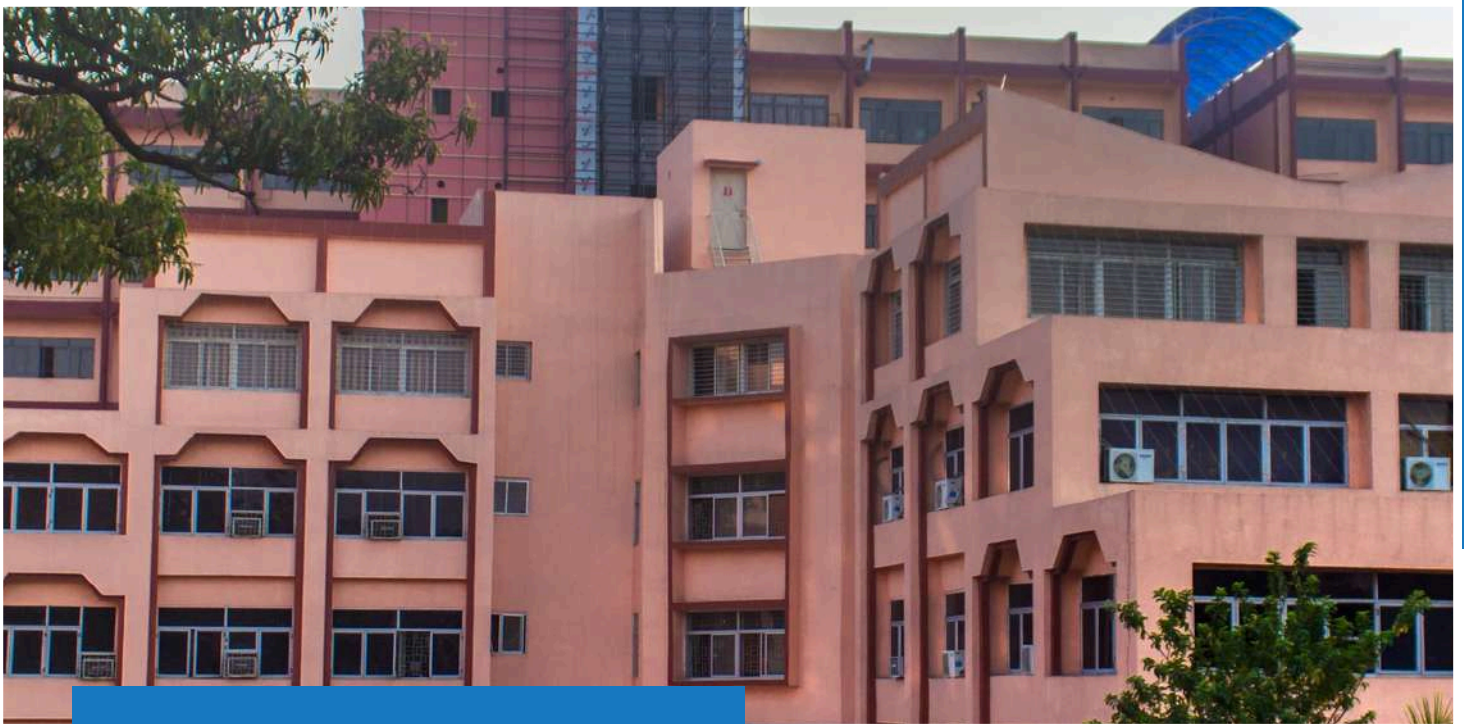


JANUARY 2026

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)



Don't document the
problem, fix it.”

— Atli Björgvin Oddsson

Prof. Amgoth Tarachand secures WIN-CoE funded Project on AI-Driven Digital Twins for Smart Mining



The Department of Computer Science and Engineering is pleased to announce that Prof. Amgoth Tarachand, Associate Professor, IIT (ISM) Dhanbad, has been awarded a sponsored research project with a total funding of ₹76,37,994.00 from the Wadhvani Innovation Network - Centre of Excellence (WIN-CoE). The project, titled "AI-Driven Digital Twins for Proactive Failure Prediction in Mining Assets," addresses critical challenges in mining operations through advanced Artificial Intelligence technologies.

The two-year project aims to design and validate an intelligent digital twin platform for key mining assets such as conveyor belts, dump trucks, and mills. A significant contribution to the project stems from Prof. Amgoth's ongoing research in Edge Intelligence, which enables real-time analytics and decision-making directly at the edge. By deploying AI models closer to the data source, the system ensures low-latency anomaly detection, accurate Remaining Useful Life (RUL) prediction, and rapid safety alerts, even in harsh and connectivity-constrained mining environments.

