Tyler Kowalski

1(647)761-4666 tkowalsk@uwaterloo.ca linkedin.com/in/tyler-kowalski-a51226212/ github.com/tkowalski9938

Technical Skills

Programming Languages: C, C++, GLSL, Python, Bash, Agda, Racket, LaTeX
Linguistic Languages: English (Native), Mandarin (Conversational), Japanese (Elementary)
Developer Tools: Linux, VS Code, Visual Studio, Git, Juypter Notebook, Google Collab, Vim, JIRA
Technologies/Frameworks: CUDA, Vulkan, Pytorch, TensorFlow, NumPy

Education

University of Waterloo **Sep. 2021 - Apr. 2026**
Bachelor of Mathematics in Computer Science *Waterloo, Canada*

Professional Development (Online Courses)

DeepLearning.AI **Sep. 2021**
Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization

Work Experience

University of Waterloo, Faculty of Mathematics **Sept. 2023 - Dec. 2023**
*CS 246 Instructional Support Assistant (OOP in **C++**)*

- Taught multiple tutorials and provided office hours each week to help students with **object-oriented programming** in **C++**
- Developed all scripts for automatic testing of assignments via **Bash**
- Migrated CS 246 sandbox environment from **C++14** to **C++20**
- Individually coordinated demoing and marking of the final project (> 500 students)

Core Avionics, Research and Innovation **Jan. 2023 - Apr. 2023**
Embedded ML/AI Developer

- Overhauled **GPU**-accelerated neural network inference engine to support multiple execution branches with emphasis on GPU parallelization and optimizing CPU-GPU synchronization in **Vulkan** using **C**
- Re-engineered NNEF **compiler** for inference engine to support multiple execution branches on a team of 2 co-op students
- Wrote efficient **GLSL** shaders to do *Local Response Normalization, Concat, addN,* and *maxPool2d* with data packing
- Added support for *AlexNet, DenseNet, ResNet,* and *InceptionNet* to neural network inference engine and debugged using **Pytorch**

Core Avionics, Research and Innovation **May. 2022 - Aug. 2022**
Embedded ML/AI Developer

- Reverse engineered **Pytorch** *MobileNetV2SSDLite* model and ported it to safety-crtical **Vulkan** using **C**, demoed at a trade conference
- Designed and optimized compute shaders in **GLSL** to do *softmax, leakyReLu, convTranspose2d, padding,* and various *Blas* functions with data packing, with similar if not better performance than *Pytorch*
- Researched segmented inference of CNNs to reduce memory cost on embedded systems

Side Projects

Stockshark **Dec. 2022**
Chess Application and Engine

- Worked on a team of 3 to create a chess application in **C++** with **object-oriented** design patterns, where users could play against others and various AIs
- Created a chess engine using a hand-crafted evaluation function and minimax with alpha-beta pruning, playing at ≈ 1000 ELO

Wellness Bot **July 2021**
NLP Project for Explore Hacks

- Designed a bag-of-words model, using word embedding with **Tensorflow Keras** and **Python**, that detects suicidal messages
- Utilized L2 regularization and mini-batch gradient descent in training the model

Volunteering

Mentouring the Stars **Jan. 2023 - Present**
Providing no-cost academic support in mathematics for secondary students on Zoom