Quarterly Newsletter (Inaugural Issue)

Mehta Family School of Data Science and Artificial Intelligence, IIT Roorkee

We are delighted to present the inaugural issue of the quarterly newsletter of the Mehta Family School of Data Science and Artificial Intelligence at IIT Roorkee. This publication marks a significant step toward sharing the dynamic journey of our School with the broader community.

Through this newsletter, we aim to showcase the academic vibrancy, innovative research, and collaborative spirit that define the Mehta Family School. Each issue will bring you highlights of major events, student and faculty achievements, research breakthroughs, industry engagements, and various initiatives shaping the future of data science and AI at IIT Roorkee.

We hope this edition provides a meaningful glimpse into the School's progress and inspires deeper connections within our academic, industrial, and global networks.
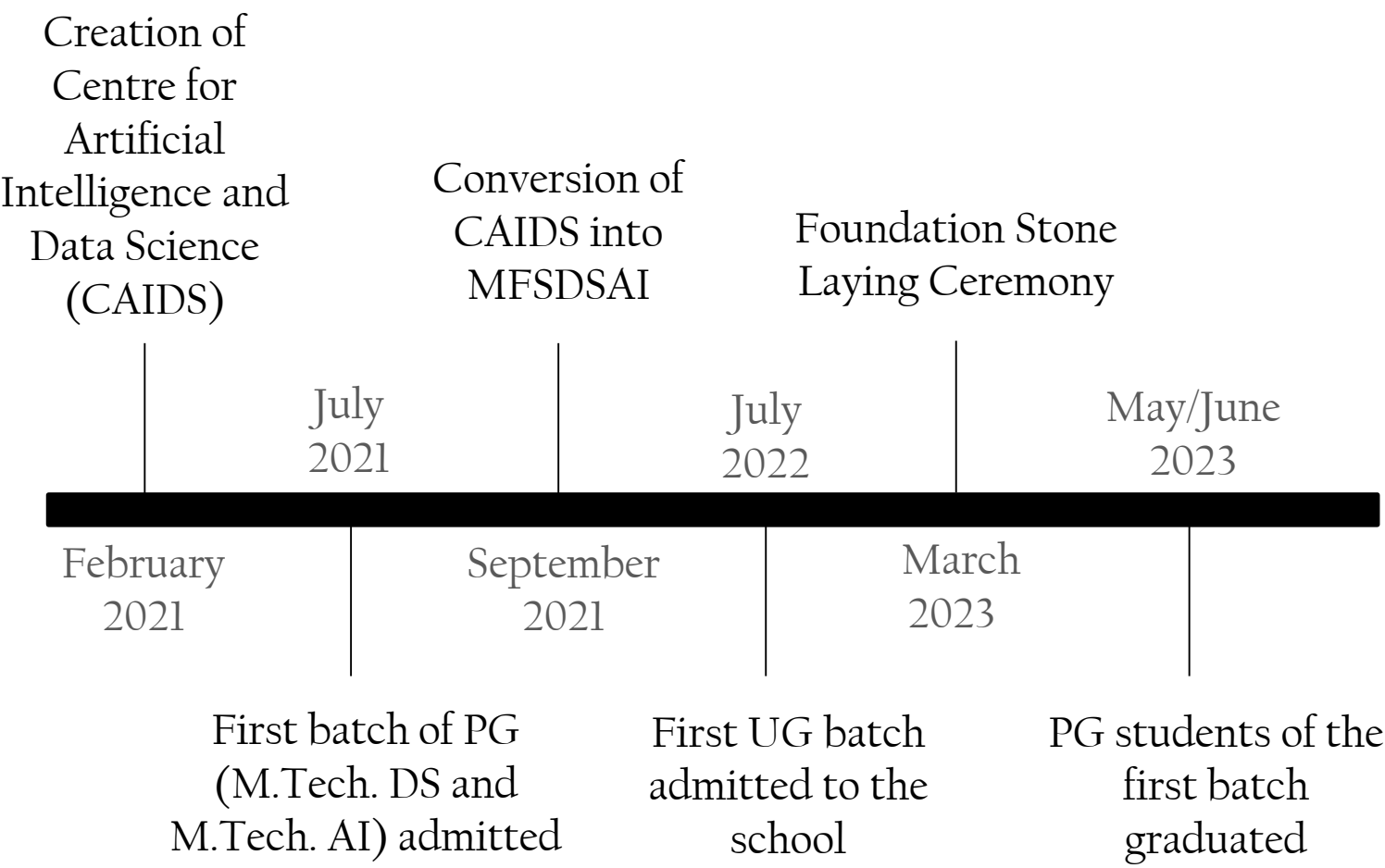
- Editorial Team

