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BYTE STREAM



COMPUTER SCIENCE AND ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY (ISM)
DHANBAD

MONTHLY
NEWSLETTER

An Insight into the
Department of Computer
Science and Engineering,
IIT (ISM)



Computer science is
the operating system
for all innovation.

— Ron Jeffries

44th Convocation Ceremony

IIT(ISM) Dhanbad celebrated the degree receivers of 2024 batch by conducting the 44th Convocation Ceremony on 17th December 2024 at the Penman Auditorium. The event was attended by various dignitaries, including the Director, Faculty Members, recently graduated students and their family members. It was a very momentous day for all the degree receivers as the day stood as the testimony to their impeccable hard work, dedication and never giving up attitude, but at the same time, the day poured on them some bitter-sweet memories.

From the CSE Dept., 149 students were awarded B.Tech. Degrees and 31 students were awarded M.Tech. Degrees, whereas 16 students received a Second Major in CSE and 4 students received a Dual Degree in CSE. Dr Nand Kumar Jyotish (guided by Prof Chiranjeev Kumar) received the best PhD Thesis Award. Mr Raunak Asnani bagged the coveted President's Gold Medal, Gold Medal in CSE B.Tech. and was also awarded the Best UG Student (through JEE). Ms Ashmita Pathak was awarded the M.Tech. Gold Medal award.

Padma Bhushan Dr V.K. Saraswat, the chief guest of the event, congratulated all the degree receivers for their achievements. He also asked them to contribute to the nation's needs with the skills and knowledge they acquired at the college.

Below is the consolidated list of the awardees for the various awards:

Presidents' Gold Medal	Raunak Asnani (20JE0775)
Gold Medallist M.Tech (CSE)	Ashmita Pathak (22MT0082)
Gold Medallist B.Tech (CSE)	Raunak Asnani (20JE0775)
Silver Medallist B.Tech (CSE)	Himanshu Das (20JE0418)
Late Mrs. Poonam (Khanna) Singh Memorial Cash Award [Sponsored Medal]	Raunak Asnani (20JE0775)
SBI Cash Prize (First) [Sponsored Medal]	Raunak Asnani (20JE0775)
IIT(ISM) AA Best UG Student Award (Admitted through JEE) [Sponsored Medal]	Raunak Asnani (20JE0775)
Smt Nirja Sahay Memorial Gold Medal Best Graduate (B.Tech) [Sponsored Medal]	Raunak Asnani (20JE0775)
Best Ph.D. Award (Department Level)	Dr Nand Kumar Jyotish (18DR0087) on (A Quantitative Approach for Dependability Evaluation of Safety-Critical Systems) under Prof Chiranjeev Kumar
IMTR Award	G. Thirumal (17DR00366) under Prof Chiranjeev Kumar





BEST WISHES FOR YOUR FUTURE



New Faculty Member Joined the Department: Prof Nikhil Tripathi

Nikhil Tripathi worked as an Assistant Professor in the Computer Science & Engineering Group at the Indian Institute of Information Technology, Sri City, India. Before that, he worked as a cyber security researcher at Fraunhofer Institute for Secure Information Technology (SIT), Germany in close collaboration with TU Darmstadt. He earned his Ph.D. in Computer Science and Engineering from the Indian Institute of Technology Indore, India, in 2019. He primarily works on the vulnerability assessment of popular application layer protocols to explore possible DoS vulnerabilities and devise novel defense mechanisms to counter large-scale DoS attacks. He has published research papers in various journals such as IEEE Transactions on Dependable and Secure Computing, ACM Computing Surveys, Computers & Security, and conferences like INFOCOM, ARES, ICOIN, and COMSNETS.



Foreign Visit of Faculty Member: Prof. Dharavath Ramesh

Prof Dharavath Ramesh recently collaborated with Prof Teresa Zielinska, Institute of Aeronautics and Mechanics and Prof Sitnik Robert, Faculty of Mechatronics, Warsaw University of Technology, Warsaw, Poland, on a groundbreaking project that integrates Cybersecurity, Digital Twin technology, and Robotics with Probabilistic Machine Learning. This partnership is focused on addressing critical challenges in the robotics domain by leveraging the synergy between advanced technologies and innovative methodologies.

Their research primarily aims to enhance the security and reliability of robotic systems through Digital Twin simulations, allowing real-time monitoring, predictive maintenance, and resilience against cyber threats. The incorporation of Probabilistic Machine Learning introduces a layer of adaptive intelligence, enabling robots to operate in dynamic environments with improved decision-making capabilities and risk assessment. By merging Cybersecurity with Digital Twin frameworks, the project aims to develop a robust ecosystem where robotic systems can be tested, validated, and secured virtually before deployment in real-world scenarios. This approach not only minimizes operational risks but also ensures data integrity and system safety.

This collaboration signifies a step forward in interdisciplinary research, combining Prof Teresa's expertise in robotics and cybersecurity with his focus on Digital Twin and Machine Learning technologies. Together, the team is striving to redefine the future of secure, intelligent robotics, bridging the gap between academic research and industrial applications.



Agglomeration 1.0 Hackathon

The CSE Society, IIT(ISM) Dhanbad, is organising Agglomeration 1.0, a two-day hackathon event to be held on January 18–19, 2025. The event, scheduled at the Open Reading Hall, Central Library, will bring together teams of five participants each to tackle ten unique problem statements through an innovative combination of strategic bidding and problem-solving.



