

Education

University of Toronto

Master of Science in Applied Computing, Artificial Intelligence Concentration *Sept '23 – Dec '24 (expected)*
• Vector Scholarship in Artificial Intelligence, worth \$17 500 CAD.

University of Waterloo

Bachelor of Computer Science, Honours, Co-operative Program, AI Specialization *Sept '18 – Apr '23*
• 93.50 major average, with courses in computer vision, autonomous vehicles, and machine learning.

Skills

Languages: Python, C++, R, C, LaTeX, Java, JavaScript

Frameworks: PyTorch, TensorFlow, NumPy, Pandas, OpenCV, ROS, Gradio

Tools: Git, Docker, Conda, Bazel, CARLA, GCP, Linux, TensorRT

Peer-Reviewed Publications

Sim-to-Real Domain Adaptation for Lane Detection and Classification in Autonomous Driving *June 2022*

- Co-authored a peer-reviewed [research paper](#) on sim2real lane detection using the CARLA simulator, integrating current GAN research with state-of-the-art lane detection models.
- Presented the paper at a poster board session during the [Intelligent Vehicles 2022](#) symposium.

Application of Machine Learning for Drone Classification Using Radars *April 2021*

- Authored a research paper and presented it at the [SPIE 2021 Conference](#), with a follow-up [peer-reviewed paper](#).
 - Used a convolutional neural network to classify 5 different commercial drones based on a Fourier transform of their noisy RADAR return signal.
 - Created a detailed physics-based simulation of RADAR returns bouncing off of a drone in flight, and used the simulated data to validate classification methods.
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Experience

Cruise

SAN FRANCISCO, CA

Model Deployment Platform Engineer

Sept '22 – Dec '22

- Developed debugging tools to assist in model deployment, reducing deployment time by days in some cases.
- Built a tool to automatically assess numerical divergence between the original PyTorch models and optimized models using [TensorRT](#) and custom computation graph representations.
- Built a linter to map [ONNX](#) nodes to lines in PyTorch source code, saving model deployment engineers hours.
- Created a tool to manually add outputs to exported ONNX graphs, allowing engineers to inspect intermediate activations while debugging models.

NVIDIA

SANTA CLARA, CA (REMOTE)

Deep Learning Researcher for Autonomous Vehicles

Jan '22 – Apr '22

- Designed and iterated on multiple experiments for a LiDAR object detection neural network, improving cyclist and pedestrian F-scores by 43% and 15%, respectively.
- Implemented sparse tensor object detectors using [Minkowski Engine](#), outperforming the baseline model while using 70% less memory.
- Integrated confidence predictions into a LiDAR object detection auto-labeling pipeline, allowing human annotators to focus efforts on anomalous and challenging data instances.

DarwinAI

WATERLOO, ON (REMOTE)

Machine Learning Developer

May '21 – Aug '21

- Built and tested defect detection deep learning solutions for clients in the manufacturing industry.
- Trained XGBoost and SVR systems to model the relationship between environmental conditions and yield for an agriculture client, achieving 11% median error by weight.
- Implemented the core functionality of Dataset Distillation using the autograd package, to pursue research in low-data machine learning contexts.
- Implemented VAE, VQ-VAE, and VQ-VAE-2 from scratch in PyTorch, evaluating each autoencoder as an anomaly detector.

Untether AI

TORONTO, ON (REMOTE)

Software Developer

Sept '20 – Dec '20

- Built a customer-facing Python API to optimize, format and quantize TensorFlow computation graphs.
- Designed and implemented Non-Max Suppression for quantized values using only integer operations, allowing single-shot detector pipelines to run on-chip.
- Experimented with different quantization schemes to improve the mAP of an SSD-ResNet-34 by 5%.
- Implemented a lookup table class to represent arbitrary non-linear functions in a quantized space.

Huawei

MARKHAM, ON

LiDAR Perception Researcher

Jan '20 – Apr '20

- Implemented key modules from 12 different research papers in PyTorch, summarizing state-of-the-art techniques and enabling further research.
- Built DBLiDARNet and focal loss from scratch in PyTorch to use in semantic segmentation experiments.
- Analysed the SemanticKITTI dataset to produce optimal class loss weights, increasing mIoU by 2%.
- Wrote a data loader to spatially align sequential LiDAR scans for temporal pipelines, based on IMU data.

Please refer to my [Linkedin profile](#) for a complete list of work experiences.