Aly Shariff

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Education

University of Waterloo **2023 – Present**
Bachelor of Computer Science + Physics Minor - 93.80 Cumulative Average (3.98 GPA) *Waterloo, ON*

Skills

Languages: English, French
Programming Languages: Python, C++, JavaScript, HTML/CSS, C, Racket, SQL, TypeScript
Frameworks/Libraries: PyTorch, Tensorflow, NumPy, SK-Learn, Pandas, React.js, React Native, MongoDB, Node.js

Experience

Undergraduate Machine Learning Researcher **November 2024 – Present**
University of Waterloo (Prof. Greg Rice) *Waterloo, ON*

- Developing **advanced statistical methods for comparing real-time probabilistic forecasting models** for NFL game outcome predictions.
- **Creating a machine learning model** to enhance prediction accuracy, with **paper publication by Summer 2025**.

Software Developer Intern **May 2024 – August 2024**
TD Bank - TD Invent Enterprise Innovation *Toronto, ON*

- Developed a personal finance simulator in Python using **Monte Carlo methods** and **Q-Learning**, optimizing decision-making strategies with a **50% increase in total net worth** across **1,000+ simulated scenarios.**
- Modernized cybersecurity at TD by developing an **email phishing detector**, powered by a fine-tuned **BERT** model, with **low memory usage and 97% accuracy**, while leveraging **Explainable AI techniques.**
- Deployed the phishing detector to **Microsoft Azure** and launched it as an **Outlook add-in**. Project was demoed to the Head of Enterprise Innovation at TD Bank.
- Built an AI chatbot powered by a **RAG pipeline**, using **GPT-4**, **Pinecone**, and enhanced with **Cohere Reranking for a 20% performance boost**. Deployed on **Azure** for seamless use by **10K+ employees**.

Software Developer **March 2023 – August 2023**
DoorHan International *Remote*

- Designed an automated cross-platform quote delivery software that reduced the delivery times by **80%**.
- Developed an admin dashboard **using React** to streamline contractor management, **increasing sales by 10%.**
- Created a **mobile app using React Native** with both online and offline capabilities for contractors to generate automatic quotes based on client configurations, featuring compatibility filtering and pricing calculations.
- Developed a **NodeJS and Express backend with a PostgresSQL database** for cross-platform communication.

Projects

Deep Reinforcement Learning in FPS Games | *Python, PyTorch, OpenAI Gym, Google Cloud Platform* **2025**

- Research Project focused on implementing **Q-Learning** and **PPO** for a player agent in DOOM (with Prof M. Crowley)
- Training and testing **Vision Transformers and Mamba in a model-free reinforcement learning environment**.

Re.live (1st place Cohere Prize @ UofT Hacks) | *React, Cohere, Azure, OpenCV, Mediapipe* **2024**

- Designed a multimedia app leveraging **computer vision and a diffusion model make static images of people dance**, achieving 94% accuracy by fine-tuning a pre-trained model on Mediapipe-generated skeletons.
- Integrated **React** frontend with backend that uses **Cohere RAG backend** to sift through a dataset and select songs and images based on the user's mood.

Artificial Sign Language (Science Fair ISEF Project) | *Python, Tensorflow, OpenCV, SciKit-Learn, Mediapipe* **2023**

- **Computer vision research project** focused on translating American Sign Language to English with deep learning. Collaboration with **Professor H. Sahraoui at Université de Montréal**.
- **1 of 8 teams chosen for Team Canada for ISEF 2023**, with **$15,000+** in science fair awards.
- Developed **LSTM model** that could **translate 25 gestures** with **custom augmented dataset**, while acquiring a comprehensive understanding of machine learning concepts **(ANNs, CNNs, RNNs, transfer learning)**.

DriveSense (Hack The North Finalist) | *Python, OpenCV, Django, React Native, JavaScript* **2023**

- Developed a **mobile application employing machine learning** to assess the driving quality of individuals on the road, analyzing factors like speed fluctuations and leveraging computer vision for environment visualization.
- Implemented **YOLOv5 for car plate, traffic light, and road sign detection**, a **distance measurement algorithm**, and a **Django backend** for mobile integration.