic behaviour in arteries with varying levels of stenosis. Using COMSOL, blood flow is simulated for arteries with different levels of blockage, and important measurements such as shear stress and pressure drop are collected. These results are then used to train an AI model that can predict these same measurements for any blockage level , without needing to run a full simulation each time. This greatly speeds up the analysis while keeping the predictions accurate. The approach can help researchers study artery health more efficiently and support the development of medical treatments and devices related to vascular diseases.

Keywords- Blood flow simulation, arterial stenosis, COMSOL Multiphysics, wall shear stress, pressure drop, hemodynamics, artificial intelligence, surrogate modeling

OP-21

AI-Based Early Stroke Risk Prediction Using Wearable Sensors.

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Abstract

Stroke is a leading cause of disability and mortality worldwide. early prediction of stroke risk can significantly improve patient survival and long-term health outcomes. This research proposes an ai-based predictive model that uses multimodal wearable sensor data such as heart rate, blood pressure, ecg, accelerometer activity, spo_2, and body temperature to detect early stroke risk. machine learning techniques and artificial neural networks are compared for performance. the system is designed for real-time health monitoring with a mobile and cloud-connected wearable device. Experimental results demonstrate that the proposed model improves risk detection accuracy and provides timely alerts to users and healthcare providers.

Keywords: Stroke prediction, AI in healthcare, wearable sensors, machine learning, early detection, iot-health systems.

OP-22

Advanced machine learning algorithms for predictive modelling in Complex Systems: Integrating mathematical Optimization And Statistical methods for Enhanced Decision-Making

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Abstract

Predictive modelling in complex systems remains a difficult task, largely because such systems exhibit nonlinear interactions, uncertain or evolving dynamics, and often rely on incomplete measurements. These challenges are compounded by the practical need to make decisions that remain reliable even when the underlying information is uncertain. In response to this, the present study introduces an integrated framework that brings together machine learning methods, mathematical optimization, and statistical inference with the aim of improving predictive accuracy, uncertainty characterization, and decision support. The approach involves a structured pipeline that includes data preparation, feature construction, and the use of both ensemble-based models and deeper learning architectures. Hyperparameters are tuned using Bayesian strategies and evolutionary search techniques, while uncertainty estimates are produced through calibrated ensemble methods and Bayesian- inspired procedures. To illustrate how the framework performs in practice, a synthetic time series representing a complex system is used, accompanied by detailed diagnostic checks and evaluations that reflect decision-making considerations. The results indicate that the proposed framework yields noticeably lower prediction errors than standard reference models and produces uncertainty intervals that align more closely with observed variability. In decision- focused tests, the method also leads to better outcomes when costs or risks associated with incorrect predictions are taken into account. Incorporating multi-objective optimization further exposes the balance between predictive accuracy and computational demands, offering guidance for selecting models in real-world applications. Taken together, the findings suggest that combining machine learning with optimization and statistical reasoning can provide more trustworthy, interpretable, and practically useful predictions for complex systems.

OP-23

Exploring India's Data Science Landscape: Job Roles, Enrolment Trends, Public Perceptions, and Learning Needs

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Abstract

Data Science has become a very popular study and career choice in India. Many working adults, parents, and students view it as a cutting-edge, well-paying choice. Because of this, colleges and universities have started many new degrees in this field. B.Sc. Data Science, B.Tech. Artificial Intelligence and Data Science, B.Com. Business Analytics, M.Sc. Data Science, MBA Business Analytics, M.Tech. Data Engineering and numerous online diploma programs are among them. The number of students enrolled in these courses is increasing annually. Some believe that Data Science is easy and that anyone can become a data scientist very quickly. This creates wrong expectations and leads to stress and disappointment when the subject becomes difficult. India has unique difficulties as well. Many colleges do not have strong faculty, updated curriculum, or good lab facilities. Many students don't know the fundamentals of programming, statistics, or mathematics. It is common for students from low-income or rural areas to lack access to computers, the internet, and proper guidance. Because of these issues, there is a large gap between what students learn and what companies expect. An extensive overview of the data science industry in India is provided in this paper. It describes the positions, degrees, enrolment patterns, causes of the surge, and critical abilities that students need to acquire in order to have a successful career in data science.

Keywords: Data Science, Skill Gap, Enrolment Trends, Analytics Careers, Curriculum

Quality, Digital Access

OP-24

AI Driven Diagnosis and Analysis for the Clinical Interpretation of Genetic Disorders

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Abstract

Artificial Intelligence is transforming genomic medicine by scaling variant interpretation beyond the limits of manual curation and enabling predictive models that capture complex molecular patterns. This review evaluates recent advances in deep learning systems developed for the expanding output of Next Generation Sequencing data. Models such as AlphaMissense and AlphaGenome deliver high accuracy in pathogenicity prediction, yet meaningful gaps remain in functional interpretation, particularly for proteins with intricate structures like CFTR, which is the gene responsible for cystic fibrosis. Current development trends point toward a clear shift from single data inputs to multimodal large language models that combine genomic information with imaging and clinical records, which provides a stronger foundation for accurate analysis. These systems show growing promise in disorders such as cystic fibrosis, Duchenne muscular dystrophy and hereditary cancers and they support applications ranging from protein structure prediction to the analysis of intronic splicing events that underlie missing heritability. The review also identifies major limitations in real-world deployment. Bias in genomic datasets, inconsistent performance across populations and restricted interpretability continue to hinder clinical trust. Progress in explainable AI aligned with major clinical interpretation guidelines offers a practical route to more transparent and equitable implementation. Overall, the trajectory of AI-driven genomics suggests a steady movement toward a more precise and personalized molecular diagnosis.

