

VANI KABADAGI

Embedded Systems | IoT | ARM7 | ESP32 | RTOS

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PROFESSIONAL SUMMARY

Embedded Systems Engineer with hands-on experience in microcontroller programming, real-time systems, and embedded communication. Experienced with CAN, UART, SPI, I²C, RS-232, RS-485 and Ethernet across ARM7/LPC2129 and ESP32 platforms. Familiar with ESP-IDF, FreeRTOS fundamentals, Linux, Python, MQTT, HTTP/HTTPS and IoT communication, with practical experience in hardware interfacing, datasheet interpretation and embedded system debugging. Strong problem-solving approach with an interest in real-time embedded systems, communication interfaces and hardware-software integration.

TECHNICAL SKILLS

• PROGRAMMING	C · Embedded C · C++ · Python · Data Structures & Algorithms · Layered Architecture
• EMBEDDED SYSTEMS	GPIO · ADC · PWM · Timers · Interrupts · RTC · Watchdog · FSM · Memory Management · Peripheral Interfacing
• COMMUNICATION	CAN · UART · SPI · I ² C · RS-232 · RS-485 · BLE · Wi-Fi
• NETWORKING & IoT	TCP/IP · UDP · Ethernet · MQTT · HTTP/HTTPS · IoT Architecture
• EMBEDDED PLATFORMS	ARM7/LPC2129 · ESP32 · STM32 · Arduino · NodeMCU · Raspberry Pi
• RTOS & ARCHITECTURE	FreeRTOS · Tasks · Queues · Semaphores · Mutexes · Task Synchronization
• HARDWARE & INTERFACING	EEPROM (24LC1024) · SRAM (23LC1024) · MPU6050/IMU · GPS · Compass · Servo Motors · Sensors /Actuators
• DEVELOPMENT & DEBUGGING	ESP-IDF · Keil µVision · STM32CubeIDE · Arduino IDE · Flash Magic · VS Code · Git/GitHub · Linux · Shell Scripting · Logic Analyzer · Serial & Hardware Debugging
• DESIGN & AI TOOLS	Proteus · MATLAB · KiCad PCB · ChatGPT · Claude · Gemini · Antigravity

EXPERIENCE

Embedded Curriculum Designer & Project Support Engineer | RoboroxX

Jun 2025 – Jul 2025

- Designed an ARM-based LPC microcontroller curriculum covering embedded C, GPIO, interrupts, timers, communication protocols, and peripheral interfacing.
- Developed hands-on embedded projects for individual concepts and created detailed technical documentation for content creators and learners.

Embedded Developer Intern | RoboroxX

Dec 2025 - Aug 2026

- Developed and integrated embedded firmware for a GPS Tracking Device, including hardware interfacing, communication, and system testing.
- Worked on an Raspberry Pi 5-based Notice Board Controller System
- Supported development of a Biometric Attendance System, covering hardware integration and communication
- Contributed to a BLDC Thrust Stand for motor performance measurement and monitoring, including sensor interfacing and data acquisition.
- Performed hardware-software integration, firmware debugging, troubleshooting, and finalized working tests
- Worked with microcontrollers, sensors, communication interfaces, serial debugging, and embedded development tools throughout the development cycle.

TECHNICAL TRAINING

Vector India Pvt. Ltd., Bengaluru

Embedded Systems Training | Jun 2025 – Dec 2025

- Completed intensive training in Embedded C, ARM7/LPC2129, data structures & algorithms, computer networks, Linux, operating system concepts, and RTOS fundamentals.
- Developed firmware for real-time embedded applications using GPIO, UART, SPI, I²C, ADC, timers, interrupts, memory management, and peripheral interfacing, with hands-on experience in debugging, synchronization, and microcontroller communication

Training Project at Vector : Advanced Ultrasonic Proximity Detection & Reverse Parking Assistance System

- Developed a CAN-based embedded system using dual LPC2129 ARM7 microcontrollers, with separate control and sensor nodes.
- Implemented interrupt-driven CAN remote/data-frame communication between the nodes and timer-based ultrasonic distance measurement.
- Designed real-time distance-based obstacle detection and buzzer alerts, demonstrating CAN communication, interrupts, timers, and sensor interfacing.

PROJECTS

Multi-Controller Smart Elevator System

- Personal Project | Raspberry Pi 5, LPC2129, STM32, ESP32, Arduino, ESP32-CAM, CAN, RS485, FreeRTOS
- Independently designed and developed a distributed multi-controller elevator system, with Raspberry Pi 5 as the master and dedicated controllers for floor and cabin operations.
- Integrated LPC2129, STM32, ESP32, Arduino, and ESP32-CAM using CAN, RS485, Wi-Fi, and BLE, along with a custom USB debugging controller connected to a Python-based test interface for raw data monitoring, command emulation, and sensor simulation.
- Implemented FSM-based elevator control, floor positioning, motor/door control, obstruction detection, weight monitoring, and fault handling.
- Developed firmware with OTA support and performed complete hardware-software integration, debugging, and system testing.

Smart RFID Attendance System

- Personal Project | ESP32, MFRC522, SSD1306, DS3231, SPI, I²C, Flask, SQLite
- Developed a complete RFID-based attendance system using ESP32 with MFRC522 RFID reader, OLED display, and RTC for timestamped attendance logging.
- Implemented SPI and I²C peripheral interfacing and integrated the embedded device with a Flask backend and SQLite database for attendance management.
- Performed end-to-end firmware development, communication, hardware-software integration, and debugging.

GPS Tracking Device (At Internship)

- Contributed to the development and testing of a GPS-based tracking device, including embedded firmware, hardware interfacing, communication, and system integration.
- Assisted with debugging, hardware validation, and troubleshooting during prototype development.

BLDC Thrust Stand (At Internship)

- Contributed to the development of a BLDC thrust measurement system for monitoring and evaluating motor performance parameters.
- Worked on sensor interfacing, data acquisition, hardware-software integration, testing, and troubleshooting.

CERTIFICATIONS & RECOGNITION

Letter of Appreciation — RoboRosX Omni Tech Solutions

- Recognized for contributions to multiple embedded systems projects, including GPS Tracking Device, Notice Board Controller, Biometric Attendance System, and BLDC Thrust Stand, during a 9-month engagement.

Embedded Systems Internship Certificate — RoboRosX Omni Tech Solutions

- Completed an initial 1-month embedded systems internship involving ARM-based curriculum development and hands-on project support.

EDUCATION

MVJ College of Engineering, Bengaluru — B.E. Electronics & Communication Engineering

2021–2025 | CGPA: 7.6/10

Shree Guru Vidya Peetha PUC College, Gulbarga — PUC

2019–2021 | 93.83%