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Historic Timeline

Creation of Centre for Artificial Intelligence and Data Science (CAIDS)

Conversion of CAIDS into MFSDSAI

Foundation Stone Laying Ceremony

July 2021

July 2022

May/June 2023

February 2021

September 2021

March 2023

First batch of PG (M.Tech. DS and M.Tech. AI) admitted

First UG batch admitted to the school

PG students of the first batch graduated

From Foundation to Frontline: Growth of MFSDSAI, IIT Roorkee

The Mehta Family School of Data Science and Artificial Intelligence (MFSDSAI), IIT Roorkee

As part of IIT Roorkee's strategic expansion into emerging technologies, the Mehta Family School of Data Science and Artificial Intelligence (MFSDSAI) was established in 2021 through generous philanthropic support from the Bhupat & Jyoti Mehta Family Foundation. The School is dedicated to promoting excellence in education and research in the fields of Artificial Intelligence (AI), Machine Learning (ML), and Data Science (DS), and it offers a broad spectrum of academic programs spanning undergraduate, postgraduate, and doctoral levels.

The school currently hosts a vibrant academic community of 124 B.Tech., 88 M.Tech., and 22 Ph.D. students. To date, 24 M.Tech. graduates have either secured placements in reputed multinational companies or have been admitted to prestigious graduate programs worldwide. These outcomes underscore the growing impact and relevance of the school's academic training and mentorship.

The school boasts a vibrant team of 26 faculty members with diverse research expertise. The school is equipped with state-of-the-art computing and research infrastructure to support cutting-edge innovation. The academic community at MFSDSAI has been actively contributing to research, with 16+ conference papers, 37+ journal publications, 3 books published, and a patent. The school is currently engaged in sponsored research projects and consultancy projects, reflecting its strong industry and academic collaborations.

The Journey So Far and the Road Ahead

Message from Head of the School

"We are delighted to launch the first edition of the Mehta Family School of Data Science and Artificial Intelligence newsletter — a platform to celebrate achievements, share updates, and strengthen connections within our vibrant community. Since its establishment in 2021, with the generous support of the Bhupat & Jyoti Mehta Family Foundation, the school has made steady progress in advancing education and research in AI and ML. We offer a comprehensive academic portfolio, including a B.Tech. in Data Science and AI, two M.Tech. programs, and a Ph.D. program. Looking ahead, we aim to expand our faculty strength and deepen collaborations with industry to apply AI solutions to real-world challenges, particularly those relevant to India. This newsletter marks a step toward fostering a stronger, more collaborative community. We welcome your feedback and participation to make it a valuable resource for all. Heartfelt thanks to the editorial team for their dedication in bringing this issue."

– Prof. Sanjeev Kumar

From the Desk of the Former Head

"As the Founding Head of the Mehta Family School of Data Science and Artificial Intelligence at IIT Roorkee, I take pride in the remarkable progress the School has made in fostering cutting-edge research and nurturing talent in Data Science and AI. The School's flagship B.Tech. program in Data Science and Artificial Intelligence, offered through the highly competitive JEE Advanced route, draws some of the nation's brightest students and provides a strong foundation in AI, machine learning, and data-driven technologies. Complementing this, the School also offers M.Tech. and Ph.D. programs in Artificial Intelligence and Data Science, designed to equip postgraduates with advanced technical and analytical skills aligned with evolving industry and research demands. With a strong foundation, a forward-looking and dynamic curriculum, and an interdisciplinary approach, the School is steadily advancing toward becoming a national leader and global contributor in the fields of data science and artificial intelligence."