Keywords: AI in Genomics; Variant Pathogenicity; Deep Learning; Multimodal Models; Splicing Prediction; Precision Medicine

.OP-25

Turning Mound into Medicine: In vitro Anti- Breast Cancer Potential of Termite Mound Soil

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Abstract

Keywords: Termite mound soil, MCF-7 breast cancer cell lines, MTT assay, anticancer agent, nanoparticle-based therapeutics

OP-26

Docking Study of *Morus alba* Bioactive Compounds Against SAP Proteins of *Candida albicans*

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Abstract

Candida albicans is an opportunistic fungal pathogen responsible for a wide range of mucosal and systemic infections. Its pathogenicity is largely driven by a group of virulence-associated enzymes known as Secreted Aspartyl Proteases (SAPs) which promote host tissue invasion, immune system evasion and sustained colonization. With the rise of antifungal resistance reducing the effectiveness of current therapies, plant-derived bioactive compounds have emerged as promising alternative candidates. The present study employs an in-silico molecular docking approach to assess the inhibitory potential of major phytochemicals from *Morus alba* against SAP proteins of *C. albicans.* Protein sequences of SAP family members were retrieved from the UniProt database and their three-dimensional structures were modelled using the SwissModel server. Structural validation, including Ramachandran plot analysis and overall stereochemical assessment was performed using the SAVES server to ensure high-quality protein models suitable for docking studies. Phytochemical constituents of *M. alba* were sourced from the IMPPAT 2.0 database and cross-validated with PubChem for structural accuracy and canonical SMILES retrieval. Molecular docking was carried out using SwissDock to assess binding affinity, interaction patterns and potential inhibition sites on SAP proteins. Among the seven phytochemicals analyzed, five flavonoids and alkaloid based compound exhibited strong binding affinity towards the catalytic domains of SAP proteins suggesting their potential to inhibit protease activity. This stable interactions with conserved active-site residues is essential for proteolytic function. This computational study highlights the therapeutic relevance of *M. alba* phytochemicals as promising antifungal candidates targeting SAP-mediated virulence mechanisms. The findings provide a valuable foundation for future in vitro and in vivo investigations aimed at developing plant-based antifungal agents with improved efficacy and reduced resistance potential.

Keywords: *Morus alba, Candida albicans*, SAP proteins, phytochemicals, molecular docking, antifungal agents.

OP-27

A Scalable and Secure Cloud Framework for Cost-Efficient Data Science Workflows Using Automated Pipelines and Distributed Machine Learning

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Abstract

The exponential rise of data generation across industries has intensified the need for high-performance, scalable, and secure computing platforms capable of supporting end-to-end science workflows. Traditional on-premise infrastructures often struggle to keep pace with fluctuating computational demands, high storage requirements, and the need for rapid model deployment. This research presents a scalable and secure cloud-based framework designed to deliver cost-efficient data science operations by integrating automated data pipelines, distributed machine learning, and elastic cloud resource management. The proposed framework employs cloud-native automation to streamline the entire analytics lifecycle, including data ingestion, preprocessing, feature engineering, model training, evaluation, and deployment. Automated pipelines significantly reduce manual overhead, minimize processing delays, and enhance reproducibility of experiments. Distributed machine learning algorithms are implemented to exploit parallelism across cloud resources, enabling the efficient training of large and complex models on massive datasets. This not only accelerates computational performance but also improves model accuracy and scalability.Security mechanisms such as encryption, identity management, access control, and continuous monitoring are embedded throughout the architecture to safeguard sensitive data and ensure regulatory compliance. Furthermore, cost-efficiency is achieved using intelligent resource allocation strategies that dynamically scale cloud services based on workload patterns, preventing unnecessary compute expenditure.Experimental evaluations conducted on multiple cloud environments show that the framework reduces execution time, improves throughput, and optimizes cost when compared to static or traditional infrastructures. Results also indicate enhanced reliability, reduced system overhead, and improved operational efficiency for real-time applications. The research demonstrates that the proposed cloud framework provides a robust solution capable of addressing modern data science challenges while supporting diverse enterprise-level analytics needs.

Keywords: Cloud Computing, Distributed Machine Learning, Automated Data Pipelines, Scalable Architecture, Cost-Efficient Analytics

OP-28

AI-Assisted prediction of vaccine candidates against pathogens

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Abstract

Immunization or Vaccination is regarded as one of the most potent preventive measures to curb worldwide disease burden and death rates. Traditional vaccines formulated from inactivated or live-attenuated microorganisms have successfully controlled many infectious diseases, including measles, poliomyelitis, diphtheria, pertussis, tetanus, and yellow fever, and enabled the global eradication of smallpox. Advances in vaccine technology, from Jenner's discoveries to recombinant genetic approaches, provide a strong foundation for the future prophylactic control of infectious diseases which also include the importance of vaccine target identification. Vaccine target identification is critical because it determines the specificity, safety, and protective efficacy of a vaccine. Selecting a highly conserved, pathogen-specific, and immune-relevant antigen that closely matches circulating strains reduces immune evasion, avoids molecular mimicry, and prevents vaccine failure caused by antigenic mismatch, thereby ensuring optimal and durable immune protection. Machine learning and deep learning algorithms accurately predict immunogenic epitopes recognized by the immune system. Recent research in this area has demonstrated that AI-driven computational approaches were instrumental in the rapid identification and prioritization of novel SARS-CoV-2 antigens, thereby significantly accelerating the development of effective COVID-19 vaccine candidates. Recent research in this area has shown those AI-driven generative models (VAE, GAN) and machine learning methods (neural networks, HMMs, SVMs) are used to predict immunogenic sequences, including B-cell, T-cell, and MHC-binding epitopes. Multiple sequence alignment tools such as Clustal Omega, MAFFT, and MUSCLE identify conserved regions, and validation is performed using databases like IEDB and SYFPEITHI, while platforms like ROSALIND aid in bioinformatics training and algorithm development. In response, AI-based methods are helping scientists find the most effective targets faster and with greater accuracy. This data-driven precision enables faster, safer, and more effective vaccine design against emerging and mutating pathogens.

Keywords: Artificial Intelligence, Vaccine target identification, Epitope prediction, Reverse vaccinology and Immunoinformatics.

OP-29

Comparative evaluation of Biofertilizers on Diosgenin levels in Tribulus terrestris roots through HPLC analysis

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Abstract

Caltrop (Tribulus terrestris L.) is a widely distributed weed that thrives in warm climates. Despite its weedy nature, the plant possesses significant medicinal value, as its crude root extracts exhibit diverse pharmacological activities that support the development of various therapeutic formulations. T. terrestris has a long history of use in the Ayurvedic and Unani systems of medicine in India. Diosgenin, a steroidal sapogenin, is present in this plant. This bioactive phytochemical has demonstrated great promise and interest in treating a number of illnesses including cancer, diabetes, arthritis, asthma and cardiovascular disease. It is also a crucial precursor for the pharmaceutical industry's production of several steroidal medications. A validated HPLC technique has been developed for estimating diosgenin. A field experiment at Sri Venkateswara University demonstrated that seed inoculation with biofertilizers, particularly the combination of Vermicompost＋VAM fungi＋Phosphate solubilizing bacteria (PSB)＋Azotobacter (T 6), significantly increased diosgenin content in plants compared to control. The T 6 sample showed 3.68% diosgenin purity, outperforming others: T 5 (2.46%), T 4 (1.60%), and T 3 (1.45%). In contrast, the lowest diosgenin percentages were found in T 2 (0.98%) and T 1 (0.30%), indicating that the quadruple inoculant leads to the highest diosgenin production while control plants exhibited minimal levels.