The hackathon will commence on 18th January with a main auction round at 2:30 PM, where teams will bid for problem statements by committing specific time durations for their solutions. Teams unable to secure problems will participate in a high-speed lightning round later in the evening. The actual coding phase will begin at 6:30 PM and continue through the night, culminating in the submission of solutions by 1:30 PM the following day. Judging criteria will include novelty, feasibility, and timeliness of the solutions, with additional bonuses for early completion and penalties for exceeding bid times. The event will conclude with the announcement of results and an awards ceremony at 3:00 PM.

Participants are expected to demonstrate exceptional teamwork, technical expertise, and strategic thinking. Winners will share a prize pool exceeding ₹1,00,000, with the top team receiving ₹50,000. The event is anticipated to be lauded for its innovative format and meticulous organization, marking a milestone in fostering creativity and collaboration within the tech community.

Short-Term Course On Cryptology and Its Practices: Securing The Digital World

The Department of Computer Science and Engineering launched a short-term course on Cryptology titled- "Cryptology and Its Practices: Securing the Digital World". This project was sponsored by the Ministry of Electronics and Information Technology under Phase III of the ISEA Project. There was no registration fee for the course, as the objective was to provide state-of-the-art teaching to interested students based anywhere. It specifically targeted internal and external faculty members, scientists, professionals, research scholars and even M-Tech/B-Tech students. It was a very essential course, given the new developments in quantum computing and its subsequent resistance to available cryptographic methods. As cryptography addresses the need to provide robust methods for secure connections, it plays a very important role in financial transactions, secure messaging, military communications, and emerging technologies like quantum computing and blockchain.



The course emphasized the need to build fundamental knowledge of mathematics required for these tasks, as they will help distinguish the students from their competitors and pave the way for more attention to research in these fields. The esteemed faculty members of the CSE Department - Prof Arup Kumar Pal (Coordinator), Prof Hari Om and Prof Sachin Tripathi covered the entire course exceptionally well, taking 17 lectures in the span of 5 days starting from 10th December 2024 to 14th December 2024. Starting from the basics of cryptography using differential analysis, they delved into AES and RSA systems and finished off with Quantum Cryptography and Intrusion Detection Systems. They also explored areas like Blockchain, Key Management, Lattice-Based Cryptography and Digital Signatures. The course was a resounding success, with extensive participation and positive feedback. Seeing the promising results, the department aims to launch many such courses in the near future.

Specialized Lab for Natural Language Processing and Machine Learning

The Department of Computer Science and Engineering at IIT (ISM) Dhanbad took a significant step in advancing research and innovation by launching a specialized lab for Natural Language Processing (NLP), Machine Learning (ML), and Artificial Intelligence (AI) under the direction of Assistant Professor Dr Mauajama Firdaus. She has received a generous research grant from the institute, enabling the acquisition of high-end GPUs (Graphics Processing Units) and fine-tuning of large language models (LLMs), thus allowing the lab to tackle complex problems such as language generation, sentiment analysis, and machine translation with unparalleled efficiency. At a time when AI is reshaping industries and redefining human-machine interaction, this lab seeks to harness the potential of LLMs to craft transformative solutions for sectors like healthcare, education, and beyond. Dr Firdaus promoted the lab as a hub for collaboration and discovery rather than just an experimental space and aimed to provide students and researchers with the tools and mentorship they need to expand their horizons of possibilities in AI. Under Dr Mauajama Firdaus's visionary leadership, the lab is set to inspire groundbreaking work in AI and be a centre of excellence in technology and research



Launch of certificate course with TCSiON



The CSE department, in collaboration with TCS iON, has introduced a 9-month certification program in Artificial Intelligence and Data Science. Mentors include Prof Chiranjeev Kumar, Prof Dharavath Ramesh, Prof Sachin Tripathi, Prof Tarachand Amgoth, Prof Ayan Das, Prof Saurabh Srivastava, Prof Mauajama Firdaus, Prof Haider Banika and Prof Sushanta Mukhopadhyay. The course comes at a crucial time when the need for skilled AI practitioners and data scientists is at an all-time high. This is obvious from the fact that the global data science education sector is poised to reach US\$378.7 billion by 2030, whereas India's data science education sector is reported to skyrocket to US\$1.391 billion by 2028, growing at a compound annual growth rate of 57.52%. Similar figures hold true for the market size of Natural Language Processing(NLP) and Computer Vision.

The aforementioned program will provide courses in Data Analytics Modeling and Visualization, NLP and Computer Vision. Each course will consist of 4 modules covering different facets of the subject. The first three modules will give the foundations of AI and Machine Learning, and the fourth module will cover the specialisations. The course offers a golden opportunity for students to learn from IIT professors and leading industry experts in the domain.



Tribute to Late Dr Rakesh Salam (Ph.D. Alumnus of the Department)



Rakesh Sir was an epitome of immense grit, resilience, and perseverance. "Always look out for something beyond this maddening cacophony that makes you happy, keeps you sane, and at peace"—these words will remain etched in our hearts forever. Rakesh Sir was more than just a labmate to us. He cared for each of us like a big brother, offering unwavering support and kindness. His determination, positivity, and exceptional work ethic were truly inspiring and left a lasting impact on all who had the privilege to know him. He will always remain in our hearts, a cherished soul whose memory will continue to guide us.

-Shaily Priyanka Bodra (Research Scholar)

R&D Projects approved in the month of December 2024

Title	Faculty	Amount	Funding Organization
To develop LLM based Expert AI agent for Mission Operation Management	Prof Saurabh Srivastava	INR 28,08,462	Department of Space, GOI
Hate speech detection across languages and modalities	Prof Mauajama Firdaus	INR 20,00,000	FRS IIT (ISM) Dhanbad

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