Martin Ethier

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TECHNICAL SKILLS

- **Programming Languages:** Python, C++, C, JavaScript, LaTeX, PHP, MATLAB
- **Libraries:** PyTorch, Scikit-Learn, OpenCV, TensorFlow, Numpy, Pandas, SciPy, VTK, ROS, wxPython, Three.js, jQuery
- **Tools:** Git, Linux, CARLA, Docker, Bash, Jira

EXPERIENCE

Huawei Technologies Canada — **Toronto, ON**
Autonomous Vehicle Perception Research Intern — *Jan 2020 - Apr 2020, Sep 2020 - Dec 2020*

- Implemented various components of LiDAR object detection deep learning models with both PyTorch and TensorFlow
- Built a tool to visualize 3D object detection predictions on the KITTI dataset using Python with Numpy and VTK
- Lead the development of a LiDAR semantic segmentation labeling web app that uses JavaScript with Three.js

P&P Optica — **Waterloo, ON**
Industrial Imaging Software Development Intern — *May 2019 - Aug 2019*

- Trained SVMs and CNNs to classify freshness in vegetables from hyperspectral image data using Scikit-Learn and TensorFlow
- Created hyperspectral data clustering visualization tools with PCA, k-means, and DBSCAN using Scikit-Learn
- Reduced data labeling time by 40% by creating an automatic ROI masking tool using spectral filtering and OpenCV

Communications Research Centre — **Kanata, ON**
Machine Learning Research Intern — *Sep 2018 – Dec 2018*

- Trained MLPs and random forests for spatial interpolation of cellular signal strength data using TensorFlow and Scikit-Learn
- Implemented cellular signal strength data visualization tools with wxPython and the Google Maps Static API

STUDENT TEAMS

WATonomous — **Waterloo, ON**
Perception Group Core Member — *Sep 2019 - Present*

- Created a synthetic lane detection dataset using the CARLA simulator for a zero-shot sim2real domain transfer project
- Trained and evaluated various CNN architectures to perform lane detection using TensorFlow and PyTorch
- Wrote lane segmentation post-processing code to cluster output masks using DBSCAN and fit cubic splines to each cluster

UW Robotics Team — **Waterloo, ON**
Computer Vision Lead — *Jan 2019 – Aug 2019*

- Lead a team of students to develop autonomous robotics perception software using C++ with ROS and OpenCV
- Generated a synthetic traffic sign dataset using Python and trained a Haar Cascade classifier with OpenCV to detect the signs
- Created an algorithm to reliably classify arrow direction on traffic signs using Canny edge detection and contour features

PROJECTS

End-to-End Path Planning Model — *Personal Project*

- Implemented and trained an end-to-end path planning neural network using PyTorch on the comma2k19 dataset
- Generated future path labels using a Kalman filter and rebalanced the dataset with a custom path curvature metric
- Designed a neural network using ResNets and LSTMs to predict a path given a sequence of images to a test MAE of 0.2 meters

Synviz (Winner) — *UofTHacks VII*

- Developed the video processing code for a smart glasses IoT device that helps impaired people in conversations by lip reading
- Implemented a Haar cascade in OpenCV to extract an ROI of the person's lips in the video feed
- Wrote an API to allow the Flask server to call a pre-trained TensorFlow lip reading neural network on the image sequence

Agilite — *DeltaHacks V*

- Designed OpenCV code to extract handwritten text from an image of multiple Post-it notes on an agile board
- Implemented a CNN-RNN neural network in TensorFlow to convert the extracted handwriting to text

EDUCATION

University of Waterloo — **Waterloo, ON**
BASc in Mechatronics Engineering with Artificial Intelligence Option, GPA: 3.9/4.0 — *Sep 2016 - Apr 2022*
External Coursework: Deep Learning Specialization (Coursera), Machine Learning Crash Course (Google), Introduction to Self-Driving Cars (Coursera), Artificial Intelligence for Robotics (Udacity)