The Institution of Engineers (India)

A Century of Service to the Nation

ALL INDIA SEMINAR ON INNOVATIONS AND RESEARCH IN ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

11-12 January, 2025
IEI Engineer Bhawan, Doranda, Ranchi

Organized By

The Institution of Engineers (India)

A Century of Service to the Nation

Jharkhand State Centre
Under Aegis of Computer Engineering Division Board, IEI

About The Institution of Engineers (India)

The Institution of Engineers (India) or IEI is the largest multidisciplinary professional body that encompasses 15 engineering disciplines and gives engineers a global platform for sharing professional interest. IEI has membership strength of above 0.8 million. Established in 1920, with its headquarter Kolkata, IEI has served the engineering fraternity close to a century. During this period of time, IEI has been inextricably linked with the history of modern-day engineering.

In 1935, IEI was incorporated by Royal Charter and remains the only professional body in India which has been accorded this honour. Today, its quest for professional excellence has given it a place of pride in almost every prestigious and relevant organization across the globe. It provides a vast array of technical, professional and supporting services to the Government, Industries, Academia and the Engineering fraternity, operating through its 124 Centres located across the country and 6 overseas chapters. Besides, IEI has bilateral agreements with about 31 international bodies and membership of another 8 international bodies of the developed nations across the globe.

Being recognized as a Scientific and Research Organisation (SIRO) by the Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India, IEI promotes the cause of research and development by providing Grant-in-Aid support to undergraduate, post graduate students and PhD Research Scholars of Engineering Institutions and Universities.

IEI has been recognized as Scientific and Industrial Research Organization (SIRO) by the Ministry of Science & Technology, Government of India and besides conducting its' own research, provides Grant-in-Aid to UG/PG/PhD students of Engineering institutes and Universities.

IEI holds the International Professional Engineers (IntPE) Register for India under the global International Professional Engineers Alliance (IntPEA). The institution also awards the Professional Engineers (PE) Certification.

IEI in collaboration with Springer regularly publishes peer-reviewed international journal in five series, namely, Series A, Series B, Series C, Series D and Series E covering fifteen engineering disciplines.

About Jharkhand State Centre

The Ranchi Sub-Centre of The Institution of Engineers (India) founded on 23rd July 1961 and over the years, the sub-centre was upgraded to Local Centre on 5th August 1983 and elevated to State Centre on 30th March 2001 after the creation of Jharkhand State. This centre was always striven to increase its various activities so as to cater fully the needs of the engineering fraternity at Ranchi. This centre has been actively engaged in articulating various technical matters, and on the engineer's role in society and as managers. In addition to various technical activities, this centre has been actively associated in organizing cultural programmes by the wives of the members (EWA) to inculcate bond among members and their families. All Statutory Days such as Engineers day, World Water Day, World Telecommunication and Information Society Day, World Environment Day, etc. are celebrated every year with family members.

From a little hut to a campus with a three storied building, two conference halls, each capable of seating 100 people, office, library, guest an auditorium for 300 people, 3 classroom for continuous education has been an impressive journey. This has been possible only due to the

dedicated contributions of esteemed members, State Government, Public Sector Undertakings and Private Sector Organisations.

Jharkhand State Centre has been designated as 'A' category centre by The Institution of Engineers (India) with around 6000 corporate members and 7500 student members. This centre has been adjudged as 'Best Centre' for All Round Performance in the years 2007-08,2008-09, 2010-11, 2015-16, 2016-17 and 2017-18 by The Institution of Engineers (India). Jharkhand State Centre has received All India Beat Technician Chapter Award for last four years in a row i.e. 2016-17,2017-18,2018-19 and 2019-20.