The project integrates IoT-based sensing, edge and cloud-based AI analytics, and human safety tracking to proactively predict equipment failures, reduce unplanned downtime, and enhance worker safety. The key outcomes are industrial plot validation and scalability.

This achievement underscores the department's strong research expertise in Edge Intelligence, AI, and IoT, and its commitment to impactful, industry-driven innovation supported by WIN-CoE.

Departmental Trip to Usri Falls

There is a specific kind of clarity that comes when you swap the hum of servers and the flicker of monitors for the roar of Usri Falls. While the Department of Computer Science and Engineering is usually defined by a relentless cycle of academic rigor and technical troubleshooting, our recent excursion proved that the best way to debug a weary mind is to step away from the screen. The falls provided more than just a scenic backdrop. They served as a vital system reset for our team. In a field where we often interact through formal hierarchies and rigid logic, the serene environment allowed those boundaries to dissolve. Faculty, staff, and research scholars connected over shared stories, fostering a genuine sense of camaraderie that builds the interpersonal trust necessary for high level collaboration.

These outings are essential because they promote mental well-being and reinforce a unified departmental culture. It was a refreshing and well coordinated day that reminded us to balance our hard work with social engagement. We look forward to more moments that trade the lab for the great outdoors.

AICTE-QIP PG Certification Program under Prof. Haider Banka

We always see in the news that AI in healthcare is going to make strides never seen before but there is no fine distinction between how much is feasible by current times and how much is speculation. That is the gap the Department of Computer Science & Engineering at IIT (ISM) Dhanbad aims to close with their new proposal: AI and Data Science for Smart Healthcare.

Under the guidance of Prof. Haider Banka, this program is designed to be more than just a technical certification; it is a toolkit for solving real human problems. The curriculum acknowledges that to truly improve patient care and fix healthcare inequities, we need professionals who can fluently speak both "tech" and "medicine".

The course will start with building a foundation in Python and computational thinking. Students won't just study theory; they will

learn to use Deep Learning to analyze medical images (like X-rays and MRIs) and apply Natural Language Processing to make sense of messy clinical notes.

Participants will get their hands dirty with projects like building diagnostic chatbots or creating models that can predict diseases like diabetes and cancer. Crucially, in a field where trust is everything, the course heavily emphasizes ethics, ensuring every student understands privacy laws like HIPAA and GDPR. It is a comprehensive path for anyone ready to make a tangible difference in patient outcomes.



Agglomeration 2.0: Code, Create, Conquer

Agglomeration 2.0: Code, Create, Conquer, organized by the CSE Society of IIT (ISM) Dhanbad, redefined the hackathon format into a high-intensity contest of coding, strategy, and problem-solving. The event was sponsored by CSE 2K10 Batch, ICICI Bank, Apparent Energy Solutions Private Limited, and Incesol, whose support enabled an industry-driven competitive platform for students. With 73 teams and 365 students participating, the event challenged competitors to balance technical execution with strategic bidding, where teams committed time through blind auctions to secure industry-level problem statements. Sponsored by Apparent Energy Solutions Private Limited and Incesol, these challenges ensured real-world relevance and demanded innovation, scalability, and disciplined delivery. The problem statements included SecureSync, a secure plant-to-cloud data synchronization system; SmartTrace, a counterfeit-proof supply chain tracker; IntelliDesk AI, an enterprise email automation engine; PET Perplexity, an AI vision system for plastic bottle sorting; WattNext, an energy optimization solution; and ShockMarket, a predictive energy market platform. These industrial-grade challenges pushed participants to integrate technical depth with strategic foresight, embodying the event's philosophy of "Code, Create, Conquer."



The award ceremony was graced by Prof. Chiranjeev Kumar, Head of the CSE Department, Mr. Abhishek Sharma, CEO of Apparent Energy Solutions Private Limited, and Mr. Spandan Kundu, Secretary of CSES '25. Their presence underscored the strong collaboration between academia and industry, highlighting the event's role in bridging classroom learning with professional-grade problem solving.