– Prof. Durga Toshniwal

Reflections from Academic Luminaries

Prof. Vipin Kumar, Regents Professor and William Norris Chair in Large Scale Computing at the Department of Computer Science and Engineering, University of Minnesota, Minneapolis, visited the department on May 2, 2025. Prof. Kumar, who also serves as a member of the Mehta Family Strategic Advisory Team, has been actively mentoring the Mehta Family School. His visit included an engaging and intellectually stimulating interaction, which proved instrumental in informing and refining the strategic vision of the department.

Prof. Satish Ukkusuri, Hubert and Audrey Kleasen Professor in Civil Engineering with Courtesy Appointment in Department of Computer Science, Purdue University, visited the department on April 24, 2025. During his visit, he interacted with faculty members and students, sharing valuable insights on the role of AI in transportation sustainability. The interaction was highly enriching, and all members of MFSDSAI greatly benefited from his visit.

Excellence in Action: Students' Achievements

Students at the Mehta Family School of Data Science and Artificial Intelligence have consistently demonstrated excellence across academic and co-curricular domains. Their remarkable performances in inter-IIT competitions, national and international hackathons, and other prestigious platforms reflect their creativity, technical expertise, and collaborative spirit. In addition, the high-quality research publications authored by undergraduate, postgraduate, and doctoral students stand as a testament to their scientific rigor, intellectual curiosity, and commitment to advancing knowledge in data science and AI. Some of their notable achievements are highlighted below:

Fellowship Achievements:

- Mr. Manas Shill has been awarded the PMRF fellowship to pursue his PhD research.
- Ms. Srishti Yadav has received the TCS Research fellowship in support of her PhD studies in computing and related disciplines.

Hackathons:

Sr. No.	Name of Students	Name of Hackathon	Position/Rank
1	Arahan Kalsoor	Meta Hacker Cup	1943
2	Shorya Singhal	Meta Hacker Cup Round 2	1581
3	Shorya Singhal	ICPC Prelims India 2024	3
4	Shorya Singhal	ICPC Amritapuri 2024	9
5	Shorya Singhal	ICPC Chennai 2024	3
6	Shorya Singhal	ICPC Asia West 2025	6
7	Shorya Singhal	ICPC World Finalist 2025	TBD
8	Aayan Yadav	Smart India Hackathon 2023	Finalist (top 4)
9	Aakash Kumar Singh	Amazon ML Challenge 2024	16

Inter IIT Events:

Sr. No.	Name of Students	Type of Event	Event Name
1	Shorya Singhal, Shree Singhi	Technical	DevRev
2	Ishan Garg	Technical	Adobe
3	Nitin	Sports	Volleyball

UG Student Publications:

Sr. No.	Student Author	Title of the paper	Conference/Journal
1	Shree Singhi	Riemann Sum Optimization for Accurate Integrated Gradients Computation	NeurIPS '24 IAI Workshop
2	Aayan Yadav, Shree Singhi	Provenance Detection for AI-Generated Images: Combining Perceptual Hashing, Homomorphic Encryption, and AI Detection Models	ICML CODEML Workshop
3	Atharv Mittal, Amritanshu Tiwari, Sukrit Jindal	Revisiting CroPA: A Reproducibility Study and Enhancements for Cross-Prompt Adversarial Transferability in Vision-Language Models	TMLR
4	Atharv Mittal	Low Rank Adaptations for Effective Machine Unlearning	AAAI CoLoRAI Workshop
5	Atharv Mittal	LoRA Unlearns More and Retains More	AAAI Student Abstract
6	Amritanshu Tiwari	Image-Alchemy : Advancing Subject Fidelity in Personalized Text-to-Image Generation	ICLR Delta Workshop
7	Shree Singhi	Strengthening Interpretability: An Investigative Study of Integrated Gradient Methods	TMLR
8	Sukrit Jindal	Rethinking Randomized Smoothing from the Perspective of Scalability	NeurIPS '24 AdvML Frontiers Workshop
9	Sukrit Jindal	Impact of AI in Social Media: Addressing Cyber Crimes and Gender Dynamics	ECSM

