Aneel Badesha

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Education

Simon Fraser University — Vancouver, Canada
Bachelor of Applied Science, Computer Engineering — *Expected Grad May 2027*

Experience

Firmware Engineer Intern — Jan 2026 – April 2026
AiModels — C, C++, Python — *Vancouver, Canada*

- Developing firmware in C/C++ for AI-powered IoT dataloggers using ESP32 microcontrollers at a stealth startup
- Created and maintained C-based unit tests for firmware components with CI integration through GitHub Actions
- Designed and implemented a secure credential store using NVS to protect and manage sensitive system data
- Developed a centralized network management component to track Ethernet and Wi-Fi interface health and manage connectivity state through a unified network status API

Firmware Engineer Intern — Jan 2025 – Aug 2025
Astera Labs — C, Python — *Vancouver, Canada*

- Created a universal firmware updater for all of Astera's products, reducing firmware update time by 67%
- Designed and implemented APIs and new features in C, resolving 50+ bug tickets for a unified SDK used across multiple product lines, including PCIe retimers and fabric switches
- Created usage examples in C to test and validate firmware features for both internal and customer use
- Developed a Pytest-based regression suite to validate system configuration parameters on a CXL Smart Memory Controller, covering 92% of configurable parameters
- Integrated regression test suite into Jenkins using Groovy, automating nightly runs and gating all pull requests with mandatory regression testing prior to merge
- Configured and debugged development boards and lab servers to bring up new firmware builds and diagnose hardware issues using SPI, UART, I2C, and JTAG

Software Engineer Intern — May 2024 – Aug 2024
Ausenco — Python, HTML, CSS — *Vancouver, Canada*

- Developed a Python dashboard to simulate oil pipeline throughput, serving as the user interface for Ausenco's in-house pipeline, rail and cargo simulation software
- Developed an interactive UI featuring dynamic data tables and satellite-imagery maps with custom popups
- Implemented data import/export APIs supporting multiple file types to enable reuse of simulation results
- Authored detailed documentation to support future project phases and assist users with installation and operation

Projects

Ultrasonic Radar System | *C, Python, ESP32, Raspberry Pi*

- Developed a wireless radar system using ESP32, interfacing an ultrasonic sensor and LED display via SPI for real-time distance visualization with 180° sweep animation
- Developed a multi-threaded FreeRTOS application that separates radar sensor data handling from the graphics display, using polar-to-cartesian coordinate transformations for dynamic visualization
- Integrated WiFi connectivity and HTTP client to transmit JSON sensor data wirelessly to a Flask web dashboard with WebSocket real-time updates

Multi-Purpose Fire and Gas Detector | *C, BeagleBone Green*

- Developed a real-time alarm system with threshold alerts and an LED matrix display on a micro-controller
- Developed embedded C software on an Embedded Linux platform for the BeagleBone Green microprocessor
- Implemented multithreading via POSIX threads with mutexes to ensure thread safety and synchronization
- Implemented sensor fusion using I2C to integrate five sensors for detecting CO, CO2, and other harmful gases
- LED matrix flashes warnings for single-sensor triggers and displays a full alarm for CO or multiple hazards

Technical Skills

Languages: C/C++, Python, MATLAB, Java, Rust, ROS, HTML, CSS, SQL, JavaScript
Embedded Systems: Embedded Linux, FreeRTOS, POSIX, I2C, SPI, UART, PWM, ADC, CAN, UDP, TCP/IP
Hardware: JTAG, Oscilloscope, Logic Analyzer, Multimeter, Raspberry Pi, ESP32, STM32, BeagleBone, Soldering