Education

University of British Columbia, *B.ASc, Engineering Physics, 3.7 c.GPA* 2018 – 2024 | Vancouver, Canada

Key Skills

Software
Python, Rust, OpenCV, Pandas, PyTorch, ROS1/2, GNU/Linux

Electrical
Altium, KiCAD, LTSpice, Embedded Systems, Reading Datasheets

Mechanical
SolidWorks, 3D Printing, Laser/Waterjet Cutting, Machining

Experience

Sensor Design/Integration Engineering Intern, *Tesla Motors* 09/2022 – Present

- Working with the sensing team to diagnose, analyze, and solve problems with various sensors across Tesla.
- Assisted with testing and validation of GNSS performance, IMU noise mitigation, and occupant classification algorithms by writing analysis scripts, collecting data, setting up rigs, and brainstorming root causes/solutions.
- Utilized Dash, FastAPI, S3, and PostgreSQL to contribute to the front and backend of a GNSS data visualizer, a car data logger, and other internal tools to help support ongoing validation efforts.
- Explored and prototyped various custom metrics and data visualization methods for evaluation use, utilizing Pandas and Plotly to process billions of datapoints from hundreds of thousands of accumulated drive hours.

Diagnostics and Controls Engineering Intern, *General Fusion* 05/2022 – 09/2022

- Worked on the controls team to design and program a control system for an experimental fusion reactor.
- Wrote, unit-tested, and validated a series of Python APIs to allow for generalized control of various diagnostic digitizers, ranging from NI DAQs, in-house designed electronics, and other precision measurement devices.
- Architected and implemented code for controlling a distributed system of PLCs using Python and TwinCat3.
- Created various GUIs using PySide6 to facilitate manual control and live data visualization for various instruments, ranging from high-speed oscilloscopes to hundred channel digitizers to infrared cameras.

Avionics Tech Lead/Project Manager, *UBC AeroDesign* 03/2021 – Present

- Leading a multidisciplinary team of 20 students through the design, manufacturing, and testing of embedded and software systems for two fixed-winged airplanes, as entries for the SAE AeroDesign competition.
- Guiding students through the engineering design process and teaching them about computer vision, machine learning, RF communication, PCB design, embedded programming, and various hands-on skills.
- Performing design reviews, writing requirements, conducting DFMEAs making timelines, and leading meetings.

Systems Engineering Intern, *General Fusion* 05/2021 – 12/2021

- Worked with the Systems Engineering team to help manage the complexity of designing and building a novel nuclear fusion reactor and test facility through requirements management, interface definition, and analyses.
- Worked under Chief Scientist to conduct experiments and research interactions between liquid lithium and materials ranging from calcium aluminate glasses to polyimide-matrix carbon fiber composites.

Software Engineering Intern, *EyeCloud* 01/2020 – 04/2020

- Prototyped a real-time medical imaging device running off a Raspberry Pi 3, using the OpenVINO toolkit and an Intel Neural Compute Stick in order to run a Tiny-YoloV3 model on the edge for real time results.

Recent Projects

Design Team - Kyogre 2.0, *Python, OpenCV, Altium* 09/2021 – Present

- Designing an embedded system capable of meeting the SAE AeroDesign competition challenge of accurately landing an autonomous drone onto 2' marker disks with data collected 50 feet in the air.
- Wrote, implemented, and optimized the core algorithm which utilizes a YoloV7 model, computer vision, geometry, and statistics in order to accurately predict the GPS location of multiple targets in real time.
- Wrote and implemented state machine logic, networking code, as well as hardware interfaces for a Raspberry Pi.
- Designing a PCB containing flight controller hardware, a RPi CM4, and power distribution components in Altium.
- Aided in the design of a robotic tracking antenna, data collection boards, and custom Python GUIs for controls.

Capstone - Fuel Cell Monitoring System, *Circuit Design, C, KiCAD* 09/2021 – 04/2022

- Designed an electrically-isolated, modular, and cost-effective fuel cell monitoring system in a team of four.
- Evaluated various ICs, including power regulators, microcontrollers, digital isolators, opto-isolators, and ADCs.
- Designed multiple PCBs in KiCAD for testing subsystems as well as multiple iterations of the full module.
- Helped write and debug firmware for an I2C controller, which also transmitted data to a LabView app via Modbus.
- Performed high-voltage testing of full system, characterized ADC accuracy, debugged using signal analyzer, and designed 3D printable DIN rail mounts in OnShape.

Design Team - Mantine, *C++, Python, Java, React* 09/2020 – 08/2021

- Worked on entire tech stack of the avionics system for a fixed-wing RC aircraft, including embedded circuits, an Android App, a Java Socket/Websocket server, a React WebApp, and a Python simulation.

- Improved existing avionics system by re-evaluating sensors, fixing bugs in code, refactoring the communication system, adding new testing features, and writing documentation to allow newer members to better contribute.

Gazebo Parking Robot Sim, *OpenCV, ROS, Gazebo, Tensorflow* 01/2021 – 04/2021

- Programmed a simulated robot using the ROS framework and Python that could run an ensemble learning algorithm composed of multiple light-weight convolutional neural nets to allow for self-driving capability.
- Designed, collected data for, and tuned an imitation learning model, achieving a 99% test validation which resulted in the bot being able to complete test course faster than 90% of other teams.

FPGA Alarm Clock, *Quartus, VHDL* 03/2021

- Used Quartus Prime to design a functioning clock capable of setting time and switching between 12 and 24 hour time and uploaded to a DE0-CV FPGA programming board.
- Programmed core logic using VHDL, and utilized Quartus' graphical editor to design inputs, outputs, and latching.

3D Printed Monitor Arm, *SolidWorks, 3D Printing* 01/2021

- Designed a custom VESA compatible dual-monitor stand using SolidWorks and printed it using a FDM printer.
- Utilized aluminum rods for structural integrity in conjunction with 3D printed joints for articulation, overall costing 20% the price of a market product.

Fizz Discord Bot, *Python, discord.py, MongoDB* 06/2020 – 06/2021

- Created a bot using the discord.py API for daily use in a student Discord server, hosted on Heroku.
- Wrote commands for music playing, moderation, role assignment, and entertainment.
- Linked bot to a MongoDB database for persistent data storage, allowing for long-term server statistics.

Recycling Robot, *STM32, Prototyping, Circuit Design, C++* 05/2020 – 08/2020

- Worked with a team to design and prototype a STM32-powered driving robot that picked up soda cans and returns them to a designated bin with no human input.
- Designed and optimized an H-bridge based motor driver, which utilized optocouplers and MOSFETs, for easy assembly and over-voltage protection, allowing for PWM control of motors.
- Modelled and 3D printed a spring-loaded trigger which opened a back door to release cans into bin.
- Assisted in debugging and optimization of PID based line following algorithm.

Facebook Bot, *Python, C++, OpenCV, AWS* 04/2020 – 05/2020

- Wrote a Python script to sequentially post images to Facebook and used an Amazon EC2 instance as a database for 24/7 uptime and utilized crontab to automate posting.
- Wrote a C++ program which utilized OpenCV to split videos into unique frames based on their SSIM index to capture details not typically noticed by viewers.
- Reached 80k followers and 1 million monthly post engagements within a year.

Interests

- Video Editing
- 3D Printing
- Cats
- Metaphysics