

# Suvam Jana

Embedded Software Engineer (STM32/FreeRTOS)

STM32 | Embedded C | MODBUS | CAN | Industrial Automation

✉ [suvamjana12344@gmail.com](mailto:suvamjana12344@gmail.com) | ☎ 6290762636

🐙 GitHub: [github.com/shimmer02](https://github.com/shimmer02)

## PROFILE SUMMARY

Entry-level Embedded Software Engineer with hands-on industrial experience designing STM32- and AVR-based control systems for power and automation panels. Strong foundation in Embedded C and real-time firmware design, with strong practical experience using FreeRTOS for task scheduling, inter-task communication, and fault handling. Skilled in building reliable embedded architectures that translate hardware requirements into safe, maintainable firmware. Actively advancing expertise in real-time system design and embedded software architecture.

## TECHNICAL SKILLS

Programming: **Embedded C, C++, Python**

Microcontrollers: **STM32** (ARM Cortex-M), AVR (ATmega)

Embedded Concepts: **Bare-metal programming, Interrupts, Timers, ADC, PWM, PID Control, HAL/LL Drivers, DMA, USB**

Real-Time Systems: **FreeRTOS (tasks and scheduling, priorities, queues, semaphores, mutexes, event flags, notifications, timers)**

Protocols: **MODBUS RTU (RS-485), CAN, UART, SPI, I2C**

RTOS Concepts: **Task prioritization, periodic tasks, ISR-to-task communication, fault/event handling, resource protection, stack sizing, starvation avoidance**

Tools & IDEs: **STM32CubeIDE, Microchip Studio, CodeVision AVR, Git, Debugger (SWD/JTAG), CMSIS\_OS V2**

Automation & Control: **PLC-like logic, safety interlocks, fault monitoring**

PCB & Hardware: **DipTrace, AutoCAD** (schematics & basic layouts)

## PROFESSIONAL EXPERIENCE

### Embedded Systems Engineer

Syantant Solutions Pvt. Ltd. | Jan 2024 – Present

- Developed **embedded firmware** for industrial substation panels including battery chargers, DC distribution boards, and load banks.
- Designed **STM32- and AVR-based** controllers implementing **PLC-like** automation logic with safety interlocks and fault handling.
- Implemented **MODBUS RTU** communication over **RS-485** for data acquisition, monitoring, and control between charger modules and supervisory units.
- Designed and migrated bare-metal STM32 firmware to a **FreeRTOS-based architecture** using multiple **tasks, message queues, and event flags** for deterministic control and **fault handling**.
- Worked with **ADCs, timers, and GPIOs** to acquire analog signals and control power-stage elements.
- Integrated **CAN** communication for inter-module data exchange in industrial environments.
- Participated in **system testing, debugging**, and on-site issue resolution, improving firmware reliability and maintainability.
- Debugged real-time firmware issues using **SWD/JTAG, breakpoints, live expressions and timing analysis**.

## PROJECTS

### PID-Controlled Thyristor Firing Module (STM32)

- Designed and implemented a **closed-loop DC voltage regulation system** using **STM32 timers** and **ADC feedback**.
- Generated precise thyristor firing pulses synchronized with input supply.
- Implemented **PID control algorithm** to dynamically adjust firing angle and maintain stable output voltage under load variations.

### MODBUS Communication Using STM32

- Developed **STM32 firmware** to function as a **PLC-like controller** for battery charger panels.
- Implemented **MODBUS RTU** protocol over **RS-485** for reading analog voltage parameters and transmitting status data.
- Designed **supervisory logic** to interface with display and monitoring modules.

### Basic Panel Automation Using AVR (ATmega8)

- Built a microcontroller-based automation controller for relay control and system supervision.
- Implemented safety interlocks and fault conditions using interrupt-driven logic.
- Replaced conventional relay-based logic with programmable embedded control.

### FreeRTOS-Based Battery Charger System (STM32)

- Re-architected an existing bare-metal control firmware into a FreeRTOS-based system with dedicated ADC, control, input, fault tasks.
- Implemented inter-task communication using queues and event flags to decouple sensing, control logic and fault indication.
- Designed priority based task scheduling to ensure real time control responsiveness while preventing starvation.
- Implemented periodic sampling using RTOS delay-until mechanisms for deterministic timing.

## EDUCATION

**B.Tech in Computer Science & Engineering** (2021 – 2025) University of Engineering and Management, Kolkata

CGPA: 8.31

**Class XII (Science)** – 2021 South Point High School, Kolkata

## ADDITIONAL NOTES

- Currently strengthening skills in **task scheduling**, and **real-time embedded system design**.
- Interested in **Embedded Software, Firmware Development, and Industrial Automation**.