For more details please visit: www.ieijscjharkhand.org

Themes and Sub-themes

The All India Seminar on Innovations and Research in Artificial Intelligence and Machine Learning is a platform to explore the transformative potential of these groundbreaking technologies. AI and ML are not just shaping the future—they are redefining the present by driving advancements across diverse fields, from healthcare and education to finance and industry. Cutting-edge developments include generative AI models, explainable AI and reinforcement learning, which are enhancing decision-making processes across various sectors. In healthcare, AI-powered systems are enabling precise diagnostics and personalized medicine, while in finance, advanced algorithms are optimizing fraud detection and trading strategies. Research in areas like natural language processing (NLP), computer vision, and edge AI is pushing boundaries, making AI systems more efficient, interpretable, and accessible. With ethical AI and sustainability gaining prominence, researchers are also focusing on minimizing biases, improving fairness, and reducing the carbon footprint of AI models. As AI and ML continue to evolve, they are poised to address global challenges, making them a critical focus for interdisciplinary collaboration and innovation. The seminar brings together leading researchers, industry experts and thought leaders to share insights, present cutting-edge innovations, and discuss the opportunities and challenges in the ever-evolving landscape of AI and ML.

Sub-Themes
Artificial General Intelligence
Artificial General Intelligence (AGI) refers to the development of intelligent systems capable of understanding, learning, and performing tasks across a wide range of domains, much like human intelligence. Unlike AI, which is specialized for specific tasks, AGI aims to replicate the adaptability and reasoning of human cognition. Achieving AGI involves overcoming significant challenges in areas such as knowledge representation, reasoning, learning, and ethical considerations. While AGI holds the promise of revolutionizing industries and addressing complex global problems, it also raises critical concerns about safety, control, and societal impact, making it a focal point of advanced AI research.

AI and ML in Manufacturing
AI and ML are transforming the manufacturing industry by optimizing processes, enhancing efficiency, and driving innovation. Through predictive maintenance, AI-powered systems can analyze data from machinery to forecast potential failures, reducing downtime and saving costs. Machine learning algorithms enable smart quality control by detecting defects with high precision in real-time. AI-driven robotics and automation are streamlining production lines, improving speed, and ensuring consistent output. Additionally, advanced analytics help in supply chain optimization and demand forecasting, enhancing overall productivity. By fostering innovation, AI and ML are paving the way for smarter, more sustainable manufacturing practices.

AI for Healthcare

Artificial Intelligence (AI) is transforming healthcare by improving diagnostics, treatment, and patient care. AI algorithms analyze medical data, such as imaging scans and patient records, to detect diseases early and with high accuracy. In drug discovery, AI accelerates the development of new medications, reducing both time and costs. Personalized treatment plans, enabled by AI, consider individual patient profiles for optimal outcomes. Additionally, AI-powered tools like virtual assistants and chatbots enhance patient engagement by providing quick responses and managing routine tasks. By streamlining processes and enhancing precision, AI is making healthcare more efficient, accessible, and effective.

Requirements in creating good ML Systems

Creating good Machine Learning (ML) systems requires a combination of high-quality data, robust algorithms, and well-defined objectives. The foundation is clean, diverse, and well-labelled data, as the quality of input data directly impacts model performance. Selecting or designing the right algorithms and architectures suited to the problem ensures optimal learning and generalization. Computational resources, such as powerful GPUs or cloud infrastructure, are essential for efficient training and deployment. Additionally, regular evaluation using appropriate metrics is crucial to monitor performance and prevent over fitting. Equally important are scalability, interpretability, and ethical considerations, ensuring the system is reliable, transparent, and aligned with real-world needs.

Supervised, Unsupervised and Reinforcement Learning

Supervised, unsupervised, and reinforcement learning are key paradigms in machine learning, each serving distinct purposes. Supervised learning involves training a model on labelled data, where the input-output relationship is predefined, making it ideal for tasks like classification and regression. Unsupervised learning, on the other hand, deals with unlabelled data, focusing on finding hidden patterns or structures, such as clustering or dimensionality reduction. Reinforcement learning is a dynamic approach where an agent learns by interacting with an environment, receiving rewards or penalties based on its actions, and is well-suited for decision-making problems like robotics and game strategies. Together, these paradigms address diverse challenges and drive innovation across various domains.

Natural Language Processing

Natural Language Processing (NLP) is a branch of Artificial Intelligence that enables machines to understand, interpret, and respond to human language. It bridges the gap between human communication and computer systems by processing text and speech in a meaningful way. NLP powers applications like chatbots, voice assistants, sentiment analysis, and machine translation, making human-computer interaction more intuitive. Techniques such as tokenization, parsing, and semantic analysis help machines grasp language structure and meaning. With advancements in deep learning and large language models, NLP is becoming increasingly sophisticated, enabling more accurate and context-aware solutions across industries like healthcare, customer service, and education.

