Mithun Vanniasinghe

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Education

University of Toronto **Sep/21 – Apr/25**

Bachelor of Applied Science in Engineering Science, Major in Machine Intelligence, Minor in Robotics *Toronto, Canada*

cGPA: 3.81/4.0, latest sessional GPA: 4.0/4.0, Dean's Honour's List:2021-Present

Relevant Courses: ECE421: Intro to Machine Learning, ECE324: Machine Intelligence, Software, and Neural Networks, APS360: Applied Deep Learning, ECE368: Probabilistic Reasoning, ECE367: Matrix Algebra and Optimization, ECE353: Operating Systems, ROB311: Intro to AI, ECE356: Intro to Control Theory.

Professional Development/Certifications

University of Alberta - Coursera **May/24 – Sept/24**

Reinforcement Learning Specialization *Toronto, Canada*

Research Interests

Reinforcement Learning, Control Theory, Optimization, Bayesian and Probabilistic Methods

Technical Skills

Languages: Python, C, C++, ROOT, Bash
Libraries: NumPy, TensorFlow, PyTorch, Keras, SciPy, Scikit-Learn, Matplotlib
Technologies/Frameworks: MATLAB, Git, High Performance Computing, Docker, Slack, Jira, VLLM

Experience

Reinforcement Learning Researcher **Aug/24 – Present**

University of Toronto-Dynamic Optimization and Reinforcement Learning Lab *Toronto, Canada*

- Leading the study of **hierarchical reinforcement learning** for a robot arm manipulation task using novel **imitation learning** based methods for interpretable agent policies.
- **Co-authoring a research paper for submission to IROS 2025 as 2nd author.**

Applied Machine Learning Engineer - Customer Success Engineering Team **May/24 – Present**

Tenstorrent Inc. *Toronto, Canada*

- Developing and maintaining an inference server for benchmarking, evaluation, and locust testing of open source LLMs on Tenstorrent hardware using **Python** and **Docker** as well as libraries such as **lm-evaluation-harness** and **VLLM**.
- Leading the deployment and containerization of **NLP** models as part of an AI playground application using Tenstorrent AI Accelerator cards
- Leading the development of Mistral AI models and integration with Tenstorrent hardware and products
- Executed benchmark tests of NLP and CV models and implemented batching in inference testing
- Conducted code reviews ensuring quality of open-source software

Machine Learning Researcher **May/23 – Present**

Super Cryogenic Dark Matter Search International Collaboration *University of British Columbia*

- Studying and implementing techniques to mitigate modal collapse in time series GANs.
- Led the implementation of time series **GANs**, tailoring the existing model architecture to our specific use cases, for enhancing blinding scheme efforts using **Python** and **TensorFlow** resulting in minimal bias experimental analyses.
- Handled data preprocessing in **C++** and conducted hyperparameter optimization resulting in losses on the order of magnitude of 10^{-2}.
- Leveraged mathematical techniques, including PCA and t-SNE, to validate the effects latent space dimensionality in temporal data.
- **Co-authoring submission to Nuclear Instruments and Methods in Physics Research 2025.**

ML Education Technical Writer **Sept/24 – Present**

UofT Machine Intelligence Student Team *University of Toronto*

- Developing programming exercises to implement fundamental RL algorithms, enhancing the learning experience for hundreds of students for an RL seminar series
- Creating educational content on **hierarchical RL** for a tournament style RL bot battle.
- Producing monthly newsletters and educational Python notebooks.

Linear Algebra and Calculus Teaching Assistant **Sep/23 – May/24**

Linear Algebra for Engineers and Calculus for Engineers *University of Toronto*

- Facilitated the development of students' confidence and intuitive understanding of abstract concepts by conducting tutorial sessions and office hours.

- Simplified complex technical topics for individuals with diverse backgrounds, receiving positive feedback from both colleagues and students on teaching proficiency.

Software Developer **May/22 – Aug/22**
Super Cryogenic Dark Matter Search International Collaboration *University of Toronto*

- Designed robust **Python** testing protocols, utilizing the **unittest** framework, to decrease the risk of signal analysis software failure on various computing clusters. Ensured seamless execution across a wide range of machines and hundreds of users. Leveraged **GitLab CI/CD** and **Singularity/Apptainer** containerization for efficient testing and deployment.
- Conducted benchmarking tests via **Bash** scripts in **High Performance Computing** environments and developed **Python** programs for runtime analysis using object-oriented approaches. This helped informing software engineers about how much resources should be allocated and understand the computing needs of the collaboration.

Projects

Semantic Segmentation of Ingredients in Food Images | *Python, Tensorflow* **Apr/24**

- Made use of semantic segmentation to better monitor personal food consumption basing model architecture off **U-net**.
- Made use of data augmentation to diversify dataset.

Voice vs. Noise | *Python, PyTorch* **Apr/23**

- Developed a neural network specifically designed for audio signal source separation, employing a multi-layered stack of **RNNs** followed by a fully connected layer using **PyTorch** libraries.
- Conducted an in-depth literature review to assess the performance of the model in comparison to existing methods.
- Collaborated with team members, contributing to the project's success, achieving a final test accuracy of 54%.

Gesture Recognition | *Python, PyTorch* **Feb/23**

- Developed and trained a **CNN** using **PyTorch** from scratch to recognize which letter of the American Sign Language is being depicted in an image, resulting in a final validation accuracy of 65%.
- Improved model performance by implementing **Transfer Learning** using the AlexNet model, reaching a validation accuracy of 94%.

Awards and Honours

- Gary L. Palmer Memorial Scholarship $1600 **Aug/23**
- Herbert Gladish Memorial Scholarship $1100 **Aug/23**
- NSERC USRA University of British Columbia $10,500 **May/23**
- Engineering Science Research Opportunity Program Award $7500 **May/22**