Ryan Mah

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Summary

- 5+ years of proven experience in C and Python
- 4+ years of embedded programming experience (bare-metal and RTOS)
- 4+ years of HW and PCB design experience

Education

University of Waterloo

BASC. Electrical Engineering

2019 - 2024

- Cummulative Average: 87%

Skills

Languages

- C
- C++
- Assembly (ARM, RISC-V)
- Make
- Python
- Bash
- Verilog

Technologies

- ARM
- RISC-V
- STM32
- SPI
- I2C
- UART
- CAN
- Ethernet
- USB
- LoRaWAN
- gcc
- clang
- gdb
- FreeRTOS
- nrf5 SDK
- Linux
- TCP
- UDP
- MQTT

Tools

- git
- Vitis
- Altium
- LTSpice

Lab

- Spectrum Analyzer
- Soldering
- Network Analyzer
- Oscilloscope

Experience

Apple - Firmware Intern (Silicon Engineering Group)

Sep. 2023 - Dec. 2023

- Developed and tested low-level FW for Apple's SoCs
- Implemented and enhanced cryptography FW ROM, used in many different SoCs

Level Home - Firmware Developer

Jan. 2023 - Apr. 2023

- Implemented the HomeKit FW update service, allowing users to update lock firmware over BLE with the Apple Home iPhone app
- Patched firmware to decrease frequency of false positive NFC wakes causing excess battery drain, decreasing percentage of defective units from 1.5% to 0.5%
- Root-caused and fixed critical issues, including flash filesystem corruption, battery drain in cold temperatures, and false NFC wakes

Siemens (Enlighted) - Firmware Engineer, IoT Platform & MACs

May 2022 - Aug. 2022

- Worked on an Agile team to develop and support applications for Enlighted's IoT lighting platform, including FreeRTOS sensors and embedded Linux devices
- Reworked packet parsing library to increase flexibility and improved speed by ~40%

TEKTELIC Communications - Systems Engineering

May 2020 - Aug. 2020 · · · Jan. 2021 - Apr. 2021

- Implemented scripts for the complete automation of conducted emissions compliance tests for 800MHz (ETSI) and 900MHz (FCC) bands

Waterloop Hyperloop Design Team - Electrical & Firmware Lead

Sep. 2019 - Jan. 2023

- Led the hardware and firmware development of all embedded devices on the hyperloop pod - including BMS, motor controller, central computer, and more
- Main developer for BMS software, including pack voltage & current sensing, state-of-charge monitoring, cell voltage monitoring over isoSPI, state machine, CAN, etc.

Projects

GuidingLite - Final-Year Capstone Project (University of Waterloo)

May 2023 - Mar. 2023

- Led the development of an ultra-wideband (UWB) 2D indoor navigation system, with accessibility features for the visually impaired
- UWB "anchors" interface with the Apple U1 chip in a user's iPhone to enable accurate, soft real-time indoor positioning and pathfinding
- Designed custom anchor PCBs in Altium, complete with PoE, BLE, and a UWB SoC
- Wrote the anchor FW in C, including two-way ranging, telemetry, and a TCP bootloader for on-the-fly debugging
- Implemented weighted-least-squares multilateration for robust 3D localization
- Engineered a 2D pathfinding solution by overlaying a navigation mesh onto a floorplan for efficient navigation