Sr. No.	Student Author	Title of the paper	Conference/Journal
10	Aakash Kumar Singh	Detection Limits and Statistical Separability of Tree Ring Watermarks in Rectified Flow-based Text-to-Image Generation Models	ICLR '25 GenAI watermarking workshop
11	Shorya Singhal	One Noise to Fool Them All: Universal Adversarial Defenses Against Image Editing	CVPR'25 AdvML Workshop
12	Aayan Yadav, Shweta Singh	Benchmarking Object Detectors with COCO: A New Path Forward	ECCV 2024
13	Aayan Yadav	StegaVision: Enhancing Steganography with Attention Mechanism	AAAI 2025 Student Abstract
14	Shivank Garg, Shweta Singh	IPO: Your Language Model is Secretly a Preference Classifier	ACL 2025 Main
15	Shivank Garg	Do Biased Models Have Biased Thoughts?	COLM 2025
16	Shivank Garg	Unmasking the Veil: An Investigation into Concept Ablation for Privacy and Copyright Protection in Images	TMLR
17	Shivank Garg, Abhishek Baghel	Snowy Scenes, Clear Detections: A Robust Model for Traffic Light Detection in Adverse Weather Conditions	KDD 2024
18	Shivank Garg	Give me a hint: Can LLMs take a hint to solve math problems?	NeurIPS'24 Math AI Workshop
19	Shivank Garg	Attention Shift: Steering AI Away from Unsafe Content	NeurIPS'24 RBFM Workshop
20	Shivank Garg	Confidence is all you need for MI attacks	AAAI 2024 Student Abstract
21	Shivank Garg	Adaptive Urban Planning: A Hybrid Framework for Balanced City Development	AAAI 2025 AI4UP Workshop
22	Shivank Garg	LoRA-Mini: Adaptation Matrices Decomposition and Selective Training	AAAI 2025 CoLoRAI Workshop

Publications by PG and Graduate Students:

- Rawat, Nishtha, and Amit Agarwal (2025). "Integration of Dimensionality Reduction and Metaheuristic Optimization for Spatiotemporal Clustering". In 16th International Conference on Advanced Systems in Public Transport (CASPT 2025).

- Rawat, Nishtha, Kuldeep Jeengar, Amit Agarwal, and Rishman Jot Kaur Chahal (2024). "Boarding Alighting Counting in Different Transit Vehicles under Crowded Conditions". In IEEE CONECCT 2024 at IISc Bangalore. DOI:10.1109/CONECCT62155.2024.10677074.

- Shrivastava, A., Nishtha Rawat, and Amit Agarwal (2024). "Deep-Learning-based Model for Prediction of Crowding in a Public Transit System". In Public Transport. DOI:10.1007/s12469-024-00360-z.

- Rawat, Nishtha, Arnav Rai, and Amit Agarwal (2024). "Deep Learning-based Passenger Counting System using Surveillance Cameras". In 16th International Conference on COMmunication Systems & NETworkS (COMSNETS), Bengaluru, India DOI: 10.1109/COMSNETS59351.2024.10426937.

- M. Shil and G. N. Pillai, "Inverted Pendulum Control using Twin Delayed Deep Deterministic Policy Gradient with a Novel Reward Function," 2022 IEEE Delhi Section Conference (DELCON), New Delhi, India, 2022, pp. 1-6, doi: 10.1109/DELCON54057.2022.9752797.

- M. Shil, G. N. Pillai and M. K. Gupta, "Improved Soft Actor-Critic: Reducing Bias and Estimation Error for Fast Learning," 2023 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS), Bhopal, India, 2023, pp. 1-6, doi: 10.1109/SCEECS57921.2023.10063058.

- M. Shil, G. N. Pillai and M. K. Gupta, "Multi-Agent Deep Reinforcement Learning based Secondary Voltage Control of Inverter-Based AC Microgrids," IECON 2024 - 50th Annual Conference of the IEEE Industrial Electronics Society, Chicago, IL, USA, 2024, pp. 1-6, doi: 10.1109/IECON55916.2024.10905414.

