Farhan Islam

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Education

McMaster University Hamilton, ON

Bachelor of Engineering, Electrical Engineering (B.Eng.) *Expected Graduation: Apr 2029*

- **Awards**: Engineering Award of Excellence
- **Relevant Coursework**: Electronic Devices & Circuits, Signals & Systems, Electromagnetics, Logic Design, Microprocessor Systems, Data Structures & Algorithms

Technical Skills

Programming Languages: C/C++, Python, MATLAB, Assembly
Embedded Systems: ESP32, STM32, Arduino, I2C/SPI/UART, Real-Time Processing
Power & Control Systems: PWM Control, PID Tuning, Power Distribution
Communication Protocols: WebSocket, Bluetooth, Serial Communication
Design Tools: LTSpice, AutoCAD, Soldering, Circuit Prototyping
Version Control: Git, GitHub

Experience

Electrical Team Lead Sep 2023 – Apr 2024

Team 9659, FIRST Robotics Competition *Toronto, ON*

- Led cross-functional team of 5+ members in designing and implementing robot electrical systems, including wiring, **power distribution**, and motor control, improving **system reliability by 20%**
- Optimized **power distribution network** to reduce energy loss by **25%**, ensuring stable voltage delivery to motors and sensors under high-load conditions during competitions
- Programmed autonomous and teleoperated **control algorithms** in **C++** for precise motor control, improving movement accuracy through **PID tuning** and sensor feedback integration
- Debugged electrical issues during testing cycles, troubleshooting voltage drops and component failures to ensure operational readiness and safety
- Contributed to team's success in earning **District Championship Rookie All-Star Award** and **FIRST Ontario Provincial Championship Qualifying Award**

Software Development Intern May 2024 – Aug 2024

IX Technology *Toronto, ON*

- Developed a **real-time** weather data platform by integrating **RESTful APIs** and implementing **asynchronous JavaScript** workflows to handle live data updates efficiently
- Worked with **event-driven** client-side logic and AJAX-based requests to dynamically update application content while maintaining **responsiveness and reliability**

Projects

Accessible Microwave Control System | *Arduino, C++, ESP32, STM32, Bluetooth, WebSocket* |

- Engineered dual-microcontroller system delivering **real-time audio feedback** to users with visual and hearing impairments, achieving **<30ms audio latency** through optimized **WebSocket communication** and Bluetooth transmission to hearing aids
- Programmed **ESP32** in **C++/Arduino** to process **HC-SR04 ultrasonic sensor array** data, implementing multi-sensor cross-validation and noise filtering algorithms to reduce false positives in button detection
- Integrated **STM32 Nucleo** microcontroller for stable **5V power regulation**, eliminating voltage fluctuations that previously caused sensor measurement errors and system instability
- Developed **WebSocket server** on ESP32 for bidirectional communication, enabling real-time sensor data streaming and **wireless audio feedback** through hearing aid integration

DC Motor Speed Controller with PWM | *Arduino, C++, H-Bridge Driver*

- Designed **closed-loop motor speed controller** using Arduino and L298N H-bridge driver, implementing **PWM control** to regulate motor speed with minimal steady-state error
- Programmed **control algorithms** in **C++** using optical encoder feedback for precise **speed regulation**, achieving fast settling time and handling load disturbances effectively
- Implemented **over-current protection circuitry** to prevent motor driver damage during stall conditions, enhancing **equipment safety and reliability**