Sean T. McAuliffe

Software Engineer

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Profile

Software engineer with a focus on embedded systems and 3 years of experience designing real-time firmware for mission-critical applications. Proficient in C, C++, Python, and FreeRTOS. Skilled in debugging and performance optimization; using tools like OpenOCD/JTAG and oscilloscopes. Well-versed in full software development process in an agile environment - from requirements gathering to design, review, building, testing and deployment. Finds fulfillment in working alongside others to solve complex technical challenges.

Technical Skills

Programming Languages: C, C++, Python, Bash
Embedded Platforms: FreeRTOS, ARM Cortex, ST Microcontrollers
Tools: Git, GitHub/GitLab, CI/CD (Jenkins, GitLab pipelines, Docker), GCC, JTAG, Logic Analyzers
Protocols: UART, SPI, I2C, CAN
Development Environments: GNU/Linux, Win32
Other Skills: Machine Learning, MySQL, Nginx, Svelte, Linux Server Administration

Education

Bachelor of Software Engineering *Sep. 2019 – Apr. 2023*
University of Victoria – Victoria, B.C.

Received degree specialization in *Data Mining and Analysis, Artificial Intelligence, and Machine Learning*. Topics courses included: embedded systems, networking, and programming language design.

President, Satellite Design Club *Sep. 2021 – Dec. 2021*
University of Victoria – Victoria, B.C.

Lead a team of 15 undergraduate students during the mission analysis and spacecraft requirements design phase of the club's entry into the Canadian Satellite Design Challenge. Developed high level systems design of power, link bandwidth, volume, and weight budgets. Lead team building and club marketing activities.

Professional Experience

Embedded Software Developer *Jun. 2023 – Present*
Zaber Technologies – Vancouver, B.C.

- Develop and maintain production firmware in C++ for an embedded *ARM* environment

- Automate common tasks and comprehensive product test suite in Python, preventing deficient firmware from being deployed
- Manage firmware configurations for over 1000 product variants
- Researched standards and gathered requirements used to define project scope, wrote internal and customer-facing documentation for new features and products
- Participated in development of Ethernet-based fieldbus control application for motion-control devices according to *IEC* and *ETG* specifications
- Identifies product performance requirements and formulates comprehensive verification plans
- Conduct code reviews of infrastructure, test, and application code, ensuring adherence to best practices and coding standards

Spacecraft Communications Engineer, Co-op *May 2021 – Dec. 2021*
Centre for Aerospace Research – Victoria, B.C.

- Developed an RF communication system for ORCASat alongside an interdisciplinary team
- Developed bare metal C firmware for the *T.I. CC1110* SoC serving as telemetry and communication system and *T.I. TMS570* MCU serving as flight control computer using *FreeRTOS*
- Modified open-source, custom *Python* toolset for development and testing of embedded devices, resulting in faster RF test procedures
- Automated integration tests involving EGSE such as spectrum analyzers, *JTAG*, and logic analyzers
- Integrated subsystems using serial communication protocols: SPI, I2C, and UART

Applications Engineer, Co-op *Sep. 2020 – Dec. 2020*
Microchip Technology Inc. – Burnaby, B.C.

- Created and maintained a suite of new tools for evaluating next generation Ethernet PHY telecommunication devices
- Developed a PyGtk GUI program to control and monitor ethernet PHY hardware
- Developed testing scripts to streamline the resolution of customer issues

Mechanical Engineer, Co-op *Jan. 2019 – Apr. 2019*
General Dynamics Mission Systems – Calgary, AB

- Environmental testing of equipment to relevant MIL-SPECs
- Supported RCCA investigations, wrote investigation report, awarded *VIES* recognition of engineering skill

Projects

Satellite Image Classifier

Trained convolutional neural network to detect the presence of mineral deposits in NASA Landsat images. Architected automated data pipeline to collect image data, metadata, and mineral location data. Developed preprocessing algorithms to improve classification performance. Created GPU accelerated learning models using TensorFlow.

FreeRTOS Earliest Deadline First Scheduler

Implemented an EDF scheduler on top of the FreeRTOS API in C for the STM32 platform. This functionality was implemented manually using C data structures and FreeRTOS tasks, queues, event bits, and other constructions.

References

Available upon request.