OP-30

Artificial Intelligence-Driven Identification of Biomarkers for Theragnostic Applications

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Abstract

Biomarkers are measurable signals in our body, such as gene-expression levels, that help identify the presence or progression of a disease. Theragnostics combines diagnosis and therapy by using the same biomarker both to detect a disease and to guide treatment decisions. In this study, we use an Artificial Intelligence (AI) model to analyze gene-expression data and identify potential biomarkers for disease prediction. A publicly available dataset containing multiple healthy and diseased samples was used to train a machine-learning classifier. The model learns patterns in gene activity that distinguish healthy samples from diseased ones. Once trained, the model can predict whether a new sample is healthy or diseased based on its gene-expression pattern. In addition, the model identifies the genes that contribute most to its predictions. These highly influential genes are considered candidate biomarkers, as they show clear differences between healthy and diseased conditions. This approach demonstrates how AI can support early diagnosis and help select targeted therapies, making it a valuable tool in theragnostic applications. The method is simple, data-driven, and suitable for undergraduate-level research in biotechnology.

Keywords: Artificial Intelligence, Gene Expression, Biomarkers, Theragnostics, Machine Learning, Disease Prediction.

OP-31

Naive Reverse Nearest Neighbor Clustering for Large-Scale Spatial Data

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Abstract

Clustering is a fundamental task in data mining and machine learning, especially for analysing large-scale spatial datasets such as sensor networks, geospatial measurements, and high-dimensional embeddings. Traditional clustering algorithms like **K-Means**, **DBSCAN**, and **OPTICS** often face challenges when applied to such data. **K-Means** requires the number of clusters to be known in advance and is sensitive to initialization. **DBSCAN** depends heavily on the choice of parameters (ε and *minPts*) and struggles with varying density clusters. **OPTICS** improves density-based clustering but is computationally expensive for large datasets. These limitations motivate the need for a **fast, parameter-light, and fine-grained clustering algorithm** that can efficiently handle large spatial data without requiring extensive prior knowledge of the data distribution. The **Reverse Nearest Neighbor Clustering (RNNC)** algorithm addresses this challenge. Instead of relying on distance thresholds or fixed cluster numbers, RNNC exploits the structure of **reverse nearest neighbor relationships** among points to discover natural groupings. This approach allows RNNC to be **robust to noise**, **adaptive to varying densities**, and **scalable for large datasets**.

OP-32

Role of Modern Technology in Wildlife Tracking and Conservation of India

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Abstract

India is a great country blessed with bio-diversity and wildlife conservation. The green environment and dense forest here is a suitable natural place for the habitat of all the wildlife. Where all the wildlife gets protection. A large number of national parks and wildlife sanctuaries have also been established in our country for proper conservation and promotion of wildlife. Modern technology is also being used in our country to conserve all the wildlife in the latest manner. The latest technology drived by artificial intelligence is being used to control wildlife-human conflict in various areas of the country. Artificial intelligence is being used under the latest technology by freeing the human system for comprehensive protection of wildlife in forests, national parks and wildlife sanctuaries. Rapid control of wildlife crime is being done by using artificial intelligence driven technology on a large scale. Through artificial intelligence driven technology, one can also get immediate results of the current presence, health, visitation status and other types of activities of wildlife. To make the wildlife tracking system more effective, solar energy devices can be used in place of batteries, but for some wildlife that mostly live in caves, solar energy devices may not be suitable. By using artificial intelligence cameras to track wildlife like elephants, tigers, lions, cheetahs and leopards, their actual numbers can also be known. The latest technology drived by artificial intelligence is also being used by PFA Institute of Research Prayagraj in various districts of Uttar Pradesh state to accurately identify various types of wildlife. Through this, PFA Institute is also identifying the species, number and age of different types of wildlife.

Keywords - Artificial Intelligence, Latest Technology, Solar Energy, Wildlife Tracking, Wildlife Conservation.

OP-33

Optimized CNN Approach for Plant Leaf Disease Detection

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Abstract

This study offers a methodological framework toward the formulation of a lightweight convolutional neural network (CNN) for the automatic detection of plant leaf diseases. It begins with the process of collecting and organizing a publicly accessible data of plant diseases. Pre-processing of images is done by resizing and normalizing the images to have all the samples consistent. In order to enhance the generalization capabilities of the model as well as help avoid over-fitting, an in-depth data-augmentation strategy is used. It includes geometric, photometric variations like rotation, translation, zooming, and horizontal flipping in this strategy. The architecture of a CNN is made to be small comprised of sequential convolutional and pooling layers. It is also employing batch normalization and global average pooling. These methods are good at capturing explicit spatial patterns at the same time making the model to be very small and having low computation density. The augmented images are then fed into the model and its performance is continuously being monitored using a separate validation set. This makes the training process vigorous and it makes the model not overfit. After the completion of the training the model is then exported and put into a Flask web application. The application will offer a simple user interface that will allow users to post photos and get real-time predictions of the disease. The whole working process, including dataset cleaning to training models and deployment, demonstrates an effective and scaled process of deep-learning plant disease diagnostics deployment in the actual field of agriculture.

Keywords: Plant disease detection; Convolutional Neural Network (CNN); Deep learning; Flask deployment

OP-34

Pharmacognostical evaluation of phytoconstituents present in Grewia asiatica leaves extract

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Abstract

Grewia asiatica, commonly called phalsa, is notable for exhibiting various pharmacological activities. The leading purpose of the work was to determine the phytochemicals present in the aqueous and ethanolic extract of Grewia asiatica leaves. Organoleptic, physicochemical and phytochemical studies were performed. The results showed that extracts of leaves are a decent source of phenols, tannins, flavonoids, alkaloids and proteins. The methanolic extract showed total phenol, flavonoid and alkaloid content as 0.2471±0.002, 0.5007±0.004 and 0.184±0.001, respectively. The aqueous extract showed Total phenol, flavonoid and alkaloid content as 0.1947±0.003, 0.1795±0.003 and 0.1046±0.00051, respectively. The current study was helpful for identification, purification and visualizing the standard of this species. This will be useful in the future to hold out for further analysis on Grewia asiatica.

