Sahil Mishra

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Education

- **Doctor of Philosophy (PMRF)** in **Artificial Intelligence** *(July'23-Present)*
  Indian Institute of Technology, Delhi *CGPA: 9.17*
- **Bachelor of Technology** in **Computer Engineering** *(August'17-May'21)*
  Indian Institute of Information Technology Design and Manufacturing, Kurnool *CGPA: 8.57*

Work Experience

- **Doctoral Researcher**
  IIT Delhi *(Nov'22-Present)*
  - Worked on the problem of taxonomy construction and augmentation in collaboration with Microsoft and Samsung.
  - Explored how the tree structure of taxonomy can be embedded in various geometries like box embeddings and spaces like Hilbert space.
  - Fine-tuned LLMs on instruction-based prompts for knowledge graph expansion using Reinforcement Learning.
  - Modeling the hierarchical properties of taxonomies using transformers and graph neural networks.
  - **Exposure:** PyTorch, PyTorch Geometric, Manifold Analysis and Optimization, Graph Neural Networks, Geometrical Embeddings.
  - **Exposure:** PyTorch, PyTorch Geometric, Graph Neural Networks, Geometrical Embeddings, Quantum NLP, LLMs, LoRA, PEFT, RLHF, RAG, PPO, DPO.

- **Software Development Engineer - Machine Learning**
  Jio Platforms Limited - Noida *(July'22-Nov'22)*
  - Developed game and user recommendation engines by applying SVD and then embedding the vectors into a graph. Optimized search operations by employing the fastest k-selection algorithm, significantly reducing latency by 50% and enhancing the overall user experience for seamless and efficient navigation.
  - Devised explicit media content moderation system to filter out explicit posts from the social media platform. The EfficientNetV2 model is trained on the custom dataset scraped from the internet to filter out explicit images and videos with an accuracy of 93%.
  - **Exposure:** PyTorch, FAISS, Docker, Kubernetes, AWS.

- **Software Engineer - MLOps**
  India Urban Data Exchange - IISc Bangalore *(May'21-July'22)*
  - Devised data ingestion pipeline and analytics engine to collect real-time data from sensors setup across the cities under Smart Cities Scheme by Ministry of Housing and Urban Affairs.
  - Performed complex big data analytics on Surat Intelligent Transit Management data, Pune Air Quality Monitoring data and Varanasi Solid Waste Management data like vehicle delay, vehicle movement and waste disposal using Spark ML and graph convolutional networks.
  - Integrated logging and monitoring functionality in the adapter server to monitor running data ingestion jobs and analytics engine.
  - **Exposure:** PyTorch, PyTorch Geometric, Tensorflow, Graph Neural Networks, Spark ML, Golang, Flink, MinIO, Zookeeper, Kudu, Trino, Superset, Airflow, RabbitMQ, Kafka, Druid, Docker, Loki, Grafana, Kubernetes, AWS, GCP.

- **Deep Learning Developer Intern**
  Tensormatics - Chandigarh *(May'20-Sept'20)*
  - Developed an AI backend as a part of Autolabel functionality for Labellerr. NodeJs was used to develop the backend, and it was deployed on GCP using Docker. The user would upload raw data on the server and then define classes for the data. The system returns a data point to the user and asks them to label it. Once sufficient data has been labeled, the model is trained on it, which labels the data further.
  - Implemented deep learning models for image classification, segmentation, and object detection for weakly supervised labeling of unstructured data.
  - Designed Proof of Concept for prospective clients i.e. weed detection model for a robotics organization and license plate OCR model for a parking service provider.
  - **Exposure:** Tensorflow, UNet, PSPNet, Faster-RCNN, NodeJS, GCP, Docker, Object Detection, Object Segmentation.

Skills Summary

- **Languages:** C, C++, Java, Python, JavaScript, Golang, Dart
- **Libraries & Frameworks:** PyTorch, PyTorch Geometric, TensorFlow, OpenCV, Flutter
- **Tools & Technologies:** Git, Docker, Kubernetes, Android, MERN Stack, MEAN Stack, Apache DevOps Tools
- **Research Skills:** Natural Language Processing, Graph Machine Learning, Geometric Deep Learning

Publications

- **Sahil Mishra**, Srinitish Srinivasan, Srikanta Bedathur, and Tanmoy Chakraborty ⋄ *TaxoBell: Gaussian Box Embeddings for Self-Supervised Taxonomy Expansion* ⋄ Submitted to WWW 2026.
- **Sahil Mishra**, Avi Patni, Niladri Chatterjee, and Tanmoy Chakraborty ⋄ *SpheREx: Geometric Hypersphere Embeddings for Hierarchical and Expressive Representation Learning* ⋄ Submitted to ICLR 2026.
- **Sahil Mishra**, Avi Patni, Niladri Chatterjee and Tanmoy Chakraborty ⋄ *QuanTaxo: A Quantum Approach to Self-Supervised Taxonomy Expansion* ⋄ Submitted to AAAI 2026.
- **Sahil Mishra**, Kumar Arjun, and Tanmoy Chakraborty ⋄ *Rank, Chunk and Expand: Lineage-Oriented Reasoning for Taxonomy Expansion* ⋄ ACL Findings 2025.
- **Sahil Mishra**, Ujjwal Sudev, and Tanmoy Chakraborty ⋄ *FLAME: Self-Supervised Low-Resource Taxonomy Expansion using Large Language Models* ⋄ ACM TIST 2024.
- Shivika Sharma, Nandini Mawane, Chetan Kumar Kuraganti, Mayur Taware, Yash Chandrashekhar Dixit, **Sahil Mishra**, Raghu Krishnapuram, and Rakshit Ramesh ⋄ *Enhanced ETA Predictions with T-GCN on Optimized Road Segments* ⋄ IEEE International Smart Cities Conference 2024.

Achievements, Honors and Awards

- Received Microsoft Academic Partnership grant from Microsoft Research India in 2024 for the duration of 1 year for developing taxonomy models via RAG.
- Received research grant from Samsung Research Institute in 2023 for the duration of 1 year for developing methods to construct low-resource taxonomies.
- Received the Prime Minister's Research Fellowship in 2023 cycle 11 for the duration of 5 years.
- Received Institute Merit-cum-Means Scholarship Awarded for being in the top 25% of the class in IIITDM Kurnool for 1 semester.
- Received Financial Assistance Scheme for Meritorious and Needy Students of IIITDM Kurnool Awarded for being in the top 10% of the class for 7 semesters.
- Nominated for Scholarship for Higher Education (SHE) under Innovation in Science Pursuit for Inspired Research (INSPIRE) scheme for being in the top 1% of ISC Examinations 2016.
- School topper with 94% in SSC and 97% in HSC from CISCE Board.