Farhan Ishraq

(604)-841-1471 f.ishraq123@gmail.com farhan-ishraq IshraqF Portfolio

Technical Skills

Programming: Python, C++, C, Java, MATLAB, VHDL, Bash, ROS, PyTorch, Tensorflow, CUDA, Git
Electrical: PCB & Circuit Design, OpAmps, Transistors, Logic Gates, KiCAD, Altium Designer
Lab Skills: Function Generator, Oscilloscope, Multimeter, VNA, Spectrum Analyzer, EMC Testing

Work Experience

Machine Learning Research Assistant **June 2025 – Present**
Supervised by Dr. Markus Roggen UBC
- Built data pipelines to transform raw cannabis chromatography data into model-ready features for predicting aroma profiles.
- Benchmarked multiple neural network architectures to identify the most effective model for predicting aroma profiles.
- Applying ensemble modeling and cross-validation to mitigate overfitting, enhancing robustness and reproducibility.

Firmware Developer Co-op **May 2025 – Present**
Shearwater Research Inc. Richmond, BC
- Designed schematic and 4-layer PCB to address limitations in prior depth simulator design, enabling automated depth emulation testing of dive computers.
- Integrated I2C, SPI, and CAN communication to support depth and tank oxygen simulation on the board.
- Designed 555 timer watchdog circuit to monitor MCU lockup failures, ensuring reliable recovery and improved system stability.
- Implementing firmware in C and VHDL to automate sensor emulation workflows, enabling scalable and efficient testing.

Hardware Engineer Co-op **May 2023 - December 2023**
Sierra Wireless Richmond, BC
- Optimized hardware components to address power inefficiency in gateway design, reducing consumption by 40%.
- Designed a collision prevention system for RS232/485 communication to address data corruption issues, achieving 100% transmission accuracy.
- Automated validation with Python and Bash to reduce manual testing overhead, decreasing completion time by 50%.

Power Team Lead **September 2022 – January 2024**
UBC Sailbot Vancouver, BC
- Led a 6-member team in designing the sailboat's power system, delivering reliable battery management, power distribution, and fault protection.
- Optimized system architecture to minimize energy loss in extreme conditions, extending vessel survival time by 30%.
- Developed a PID rudder control algorithm to correct navigation errors, enabling course correction and autonomous sailing.

Software Developer **September 2020 – September 2022**
UBC Agrobot Vancouver, BC
- Developed a weed detection system using Python and OpenCV, improving sprayer alignment and reducing aiming errors by 90%.
- Programmed sprayer control systems in ROS (C++), optimizing chemical application efficiency and reducing usage by 80%.
- Designed and implemented a sorting algorithm in ROS (C++), efficiently prioritizing weeds based on relative positions.

Projects

Improved Coffee Can Radar System | Capstone **September 2024 – May 2025**
- Designed and optimized a 2.4 GHz cantenna using MATLAB and HFSS, improving impedance matching and minimizing S11.
- Developed the RF front-end circuit, integrating mixers, amplifiers, and filters for signal transmission and reception.
- Characterized antenna and RF circuit performance using a VNA and spectrum analyzer, minimizing return loss and VSWR.
- Implemented FFT-based radar signal processing in Python, using ADC data for object detection and range computation.

AI Digital Clone | UBC PLAI Capstone **August 2023 – May 2024**
- Developed a multi-modal diffusion model capable of generating future Minecraft frames from partial modality data.
- Fine-tuned state-of-the-art motion diffusion models in Python to simulate realistic human movements, improving the accuracy of generated motion sequences.
- Extended motion diffusion models into a multi-modal framework to generate human motion from diverse inputs.

License Plate Detection in Autonomous Vehicles | UBC **January 2023 – April 2023**
- Developed a license plate detection system using OpenCV and a CNN model, achieving 92% accuracy in character recognition.
- Simulated the autonomous vehicle in Gazebo and integrated it with ROS for real-time perception and control.
- Implemented camera-based object detection and processed video frame data in ROS, enabling license plate identification in a simulated environment.

Education

Bachelor of Applied Science in Engineering Physics **September 2020 – May 2026**
The University of British Columbia Vancouver, BC