Keywords: Grewia asiatica, organoleptic, phenolic, pharmacognostical, medicine.

OP-35

Deep Learning–Based Diagnosis and Progression Analysis in Alzheimer's Disease.

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Abstract

Alzheimer's disease (AD) is a progressive neurodegenerative condition that leads to gradual cognitive decline, making early identification and management difficult. Recent developments in artificial intelligence (AI) have transformed medical image evaluation by offering powerful, automated tools capable of improving the accuracy and efficiency of AD detection. Diagnosing Alzheimer's disease through visual inspection of MRI scans is often difficult, especially in the early stages. Mild or very mild AD can closely resemble normal age-related brain changes, making accurate distinction challenging for clinicians. Achieving high precision in early detection is essential for timely intervention. Recent studies show that deep-learning models outperform human observers in identifying subtle patterns associated with different stages of AD, making them highly effective tools for early diagnosis. This study aims to design a deep-learning framework that employs pre-trained convolutional neural networks (CNNs) to reliably classify the severity levels of Alzheimer's disease, with a specific focus on addressing scenarios where dataset size and quality are limited. AI-based diagnostic tools improve detection accuracy, facilitate earlier clinical intervention, and assist in designing individualized treatment plans. Predictive models can anticipate disease progression, estimate risk in individuals without symptoms, and track therapeutic response in real time. Moreover, AI streamlines the drug discovery pipeline by uncovering potential targets and rapidly evaluating new compounds. Collectively, these innovations illustrate how AI is reshaping Alzheimer's research and clinical practice, enabling earlier diagnosis, better patient segmentation, and more effective treatment outcomes.

Keywords: Alzheimer's Disease, artificial intelligence, Convolutional neural networks, Deep Learning Models.

OP-36

Tissue Engineering: The Next Frontier in Medicine

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Abstract

Tissue engineering seeks to mitigate the critical organ shortage by constructing functional biological structures in vitro. Tissue engineering is a well-known example of an interdisciplinary field. In this field, researchers from different fields work together to improve peoples health by addressing urgent health issues. Developmental and molecular biology, as well as technologies like additive manufacturing and micro- and nanotechnologies, have all helped tissue engineering move forward. In the past 20 years, there has been a lot of progress in using nature's healing powers to fix damaged organs and tissues. Patients no longer have to worry about rejection because they have received tissues and organs made in a lab from their own cells. But it's still hard to deal with solid organs that are more complex, like the liver, kidney, and heart. In this article, we look at the most recent successes in tissue engineering, the problems that still need to be solved, and the ways that development might happen in the future.

OP-37

AI-Powered Smart Urban Safety Surveillance System Using Real-Time Video Analytics

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Abstract

With rapid urbanization, public safety has become a major challenge. Traditional surveillance approaches are based on human operators who monitor numerous CCTV camera feeds, which is unworkable with increasing numbers of cameras and continuous activities in cities.This paper proposes an AI-enabled intelligent urban safety surveillance system that would leverage the benefits of real-time video analytics to automatically detect unsafe or suspicious activities. Such advanced computer vision techniques integrated into the system include object detection, motion tracking, and anomaly recognition. Pre-trained models like YOLO are used, along with tracking algorithms like DeepSORT, to identify such unusual behaviours as fights, thefts, crowd gatherings, and unattended objects. Anomaly detection initiates immediate alerts to the authorities for quick intervention and contains incidents before they escalate. Public datasets include UCF101, Avenue, and CCTV anomaly datasets, which were employed in order to simulate realistic urban scenarios and validate system performance. The outcomes highlight that the proposed AI system is very efficient at monitoring multi-camera feeds, detecting abnormal events with high accuracy, and reducing the workload on human operators. Besides detection, this method shows how AI can unlock an even safer urban environment for all by helping both law enforcement and city planners make better decisions. The research reveals that pairing real-time analytics with automated alerts delivers scalability, reliability, and adaptability for the modern city, focusing on a human-centred approach that secures safety while keeping efficiency in mind.

OP-38

In Silico Analysis and Protein–Protein Docking of Bacteriocins from *Bifidobacterium* and *Lactobacillus* Species Against Virulence Proteins of *Helicobacter pylori*

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Abstract

Helicobacter pylori is a globally prevalent gastric pathogen strongly associated with chronic gastritis, peptic ulcer disease, mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric adenocarcinoma. Escalating antibiotic resistance among clinical isolates of *H. pylori* has necessitated the exploration of alternative therapeutics, including probiotic-derived antimicrobial peptides. Bacteriocins produced by *Bifidobacterium* and *Lactobacillus* exhibit promising bioactive potential; however, their mechanistic interactions with H. pylori virulence determinants remain poorly understood. The present study employed a comprehensive in silico approach to predict and characterize protein–protein interactions between selected bacteriocins and major H. pylori virulence proteins. Protein sequences of bacteriocins and target virulence factors were retrieved from the UniProt database. Three-dimensional structural models were generated using the SWISS-MODEL homology modelling platform, followed by structure validation through the SAVES server. Ramachandran plot evaluations demonstrated favorable stereochemical properties and high model reliability. To elucidate interaction dynamics LZerD Web Server, a 3D protein–protein docking web server, was employed to analyze binding affinity, interface residues, and complex stability. Docking simulations revealed that bacteriocins from both *Bifidobacterium* and *Lactobacillus* species formed energetically stable complexes with *H. pylori* virulence proteins, including adhesins and toxins implicated in host colonization and pathogenicity. Key interacting residues suggested potential inhibition of functional domains essential for bacterial survival and epithelial adhesion. The predicted models highlight the capability of probiotic-derived bacteriocins to impede virulent pathways of *H. pylori*, suggesting their promise as natural therapeutic candidates. This computational study provides mechanistic insights into bacteriocin–protein interactions and establishes a foundation for subsequent in vitro, in vivo, and translational studies aimed at developing novel anti-*H. pylori* biotherapeutics.

