Naga Tarun Moturi

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Education

McMaster University Hamilton, ON

Automation Systems Engineering Co-op

Experience

Firmware and Software Developer September 2024 – Present

McMaster Formula Electric FSAE *Hamilton, ON*

- Developed a real-time vehicle dashboard and alert system using **FreeRTOS** and **CAN** communication to coordinate control commands and status data between **4 microcontrollers**, ensuring safe and accurate management of motors, driver controls, battery, and lights.
- Programmed and optimized firmware to manage **GPIO, ADC, Flash memory, and timer** peripherals for reliable dashboard sensor input and display control.
- Developed embedded firmware using **C++, MATLAB, and STM32** microcontrollers, enhancing motor response time by **20%** and improving overall vehicle efficiency.
- Converted **Simulink** models of the BMS into code, ensuring seamless integration with the electric vehicle's embedded system.

Software Developer Intern June 2024 – August 2024

BrightSparks Academy *Cupertino, CA*

- Implemented front-end features using **ReactJS**, enhancing the UI for websites at BrightSparks Academy.
- Contributed to back-end development using **Firebase** databases, including setting up and managing APIs.
- Developed and maintained mobile applications for both **Android and iOS** platforms, contributing to the full development lifecycle from conceptualization to deployment on app stores.

Projects

AI-Powered Automotive Dashboard | *React, TypeScript, Web Speech API*

- Developed a full-stack web application using **TypeScript** serving a **Web Speech API** with **React** as the frontend.
- Implemented real-time predictive maintenance algorithms with machine learning diagnostics, reducing potential vehicle downtime by **30–40%**.
- Built voice-controlled AI assistant with speech recognition and natural language processing, ensuring hands-free operation for driver safety compliance.

Battery Monitor | *Simulink, C++, Google Test, MATLAB, Matplotlib, Git*

- Developed a modular **C++** battery monitoring application based on a converted Simulink model, implementing complex state machines to manage contactor logic, pre-charge sequencing, and safety overrides.
- Wrote unit tests in **Google Test** to validate 20+ edge cases including charge depletion, relay feedback loss, and thermal fault handling.
- Visualized command vs. feedback behavior across all states using **Matplotlib**, verifying system response timing and safe operating thresholds.

Arduino Sumobot | *Arduino, SOLIDWORKS, HC-05 Chip*

- Designed the chassis for a Sumobot using **SOLIDWORKS**, incorporating a Bluetooth **HC-05** chip for wireless control.
- Programmed control logic using **Arduino**, enabling precise navigation and smooth operation.
- Engineered both hardware and software components, ensuring seamless integration for optimal performance.

Technical Skills

Languages: Python, Java, JavaScript, HTML/CSS, C++, C#, TypeScript, SQL, MATLAB, Bash, Allen-Bradley (PLC)
Frameworks & Libraries: NodeJS, ReactJS, Flask, PyTorch, TensorFlow, Matplotlib, NumPy
Tools: PlatformIO, SOLIDWORKS, AutoCAD, Git, GitHub, Linux, Docker, Simulink, CMake, Firebase, AWS, FreeRTOS, CAN, EasyEDA
Hardware: H-bridges, HC-05 (Bluetooth Module), ESP32, Raspberry Pi 3, STM32, Arduino, Analog Discovery 3