Bharani Dharan R

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Embedded Engineer

Embedded Firmware Engineer with hands-on experience of 1.5+ years in **microcontroller-based system design, firmware debugging, and hardware validation**. Skilled in **Embedded C**, **FreeRTOS**, and **bare-metal programming** for **real-time embedded applications**. Strong working knowledge of **USB, I²C, UART, SPI**, and **GPIO** interfaces. Proficient in using **oscilloscopes, logic analyzers, protocol analyzers, power supplies, and electronic loads** for system bring-up and validation.

WORK EXPERIENCE

Embedded Engineer • Full-time — Coimbatore, Tamil Nadu

Semicon Media Private Limited — **November 2025 - Present**

- Built single-board demos using ESP32, Arduino, and Raspberry Pi Pico
- Interfaced peripherals like Sharp distance sensors and MAX98357A
- Designed basic 3D parts and fabricated enclosures using 3D printing
- Implemented interfacing, communication, and control logic in firmware
- Wrote technical documentation and maintained code on GitHub for CircuitDigest platform

Associate Embedded Engineer — Bangalore, Karnataka

Optipace Technologies Private Limited — **May 2024 - September 2025**

- Led an engineering team in coordinating testing workflows and performing **root cause analysis** during validation cycles.
- Designed and developed **embedded firmware** for multiple MCU platforms (**nRF52**, **ESP32**) to support reference designs and solution demos.
- Worked closely with hardware and software teams to perform **firmware optimization** based on real-world performance data.
- Supported component procurement and used Git, VS Code, and debugging tools for development.
- Implemented and tested **USB**, **I²C**, **SPI**, and **UART** communication protocols for system-level integration and client requirements.

EDUCATION

Master of Science in Electronics and Communication Systems • Coimbatore, Tamilnadu •

Sri Ramakrishna College of Arts & Science • GPA: 8.3 — June 2022 - May 2024

- Published a research paper on Smart Farming Solutions using Embedded Systems.
- Hosted an inter-department Hackathon event as part of the Smart India Hackathon - 2024 initiative.

Bachelor of Science in Electronics and Communication Systems • Coimbatore, Tamilnadu •

Sri Ramakrishna College of Arts & Science • GPA: 8.2 — June 2019 - May 2022

- Developed **IoT-based hydroponics automation system** using **ESP32** with sensor interfacing via **I²C and UART protocols**.
- Published 2 research papers on IoT and embedded automation.
- Started hands-on embedded development with microcontrollers and basic electronics projects.

SKILLS

Technical Skills: C, Embedded C, Visual Studio Code, Platform IO, Git, FreeRTOS

Microcontroller & Protocols: nRF52, ESP32, ATMega, STM32, STM8, BLE, I2C, SPI, UART

Testing & Debugging Tools: Logic Analysers, Oscilloscope, Multimeter

Hardware Skills: KiCAD, Schematic Design, Circuit Simulation, Double layer PCB Design, Fabrication & Assembly Process, Signal Tracing, Soldering & Reworking, Autodesk Fusion

Documentation: Application Note Writing, Schematic Review, Firmware Version Control, Test Report Preparation

Soft Skills: Communication, collaboration, Problem-Solving, Adaptability, Detail-Oriented

Languages Known: English, Tamil, Telugu, Hindi

CERTIFICATIONS

Diploma In Embedded Systems
November 2023 - May 2024

Manfree Technologies

Google IT Support
February 2023

Coursera

Certificate in PCB Designing

MSME PPDC (Agra)

PROJECTS

Arduino Library for PZEM004Tv40
January 2026 - February 2026

- Developed Arduino library for PZEM-004T V4.0 energy monitor using Modbus RTU
- Enabled measurement of voltage, current, power, energy, frequency, and power factor
- Made the library work on different Arduino boards, including UNO R4
- Published the library to Arduino IDE Library Manager and PlatformIO Registry

IoT-based Automation System for Hydroponics Farm
December 2021 - April 2022

Sri Ramakrishna College of Arts & Science

- Developed an **IoT-enabled hydroponics automation system** using **ESP32** microcontroller.
- Integrated **SHT40, DS18B20, pH, and Sense air CO2 sensors** for complete environmental monitoring.
- Controlled **exhaust fan, grow lights, and water pump** through **threshold-based logic** for autonomous operation.
- Implemented **bidirectional data communication** via HTTP to a **custom-built web dashboard** and **I2C based LCD** for real-time local display.

VOLUNTEERING & LEADERSHIP

Sri Ramakrishna College of Arts and Science
January 2024 - February 2024

Hackathon Coordinator - Smart India Hackathon (Internal Round) — Coimbatore, Tamil Nadu

- Successfully organized an inter-department level Hackathon to prepare students for the Smart India Hackathon.
- Coordinated event, guided participants, and collaborated with the faculty to ensure smooth execution.
- Promoted innovation and problem-solving culture among juniors through peer mentoring and tech discussions.