Team AG34 led by Kartik Lolla emerged as champions with SecureSync, followed by Team AG70 led by Siva Sai for SmartTrace, and Team AG55 led by Prabhav Agarwal for IntelliDesk AI. Special recognition went to Team AG41 led by Aditya for PET Perplexity,

Team AG66 led by Aditya Pratap Singh for WattNext, and Team AG56 led by Pathan Gulamgaush for ShockMarket. Distinction awards included the Empower Award for Team AG56 and the Pioneer Award for Team AG01 led by Sofyan Alam. Agglomeration 2.0 stood as a testament to what can be achieved when students, faculty, industry leaders, and alumni come together to nurture innovation, leadership, and professional excellence.



Successful Conclusion of WebCSE Recruitathon 2.0

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Recruitathon 2.0, conducted by WebCSE under the CSE Society, brought together talented developers to showcase innovation and technical prowess in a competitive yet collaborative environment. The event culminated in recognizing exceptional solutions that combined technical rigor with practical problem-solving. The 1st prize was bagged by Kavya Jain for showcasing exceptional skills in the problem statement Persona, a browser-based mock interview system utilizing modern web APIs. The 2nd prize went to Animesh Roy for Mirascope, an analytical tool transforming survey feedback into actionable insights. The 3rd prize was awarded to Muneeb Syed for Novasync, a collaborative expense management application designed for seamless group settlements. Additionally, the Women-in-Tech award was secured by Ippili Chinmayi for Ripplecore, honoring her work on an innovative, lightweight payment tracking system.

The event was conducted with a focus on structured guidance and fair evaluation, simulating the real feel of an actual working environment. Technical mentors were available to assist participants whenever they faced roadblocks, while dedicated managers for each problem statement oversaw the process and conducted interviews to ensure quality standards were met. Overall, the event was a resounding success, marked by seamless execution. The credit for this achievement goes to the enthusiastic participants, WebCSE Coordinator, Pratham Aggarwal and the entire WebCSE team, who served as dedicated mentors and managers to collectively support this journey of excellence.



FDP on Cryptographic Mechanisms for Conceptual Blockchain (CBC-2026)

The Department of Computer Science and Engineering at IIT (ISM) Dhanbad organized a Faculty Development Programme (FDP) on “Cryptographic Mechanisms for Conceptual Blockchain: An Architectural Scenario (CBC-2026)” from 13-17 January 2026. Sponsored by the Ministry of Electronics and Information Technology (MeitY), Government of India, under the ISEA Phase-III project, the program was conducted in hybrid mode at the Seminar Hall of the CSE Department.

Designed exclusively for working faculty, the FDP provided advanced exposure to cryptographic paradigms that are reshaping blockchain technology in the era of quantum threats. Sessions covered lattice-based signatures, homomorphic encryption for smart contracts, zero-knowledge proofs for scalable verification, resistant key exchange protocols, multi-party computation for secure data oracles, hash-based digital signatures, and blockchain-assisted IoT applications. These topics highlighted how post-quantum algorithms can safeguard privacy, ensure tamper-proof ledgers, and expand blockchain’s role across industries such as finance, healthcare, and supply chain management.

The program featured distinguished speakers, including Prof. D. Ramesh, Prof. Arup Kumar Pal, Prof. Hari Om, Prof. Sachin Tripathi, Prof. Sangram Ray from NIT Sikkim, and Prof. Nikhil Tripathi. Their lectures combined theoretical depth with hands-on demonstrations, ensuring participants gained both conceptual clarity and practical skills.

CBC-2026 reinforced IIT (ISM) Dhanbad’s commitment to faculty development and research excellence in cryptography and blockchain, laying the foundation for secure, scalable, and future-ready decentralized systems.





Saraswati Puja 2026 Execution Report

The Department of Computer Science & Engineering celebrated Saraswati Puja with great devotion, enthusiasm, and cultural spirit on 23rd January 2026 at the department premises. The preparations for the puja began with the Head of the Department, Prof. Chiranjeev Kumar Sir, approving a documented plan. The puja ceremony commenced at around 9.30 in the morning with the chanting of Vedic mantras performed by a priest. Following the rituals, prasad was distributed among all. Khichadi bhog was distributed outside the CSE department ground floor to all visitors, students, faculty, their family members, and staff. This is the first time bhog has also been distributed at Dhanbad Railway Station. Raja Sharma Dey from the Humanities department also accompanied to execute the event effectively.



