Tyler Kowalski

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Technical Skills

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

Education

University of Waterloo **Sep. 2021 - Apr. 2026**
Bachelor of Mathematics in Computer Science, CS Avg. 92.33% *Waterloo, Canada*

Professional Development (Online Courses)

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

Work Experience

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

- Overhauled Core Avionics' safety-critical neural network inference engine to support multiple execution branches with emphasis on GPU parallelization and optimizing CPU-GPU synchronization in **Vulkan**
- 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*
- Indvidually led research on 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

Relevant Coursework

CS 245E **Dec. 2022**
Logic and Computation (Enriched) *100%*

CS 246 **Dec. 2022**
Object-Oriented Software Development (C++) *96%*

Volunteering

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