Call for Papers

All interested participants are requested to contribute technical/ research papers and case studies detailing concept, innovation, idea or practical experiences for oral presentation. Each paper should begin with a synopsis of about 200 words and preferably within 3000 words excluding figures, tables and references. A brief bio-data (not more than half a page, affixing a photo) of the author(s) should accompany the paper.

Submission of Full Paper: 20th December 2024
Communication of acceptance of Paper: 05st January 2025

Publications

All the selected and presented papers will be forwarded for published in Springer Journal of The Institution of Engineers India Series – B, Scopus Indexed.

*Terms & Conditions for Publication The Institution of Engineers (India), Jharkhand State Centre will take all appropriate steps to review the papers before accepting. However, the editorial board of the Springer Journal of The Institution of Engineers (India) Series – B reserves its rights to put the submitted papers to an enhancement process as per their standards and requirements. Authors are kindly requested to follow the journal's editorial comments and update their papers for publishing. All necessary communications regarding it will be given to authors by the IE(I), Jharkhand State Centre.

IE(I) Jharkhand State Centre however will not be responsible if any or all of the presented papers are not accepted and printed by the Springer.

The contributors of submitted papers selected for printing in souvenir will receive certificate from The Institution of Engineers (India), Jharkhand State Centre.

Registration

The registration fee for the Seminar will cover participation in Technical Sessions, Seminar Proceedings, Printed materials, Seminar kit, Lunch, Tea/coffee. Additional 18% GST will be applicable.

Category of Delegate	Delegates
Delegate from Industries	Rs. 8000 + 18% GST
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For any query, Please contact: ieijscseminar@gmail.com/jharkhandsc@ieindia.org

For Guidelines for Submission of Papers scan the QR Code

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Account Details

"The Institution of Engineers (I), JSC", payable at Ranchi
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Branch : Shyamali Colony, Doranda, Ranchi
IFSC Code : UBIN0548014
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About Ranchi

Ranchi is the capital of state of Jharkhand, which is endowed with rich iron ore and coal deposits. With its rich mineral resources and industrial base, Ranchi is rapidly developing into an important industrial sector in India. The city is surrounded by thick forests and beautiful natural waterfalls and still unspoilt by modern commercialism. Ranchi is located in eastern part of India, around 400 km from Kolkata. It has very pleasant climate throughout the year and the temperature in October may vary between $+21^{0}C$ and $+26^{0}C$.

Travel

Domestic airlines operate between Ranchi and other major cities of India such as New Delhi, Mumbai, Kolkata, Bengaluru, Hyderabad, Raipur, Bhubneshwar and Patna. Ranchi is also well connected by rail and road with all major cities of the country, namely Bengaluru, Bhubaneshwar, Chennai, Hyderabad, Jamshedpur, Jaipur, Kolkata, Mumbai, Nagpur, Patna, Raipur, New Delhi, Vishakhapatnam, etc.

Accommodation

Ranchi offers a wide range of accommodation to suit every budget. Both economy and luxury class hotels are located within 5 km from the directly or through Seminar Venue. Delegates are requested to book the accommodation in advance to get preferred choice.

National Advisory Committee

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          Er. Sachin Semwal, ACM

Address for Correspondence

Er. Harun Ansari
Honorary Secretary, IEI, JSC
IEI Engineers Bhawan,
Nepal Kothi Campus, Doranda,
Ranchi 834002, India
Phone: 0651-3510412
E-mail : jharkhandsc@ieindia.org

Er. Kunal Sinha
Convenor
EI Engineers Bhawan,
Nepal Kothi Campus, Doranda,
Ranchi 834002, India
Phone: 9934311183
E-mail : jharkhandsc@ieindia.org

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IEI Engineer Bhawan, Doranda, Ranchi

To
The Hony. Secretary
The Institution of Engineers (India)
Jharkhand State Centre, IEI Engineer Bhawan
Nepal Kothi Campus, Doranda
Ranchi - 834 002, India

Dear Sir,

The following persons may please be registered as delegates for participation in the above seminar to be held at Ranchi

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3.					
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