Kyle Mackenzie

1mackenziekyle@gmail.com | github.com/1mackenziekyle | linkedin.com/in/kyle-mackenzie-url

Technical Skills

Languages: Python, C/C++, MATLAB, Erlang
Frameworks / Packages: OpenCV, ROS, Numpy, Pandas, Tensorflow, PyTorch, Matplotlib & Seaborn
Tools/Environments: Git, Linux Command Line

Education

University of British Columbia Vancouver, BC
Engineering Physics - Bachelor of Applied Science *Sep. 2020 - May 2025 (Expected)*
Coursework: Software Design, Microcomputers, Signals and Systems, Machine Learning, Calculus, PDEs.

Relevant Experience

Controls Systems Co-op September 2023 – Present
Corvus Energy *Richmond, BC*
- Carried out unit tests for software and hardware functionality of battery management system.
- Wrote automation scripts for unit testing on hardware-in-the-loop test bench for battery management system.
- Developed a thermal model of the pre-charge system of the battery pack to control current while pre-charging.
- Developed a coulomb-counting algorithm to validate the State-of-Charge estimation algorithm.
- Designed and documented a process for collecting battery cell data for validation of SoC algorithm.
- Added wiring and sensors to extend functionality of a hardware-in-the-loop test bench.

Drivetrain Firmware Developer Sep. 2022 – Present
UBC Formula Electric *Vancouver, BC*
- Designed a custom torque vectoring algorithm based on existing research to control motor power and torque requests and optimize cornering speed and wheel slip conditions.
- Implemented torque vectoring algorithm in C code on an STM32 microcontroller.
- Led testing, validation, and data collection of the torque vectoring algortihm performance across multiple test days.

Research Assistant May 2023 – Aug. 2023
Cognitive Neuroscience of Schizophrenia Lab, BC Children's Hospital *Vancouver, BC*
- Optimized an algorithm to perform Constrained Principal Component Analysis on brain fMRI data, and extract functional brain network components.

Full-Stack Developer Co-op Jan. 2022 – Apr. 2022
ICBC *Vancouver, BC*
- Wrote automation scripts for data entry using Blue Prism framework
- Developed prototype for automation of web form data entry using python-based libraries alternatively to the previously used internal tool, proving development time could be reduced by 50%.

Technical Projects

Uni-wheeled Robot Drive Controls | *5-person Capstone project - MATLAB, Simulink* Sept. 2023 – Present
- Derived equations of motion for a single drive wheel robot and characterized as a linearized time-invariant system for our control algorithm.
- Developed Simulink model to facilitate Software-in-the-Loop testing of our control model.

Autonomous Wheeled Robot | *4 person project - C/C++, OnShape* May 2021 – Aug. 2021
- Designed the CAD model, circuit boards, and wrote the firmware in C for a wheeled robot to navigate a course to pick up items autonomously.
- Fabricated robot using sheet metal parts, laser-cut hardboard, and 3D-printed components.
- Assembled, soldered, and tested custom-designed printed circuit boards for power distribution and drive control.