Nishaanth Kanna Ravichandran

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Education

University of New Brunswick **NB, Canada**

Masters in Computer Science, Coursework. *GPA: 3.8* Sept 2022 – Dec 2023

Relevant Courses: Machine Learning (A+), Natural Language Processing (A+)

PSG College of Technology **TN, India**

Bachelors in Computer Science & Engineering. *First Class* Jun 2017 – May 2020

Research interests

Fair and Trustworthy AI, Robustness and Out-of-Distribution Generalization.

Publications

1. **On the Fairness Impact of Hardware Selection in Machine Learning**
   Sree H Nelaturu*, **Nishaanth K Ravichandran***, Cuong Tran, Sara Hooker, Ferdinando Fioretto
   *International Conference on Machine Learning (**ICML**), 2024. * - Equal Contribution*

2. **Investigating Continual Pretraining in Large Language Models: Insights and Implications**
   Çagatay Yildiz, **Nishaanth K Ravichandran**, Prishruit Punia, Matthias Bethge, Beyza Ermis
   [submitting to] Association for Computational Linguistics (ACL)

3. **Neural MMO 2.0: A Massively Multi-task Addition to Massively Multi-agent Learning**
   J. Suarez, D. Bloomin, K. W. Choe, H. X. Li, R. S., **Nishaanth K Ravichandran**, D. Scott
   *Neural Information Processing Systems (**NeurIPS**), 2023 Datasets and Benchmark Track*

Research experience

Cohere For AI

Mentors: Dr. Sara Hooker (Head at Cohere For AI) & Prof. Ferdinando Fioretto (Assistant Professor at University of Virginia) Nov 2022 – Mar 2024

- Conducted a comprehensive study to investigate the uneven impact of hardware tools on model performance and **fairness among diverse under-represented groups** (Ethnicity, Gender etc.).
- Experimented by training 3000+ models across different configurations, hardware setups, datasets, and model complexity. Further explored the relationship between fairness, hardware tools and **impact of Adversarial Attacks and Membership Inference Attacks** on ML models.
- Proposed a **mitigation solution that reduced fairness violation by more than 50%** with no extra performance overhead, and our work was accepted at **ICML 2024**.
  Keywords: *Fairness, Geometry of Loss surfaces, Adversarial Attacks*, PyTorch, GCP.

Mentor: Dr. Beyza Ermiş (Senior Research Scientist at Cohere For AI) Mar 2023 – Feb 2024

- Explored several LLMs on their **forgetting**, backward and forward transfer properties in a **Continual-PreTraining** scenario across 166 domains in the Massively Multi-Domain Dataset (M2D2). Exam-

ined the results of the findings and proposed a benchmark based on M2D2 to evaluate the Continual Pre-Training capabilities of an LLM.
- Investigated a mitigation solution for the Catastrophic Forgetting problem by building a sophisticated RAG pipeline on the M2D2 Dataset. Built FAISS Indices with 25M Vectors, experimented with different indexing algorithms such as HNSW, IVQ, PQ and their variations.
  Keywords: Out-of-Domain Generalization, Continual Learning, Retrieval-Augmented Generation, FAISS, Domain Adaption, HuggingFace.

Industry Experience

Four Eyes Financial, Data Team — Saint John, Canada

Machine Learning Engineer — Jan 2024 - Present

- Designing AWS Bedrock and Claude Sonnet-based agentic LLM solutions to automate QA processes for the company's front-end system.
- Developed a multi-stage LLM-powered ML pipeline to efficiently match financial securities from clients with the internal database and risk rating system.
- Built a two-stage pipeline: Stage 1 utilized Sentence-T5 embeddings fine-tuned on proprietary data for pre-filtering, while Stage 2 utilized Llama 3.1 with multi-shot and chain-of-thought prompting for accurate security matching. **Achieved a 70% reduction in false matches.**

Intel Corporation, Data and Analytics Division — Bengaluru, India

Data Engineer — Jun 2020 - Dec 2021

- Designed and implemented Flask-based REST APIs to process terabytes of raw processor manufacturing data, delivering graphical insights for Data Scientists and Engineers at Intel Fabs. **Reduced execution time from 12 hours to 20 minutes.**
- Built scalable software to handle billions of rows of data, optimizing Python code for reduced memory usage. Leveraged caching, compression, and intelligent data retrieval techniques to deliver terabytes of data via a web interface efficiently.

Undergraduate Internship — Jan 2020 - May 2020

- Automated CI/CD pipelines for front-end development using Ansible and TeamCity.

Academic Service

Reviewer

ICLR 2025, MINT Workshop@NeurIPS 2024

Teaching experience

University of New Brunswick, Canada

Teaching Assistant, Data structures and Algorithms — Sept 2023 - Dec 2023

Technical Skills

- **Languages:** Python, SQL
- **Tools:** Git, Docker, Google Cloud & AWS Sagemaker Platform
- **Libraries:** PyTorch, Pandas, NumPy, HuggingFace Transformers
- **Certifications:** AWS Machine Learning Specialty, Coursera Deep Learning Specialization