Keywords: *Helicobacter pylori*; bacteriocins; *Bifidobacterium; Lactobacillus*; in silico analysis; protein–protein docking: peptic ulcer disease.

OP-39

Role of Machine learning in the identification of AMR genes

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Abstract

Antimicrobial resistance (AMR) has emerged as one of the most critical global health challenges, driven by the rapid evolution and dissemination of resistance determinants across bacterial populations. Traditional laboratory-based approaches for detecting AMR genes are accurate but time-consuming, and often fail to capture novel or uncharacterized resistance loci. Recent advances in machine learning (ML) have transformed AMR genomics by enabling high-throughput, data-driven prediction of resistance determinants from whole-genome sequencing data. Machine learning frameworks leverage gene presence–absence patterns, sequence features, and phenotypic antimicrobial susceptibility testing to identify both known and previously unreported AMR genes with high accuracy. Studies using supervised models such as Random Forest, Gradient Boosting, Support Vector Machines, and ensemble learners demonstrate that ML can discriminate resistant and susceptible strains even when using thousands of genomic features, outperforming conventional genotype–phenotype prediction approaches. Importantly, ML-based prioritization of putative AMR genes followed by validation through homology modelling and molecular docking has confirmed stable antibiotic–protein interactions, supporting the biological relevance of these computationally predicted loci. This integrative strategy not only uncovers novel genetic factors contributing to AMR but also accelerates the discovery pipeline for resistance mechanisms across pathogens. Overall, machine learning offers a powerful, scalable, and unbiased platform for identifying AMR genes, enhancing surveillance, and informing targeted therapeutic or diagnostic development.

Keywords: Antimicrobial resistance (AMR), Machine learning, Whole-genome sequencing, AMR gene prediction, Genome-phenotype mapping, Homology modelling, Molecular docking, Novel resistance determinants, Antibiotic susceptibility prediction.

OP-40

Molecular Encapsulation of *Saussurea lappa* Through Beta-Cyclodextrin

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Abstract

Molecular encapsulation of *Saussurea lappa* with β-cyclodextrin (β-CD) offers a promising strategy to enhance the solubility and stability of its bioactive compounds, which are typically poorly soluble in water. This study aims to improve solubility of *S. lappa* extract using β-CD encapsulation. Ethanol extraction was carried out followed by phytochemicals profiling using gas chromatography-mass spectrometry. The co-precipitation method was used to develop the *S. lappa*–β-CD complex. The reaction conditions were optimized using a One-Factor-At-a-Time (OFAT) approach. The parameters tested included extract concentration (1–4 mg/mL), stirring time (15–120 min), and temperature (30–70°C). The complexed powder was obtained from vacuum-drying. GC-MS results showed that the majority of the ethanol-soluble compounds were sesquiterpenes and sesquiterpene lactones. They are non-water-soluble, supporting the need for encapsulation to improve aqueous compatibility. Preliminary OFAT screening revealed that substrate concentration, temperature, and stirring time were critical factors in determining the optimal ranges for encapsulation efficiency and antioxidant activity. These findings established appropriate working ranges for subsequent optimization using Design of Experiments (DoE). Overall, β-cyclodextrin proved to be an effective carrier, significantly improving the encapsulation efficiency and antioxidant activity of *S. lappa* phytochemicals under the established baseline conditions

OP-41

AI-Based Cybersecurity Threat Detection System Using Hybrid Machine Learning and Deep Learning Models

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Abstract

Cyber threats are changing fast and getting smarter, so we really need automated tools that can spot tricky attacks as they happen. Old-school systems that rely on fixed rules often miss new or sneaky attacks, which means slower reactions and more risks. This research creates an AI system to detect cyber threats. It combines regular machine learning with deeper AI techniques to find unusual activity in network traffic and computer logs. The system mixes proven methods—like Random Forest, Support Vector Machines, and Logistic Regression—with a simple type of neural network called LSTM that's good at spotting patterns over time. We tested it on a standard public dataset after carefully cleaning the data, picking the most useful features, and preparing it properly. When compared to using any single method alone, our combined approach performed better—it was more accurate and better at catching real threats without too many false alarms. The results show that mixing traditional techniques with modern neural networks makes the system much stronger against new kinds of attacks. In the end, this is a practical, efficient solution that can scale up and work well in real companies that want better protection and smarter threat detection.

OP-42

An Analytical model of Anisotropic Strange Quark Compact Star

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Abstract

In the present study, I have conducted an extensive investigation into a new category of relativistic solutions that describe the properties and behaviour of anisotropic strange stars within the theoretical framework provided by the MIT bag model equation of state (EoS). This equation of state is mathematically expressed as , where the parameter B g represents the bag constant, a fundamental quantity that characterizes the confinement of quarks within the strange matter. In this comprehensive analysis, I have taken the specific choice to represent the interior space-time geometry of these stellar objects using the well-established “Durgapal IV” metric potential, which provides a mathematically tractable framework for describing the gravitational field within the star. Through this methodological approach, I have successfully derived complete analytical solutions to Einstein&s field equations in their exact form. To guarantee the stability of a strange matter configuration within the interior of the stellar object, I have implemented the numerical value of the bag constant Bg within a specifically defined range of 57.55MeV/fm 3 < B g < 95.11 MeV/ fm 3 .This particular range has been selected based on theoretical constraints that are necessary for maintaining the physical viability of strange quark matter in stellar environments. Given these established specifications and parameter constraints, a comprehensive investigation of the theoretical model demonstrates that all the fundamental characteristic parameters, including pressure, density, energy conditions, and stability criteria, are satisfactorily fulfilled and properly satisfied within the framework of the present theoretical scenario. The analysis confirms that the chosen range of the bag constant not only ensures the stability of the strange matter phase but also maintains consistency with the underlying physics governing compact stellar objects containing quark matter. In this theoretical model, the determination of the maximum possible mass involves maximizing the radial sound velocity specifically at the central core of the stellar object. Through this analysis, I have observed some notable findings regarding isotropic stellar configurations under different parameter conditions. When examining an isotropic stellar configuration where the bag constant parameter Bg is set to the lower value of 57.55 MeV/fm 3 , it is demonstrated that this configuration yields a maximum achievable mass of 2.91 M Θ , which corresponds to a stellar radius measuring 13.74 Km. Conversely, when we consider the upper boundary limit where the bag constant Bg reaches 95.11 MeV/fm 3 , the resulting stellar properties show markedly different characteristics. Under these conditions, calculations reveal that the maximum mass that can be sustained by the stellar structure decreases significantly to 2.27 M Θ , while the corresponding radius also contracts substantially to 10.69 Km. These