Cultural activities were organized in the evening. Family members of professors, including the children and scholars, enthusiastically participated in the cultural program. The puja celebration also received sponsorship from some renowned shops like Shyam Sundar Chandiwala, Agarwal Pure Veg, Aami Bangali, and from inside the campus too. Sponsors were allotted dedicated stalls from the outset of the cultural program. This was followed by dinner in the department. The celebration concluded peacefully on 25th Jan with the immersion of the idol, which marks the end of the festival. In the end-to-end execution, there was constant involvement of 25DRs, 24DRs, and senior Ph.D. Scholars with M.Techs. Overall, the Saraswati Puja 2026 celebration organized by the Department of Computer Science was a grand success.



AICTE-QIP-PG Certification: Digital Risk, AI, and Cybersecurity for Managers

With the increasing use of AI-based systems and the rapid pace of digital transformation in organizations, managers are faced with increasingly complex risks associated with data privacy, cybersecurity, regulatory compliance, and resilience. To help managers cope with these new realities, the Indian Institute of Technology (Indian School of Mines), Dhanbad, is conducting the AICTE-QIP-PG Certification Program on AI, Cybersecurity, and Digital Governance: Risk Management for Managers.

The program develops application-oriented capabilities by integrating foundations in AI and analytics, cybersecurity, compliance, and risk management. The program exposes participants to business analytics and machine learning with Python, as well as necessary concepts in network security, cyber-physical systems, threat modeling, and risk quantification using structured methods such as FAIR. The program also includes an industry-linked capstone project where participants can apply these tools to solve real-world problems.

The program will be organized by Prof. Hari Om and Prof. Pranay Kumar Saha will co-ordinate the program. Applications can be made through the official website at qippg.aicte.gov.in.

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Indian Institute of Technology (Indian School of Mines) Dhanbad

AI, Cybersecurity, and Digital Governance: Risk Management for Managers - AICTE-QIP-PG Certification Program

Empowering Leaders to Secure the Digital Future

Core Module 1: AI, Analytics & Digital Tools
Data-Driven Decisions for Management.

Core Module 2: Business Analytics & ML
Machine Learning with Python.

Domain Core CPS & Network & Compliance
Risk Quantification, Threat Modeling.

Domain Core Cyber Risk & Compliance
Foundations of Cyber-Physical Systems.

Domain Specialist Cyber Risk & Compliance
Risk Quantification (FAIR), Threat Modeling.

Capstone Project: Industry Capstone Project
Hands-on, Applied Project with Industry Linkage.

PROGRAM DETAILS:
Duration: 6 Months (200 Hrs)
Start: 16th Feb 2026
End: 20th June 2026
Mode: Hybrid (On-Campus & Online Sessions)

KEY LEARNING OUTCOMES
Develop Security Frameworks
Assess & Mitigate Cyber Risks
Gain Practical Leadership Skills
Lead Incident Response

Apply Now: <https://qippg.aicte.gov.in/>

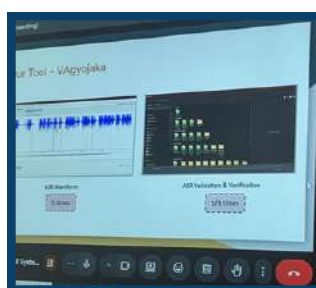
CONTACT & APPLY

Coordinators: Dr. Hari Om (hari@itism.ac.in), Dr. Pranay Kumar Saha (pranay@itism.ac.in) | Phone: 9430758169, 7903081228

Building Indic ASR Systems – An Alumni Talk by Mr. Rishabh Kumar

On the evening of 21 January 2026, the Department of Computer Science and Engineering hosted an alumni speaker session titled “Building Indic ASR Systems”, delivered by Mr. Rishabh Kumar, CSE alumnus of the 2016 batch. The session focused on how he is building speech recognition systems for low-resource Indic languages and on the practical considerations involved.

Mr. Kumar began by addressing a common misconception in speech technology – that models designed for widely spoken languages can be directly adapted for Indian languages. He explained that linguistic diversity, data limitations, and variation in usage patterns introduce challenges that require a more careful, context-based approach. Instead of presenting the topic through isolated technical components, the talk followed how an ASR system develops in practice. Mr. Kumar discussed the stages of data collection, annotation, quality checks, model training, deployment, and post-correction. He noted that attention to data quality and consistency is more important than the individual model choices.



A significant part of the session focused on post-correction. Mr Kumar pointed out that real-world speech data is rarely clean or uniform. This makes refinement and validation continuous requirements. He highlighted the role of human judgment alongside automated systems, particularly when working with languages with limited digital representation, such as Sanskrit or Marathi.

