

Vijay Teja Uppalapati

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SUMMARY

Embedded firmware engineer with **2+ years of industry experience** shipping ARM Cortex-M firmware for distributed, field-deployed systems, plus **published research** in edge ML and computer vision. Strong in bare-metal driver development, RTOS-based architectures, wireless protocol debugging, and real-time sensor integration. Currently pursuing an MS in Computer Engineering, focused on building intelligent embedded and edge systems.

EDUCATION

Florida Tech, Melbourne, FL Aug 2024 – Present
Master of Science in Computer Engineering, GPA: **3.87 / 4.0**

Jawaharlal Nehru Technological University, India Jul 2018 – May 2022
Bachelor of Technology in Electronics & Communication Engineering, GPA: **3.4 / 4.0**

SKILLS

Languages: Embedded C, C++, Python

Microcontrollers: ARM Cortex-M (STM32), PIC

Firmware: FreeRTOS, bare-metal development, interrupts, DMA

Protocols & Interfaces: UART, SPI, I²C, CAN, ADC, timers/PWM

Automotive: CAN, UDS diagnostics, DTC fault management

Wireless: BLE, Wi-Fi, Zigbee, LoRa

Edge ML & Vision: TensorFlow Lite Micro, TinyML, OpenCV, Raspberry Pi / Jetson deployment

Tools: Git, Linux, MATLAB/Simulink, Altium Designer, logic analyzer, oscilloscope

EXPERIENCE

Graduate Student Assistant (Teaching & Research) – EECS Department, Florida Tech Aug 2024 – Present

- Designed and evaluated a real-time depth-sensing perception pipeline integrating RGB-D data and ML-based tracking models, addressing synchronization, latency, and embedded performance constraints.
- Delivered hands-on instruction in LabVIEW, DAQ, and Microcomputer Systems labs for **40+ students**, covering bare-metal Embedded C/C++ on ARM microcontrollers, peripheral configuration (UART, SPI, I²C, ADC, timers), and interrupt-driven firmware design.
- Introduced FreeRTOS concepts (task scheduling, queues, semaphores) and mentored students in firmware debugging and hardware-software integration using oscilloscopes, logic analyzers, and serial tools.

Summer Research Intern – CWCITL Lab, Florida Tech May 2025 – Jul 2025

- Built end-to-end pipelines for intelligent edge devices covering sensor data acquisition, real-time processing, local storage, and remote monitoring. Reduced overall pipeline latency by **25%**.
- Developed bare-metal sensor drivers in C for STM32 microcontrollers, implementing low-level register configuration and interrupt handling over SPI, I²C, and UART **without relying on HAL abstractions**.

Embedded Firmware Engineer – Avench Systems, Bengaluru, India Feb 2022 – Jun 2024

- Developed and deployed Embedded C/C++ firmware for ARM Cortex-M based systems across multiple industry projects, owning peripheral driver implementation, real-time logic, and release version management.
- Wrote bare-metal sensor drivers and integrated IMU and environmental sensors over SPI, I²C, and UART, validating system behavior using oscilloscopes and logic analyzers.
- Built Python scripts for automated test logging and validation, and debugged Zigbee and LoRa wireless communication stacks to ensure reliable field operation.

PROJECTS

Automotive ECU Safety Management System (CAN, FreeRTOS, UDS) github.com/vijayspace7/Automotive_ECU

- Built an automotive body/safety ECU on STM32 NUCLEO-F446RE using FreeRTOS with a layered BSP/Services/Application/RTOS architecture and **8 concurrent tasks** communicating via queues, mutexes, and event flags.

- Implemented CAN bus communication, UDS diagnostic services, DTC fault management, watchdog supervision, and safety interlock logic with structured test validation.

3D Depth-Sensing Framework for Hand-Object Interaction

- Designed a modular SDK-style framework using Python, Intel RealSense RGB-D cameras, MediaPipe, and Open3D for real-time 3D perception.
- Integrated depth maps, RGB streams, and ML-based hand tracking to compute accurate real-time 3D spatial coordinates.
- Benchmarked YOLOv10, YOLOv8, SSD, and Faster R-CNN for real-time object detection under edge-compute constraints.

PUBLICATIONS

Peer-Reviewed

V. T. Uppalapati, N. Mensi, and D. B. Rawat, "3D Depth-Sensing Framework for Hand-Object Interaction in Microgravity Environments," *IEEE ICC Workshops 2026*, Glasgow, UK, May 2026.

V. T. Uppalapati et al., "YOLOv10 for Real-Time Emergency Vehicle Detection in Intelligent Traffic Systems," *IEEE IC_ASET 2025*.

Posters & Presentations

3D Depth-Sensing Framework for Hand-Object Interaction in Microgravity Environments, *SpaceU Symposium 2025*, University of Central Florida.