- G. Pare, M. Shil, G. N. Pillai and A. Dey, "Magnetic Levitation Control Using Deep Reinforcement Learning and Prioritized Experience Replay with Action Noise Variations," 2025 Fourth International Conference on Power, Control and Computing Technologies (ICPC2T), Raipur, India, 2025, pp. 1-5, doi: 10.1109/ICPC2T63847.2025.10958614.

- Srishti Yadav, Anshul Pundhir, Balasubramanian Raman, Sanjeev Kumar, "Unveiling Robustness of Spiking Neural Networks Against Data Poisoning Attacks", Published in International Joint Conference on Neural Networks (IJCNN), 30 June - 5 July 2024, Yokohama, Japan.

- Srishti Yadav, Anshul Pundhir, Tanish Goyal, Balasubramanian Raman, Sanjeev Kumar, "Differentially Private Spiking Variational Autoencoder", Published in International Conference on Pattern Recognition (ICPR), 1- 5 December 2024, Kolkata, India.
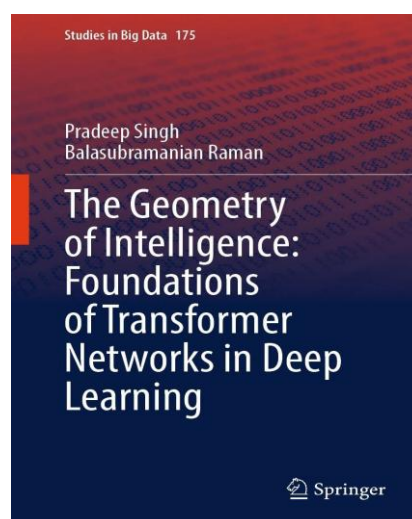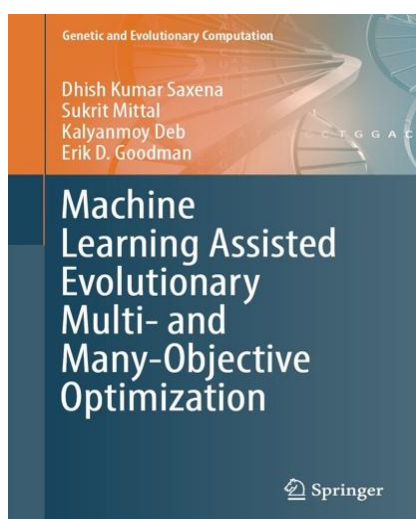
Faculty Awards and Recognitions

Prof. Amit Agarwal (*Joint Faculty, MFSDSAI*), received the Young Achiever's Award from MNIT Jaipur

Prof. Sanjeev Kumar is associated with *Soket.ai*, which has been selected by IndiaAI to build Project EKA—an open-source 120-billion-parameters Foundation Language Model announced by Union Minister Shri Ashwini Vaishnaw ji.

Prof. Dhish Kumar Saxena published a book, 'Machine Learning Assisted Evolutionary Multi-and Many-Objective Optimization'.
Prof. Balasubramanian Raman published a book, 'The Geometry of Intelligence: Foundations of Transformer Networks in Deep Learning'.

Faculty Spotlight: Prof. Gaurav Kumar Nayak

We are delighted to introduce Prof. Gaurav Kumar Nayak, an Assistant Professor at the MFSDSAI. Prof. Nayak leads the Visual Intelligence and Technology Advancement Lab. His research spans a wide spectrum of cutting-edge areas, including data-efficient Deep Learning, Generative AI - Diffusion models and LLMs, Deep Learning for Computer Vision, Machine Learning, Knowledge Distillation, Adversarial Robustness, Domain Adaptation, Continual Learning, Geo-localization, and Federated Learning. With a strong focus on both foundational advances and real-world applications, his work is shaping the future of intelligent visual systems.

Recent Research Highlights:

- J. A. C. Santiago, P. Tirupattur, G. K. Nayak, G. Liu, and M. Shah, "MGD³: Mode-Guided Dataset Distillation using Diffusion Models", International Conference on Machine Learning (ICML), 2025.

