Brian Mao

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Technical Summary

- **Programming Languages**: Python, C++, MATLAB, R, VBA, Swift
- **Tools/Frameworks**: ROS 2, ROS, Keras, scikit-learn, Git, Docker, Qt, LaTeX, MATLAB Deep Learning Toolbox
- **Operating Systems**: Linux, iOS, Android, Windows
- **Simulation Software**: Simulink, CarSim, LGSVL, Adams, Ansys, Abaqus, PSIM, DEFORM, FormingSuite

Work Experience

AeroVect Technologies Inc: Autonomy Software Developer (San Francisco, California) Sep. 2022-Dec. 2022

- Programmed motion planning algorithms for autonomous airport cargo delivery under a **ROS 2** framework
- Created various semantic maps for planning under a **Lanelet2** format using **JOSM**
- Developed script to process and convert ROS bag data between physical testing and simulation using **C++**
- Configured **Docker** platform to ensure a consistent environment between developers within simulation
- Experimentally tuned a **PID** controller which resulted in smoother trajectories upon steering commands

Electrans Technologies Ltd: Electric Vehicle Researcher (Oakville, Ontario) Jan. 2022-Apr. 2022

- Designed controller for regenerative braking on an electric converter dolly adaptive to varying trailer weights
- Programmed **Android** based HMI to display real-time trailer positioning using **C++** under a **Qt** framework
- Verified the transmission and receival of J1939 and proprietary CAN frames using **CANalyzer**

Apple Inc: Metal Tooling Engineering (Cupertino, California) Jan. 2019-Aug. 2019

- Programmed an **iOS** app using **Swift** to present experimental data to various design and manufacturing teams
- Designed and developed **Python** script to convert raw data from material testing into simulation input files

Ansys Inc: Simulation Software Tester (Waterloo, Ontario) Sep. 2017-Dec. 2017

- Created and maintained automated regression tests in **Python** to validate the Ansys 19.0 release
- Improved UI and UX through exploratory testing on structural and fluid engineering simulations

Forming Technologies Inc: QA Developer (Burlington, Ontario) Jan. 2017-Apr. 2017

- Improved quality on cost optimization software through test case development and bug tracking
- Created automated test suite for GUI using **C#** which reduced software validation time

Projects

MIT Driverless: Path Planning, Controls, and Vehicle Modeling Team Lead Sep. 2021-Jan. 2023

- Managed a team of 16 to develop algorithms in **Python** and **C++** for a Dallara AV-21 race car to drive autonomously around a multi-agent environment at the Las Vegas Motor Speedway for CES
- Designed steering algorithm which resulted in continuous transitions between racing lines
- Featured on various national news outlets for operating an autonomous vehicle at over **240 km/h**

Mechatronic Vehicle Systems Lab: Graduate Research Assistant Sep. 2020-Jan. 2023

- Trained recurrent neural networks to classify road conditions using **Keras** in collaboration with General Motors
- Simulated complex driving scenarios involving **ADAS** using **CarSim** for data collection

Education

MMath in Applied Mathematics, University of Waterloo Sep. 2020-Jan. 2023

- Publication: Robust Modeling and Controls for Racing on the Edge (ICRA 2022)

BASc in Mechanical Engineering with Mathematics Minor, University of Waterloo Sep. 2015-Apr. 2020

- Graduation with Distinction - Dean's Honours List