Mihir Panchal

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EDUCATION

University of Mumbai - Dwarkadas Jivanlal Sanghvi College of Engineering — 9.00 CGPA
Bachelor of Technology in Computer Engineering, Honors in Intelligent Computing — August 2023 – May 2026

Shri Bhagubhai Mafatlal Polytechnic and College of Engineering — 9.45 CGPA
Diploma in Information Technology — August 2020 – May 2023

RESEARCH COLLABORATIONS

Georgia Institute of Technology & NIDM India — August 2025 – Present
Generative Modeling for Disaster Management — Dr. Ying-Jung Chen, Dr. Surya Parkash — Georgia, Atlanta
- Developed CC-GRMAS, a multi-agent graph neural system for spatiotemporal landslide risk forecasting, integrating GNNs, Retrieval-Augmented Generation, and graph databases for proactive disaster preparedness.
- Collaborated with a cross-institutional team to preprocess NASA Global Landslide Catalog, design spatial graphs, and evaluate graph-based models achieving 0.79+ F1-score while reducing model complexity by 99.9%.

King's College London & National University of Singapore — June 2025 – Present
Reasoning and Interpretability of LLMs — Dr. Mamta Sahni, Dr. Deeksha Varshney — Singapore
- Advanced multi-lingual LLM reasoning and interpretability, leveraging reasoning chains, circuit tracing, logit lens, and attention head analysis to enhance model transparency and performance across diverse linguistic tasks.
- Conducted systematic probing over model internals by recording activations across residual streams, attention layers, attention output projections, and MLP blocks to trace information flow and identify causal pathways.

IIT (ISM) Dhanbad & IIT Jodhpur — June 2025 – Present
Graph Representation Learning in LLMs — Dr. Manoj Kumar Dr. Deeksha Varshney — Jodhpur, India
- Optimized Graph of Thoughts reasoning using Block Successive Upper-bound Minimization and graph coarsening on GSM8K dataset, finetuning models to improve scalability and efficiency for complex reasoning tasks in LLMs.
- Proposed a graph structured reasoning framework that abstracts reasoning chains into compact representations, enabling models to perform multi-step reasoning without explicit prompting or additional finetuning.

Defence Research and Development Organisation & IIT Mandi — January 2025 – September 2025
Speech Processing and NLP — Dr. Prabhat Bharti, Dr. Asif Ekbal — Mandi, India
- Implemented ECAPA-TDNN architecture incorporating SE-Res2Blocks, channel attention, and skip connections for extracting high quality speaker embeddings, deployed by Government of India in multilingual systems.
- Developed end-to-end pipelines for speech preprocessing, embedding extraction, and diarization scoring, ensuring accurate segmentation of overlapping speakers in diverse Indian multilingual datasets.

AI-NLP-ML Research Group (IIT Patna) — December 2023 – September 2025
Computational Linguistics in Peer Review — Mr. Viral Dalal, Dr. Mayank Agarwal — Bihar, India
- Implemented GraphRAG to assess peer review consistency, leveraging knowledge graphs and counterfactual reasoning at word, sentence, and aspect levels to improve transparency and reliability in review processes.
- Developed multi-task models with 6 ablation variants, comprising SciBERT, BERT-Base, and Bi-LSTM, connected to multiple attention blocks to determine aspect categories and their sentiments for any given review.

PROFESSIONAL EXPERIENCE

Infiheal Healthcare Private Limited — June 2024 – August 2024
Software Engineering Intern — Ms. Srishti Srivastava, Mr. Vipul Chivate — Mumbai, India
- Boosted model accuracy by 15% using advanced AI, improved data processing efficiency by 20% with classification models, and built robust mental health AI apps using FastAPI, Docker, Git, and AWS for cloud deployment.
- Utilized AWS services to improve system reliability by 25%, cut infrastructure costs by 30%, automated workflows achieving a 40% reduction in processing time, and collaborated with multidisciplinary teams in agile environments.

Skillsvista — July 2022 – September 2022
Full Stack Developer Intern — Mr. Shrenik Doshi, Mr. Jason Culloty — Mallow, County Cork (Remote)
- Architected responsive web components using modern front-end technologies, resulting in a 30% improvement in page load times and a 20% increase in user engagement, leading to better user experience and retention.
- Engineered highly efficient RESTful APIs and data models in Django, achieving 99.9% uptime and reducing API response times by 40%, improving overall application performance and scalability.

