

Aashir Farooqi

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Education

University of California, Davis

Fall 2016 - Summer 2020

Major: Computer Engineering, B.S

GPA: 3.4

CS Coursework: Algorithm Design & Analysis, Applied Linear Algebra, Operating Systems, Networks.

EE Coursework: Embedded Systems, Digital Systems, Circuits, Signal Processing.

Experience

Firmware & Hardware Engineer - Research Assistant

April 2018 - June 2020

Miller Lab (millerlab.faculty.ucdavis.edu)

Auditory Neuroscience & Speech Recognition Lab

- Independently brought up, prototyped, and delivered a real time solution to cross-reference external audio inputs with an EEG acquisition system by writing embedded firmware code in C and designing a circuit for a low latency optimized, single-bit ADC. Implemented low-overhead data structures/algorithms, and introduced large amounts of code modularity for maintainability. Brought latency down from the previous iteration by a factor of 10.
- Configured, built, and ran a custom Linux RTOS and cross-toolchain using the Yocto Project, including configurations for a bootloader, OS, and other optimizations based on the architecture of the embedded system.
- Taught myself TCP/IP communication in the scripting languages of MATLAB and Python, to implement an external eye-tracking system for use in behavioral studies.
- Debugged software issues using tools such as GDB and Valgrind, alongside hardware issues through use of various lab bench equipment (oscilloscopes, function generators, logic analyzers).

Software Engineer - Intern

June 2018 - August 2018

General Atomics

EMS - Software and Controls

- Brought up a new iteration of an aircraft landing simulation in C++, by studying the in-house developed physics models reflecting the interaction of the aircraft and custom motors/actuators, and consulting the original codebase in MATLAB. Brought the runtime of the simulation down by a factor of 2, alongside the inclusion of more accurate physics models and algorithms. Despite tight time constraints and minimal assistance, I earned the "MVP" award for saving "hundreds of hours in simulation time and greatly reducing control system tuning efforts".
- Leveraged object-oriented design patterns, implemented large amounts of code modularity, and designed data structures with clean interfaces, for emphasis on maintainability.

Projects

Smart Dog Collar Senior Design Project C & Verilog

Fall 2019 & Winter 2020

- Wrote embedded firmware code in C, with peripheral interfacing using SPI, I2C, I2S, and UART, to track ambient noise, and cycle between different power modes for the SoC and peripherals.
- Brought up, assembled, and debugged multiple iterations of hardware to house the microcontroller and various sensors, leveraging circuit analysis techniques, a myriad of datasheets, and various lab bench equipment.

Operating Systems & Embedded Systems Relevant Course Project C++

Fall 2019 & Winter 2020

- Wrote C++ code to implement functionality of a Unix based OS, including the implementation of preemptive threading, building a device driver for a FAT16 file system, and writing a Unix shell.
- Built a smart, IoT AC unit onto a 32-bit MSP430 microcontroller, with a feedback loop to control an IR emitter over SPI, based on data collected from a temperature sensor over I2C, and real time weather forecast over the REST API.

Mobile Applications (IOS): *Round 'a Bound, Tic-Tac Emoji* Swift

Winter 2017 & Spring 2018

- Successfully delivered the products through their full life cycle, by utilizing different APIs to detect physics collisions, exhibiting independently made animations and sound, and incorporating an online leaderboard via a real time database. While formerly published, the apps culminated in over 250 downloads.