MARTIN MA

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Experience

Machine Learning Engineering Intern

Google - Research

May 2023 - Aug 2023 Mountain View, CA, US

- Designed an evaluation framework to assess embedding alignment in **vision-language models** (CLIP, BLIP-2), using **Tensorflow**, **JAX**, and **FLAX**. Framework supports few-shot classification, open-vocabulary classification, visual question answering, and phrase grounding via transformer attention rollout.
- Integrated framework in our distributed ML training pipeline with **large language models** (PaLM-2) as decoder.

Researcher - Machine Learning

Harvard Medical School - Prof. Pranav Rajpurkar

Jan 2023 - Present Cambridge, MA, US

- Developed a **zero-shot segmentation** model from unlabeled data via **self-supervised learning** model based on CLIP. Model shows adaptability to **distribution shift** while preventing catastrophic forgetting, through designing adaptation loss functions.
- Applied statistical testing to evaluate model generalizability on different populations (e.g., gender, race, age, region).

Software Engineering Intern

AstraZeneca - Data Science & Modeling

June 2022 - Aug 2022 Gaithersburg, MD, US

- **[Patent pending]** Developed a **real-time locating system** (RTLS) prototype to track equipment positions using ultra-wideband and integrated with autonomous mobile robots (AMR), in **C++** and **Python**.

Researcher - Machine Learning

Autonomous Vehicle Lab - Prof. G. Shaker & K. Czarnecki

May 2020 - Dec 2020 Waterloo, ON, Canada

- Implemented an active learning framework for LiDAR-based **3D object detection** and improved sample efficiency by 5% through designing uncertainty-based acquisition functions, in **Pytorch** and **CUDA**.

Awards & Honours

- Full scholarship to MIT through departmental fellowship (2021)
- First-in-department Academic Scholarship (2019, 2020)
- President's Scholarship (2017)

Publications

- **Deep Learning-Based In-Cabin Monitoring and Vehicle Safety System Using a 4D Imaging Radar Sensor**
  H. Abedi, M. Ma, J. He, J. Yu, A. Ansariyan, G. Shaker
  IEEE Sensors, 2023
- **ELIXR: Towards a general purpose X-ray artificial intelligence system through alignment of LLMs and radiology vision encoders**
  S. Xu*, L. Yang*, C Kelly*, T. Kohlberger, M. Ma, ..., A. Sellergen
  https://arxiv.org/abs/2308.01317

Education

Harvard University

MS - Computational Science and Engineering

2022/09 - 2024/05 Cambridge, USA

- GPA: 3.95 / 4.0
- **Relevant Courses**: Deep Learning, MLOps, High Performance Computing

Massachusetts Institute of Technology

MS - Chemical Engineering

2021/09 - 2022/08 Cambridge, USA

- GPA: 5.0 / 5.0
- **Relevant Courses**: Dynamic Programming & Reinforcement Learning, System Engineering, Numerical Methods

University of Waterloo

BASc - Chemical Engineering

2016/09 - 2021/06 Waterloo, Canada

- GPA: 95%
- Option (similar to Minor) in Artificial Intelligence
- **Relevant Courses**: Machine Learning, Optimization, Algorithms & Data Structures, Data Mining, Game Theory.

Technical Skills

Languages

Python C++ Java SQL

Tools

AWS GCP Vertex AI Kubernetes Docker Conda Git R Matlab

ML Libraries

Pytorch Tensorflow JAX FLAX Lightning sklearn Keras WandB

Projects

- Betting against beta strategy to achieve Sharpe ratio of 3.4 compared to market average of 2.0 on NYSE.
- Reinforcement learning methods for pricing American-style options - github
- Gaussian process for anomaly detection in commodity prices - link.