Rahul Gangwani

Embedded Systems Engineer

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OBJECTIVE

I am a **highly motivated**, **hard-working**, and **experienced** Computer Engineer specializing in **embedded software** and **firmware** design and test. I am able to efficiently and effectively collaborate in a team environment or lead a team to help transform ideas into innovative devices. My goal is to use my skills and expertise to make an impact as an **embedded systems engineer in industry**.

WORK EXPERIENCE

CraniUS LLC Baltimore, MD
Senior Embedded Systems Engineer Oct 2022 – May 2024

- Demonstrated proficiency in identifying and resolving hardware and software issues affecting device functionality and stability, devising innovative solutions to intricate challenges within a week of receiving initial hardware.
- Authored and implemented comprehensive test protocols and instructional documentation facilitating seamless hardware and software setup for Class III medical devices, ensuring adherence to FDA regulatory standards.
- Spearheaded the development of approximately 70% of the low-level firmware for the device in C, leveraging Nordic's nRF52833 hardware and implementing device trees with Zephyr's RTOS framework to ensure seamless adaptability to hardware changes, while also orchestrating the setup of the initial testing infrastructure and mentoring a team of 4 software engineers in firmware development.
- Created functions that leveraged microcontroller peripherals, including I2C, SPI, UART, and ADC, to interface with various hardware sensors, which helped abstract low-level details and hardware complexity so software engineers could easily interact with sensors.
- Redesigned schematic and PCB layout of the medical device hardware in Altium, constraining board size to 40% of its original size by employing innovative segmentation into multiple boards, while concurrently optimizing hardware design with superior components to achieve a notable 30% reduction in power consumption and enhancing Bluetooth signal strength by 20dBm.
- Orchestrated and led a team of 3 hardware engineers, overseeing project progress through regular check-ins, presenting comprehensive summaries of hardware team accomplishments to executive stakeholders, distributing schedules to ensure timely project completion, and conducting technical screenings for 20 candidates as part of recruitment efforts.

Texas Instruments Dallas, TX
Test Engineer - Custom Analog Automotive and MSP430 Microcontrollers Jun 2020 – Oct 2022

- Developed novel test programs that verified proper functionality of cutting-edge devices that are then sent out worldwide to 230+ priority customers
- Coordinated and diagnosed with TI Labs and vendors to help pilot test and verify 2,500 new customer devices across 3 different PCBs, resulting in an estimated $1.4B in revenue
- Organized detailed schematic and code reviews as part of the test program development process, which helped to identify errors that would further delay project timeline
- Diagnosed and solved hardware and software issues by collaborating with teams in China and Taiwan, leading to a 5-6% yield improvement
- Optimized performance of existing test programs through test time reduction strategies, leading to a 15 - 30% test time savings and overall projected cost savings of $0.0041 per device

University of Michigan Ann Arbor, MI
Graduate Student Instructor and Research Assistant (C++ and Embedded Systems) Aug 2018 – Jun 2020

- Created and tested over 20 unique test programs in order to assess the students' strength of knowledge in programming and embedded systems
- Fabricated a Bluetooth Low Energy (BLE) eyedropper bottle incorporated with sensors and a custom-made PCB in order to determine if a patient has regularly taken their scheduled eyedropper medication on time, which would help more than 1.9% of the world's population suffering from uncontrolled glaucoma
- Integrated machine learning algorithms on the embedded device to classify at a 94% accuracy whether or not the eyedropper medication was dispensed based on the exported sensor data from an iOS app developed in Swift

EDUCATION

UNIVERSITY OF MICHIGAN Ann Arbor, MI

Masters of Science in Engineering — Aug 2018 - Jun 2020

- Major in Computer Engineering, Specialization: Embedded Systems
- Relevant Coursework: Advanced Embedded Systems, Embedded Systems Research, and Parallel Computer Architecture

PURDUE UNIVERSITY — West Lafayette, IN

Bachelors of Science in Engineering — Aug 2014 - May 2018

- Major in Computer Engineering, Minor in Psychology
- Relevant Coursework: Microcontrollers/Microprocessors, Embedded Systems and IoT, Advanced C Programming

CERTIFICATES, PAPERS, PATENTS, AND SKILLS

Papers:

Payne, N., **Gangwani, R**., Barton, K., Sample, A. P., Cain, S. M., Burke, D. T., Newman-Casey, P. A., & Shorter, K. A. (2020). Medication Adherence and Liquid Level Tracking System for Healthcare Provider Feedback. *Sensors (Basel, Switzerland), 20(8),* 2435. https://doi.org/10.3390/s20082435

Patents:

"Medical implant software systems and methods" - US Patent No. 11,837,356 - Date Published: 12/05/2023

"Medical implant software systems and methods" - US Patent No. 11,937,089 - Date Published: 03/19/2024

Certifications:

Medical Devices Quality Management System - ISO 13485:2016

Skills:

C/C++/Assembly, Python, PCB (Eagle and Altium), Microcontroller, Linux Device Drivers, FreeRTOS, Zephyr RTOS, Computer Architecture Design, Verilog, LabView, Data Structures and Algorithms, FPGA, Swift and iOS development