contrasting results highlight the sensitive relationship between the bag constant parameter and the fundamental properties of the stellar configuration, demonstrating how variations in this key parameter can lead to substantial differences in both the maximum supportable mass and the overall size of the resulting stellar object. Conversely, when anisotropic conditions are present within the stellar medium, it is observed that the maximum allowable mass of the stellar object experiences a significant increase, while simultaneously the corresponding radius undergoes a reduction. Through this analysis of the theoretical model, we have predicted the radii of several recently discovered compact stellar objects, including neutron stars and pulsars that have been identified through advanced observational techniques.

OP-43

Artificial Intelligence in Healthcare: Applications, Trends, and Challenges

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Abstract:-

Artificial Intelligence (AI) enhances healthcare through transforming clinical trials, surgery, drug development, and patient care. AI systems are being used by hospitals to manage surgical tools, assist medical staff, and enhance the effectiveness of nursing and patient health management. Through extensive data analysis, risk factor identification, and predictive insights into patient outcomes, AI technologies enable the development of personalized treatment plans. Chatbots and virtual AI-powered health assistants offer continuous support, answering questions and providing medical advice based on a patient's history. AI reduces time and expenses while ensuring accuracy in clinical trials by identifying suitable candidates, monitoring patient responses, and conducting real-time data analysis. By analyzing biological data, simulating drug interactions, and optimizing chemical structures, artificial intelligence (AI) accelerates the process of discovering new drugs. Robotic surgery and AI-assisted instruments enhance accuracy, provide real-time feedback, and minimize complications, enabling less invasive surgeries. However, challenges such as security, data privacy, ethical issues, and the need for standardized regulations persist

OP-44

Phylogenetic Characterization of Monkeypox Virus Using MEGA, Clustal Omega, and BLAST-Based Sequence Analysis

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Abstract

The Monkeypox virus (MPXV), the causative agent of monkeypox disease, is a zoonotic pathogen noted for its recurring outbreaks and recent expansion outside its historical endemic areas. The persistent re-emergence of cases worldwide underscores a critical need to clarify the evolutionary connections between MPXV lineages currently in circulation. This research aims to elucidate these connections through a comparative genomic examination of four complete MPXV genomes, representing diverse geographical and historical contexts: two archival African isolates and two contemporary outbreak samples. An integrated computational biology strategy was implemented to trace evolutionary patterns, which included, BLASTn analysis to assess sequence homology, Multiple genome alignment performed with ClustalW, Phylogenetic tree construction using both the Neighbor-Joining method in MEGA and Maximum Likelihood in IQ-TREE and Statistical support for tree nodes was established via bootstrap resampling.

The analysis yielded several pivotal genomic observations, starting with isolates from the 2022 outbreaks (USA and South Korea) demonstrate near-identical genomic sequences (>99.9% identity) when compared to the historical West African strain. The genomes belonging to the Central African lineage exhibit substantial genetic distinction, sharing only 96–97% identity with West African variants. Core viral proteins were found to be highly conserved among all four investigated strains. Collectively, these results strongly support the conclusion that the 2022 multinational MPXV outbreaks originated from pre-existing West African viral clades, rather than from a novel, highly divergent variant. This work highlights the value of employing multi-faceted genomic analysis in monitoring viral evolution and offers a transferable methodological framework for the study of other emerging zoonotic diseases.

Keywords: Monkeypox disease, zoonotic pathogen, viral clades, genomic analysis, MPXV

OP-45

Prediction of Target Genes & GO (Gene Ontology) Analysis associated with Monkeypox

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Abstract

Monkeypox, a re-emerging zoonotic disease caused by the Monkeypox virus (MPXV), has raised global health concerns due to its increasing incidence and outbreak potential. Deciphering the host-virus interactions at the molecular level is essential for understanding disease mechanisms and identifying therapeutic targets. In this study, we computationally predicted host genes likely involved in MPXV infection and conducted a comprehensive Gene Ontology (GO) analysis to explore their functional roles. This approach integrated bioinformatic tools to analyse gene interactions, followed by GO term enrichment to categorize biological processes, molecular functions, and cellular components associated with viral infection. The findings reveal significant enrichment in immune response pathways, viral entry mechanisms, and inflammatory regulation, suggesting critical host factors that may influence MPXV pathogenicity. These predictions provide a foundation for further experimental studies and potential antiviral strategies. By bridging computational predictions with functional annotation, this work enhances the current understanding of Monkeypox and highlights candidate genes for future research.

Keywords: Monkeypox virus, host-pathogen interaction, gene prediction, functional enrichment, bioinformatics, viral targets

OP-46

Whole Genome Variant Profiling to Compare Non-Tumorigenic MCF10A and Invasive MCFCA1 Breast Cancer Cell Lines

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Abstract

Breast cancer progression is driven by the accumulation of genomic alterations that convert non-tumorigenic cells into invasive cancerous phenotypes. This study presents a whole genome variant profiling analysis comparing the non-tumorigenic MCF10A breast epithelial cell line with its invasive counterpart, MCFCA1. Differences in single nucleotide variants (SNVs), insertions/deletions (indels), and structural variants were assessed to uncover mutation patterns associated with tumorigenicity. MCFCA1 exhibited a higher mutational burden and greater genomic instability, along with distinct variants in genes related to cell cycle control, DNA repair, and oncogenic signaling pathways. Among the analyzed variants, KDM1A and FUCA1 were the only two genes recurrently mutated across all samples. KDM1A is a known biomarker and therapeutic target in triple-negative breast cancer (TNBC), while FUCA1, though altered, is not yet established as a cancer biomarker.. These findings highlight key genomic changes that may underlie malignant transformation and suggest potential molecular markers or targets relevant to breast cancer progression.

Keywords: Breast cancer, whole-genome variant profiling, genomic instability, mutational burden, KDM1A, FUCA1, malignant transformation.

