Andrew McCullough, EIT

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SKILLS

Tools: Microsoft Office, Visual Studio Code, Atlassian (Jira, Confluence, Bitbucket), Jenkins, Code Collaborator, Altium, MATLAB/Simulink
Programming: C, C++, Python, Git, Linux, Bash, TensorFlow
Industry: Embedded Software, Scripting, Microcontrollers, Microprocessors, Circuit Design, PCB Design, Power Electronics, Circuit Testing, Oscilloscopes, Machine Learning & Vision

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EXPERIENCE

Micron Technology
Jan 2022 – Present
Longmont, CO

Firmware Engineer
- Designed controller firmware in C for next generation high-capacity solid state drives within a Scrum team
- Implemented crediting system to gate data relocation from high-speed to high-density NAND
- Wrote a migration system that prioritizes data ready to be relocated within storage
- Created an API to recalculate non-persistent system critical information after power loss
- Developed unit tests in C++ using Google's Testing and Mocking Framework
- Created NVMe Vendor Specific (VS) Commands to interface with developed firmware features
- Designed integration tests in Python exercising VS Commands on simulated and physical hardware over NVMe bus
- Participated in the code review process using Bitbucket, Jenkins, and Code Collaborator
- Prepared technical documentation for APIs and code contributions in Confluence

Ball Aerospace
Jun 2019 – Dec 2021
Broomfield, CO

Electrical Engineer
Microcontroller, Sensors, and Payload Flight System
- Designed and conducted bring-up of Mezzanine PCB containing a 32-bit ARM Cortex-M7 based microcontroller, IMU, and ADC, JTAG, and UART headers to interface with a baseboard containing an RF module and payloads
- Wrote firmware for the microcontroller in C to sample the ADC in a tight frequency window, detect small inertial movements from the IMU, perform encryption/decryption with a AES 256-bit key, switch power modes, and interface with the baseboard and its components
- Created a payload simulator by programming an Arduino to simulate four individual payloads by parsing I2C telemetry and GPIO inputs to interface with the system
- Developed a Python script to read ADC serial data from the microcontroller UART and create a CSV file for testing and future development purposes
- Created a MATLAB script to take MATLAB algorithm variables and create readable C header files containing the necessary MATLAB variable contents
- Utilized a Python script to read IMU data from the microcontroller UART and plot accelerometer and gyroscope data in real time
- Streamlined ADC sampling process cutting read time by 50% and wrote custom UART driver to allow for an increase in baud rate from 115200 to 400000

Low SWaP Imaging Research Project
- Utilized a local Jupyter Notebook and Python to train and deploy a TensorFlow object detection model to detect hand gestures using a laptop camera
- Successfully ran inference on a TensorFlow Lite model converted to a C byte array in C++ on a microcontroller evaluation board
- Designed a camera adapter PCB to interface a OV5640 CMOS image sensor with a microcontroller evaluation board for further machine vision development
- Conducted testing and training of different models to increase image sampling from 2.1 FPS to 7.6 FPS while keeping detection accuracy

Micron Technology Jun 2018 – Dec 2018 Boise, ID	**Product Engineer Intern** - Led root cause analysis on 3D XPoint failures to identify fabrication fixes and accelerate development timeline - Conducted investigation of memory production data to increase yield and developed scripts to automate the processes using R and Perl - Consolidated findings of fabrications errors, production yield data, and possible solutions into presentations that were shown to multiple managers and colleagues
Concept Systems Inc Apr 2017 – Sep 2017 Albany, OR	**Controls Engineer Intern** - Programmed, configured hardware, and tested control panels utilizing RSLogix5000, Variable Frequency Drives, and Ignition SCADA Software - Assisted in development of new automated FANUC robotic coating platform and programmed motion scripts using the Fanuc Programming Language

EDUCATION

Oregon State University 2014 – 2019	**Electrical and Computer Engineering** **Degree:** Bachelor of Science **Significant Courses:** Microcontroller Design, Computer Organization & Assembly, Data Structures, VLSI System Design, Digital Logic Design, Networks, Power Electronics, Transmission Lines, Power System Analysis, Hybrid & Electric Vehicles **Notable Projects:** Microcontroller based Digital Clock Radio with 7-seg Display, Temperature Measurement, and Automatic Dimming using C; Satellite Temperature Averager System Simulation using SystemVerilog; Electric Vehicle Efficiency and Simulation project using MATLAB; **GPA:** 3.79 out of 4

PROJECTS

Workout Timer and GUI in Python
- Fully customizable workout timer that reads exercises from a CSV, can modify number of reps, and sets times for exercises and rest
- Intuitive GUI created with Tkinter to view exercises and examples, enter workout settings, calculate workout duration, and show status of timer
- Text-to-speech implementation using pyttsx3 to lead workout with exercise names and countdowns

Android Calculator App in Java
- Fully functioning calculator with all standard mathematical operators
- Results are automatically calculated as expression is typed in
- Utilizes string manipulation and Java Expression Evaluator EvalEx

TensorFlow Lite Micro on SAM V71 Microcontroller in C++ and C
- Microchip Studio project to run a TensorFlow Lite for Microcontrollers project
- Successfully runs inference on the SAM V71 ARM Cortex-M7 based microcontroller that approximates the resulting Sine of an input

OSU Senior Project: Miniature High Integrity Flight Data Recorder for Rockwell Collins
- Project manager for design and production of flight data recorder for UAV applications
- Measures GPS position, yaw, pitch, roll, heading, barometric altitude, temperature, and captures images
- Data wirelessly viewable on a mobile device via ad hoc network to give real-time data and updates during flight
- Fully water resistant case to function in any condition and runs on battery or external power