

Rohith Malkuchi

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SUMMARY

Embedded Systems Engineer with hands-on experience developing firmware for ARM Cortex-M and Cortex-A architectures using bare-metal, FreeRTOS, and embedded Linux. Proficient in driver development and real-time system design. Skilled in low-level debugging with a strong focus on performance and system-level problem solving.

EDUCATION

Virginia Tech Master of Science in Computer Engineering	Blacksburg, VA Jan 2023 – Dec 2024
Osmania University Bachelor of Engineering in Electronics and Communication Engineering	Jul 2017 - Jul 2021

TECHNICAL SKILLS

Platforms & Protocols: STM32F4, BeagleBone Black, MSP432, Arduino, 8086 | UART, I2C, SPI, CAN

Languages & OS: C, C++, Bash, Python, Assembly, SQL | FreeRTOS, Embedded Linux

Tools: GDB, SWD, Logic Analyzer, SystemView, Ozone, Vivado, Proteus, MATLAB, Oscilloscope, Multimeter

WORK EXPERIENCE

Virginia Tech Embedded Systems – Lab Assistant	Blacksburg, VA Feb 2023 – May 2024
<ul style="list-style-type: none">Trained and guided over 70 students on embedded systems concepts, microcontroller programming, and real-time debugging using MSP432 BoosterPack.Evaluated firmware projects and assisted in resolving hardware/software issues during lab sessions.	

Scale AI AI Trainer, Expert Domain: Embedded Systems and VLSI.	Remote Mar 2022 – Dec 2022
<ul style="list-style-type: none">Designed and evaluated Embedded Systems use cases to train and test the GPT-4 model.Contributed to the enhancement of both text-based and image-based models.	

IIT Kharagpur Embedded Systems & Robotics Intern	May 2020 – Aug 2020
<ul style="list-style-type: none">Acquired and applied expertise in embedded firmware development, integrating various modules, and an accelerometer with the STM32F4 microcontroller to design a multifunctional embedded system.Enhanced problem-solving skills by troubleshooting and optimizing embedded system configurations, achieving a 15% improvement in system response time and stability.	

PROJECTS

FreeRTOS-Based Embedded Command-Line Interface System
<ul style="list-style-type: none">Developed a robust UART-based interactive command-line interface (CLI) on STM32 Cortex-M4 using FreeRTOS.Integrated FreeRTOS primitives including Queues, Semaphores, Mutexes, and Task Notifications to achieve inter-task communication, concurrency, and peripheral interaction.Used Segger SystemView and Ozone to trace task-level execution, timing accuracy, and interrupt behavior.

Multithreaded Shell with Command Execution and Synchronization
<ul style="list-style-type: none">Developed a multithreaded shell in Linux, supporting both foreground and background execution.Implemented a thread-safe producer-consumer queue with synchronization, logging, FD handling, and graceful shutdown.

ADXL345 Accelerometer Interface with Custom LCD Driver on Embedded Linux
<ul style="list-style-type: none">Interfaced the ADXL345 accelerometer over I2C on BeagleBone Black using direct /dev/i2c-* access with manual register-level configuration, without external drivers or libraries.Built a complete GPIO-driven HD44780 LCD controller in C via Linux sysfs, supporting 4-bit and 8-bit modes, formatted text output, word wrapping, and scrolling.

Implementation of EDF, and its Comparison to RM and DM
<ul style="list-style-type: none">Developed and implemented the Earliest Deadline First (EDF) scheduling algorithm in FreeRTOS and compared its performance with Rate Monotonic (RM) and Deadline Monotonic (DM) scheduling algorithms.Analyzed task schedulability on Arduino Mega, demonstrating improved real-time performance under EDF.