ABSTRACTS

(POSTER PRESENTATIONS)

PP-01

Isolation and Profiling of Bioactive Compounds from Herbal Plant: Echinops niveus

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Abstract

Echinops niveus, a lesser-explored medicinal herb native to the Himalayan region, is traditionally valued for its therapeutic benefits, yet its phytochemical composition remains insufficiently characterized. The present study focuses on the isolation, purification, and profiling of bioactive compounds from E. niveus using a combination of chromatographic and spectroscopic techniques. Fresh plant material was subjected to sequential solvent extraction followed by fractionation through column chromatography, which enabled the separation of distinct phytoconstituent groups. The purified compounds were structurally characterized using UV–Vis spectroscopy, FTIR, GC–MS, and NMR analyses. Preliminary phytochemical screening indicated the presence of flavonoids, alkaloids, sesquiterpene lactones, and phenolic compounds, The study successfully identified several key metabolites, contributing to a comprehensive phytochemical profile of the species. These findings provide a scientific foundation for the traditional uses of Echinops niveus and highlight its potential as a source of novel bioactive molecules for pharmacological development.

Keywords: Echinops niveus, spectroscopy, phytochonstituents, phytochemical profile, chromatography

PP-02

Tumor Segmentation Using Reinforcement Learning-Based K-Means Clustering

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Abstract

Tumor segmentation from magnetic resonance imaging (MRI) is a core task in computer aided diagnosis and treatment planning. Traditional K-means clustering is commonly employed for unsupervised medical image segmentation because of its simplicity and computational efficiency; nonetheless, it has a strong dependence on the selection of initial centroid and fixed clustered strategy. These constraints can lead to less than optimal convergence and misclassified tumor tissues, as well as limited precision of segmentation. To mitigate these limitations, the current work proposes a Reinforcement Learning (RL) based K-means clustering with adaptive learning approach which iteratively refines initialization of center-point coordinates, updating cluster membership and exploration in feature-space. Our approach involves an RL agent interacting with the clustering environment by choosing centroid coordinates, receiving rewards for intra-cluster compactness and inter-cluster separation. The agent gradually learns a better policy in an iteration manner, resulting in the improvement of cluster stability as well as the precision of border delineation of tumor regions. The proposed framework is evaluated on benchmark brain tumor MRI datasets, and it achieves better segmentation performance over the conventional K-means as well as other baseline performances. Experiments show that the proposed model consistently outperforms previous methods in terms of Dice coefficient, sensitivity, structural consistence and whole-tumor localization. Combining RL-based decision-making with unsupervised clustering, the proposed model provides a smarter and adaptive segmentation mechanism that can deal with intensity variations, noise and irregular shapes of tumors. This work demonstrates the feasibility of hybrid RL–clustering approaches to progress automated tumor analysis from medical images towards clinical practice used for both more accurate and interpretable segmentation of tumor.

Keywords: Reinforcement Learning, K-Means Clustering, Tumor Segmentation, MRI Image Analysis Optimization-based Segmentation Medical Image Processing**.**

PP-03

Quality Management in the Software Industry

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Abstract

Quality management in the software industry is essential for ensuring that software products meet standards of reliability, efficiency, security, and customer satisfaction. As software systems become increasingly complex day by day, so organizations rely on structured quality management frameworks—including ISO 9001, CMMI, Six Sigma, and Agile-based quality practices—to enhance process capability and product performance. Quality management spans the entire software development lifecycle, incorporating requirements validation, design verification, code inspections, automated testing, continuous integration, and defect-prevention mechanisms. It further promotes a culture of continuous improvement and evidence-based decision-making. The integration of modern tools such as DevOps pipelines, test automation suites, and real-time monitoring systems enables organizations to minimize defects, reduce development costs, and improve team productivity. Effective implementation of quality management not only strengthens operational efficiency but also contributes to sustained customer trust and long-term organizational competitiveness.

Keywords: Software Quality Management; Software Development Lifecycle; CMMI; ISO 9001; DevOps; Continuous Improvement.

PP-04

Augmented Reality (AR) in fashion marketing

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Abstract:

Augmented Reality (AR) has emerged as a transformative technology in fashion marketing, offering immersive and interactive customer experiences that bridge the gap between digital and physical retail environments. By enabling virtual try-ons, 3D product visualization, and personalized styling recommendations, AR enhances customer engagement and reduces uncertainty in online purchasing decisions. Fashion brands increasingly leverage AR applications—through mobile apps, smart mirrors, and social media filters—to improve brand perception, drive consumer involvement, and increase conversion rates. The technology also supports data-driven marketing strategies by capturing behavioral insights that inform targeted promotions and product development. Despite its significant potential, the adoption of AR presents challenges, including high implementation costs, technological limitations, and varying levels of consumer readiness. Nevertheless, AR is expected to play a pivotal role in shaping the future of fashion retail by delivering experiential value, improving customer satisfaction, and strengthening competitive advantage in an increasingly digital marketplace.

Keywords: Augmented Reality, Fashion Marketing, Virtual Try-On, Consumer Engagement, Retail Technology**.**

PP-05

Impact of Arrhenius Activation Energy on Gyrotactic Stability in a Photosynthesis-Driven Triple-Taxis MHD Nanofluid through a Porous Medium

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Abstract

This research presents a theoretical investigation into the gyrotactic stability of an unsteady, rotational magnetohydrodynamic (MHD) bioconvective flow of an Al2O3–nanofluid, incorporating the effects of Arrhenius activation energy and binary chemical reaction. The model is distinguished by a triple-taxis framework (chemotaxis, phototaxis, and gyrotaxis) in a fluid-saturated porous medium. The core novelty lies in analysing the thermo-chemical coupling, where the local temperature field regulates the rate of attractant consumption by microorganisms via an Arrhenius kinetics law. This creates a non-linear feedback loop between the thermal boundary layer and the chemotactic signalling pathway. The comprehensive physical model includes thermal radiation, photosynthesis, and parabolic plate acceleration. The governing partial differential equations are rendered dimensionless and solved using a semi-analytical perturbation method. The analysis focuses on elucidating how the activation energy parameter modifies the chemical field, thereby influencing the chemotactic pull and the resulting gyrotactic stability.

