

# Ruthu J

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## Embedded Developer

Embedded Engineer with strong skills in microcontroller communication protocols, ESP-NOW communication, FreeRTOS task management, and ESP-IDF framework. Focused on designing efficient embedded systems, managing NVS data, and driving performance optimization. Passionate about optimizing system functionality and embracing new technologies for continuous improvement.

## WORK EXPERIENCE

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### ValueVertex So;utions • Bengaluru • 08/2024 - Present

#### Embedded Developer • Freelancer

- Developed a data management and communication system for IoT sensors using **ESP32**, enhancing data integrity with **CRC-based verification**.
- Created multi-threaded applications using **FreeRTOS**, managing inter-task communication through queues, mutexes, and semaphores.
- Implemented peer-to-peer communication with **ESP-NOW** for efficient data exchange.
- Debugged and optimized memory usage within NVS, ensuring robust and error-free operation during high-load scenarios.
- Designed a flexible configuration system for gateway parameters, including polling frequency, reset logic, and security keys.
- **Skills and Tools:**  
C, ESP-IDF, FreeRTOS, NVS, ESP-NOW, Debugging Tools(ESP-LOG).

### EmQos Embedded Engineering Pvt. Ltd • Bengaluru • 01/2023 - 01/2024

#### Trainee Embedded Engineer • Full-time

- Contributed to the design and implementation of embedded solutions for Smart Bollard and Liberty Next-Gen Parking Meters.
- Developed **I2C** and **UART** communication protocols for seamless data exchange between the Texas Instruments **MSP432** (ARM Cortex-M4F) and external cameras.
- Enhanced parking meter functionality by collaborating with the team to implement new features, improving performance by optimizing power consumption.
- **Skills and Tools:**  
C, CCS, I2C, MSP4342.

## EDUCATION

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### PG Diploma in Embedded Systems and IoT

Cranes Varsity • Bengaluru • `

### M.Texh in Digital Electronics

SJB Institute of Technology • Bengaluru •

## PROJECTS

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### Smart Water Metering • 08/2024 - 12/2024

ValueVertex Solutions

1. Designed and implemented an IoT sensor gateway using ESP32, ESP-NOW, and FreeRTOS for efficient data aggregation and transmission.
2. Developed a structured Non-Volatile Storage (NVS) system for gateway configurations, polling frequencies, and security keys. Ensured data integrity with CRC16 checksum validation.

3. Created modular C code for storage and retrieval with debugging support. Optimized inter-task communication using queues, semaphores, and mutexes, enhancing reliability through error handling, resource management, and memory optimization.

### **Smart Bollard and LNG Meter's • 01/2023 - 01/2024**

EmQos Embedded Engineering Pvt. Ltd

#### **LNG Meter:**

1. Designed and implemented a system to detect and handle coin jams, triggering an LED indicator for user notification.
2. Debugged and resolved unusual resets, ensuring system stability.

#### **Smart Bollard:**

1. Established reliable communication between the MSP432 microcontroller and an external camera using the I2C protocol, enhancing the bollard's functionality.
2. Optimized power consumption by utilizing low-power sleep modes on the MSP432 microcontroller and managing the modem's power state for efficient operation.

Focused on energy efficiency, system stability, and robust communication, driving the performance of smart infrastructure solutions.

### **SKILLS**

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**Programming Languages::** C Programming, Python

**Embedded Systems Development::** ESP32, MSP432, NXP-LPC2129

**Communication Protocols: :** ESP-NOW, I2C, SPI, UART

**Development Tools & Frameworks::** Code Composer Studio, ESP-IDF, Keil.

**Version Control: :** GIT