SINCLAIR HUDSON

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3rd Year Computer Science, University of Waterloo, Graduating May 2023

LANGUAGES	**FRAMEWORKS**	**TOOLS**	**SOFT SKILLS**
Python, C++, C, LaTeX, R, Java, Javascript	PyTorch, TensorFlow, NumPy, ROS, OpenCV	Git, CARLA, VIM, GCP, Docker, Linux, AWS	Curious and Innovative Resourceful and Efficient

EXPERIENCE

Machine Learning Developer, DarwinAI
May 2021 - Aug 2021 (Full-time)

- Built and tested **proof-of-concept deep learning solutions** for clients in the manufacturing industry. Presented technical results to non-technical stakeholders weekly.
- Implemented the core functionality of Dataset Distillation using the **autograd** package, to pursue research in low-data machine learning contexts.
- Trained **XGBoost** and **SVR** systems to model the relationship between environmental conditions and yield for an agriculture client, achieving **11% median error by weight**.
- Created a research repository to use **autoencoders** for anomaly detection in images. Implemented **VAE, VQ-VAE**, and **VQ-VAE-2** from scratch and evaluated models on public and client datasets.

Software Developer, Untether.AI
Sep 2020 - Dec 2020 (Full-time)

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

LiDAR Perception Researcher, Huawei
Jan 2020 - Apr 2020 (Full-time)

- Built DBLiDARNet and focal loss from scratch in **PyTorch** to use in **semantic segmentation** experiments.
- Wrote a summary paper on current LiDAR point cloud segmentation techniques, **summarizing 12 papers**.
- 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.
- Managed a compute server with 8 GPUs, using **Docker** to continuously run and document deep learning experiments over a 4-month period.

PROJECTS

CANSOFCOM: RADAR return drone classification
Jan 2021

- Authored a research paper and presented it in a short presentation at the **SPIE 2021 Conference**.
- Came 1st place in the Hack The North 2020++ CANSOFCOM Drone ML challenge.
- Used a convolutional neural network to classify 5 different commercial drones based on a **Fourier transform** of their noisy RADAR return signal.

WATONOMOUS design team, Perception Technical Lead
May 2019 - Sep 2021

- Working on a **domain adaptation** research project to train a lane detection model using only simulated data from **CARLA**. Integrating current **GAN** research with state of the art lane detection models.
- Building, training, and evaluating novel lane detection models on the **TuSimple** and **CULane** datasets.
- Trained and deployed multiple computer vision models for the autonomous vehicle, including a **YOLOv3** model for traffic light detection and an **EfficientNet**-based segmentation model for roadline detection.