

Rasmi Ranjan Senapati

Embedded Software Engineer

rasmiranjansenapati108@gmail.com | 8917626393 | <https://www.linkedin.com/in/rasmiranjansenapati> | <https://github.com/rasmiranjan1999> | mrrs.in

PROFILE

Embedded Software Engineer with 4+ years of experience in Embedded Firmware Development, IoT Solutions, Embedded Linux, and Wireless Communication Systems. Proficient in C/C++, FreeRTOS, MQTT, TCP/IP, UART, SPI, and I2C. Experienced in developing cloud-connected devices, device-to-cloud communication, FOTA solutions, sensor integration, and real-time embedded applications using Renesas, Nordic nRF, ESP32, and Linux-based platforms.

TECHNICAL SKILLS

- **Programming Languages:** C, Embedded C, C++, Python
- **Embedded Systems & RTOS:** FreeRTOS, Linux, Firmware Development, Device Drivers, ADC, GPIO, Sensor Integration, Debugging, Troubleshooting, Firmware Validation, On time delivery.
- **Communication Protocols:** UART, SPI, I2C, MQTT, LwM2M, HTTP/HTTPS, TCP/IP, UDP, AT Commands
- **Microcontrollers & Boards:** Renesas RA Series, ESP32, STM32, nRF Series, Raspberry Pi, J-Link
- **Tools & IDEs:** Git, VS Code, Eclipse IDE, e² Studio, STM32CubeIDE, Tera Term, PuTTY, H-Term
- **IoT & Cloud Technologies:** MQTT, REST APIs, Cloud Connectivity, Cellular Communication (LTE-M, NB-IoT), FOTA
- **Domains:** Embedded Systems, IoT Solutions, Firmware Development, Remote Device Management

PROFESSIONAL EXPERIENCE

Embedded Software Engineer

Aug 2022 – Present

Meritech Software Pvt Ltd

- Developed and maintained embedded software solutions for IoT and industrial applications using C/C++.
- Implemented communication protocols including UART, SPI, I2C, MQTT, HTTP, and TCP/IP, UDP.
- Integrated sensors, cloud services, and wireless modules for real-time monitoring and remote control.
- Debugged firmware, communication, and hardware interface issues to improve system reliability.
- Contributed to 5+ embedded and IoT projects, including cloud connectivity, FOTA, cellular communication, MQTT messaging and sensor monitoring solutions and wireless data transmission.
- Mentor junior engineers and support system integration, testing, and technical documentation activities.

PROJECTS

monoZ JET (IoT Communication Module) ·

Technologies: C, Renesas RA0 MCU, UART, GPIO, AT Commands, Quectel BG770A, MQTT, TCP/IP, e2 studio IDE

monoZ JET is an IoT communication module that enables cloud connectivity using the Quectel BG770A cellular modem for remote monitoring and device management.

- Developed UART-based communication between the host device and Quectel BG770A module.
- Implemented AT command processing for module configuration, network connectivity, and status monitoring.
- Developed MQTT publish and subscribe functionalities for cloud communication.
- Implemented data transmission and command reception mechanisms between devices and cloud servers.
- Performed debugging and validation using serial communication tools and logs.

monoZ TAP

Technologies: C, Renesas RA0 MCU, FreeRTOS, UART, AT Commands, MCP39F511N, monoZ-JET, IoT, e2 Studio IDE

Developed a cloud-connected Smart Power Strip (monoZ TAP) solution using Renesas MCU, MCP39F511N, and monoZ-JET for real-time energy monitoring, power measurement, remote device control, and IoT cloud connectivity.

- Developed monoZ-JET communication using UART and AT commands.
- Implemented uplink/downlink communication for remote monitoring and plug control.
- Developed timer-based payload generation and cloud data transmission.
- Supported junior engineers in Integrated MCP39F511N power-monitoring IC voltage, current, power, and energy calculation implementation.

Resistance Monitoring System

Technologies: C, monoZero board RA6m5 MCU, FreeRTOS, GPIO, ADC, UART, e2 studio IDE

Developed embedded firmware for a Renesas RA-based resistance monitoring system, implementing resistance measurement, sensor data processing, signal averaging, and real-time data acquisition for IoT applications.

- Developed resistance measurement and calculation logic using capacitor charging/discharging techniques.
- Implemented timer-based resistance value calculation and data processing.
- Optimized measurement accuracy by averaging multiple sensor readings.
- Performed debugging, testing, and validation of resistance measurement functionality.

C3 RFID Tracking Gateway

Technologies: C++, Linux, ASUS Tinker Board, SQLite, UART, AT Commands, TCP Socket Programming, FOTA, VS Code

Developed firmware for a Linux-based RFID tracking gateway using ASUS Tinker Board, SQLite, and monoZ-JET. The system collects RFID data from beacon devices, performs local data processing, and securely transmits data to the cloud for real-time monitoring and tracking.

- Developed monoZ-JET communication interfaces using UART and monoZ-JET AT commands.
- Developed FOTA (Firmware Over-The-Air) functionality for remote firmware upgrades.
- Integrated monoZ-JET communication with the gateway's data processing workflow and downlink command handling.
- Supported the development and testing of TCP socket-based communication between beacon devices and the gateway.

Kitchen Inventory Management System

Technologies: Python, Flask, Linux, NanoPi, TCP/IP, REST API, Hikvision Camera,, VS Code

Developed a smart kitchen inventory management system that uses a weighing scale, camera, and NanoPi gateway to automatically record material usage, capture images, and send inventory data to a central server for monitoring and management.

- Developed Flask-based local web application for device configuration and inventory operations.
- Integrated NanoPi with weighing scale devices to acquire real-time weight measurements.
- Implemented data collection and processing logic for material name, weight, timestamp, and transaction information.
- Performed Conducted customer site testing, system validation, troubleshooting, and integration activities to ensure reliable end-to-end system performance.

Wirepas

Technologies: C, Wirepas Mesh SDK, Nordic nRF54L15, nRF52840, Wireless Mesh Networking, UART, Raspberry PI, Git, VS Code, Docker, Python

Developed Wirepas Mesh-based firmware for an Indoor Air Quality (IAQ) monitoring solution. The system collects environmental sensor data from IAQ devices, transfers data through Wirepas mesh nodes and gateways, and sends monitoring data to the cloud for remote analysis and management.

- Performed R&D and development using the Wirepas Mesh SDK.
- Developed Node firmware for the KAGA FEI EC4L15BA1 board based on the Nordic nRF54L15 MCU.
- Developed Sink firmware for the nRF52840 Dongle to receive and forward mesh network data.
- Implemented data collection, packet handling, and communication between IAQ devices and the Wirepas network.
- Integrated Node and Sink devices with the Wirepas Gateway for cloud connectivity.
- Debugged, tested, and validated mesh network communication and data transfer reliability.
- Collaborated with team members during system integration and deployment activities.

EDUCATION

Diploma in Computer Science

2018 – 2021

Einstein School of Engineering, Khordha, Odisha

B.Tech in Computer Science

2021 – 2024

Nalanda Institute of Technology [NIT], Bhubaneswar, Odisha