

Hooman Ramezani

Machine Learning & Cloud

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EDUCATION

University of Toronto, MAsc, Operations Research (Machine Learning)

2023 - 2024

- **Thesis:** Tuning medical-focused LLM and ViT models with **multimodal** clinical data for lung cancer treatment planning
- **GPA 4.0 / 4.0** | **Coursework:** Large Language Models, Cloud Data Eng. (Spark, AWS), Deep Learning Theory

University of Waterloo, BAsc, Systems Design Engineering

2018 - 2023

- **GPA 3.7 / 4.0** | **Coursework:** Intro. Deep Learning, Intro. Machine Learning, Pattern Recognition, Neuroscience

EXPERIENCE

Machine Learning Researcher | University Health Network

Full Time - MAY 2023 - PRESENT

- **Authored** 'LungSAM', 3D lung segmentation system integrating **meta-SAM** foundational model achieving **90%** DiceC
- Training novel **medical multi-modal LLM (vision/text)** for cancer treatment via analysis of lung-CT images + clinical notes
- Features **LoRA** finetuning, cross-attention for **token alignment** between modalities, optimized **FLOP** utilization

Machine Learning Engineer | Advanced Micro Devices

Internship - SEPT. 2022 - APRIL 2023

- Accelerated **LLM** inference on AMD CPUs with ZenDNN, applying model compression with **pruning** and **quantization**
- Architected a scalable, distributed ML training pipeline with **Spark + Azure**, handling multi-terabyte **cloud** datasets
- Trained and deployed **BERT-based LLM** for sentiment analysis with Few-Shot learning, with **80% latency** improvement

Deep Learning Developer | Apple (former DarwinAI)

Internship - JAN. 2022 - APRIL 2022

- Delivered a **CNN** based Liver Fibrosis diagnosis model to **Pfizer** team, reducing examination time for clinicians by **40%**
- Produced a highly **sensitive** and **generalized** model using custom data **augmentations** and multi-GPU training (DDP)
- Collaborated with customers to translate requirements into scalable deep learning solutions deployed on edge devices

Deep Learning Developer | Applied Brain Research

Internship - MAY. 2021 - AUG. 2021

- Engineered entire lifecycle for a **drone object-detection** model to identify surface defects on complex structures
- Built **Unreal Engine 4** simulation to synthetically generate **50,000** annotated images to overcome lack of real-world data
- Achieved **94% YOLOv3** accuracy using **CNN-LSTM** model to track **temporal data** in video frames

Other Internships (12 months) Data Engineer. (2020) Android Developer. (2020) QA Developer. (2019)

RESEARCH // PROJECTS

Machine Learning Lead | Livy Education Chatbot Team

JAN 2024 - PRESENT

- Built an assignment research tool as chatbot for Canvas students, integrating **GPT-4**, **RAG**, **web search** in LangChain
- User queries return highly relevant course materials with **inline citations**, providing informed ideas for assignments
- Optimizes content relevancy through **RAG reranking**, utilizing a **Chroma** vector database and **fine-tuned embeddings**

Information Bottleneck Attribution for CNNs and Transformers | University of Toronto

2024

- Developed **attribution** library for better deep learning **interpretability**, demystifying decision-making in CNNs and Transformer models using Information Bottleneck Theory, which identifies critical information for transparent decisions

Advanced Detection of Parkinson's Freezing of Gait | University of Waterloo

2023

- Introduced a **novel time-series InceptionTime** model (time-series CNN) for the early detection of **Freezing of Gait (FOG)** in Parkinson's patients, analyzing biometric data (EMG, ECG) for fall forecasting with **94%** testing accuracy

Enhanced Robotic Grasping with Adapted PointNet | UW Vision and Image Processing Lab

2022

- Enhancing **robotic arm grasp** capabilities, adapted custom PointNet deep learning models to develop a **3D computer vision** system capable of identifying optimal grasp points from **LiDAR** camera, demonstrating an **81%** grasp success rate