

Sruthin S

Embedded Engineer

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Professional Summary

Resourceful and detail-oriented **Embedded Engineer** with proven expertise in **firmware development, microcontroller programming, and embedded systems integration**. Adept at full-cycle development from architecture to deployment, including testing and field debugging. Known for solving complex problems under pressure and delivering robust solutions for **power electronics and EV charging systems**. Eager to contribute technical acumen, leadership, and innovation in a high-impact engineering environment.

Professional Experience

IntelliCon Technologies

Noida, Uttar Pradesh

Senior Engineer-L2

April 2026 – Present

Engineer-L1

October 2023 – March 2026

- Led firmware development efforts across multiple EV charger and electronics product lines.
- Developed scalable, real-time embedded firmware for **ARM Cortex-M series MCUs** (Renesas RA2L1, GD32F103).
- Played a lead role in **R&D**, testing, client-side debugging, and **custom firmware solutions**.
- Acted as the primary point of contact for firmware-related integration across **20+ client deployments**.
- Implemented **GitHub-based version control** with clear repo structure and workflows, improving team collaboration.
- Recognized for **resolving critical on-site bugs** and optimizing systems for mixed BMS and communication protocols.

Technical Skills

- Tools & Environments: ESP-IDF, PlatformIO, VS Code, E2Studio, STM Cube IDE, Make, OpenOCD, GDB, SDCC, Git, QSPICE, LTSPICE
- Microcontrollers: ARM Cortex-M (Renesas RA2L1, GigaDevice GD32F103), ESP32S3, ESP32C3, Raspberry Pi, ATtiny13, STM8
- Languages & Protocols: C, Python, FreeRTOS, CAN (SAE J1939), UART, RS-485, USB, I2C, MQTT

Technical Projects

• **Auto Ageing & Calibration System for EV Chargers [End to End | Dec 2025 - Present]**

Microcontroller: GigaDevice GD32F103, Renesas RA2L1, ESP32 (FreeRTOS)

Tools: ESP-IDF, PlatformIO, Python Tkinter, Raspberry Pi, GDB Debuggers

- Engineered a scalable automated ageing & calibration system for EV chargers using distributed multi-node CAN architecture, and led PPAP validation and production rollout that boosted throughput and traceability while significantly reducing manpower requirements.
- Enabled parallel calibration and aging of chargers per ESP32 node, expandable via multi-node RS-485 clustering.
- Automated voltage/current sensing calibration, CV-OCV setting, and serial/model parameter programming with flash storage.
- Implemented FreeRTOS-based UART-RS485 and MQTT task scheduling using a custom communication protocol.
- Developed Python-based real-time monitoring & logging system on Raspberry Pi with anomaly detection & auto-shutdown.
- Integrated remote access via Tailscale + VNC, enabling remote diagnostics and monitoring.
- Reduced calibration time to **under 30seconds per charger**, eliminating manual calculations and data entry.

• **EV Battery DC Charger IP67 (1.3kW, 2kW) [End to End | Oct 2024 - Present]**

Microcontroller: GigaDevice GD32F103 (ARM Cortex-M3)

Tools: VS Code, ARM GCC, Make, OpenOCD, GDB, GD-Link, Python

- Reverse-engineered the original IP67 firmware and traced the PCB for expansion capabilities.
- Built a custom Linux build environment from scratch using Makefiles and custom linker scripts without OEM-IDE.
- Implemented scheduler-based control loop, RMS sensing via ADC, and LLC stage control via PWM.
- Developed CAN-based auto-calibration tools using Python and optimized flash-based runtime tracking.
- Enabled Constant Power (CP) and temperature-based derating, improving charger thermal safety.

- **BMS Monitor & Data Logger [End to End | Oct 2025- Nov 2025]**

Microcontroller: ESP32 (FreeRTOS)

Tools: ESP-IDF, CustomTkinter, PySerial

- Reverse-engineered proprietary Chinese BMS monitor after identifying CAN bus flooding due to high-priority ID spam causing charger communication failures.
- Developed a custom CAN monitoring and logging tool using ESP32 with intelligent filtering/scheduling to prevent bus saturation.
- Built a Python GUI using CustomTkinter for real-time visualization of pack voltage, cell voltages, temperature, current, and charge/discharge logs.
- Implemented FreeRTOS-based CAN TX/RX tasks with queue-based message routing and UART interface for data streaming.
- Delivered an OEM-grade diagnostic tool that resolved field issues and improved reliability, expandability, and debugging efficiency.

- **EV Battery DC Charger IP20 (1.2kW – 3kW Range) [Peripherals integration, H/W Testing | Oct 2023 – Sept 2024]**

Microcontroller: Renesas RA2L1 (ARM Cortex-M23)

Tools: Eclipse E2 Studio, Renesas FSP

- Architected timer-driven non-blocking control loop for PWM-based CC/CV charging.
- Implemented SAE J1939 CAN & RS-485 communication protocols for dynamic BMS compatibility.
- Developed a custom driver for TM1637 4-digit 7-segment display via bit-banged I2C-like protocol.
- Solved critical CV mode regulation issues by optimizing PI control logic in the feedback loop.
- Delivered custom firmware for multi-BMS compatibility (LFP & NMC), allowing cross-platform charging.
- Executed on-site integrations and troubleshooting for top-tier clients, resolving issues where others failed.
- Migrated EEPROM usage to MCU flash for efficient, non-volatile memory handling.
- Simulated and validated electrical behaviour using QSPICE and LTSPICE.
- CAN Bootloader of Renesas for update firmware through CAN, programmer gets firmware through UART and sends through CAN to target

- **EV Battery AC Charger (Type 2 with 3kW output) [Hardware Testing, Firmware | Jan 2024 – Mar 2024]**

- Performed hardware validation, embedded firmware development, and electrical behaviour analysis via SPICE simulations for a Type-2 3kW Offboard AC Charger.

- **CAN Analyzer & Serial Monitors [End to End | Oct 2023 -Dec 2023]**

- Developed a custom CAN analyzer tool using ESP32 and Python for CAN bus analysis.
- Designed and implemented ESP32 firmware using ESP-IDF within VS Code and PlatformIO.
- Built a Python-based CAN analyzer GUI using Tkinter, integrating ESP32 as a CAN bus sniffer.
- Designed and developed custom hardware for the CAN analyzer, featuring an OLED display with I2C.

- **Timer and UV/Motor Guards for RO Water Purifiers [End to End | Jan 2025]**

- Developed sequential timer-based UV/Motor protection modules for RO water purifiers using ATtiny13 with ADC-based current sensing and on-site calibration for real-world deployment.

- **AI speaker chat-bot with voice-controlled home automation [Firmware Development | Mar 2023 -Aug 2023]**

- Developed an AI-powered chat-bot integrated with home automation using Raspberry Pi and ESP32, showcasing proficiency in IoT and natural language processing. Utilized MQTT communication for seamless voice-controlled interactions and device management, demonstrating expertise in smart home technologies and MQTT protocol.

Academic Credentials

Bachelor Of Technology Electronics and Communication Engineering

Kerala University College of Engineering

2019-2023
Kariavattom, Thiruvananthapuram, Kerala

Diploma in Engineering Electronics Engineering

Government Polytechnic College

2017-2020
Nedumangadu, Thiruvananthapuram, Kerala

Higher Secondary

Janatha Higher Secondary School

2015-2017
Thembamoodu, Thiruvananthapuram, Kerala