Mr. Kumar also spoke about the relevance of Indic ASR systems in improving accessibility and supporting large, diverse user bases. He noted that building such systems requires sensitivity to linguistic context, rather than assumptions.

The session provided students with a clear and balanced perspective on speech system development. The department extends its sincere appreciation to Mr. Rishabh Kumar for returning to his alma mater and for sharing his experiences with a practical understanding.



DARSI is Mapping India's Solar Future

JANUARY 2026

As India pushes toward its ambitious renewable energy goals, the project DARSI (Demand-Aware Rooftop Solar Mapping and Installation) is ensuring that no rooftop is left behind, even when the view from above is blurry. It is a groundbreaking initiative designed to revolutionize how we plan and install solar energy systems in diverse landscapes. While rooftop solar is scaling rapidly, many installations underperform, as current planning often relies on expensive, high-resolution satellite imagery or manual surveys, leading to suboptimal panel placement and a gap between installed capacity and real energy output.

The DARSI project aims to address these challenges by developing an intelligent, data-driven framework for rooftop solar deployment. The proposed system focuses on identifying rooftops and obstructions even when image quality is poor, rather than using simple rules of thumb. DARSI uses a multimodal approach to estimate solar potential, ensuring reliability at low resolution. The final step is where DARSI becomes "demand-aware", it formulates a robust optimization model that jointly considers uncertainty in both electricity demand and solar generation, producing placement and sizing decisions that remain cost-effective under worst-case conditions. It also plans an integrated DARSI Planner tool with visualization (rooftop maps, heatmaps, demand profiles, and optimized layouts) and pilot deployments across representative urban and rural sites, targeting real stakeholder use, from policymakers to installers. Through this approach, DARSI aims to enhance the efficiency and effectiveness of rooftop solar installations across the nation.



Purushottam Kumar Honoured with Ati Vishisht Rail Sewa Puraskar

Purushottam Kumar, an alumnus of IIT (ISM) Dhanbad, Computer Science & Engineering Department, batch of 2010, has been conferred with the Ati Vishisht Rail Sewa Puraskar for his outstanding services to Indian Railways. The award was presented on 9th January 2025 by Minister of Railways Shri Ashwini Vaishnav at a ceremony in New Delhi.

An officer of the Indian Railway Traffic Service, Mr. Kumar is presently on deputation to the Ministry of External Affairs. He has played a pivotal role in the development and application of the PM GatiShakti National Master Plan (PMGS-NMP) Portal. This GIS-based digital planning tool, developed by the Bhaskaracharya National Institute for Space Applications and Geo-informatics (Ahmedabad) with satellite imagery from ISRO, enables faster planning and implementation of multimodal transport infrastructure across railways, roadways, waterways, airways, and seaports.

In 2024, Mr. Kumar facilitated smooth land acquisition and forest clearances for 54 projects using this platform, significantly accelerating infrastructure development and ensuring coordinated execution among ministries.

Launched in 2021, PM GatiShakti aims to provide seamless connectivity for the movement of people, goods, and services. By integrating multiple modes of transport, the initiative reduces travel time, enhances last-mile connectivity, and strengthens India's logistics ecosystem.

Mr. Kumar's recognition with the Ati Vishisht Rail Sewa Puraskar highlights how digital innovation and leadership can transform infrastructure planning, advancing India's transport network for the future.



Ph.D. Awarded

Awardee	Supervisor	Thesis Title
A Sai Venkateshwar Rao (20DR0166)	Prof. Tarachand Amgoth, Dr. Ansuman Bhattacharya (School of Computing, Southern Illinois University, Carbondale, USA)	Integrated Deep Learning Models for Authentication, Recognition, and Compression in Resource- Constrained IoT Surveillance Networks

Publications

Title: **Folded Artifact Removal in Document Images via Lightness Channel Simulation and Conditional GAN Restoration**

Authors: Banty Jha, Prabhat Dansena, Ashish Ranjan, and Prof. Soumen Bag

Accepted at: International Conference on Intelligent Computing, Cognitive Networks, and Smart Systems (IC2NS2-2026), Bhubaneswar, Jan 30-31, 2026

Title: **A 3D Chaotic Map-based Novel Intra and Inter-level Bit Plane Image Content Encryption**

Authors: Deepankumar S, Rengaraj R, Pranesh R, P. Mishra, and Prof. A. K. Pal

Accepted at: Journal of Information Security and Applications (Accepted January 2026)

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Kasam Pramodha (23JE0463)

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