- G. K. Nayak, I. Khatri, S. Randive, R. Rawal, and A. Chakraborty, "DAD++: Improved data-free test time adversarial defense", Neurocomputing Journal, 2025.

- N. Siddiqui, F. A. Croitoru, R. T. Ionescu, G. K. Nayak, M. Shah, "DLCR: A Generative Data Expansion Framework via Diffusion for Clothes-Changing Person Re-ID", IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2025.

- M. Yashwanth, G. K. Nayak, A. Singh, Y. Simmhan, and A. Chakraborty, "Adaptive Self-Distillation for Minimizing Client Drift in Heterogeneous Federated Learning", Transactions on Machine Learning Research (TMLR), 2024.

- P. P. Kulkarni, G. K. Nayak, M. Shah, "CityGuessr: City-Level Video Geo-Localization on a Global Scale", European Conference on Computer Vision (ECCV), 2024.

- M. Yashwanth, G. K. Nayak, H. Rangwani, A. Singh, A., V. B. Radhakrishnan, A. Chakraborty, "Minimizing Layerwise Activation Norm Improves Generalization in Federated Learning", IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2024.

Sponsored Projects:

- "Geospatial Foundation Model using AI and ML" - Funded by Graylark Technologies, Inc., USA (Ongoing) [PI]

- "Developing Generative AI strategies for Data Expansion and Data Completion on Computer Vision Tasks using Diffusion and LLMs" - FIG Grant, (Ongoing) [PI]

Voices of Experience

"*As a PMRF fellow since 2023, my research at MFSDSAI focuses on Multi-Agent Deep Reinforcement Learning for secondary voltage control in microgrids, aiming to enhance noise resilience amid renewable energy fluctuations. The collaborative and interdisciplinary environment at MFSDSAI has been instrumental in shaping my pursuit of intelligent, robust, and sustainable control strategies.*"

– Mr. Manas Shill, Ph.D. Scholar

"*The Mehta Family School of Data Science and Artificial Intelligence (MFSDSAI) provided me the perfect platform to transition into the field of Artificial Intelligence, especially in data privacy. The department's interdisciplinary approach, supportive faculty, and access to excellent computing resources have been instrumental in shaping my research. Guided by Prof. R. Balasubramanian and Prof. Sanjeev Kumar, I've published two papers in international conferences and received the prestigious TCS Research Fellowship. MFSDSAI truly encourages students from diverse academic backgrounds to explore and grow in the rapidly evolving world of data science and artificial intelligence.*"

– Ms. Srishti Yadav, Ph.D. Scholar

"*My experience at MFSDSAI has been foundational for both academia and industry. Professors Sanjeev, Pillai, Sparsh, and Manu taught with such clarity that their lessons directly helped me during internship interviews. I'm deeply grateful for their guidance.*"

– Shree Singhi, B.Tech. Student

"When I joined MFSDSAI, ours was the very first undergraduate batch. I chose this branch for its unique interdisciplinary curriculum, which has integrated concepts from Computer Science, Mathematics, AI and Machine Learning. Our faculty are well-versed in this discipline and have consistently been supportive. With the support of a thoughtfully designed curriculum and strong academic guidance, this branch and the platform it provided has helped me to gain both research and industrial experience in this domain"

*– **Sukrit Jindal, B.Tech. Student***

"As I enter my final year at the Mehta Family School of Data Science and Artificial Intelligence, I'm truly grateful for how the department has shaped my journey in AI. The thoughtfully designed curriculum—from core statistics to deep learning—made complex topics exciting and approachable, while the supportive professors and driven peers created an environment that constantly encouraged growth. This school has turned my curiosity into confidence, and I couldn't have asked for a better place to learn".

*– **Aayan Yadav, B.Tech. Student***

Newsletter Committee:

- Prof. Sanjeev Kumar (HoD, MFSDSAI)
- Prof. Sparsh Mittal
- Prof. Manu Gupta
- Prof. Chetan Ralekar
- Ms. Gowri D. V.