Keywords: Arrhenius activation energy; gyrotactic stability; triple-taxis; MHD, Al2O3 nanofluid; porous medium;

PP-06

Poly 3, 4 ethylenedioxythiophene as cathode in an electrolytic cell – A case study

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Abstract:

In recent days, conducting polymers (CPs) have attracted a lot of attention in different applications starting from thermoelectrics to batteries. Among the CPs poly 3, 4 ethylenedioxythiophene (PEDOT) is considered to be a potential candidate for various applications. In the present work, PEDOT has been synthesized employing insitu polymerization agents in order to study the effect of oxidizing agents (Iron chloride and Ammonium peroxydisulfate) on the structural and electrochemical properties. The first sample has been synthesized using Iron chloride as the dopant as well as the oxidizing agent along with a surfactant sodium dodecyl sulfate (Sample -I). The other has been synthesized using Iron chloride as the dopant and ammonium peroxydisulfate as the oxidizing agent (Sample – II). FESEM and XRD has been carried out to structurally characterize the samples. The XRD spectra shows a difference in peak positions of the synthesized samples. FESEM studies shows the formation of granular-like structure for both the samples yet the size with a variation of the particle size. An EMF was measured from both PEDOT samples, in a 1M NaCl electrolytic cell, in which the PEDOT was the cathode, and Graphite was the anode. A variation in the rise in voltage has been observed for both the samples. Sample I had relatively good connectivity due to a favourable interaction between SDS and polymer that probably aligned the polymer chains, but fails to give a consistency value of open circuit voltage probably due to the absorbency of moisture caused. Sample II instead shows a consistent and higher open circuit voltage. This work helps one critically understand the structure-property relationships that depend on dopant type, and this work lays a foundation for optimizing PEDOT materials for next-generation circuits.

Keywords: PEDOT, FESEM, XRD, Electode

PP-07

Advancements in Fraud Detection Using Machine Learning: A Review of Fake Account Detection and E-Commerce Fraud Detection

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Abstract

This review paper examines two recent studies in the domain of fraud detection using machine learning techniques. The first study focuses on fake account detection in online social networks (OSNs), employing algorithms such as Random Forest, Support Vector Machine (SVM), Logistic Regression (LR), and K-Nearest Neighbours (KNN). The second study conducts a systematic literature review on e-commerce fraud detection, exploring the effectiveness of machine learning and data mining techniques in combating fraud in digital marketplaces. Both studies highlight the growing importance of machine learning in addressing fraud, with a particular emphasis on high-dimensional data, imbalanced datasets, and real-world applications. This review synthesizes the methodologies, findings, and future directions from both papers, providing insights into the current state of fraud detection research and its practical implications.

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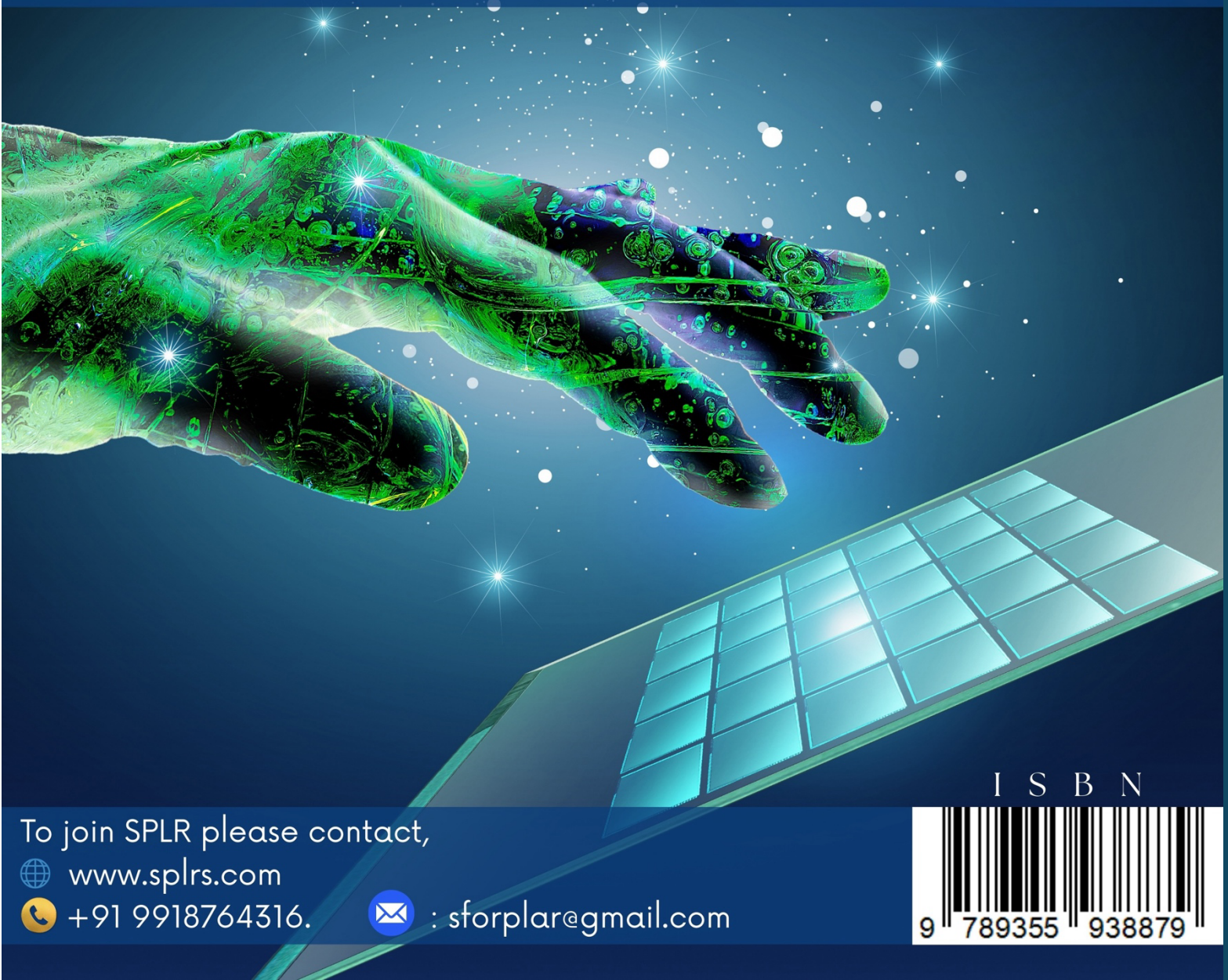

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