Kausthubh Manda

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Education

International Institute of Information Technology Bangalore *Oct 2022 – Jul 2027*
Integrated Mtech (Btech + Mtech) in Computer Science and Engineering, **GPA: 3.61/4.0**
with a minor in *Artificial Intelligence and Machine Learning*

Publications and Technical Writing

(denotes equal contributions, S = In submission, C = Conference, J = Journal, P = Pre-Print, B = Blog, M = Manuscript in Preparation)*

[S.2] **Nostalgia to Prevent Catastrophes: Memory and Forgetting in Supervised Fine-Tuning for Vision Models** [ArXiv]
Manda Kausthubh*, Naganand Yadati.
Pre-print, Slated for submission at ICML'26.

[S.1] **Generalisation in Multitask Fitted Q-Iteration and Offline Q-learning** [ArXiv]
Manda Kausthubh*, Raghuram Bharadwaj.
Pre-print, Slated for submission at ICML'26.

[M.1] **Pseudo Convex Optimisation with Parametrized Constraints in Joint Learning for Stochastic Portfolio Management** [In preparation]
Manda Kausthubh*, Aswin Kannan*.

[B.1] **Manda Kausthubh** (2025) **A Proof of Hoeffding's inequality and views in Statistical Generalisation**. Kausthubh Manda's Blog. [Blog]

Experience

Summer Research Intern *Bangalore, Karnataka*
CCSSMP, IIIT Banglore | Advisor: Prof. Balakrishna Ashok *May 2024 - Jul 2024*

- → Researched Adiabatic Quantum Computing as a part of CCSSMP, IIIT Bangalore. Used Numerical analysis for solving and visualising partial differential equations encountered in Adiabatic Quantum Transitions using Python.
- → The codebase for simulations proved to be crucial in determining adiabatic transitions.
- → Developed new methods for assessing algorithms for evaluating anytime algorithms for the Discrete Optimisation.

Selected Research Projects

LLM Chaining for Mathematics and Reasoning in Lean4 *Apr 2025 - May 2025*
Submission through Pioneers@IIITB

- → Created modified Group Relative Policy Optimisation (GRPO) for training models for mathematical reasoning.
- → Used LLM Chaining to create a combined model, which is efficient at proof engineering in Lean-4 code for representing mathematics, including complex statements and logical structures such as proofs.
- → Improved baseline score (APE Benchmark) on DeepSeek-based (Qwen2.5B) logical extraction, followed by code generation by Gemini-Flash 2.0 from 42.75 baseline score to 50.35 pass rate.

Nostalgia: Forgetting free continual learning for SFT *Aug 2024 - Jan 2025*
Advisor: Dr. Y Naganand

- → Developed a novel method for multi-task sequential fine-tuning of Vision, Language and Multimodal(VLM) models (ViT-32B, BERT-base, CLIP), which helps forgetting in supervised fine-tuning, through a constrained optimization.
- → Used approximate linear algebraic methods calculating null spaces for second order informations to effectively computing solutions for learning without forgetting.
- → Resulted in publication at ICML'26.

Self-Supervised Training of Matching Networks for ASR *Aug 2024 - Jan 2025*
Advisor: Dr. V Ramasubramanian

- → Developed an (FSL-SSL) paradigm for Automatic Speech Recognition (ASR), based on Matching Networks, trained on pseudo-labels generated by various SSL strategies such as K-means, GMMs.
- → Contributions to the project include improving the implementation of SSL strategies by using the FAISS library, bringing the time of obtaining pseudo-labels from 1 weeks → 20 minutes.

Psuedo-Convex Optimisation in Joint Learning Problems *Feb 2025 - Sep 2025*
Advisor: Dr. Aswin Kannan

→ Created and implemented optimisation strategies for optimising various machine learning models, with pseudo-convex assumptions and parameterised constraints in learning.

→ Proved multiple theorems, helping establish upper bounds on error, and proving the convergence of the algorithms.

→ Implemented and tested various machine learning models in the setup of Portfolio optimisation.

Notable Applied Projects

Custom Image Compression Algorithm using Huffman Encoding [code] *May 2025*

→ Developed and implemented a custom lossless image compression algorithm from scratch based on a modified Huffman encoding mechanism. This mechanism, combined with *zstd* compression mechanism, provides a compression ratio of 0.63, competing with PNG compression of 0.69.

Foundational Vision Model for Gravitational Lensing [code] *Dec 2024*

→ Developed and implemented a custom Masked Autoencoder Vision Transformer (MAE ViT) from scratch, achieving a significant reduction in reconstruction error (MSE Loss) from 0.0145 to 1.78×10^{-3} and boosting accuracy to 0.983 on classification tasks with an SSIM score of 0.902 and psnr score of 35.1 for super-resolution tasks.

Technical and Scholastic Achievements

→ Reviewer for **ACCS ADCOM, 2025**.

→ *Dean's Merit List, IIIT Bangalore* for the years 2022-2023 and 2024-2025.

→ Qualified for the prestigious *Amazon ML Summer School 2025*.

→ Bronze Position and Honourable mention in *Flipr 27.1-AI/ML (Gen AI)* Hackathon.

→ JEE Mains: **99.418** percentile and JEE Advanced: ranked **3615*th*** out of roughly 156,000 in India.

Teaching and Mentorship

→ **Teaching Assistant, AIM 102 Statistical Machine Learning**, *IIIT Bangalore, Spring 2026*

→ **Instructor, An introduction to Real Analysis and Topology**, *Pioneers (Math Club), IIIT Bangalore, Fall 2025.*

→ **Teaching Assistant, AIT 201 Deep Learning and Neural Networks**, *IIIT Bangalore, Fall 2025.*

→ **Teaching Assistant, AIM 101 Statistics for Data Science**, *IIIT Bangalore, Spring 2025.*

→ **Teaching Assistant, AIM 103 Calculus**, *IIIT Bangalore, Fall 2024.*

Relevant Coursework

AI, Machine Learning and Data Science: Machine Learning, Visual Recognition, Generative AI for Vision, Few Shot Learning, Multi-Objective Machine Learning, Advanced Reinforcement Learning, Reinforcement Learning and Data Visualisation. **Mathematics:** Calculus and Real Analysis, Probability and Statistics, Linear Algebra, Number Theory and Abstract Algebra. **Algorithms and Computer Science:** Data Structures and Algorithms, Design and Analysis of Algorithms, Optimisation Theory, Database Management System. **Self-Study:** Topology(Munkres), Measure Theory (Real and Complex Analysis, Walter Rudin) and Statistical Methods for Machine Learning (by Larry Wasserman, CMU)

Leadership & Extracurricular

→ *Reviewer and organiser:* **ACCS ADCOM 2025**.

→ Founder and Core member, Pioneers (Mathematics Club@IIIT B), May 2023 - present.

→ Core member, Qimaya, Quantum Computing Club @IIITB, December 2024 - present.

→ Core member of technical fest Synergy@IIIT B, 2024 edition.

→ Core Member, SquareOne@IIIT B, 2023.