PUBLICATIONS

CC-GRMAS: A Multi-Agent Graph Neural System for Spatiotemporal Landslide Risk Assessment in High Mountain Asia | Neural Information Processing Systems (NeurIPS)   In review
- Co-authored a novel framework integrating GNNs and multi-agent coordination for climate-resilient disaster preparedness, validated on NASA's Global Landslide Catalog in High Mountain Asia(HMA region)

Indic-TunedLens: Interpreting Multilingual Models in Indian Languages | International Joint Conference on Natural Language Processing (IJCNLP AACL)   Minor Revision
- Developed Indic-TunedLens framework for multilingual LLM interpretability in Hindi, Marathi & Bengali, using language specific affine transformations to improve layer wise decoding accuracy over English-centric methods

Not all peer reviews are significant: A Dataset for Good (Exhaustive) vs Bad (Trivial) Scientific Peer Reviews Leveraging Chain-of-Thought Reasoning | Scientometrics, Springer   Accepted
- Constructed InsightfulPeer, a peer review classification dataset leveraging Chain-of-Thought reasoning with LLMs (LlaMa-3.1, GPT-4, Mixtral, Gemma) and evaluated model-human agreement using Cohen's and Fleiss' Kappa.

ConsistentPeer: Reviewers Through GraphRAG-Driven Counterfactuals to Measure Consistency in Peer Review | International Journal of Data Science and Analytics, Springer   Minor Revision
- Proposed a novel knowledge graph-based framework to evaluate consistency in peer reviews by correlating review text, confidence scores, and ratings, incorporating counterfactual reasoning to detect and resolve inconsistencies.

LEDGE : Leveraging Dependency Graphs for Enhanced Context-Aware Documentation Generation | Automated Software Engineering, Springer   Preprint
- Researched and developed LEDGE, a novel framework integrating dependency graphs and GraphRAG to advance automated, context-aware software documentation generation, empirically validated through rigorous evaluation.

Co-Reviewer: Are LLMs on the Same Page as Human Reviewers? An Agentic AI Framework for Evaluating Review Quality and Consensus | Scientometrics, Springer   Minor Revision
- Designed Co-Reviewer, a multi-agent LLM framework for collaborative peer review generation and refinement; evaluated its outputs against human reviews across informativeness, sentiment, and editorial decision alignment.

PeerGauge: a Dataset for Peer Review Disagreement and Severity Gauge | Language Resources and Evaluation, Springer   In review
- Built PeerGauge, a 28k-pair peer review contradiction severity dataset (-5 to +5 scale) from ICLR/NeurIPS, and benchmarked models (RoBERTa, LSTM, SciBERT, LLMs) for automated severity prediction.

Game Machine and Algorithm towards Trends in Game States using Machine Learning and Deep Learning | 2023 10th International Conference on Computing for Sustainable Global Development   DOI
- Developed a hybrid approach integrating machine learning and deep learning, utilizing Markov Chain models to analyze game states in chess, poker, cricket, and football.

TALKS

Why Research Papers? A Comprehensive Guide | DJSACM Research Seminar   Youtube
Transformers in AI: From Perceptrons to Generative Models | SBMP Alma Mater   GitHub Event
Building Intelligent Applications with LangChain and LLMs | TFUG ML Mumbai   GitHub Event
Leveraging Boto3: Pythonic access to S3 and SNS on AWS | Mumpy June Meetup 2024   GitHub Event
From Code to Community: Publishing PyPI Packages | FOSS United June Meetup 2024   GitHub Event
Unlocking the Power of Computer Vision with Mediapipe | Mumpy March Meetup 2024   GitHub Event
Mastering Python: A Hands-on Workshop for Developers | NMIMS Navi Mumbai   GitHub Youtube

TECHNICAL SKILLS

Languages : Python, C, C++, CUDA, SQL, Latex, Javascript, Typescript, Dart
Dev Tools : Linux, AWS, GCP, Docker, Kubernetes, Hugging Face, Wandb, Overleaf, GitHub
Frameworks : TensorFlow, PyTorch, FastAPI, Flask, Django, OpenCV, Langchain, React, React Native

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