

# Sinclair Hudson *Machine Learning Researcher and Developer*

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## 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.
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## Peer-Reviewed Publications

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

June 2022

Application of Machine Learning for Drone Classification Using Radars

April 2021

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## Relevant Work 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 [TensorRT](#) models, allowing engineers to identify optimization errors immediately and automatically.
- Built a linter to map [ONNX](#) nodes to lines in PyTorch source code, saving deployment engineers hours of manual debugging every week during deployments.
- 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 detections by 43% and 15%, respectively.
- Implemented sparse tensor object detectors using [Minkowski Engine](#), outperforming the baseline model while using 70% less memory.
- Presented a 30-minute research overview to the organization, communicating 4 months worth of findings and insights to internal stakeholders and leadership.
- 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, giving the client insight into the impact of environmental conditions on their yield.
- 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, demonstrating the effectiveness of autoencoders as anomaly detectors on client datasets.

Untether.AI

TORONTO, ON (REMOTE)

**Software Developer**

Sept '20 – Dec '20

- Contributed to a customer-facing Python library to quantize and optimize TensorFlow computation graphs, towards compiling models for custom hardware.
- Designed and implemented Non-Max Suppression for quantized values using only integer operations, eliminating a CPU bottleneck and allowing object detection pipelines to run 10x faster on-chip.
- Experimented with different quantization schemes to improve object detection performance of an SSD-ResNet-34 by 5%.
- Implemented a lookup table class to represent arbitrary non-linear functions in a quantized space, allowing the Python library to support dozens of additional model architectures.

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

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## 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