

Rituraj Pandey

Embedded Software Developer



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GITHUB

- Highly motivated and resourceful **Embedded Systems Engineer** with around 1 year of hands-on experience in developing and optimizing microcontroller-based systems.
- Proficient in working with a broad spectrum of microcontrollers, sensors, and advanced technologies, including ESP32, STM32WB, STM32G4, STM32L0, STM32L4, SAM3X8E, ATmega328, ATmega16, and NRF52 DK.
- Skilled in integrating and programming diverse sensors and modules such as VL53L8CX, VL53L5CX, VL53L0CX, MPU6050, MPU9250, BME680, BME280, SHT45, thermistors, moisture sensors, and load cells.
- Experienced in battery management systems (Max17055), wireless communication protocols (LoRa, NRF24, and DWM1000), and display technologies (OLED, Nextion Display).
- Adept at designing and implementing TEC controllers, Peltier modules, and creating stable algorithms such as Kalman filters for sensor fusion.
- Demonstrates expertise in developing reliable systems for temperature control, power management, and data acquisition.
- Passionate about delivering innovative and efficient solutions, with a strong foundation in low-power design, real-time communication, and firmware development.

- Committed to continuous learning and leveraging expertise to develop impactful and scalable applications in embedded systems.



Technical Profile

● Microcontrollers and Development Boards:

- STM32 Series (STM32WB, STM32G4, STM32L0, STM32L4)
- ESP32, NRF52 DK, SAM3X8E, ATmega328, ATmega16

Sensors and Modules:

- Time-of-Flight Sensors: VL53L8CX, VL53L5CX, VL53L0CX
- IMUs: MPU6050, MPU9250
- Environmental Sensors: BME680, BME280, SHT45, Thermistors, Moisture Sensors
- Load Cells for precise weight measurement

Wireless Communication Protocols and Modules:

- LoRa, NRF24, DWM1000, BLE

Display Interfaces:

- OLED Displays, Nextion Enhanced Displays

Power and Thermal Management:

- Battery Management Systems: MAX17055
- TEC (Thermoelectric Cooler) Controllers and Peltier Modules

Programming and Algorithms:

- Expertise in developing advanced algorithms for sensor fusion, data filtering, and predictive analytics
- Implementation of robust control systems for stability, optimization, and real-time decision-making

Communication Protocols:

- Proficient in I2C, SPI, UART, BLE, and RF protocols

Tools and Development Environments:

- STM32CubeIDE, Arduino IDE, Segger Embedded Studio, Keil, and other platform-specific SDKs



Work History

● Embedded Software Developer

Nard Photonics , Gurugram , Haryana

- Designed, developed, and tested embedded systems using STM32, ESP32, NRF52, and ATmega microcontrollers.
- Integrated and configured advanced sensors, including VL53 series, MPU6050, MPU9250, BME680, BME280, SHT45, and load cells, for accurate data acquisition and processing.
- Implemented wireless communication protocols such as LoRa, NRF24, BLE, and DWM1000 for long-range, reliable data transfer.
- Developed firmware for OLED and Nextion displays to present real-time data and interactive interfaces.
- Designed and optimized algorithms for sensor fusion, data filtering, system stability, and predictive control.
- Configured battery management systems (MAX17055) for efficient energy utilization and power monitoring.
- Designed TEC and Peltier-based thermal management systems for temperature-sensitive applications.
- Utilized tools like STM32CubeIDE, Segger Embedded Studio, Keil, and Arduino IDE for efficient firmware development and debugging.
- Implemented communication protocols such as I2C, SPI, UART, and RF for seamless device integration and control.
- Performed hardware-software co-design to ensure optimized system performance and reliability.
- Debugged and tested firmware to ensure robustness and compliance with system requirements.
- Collaborated on multi-disciplinary projects, ensuring the successful integration of hardware components and software algorithms.
- Conducted real-time system performance analysis and implemented low-power design strategies to enhance energy efficiency.

● Projects

STMET

Developed a system based on **STM32F429ZIT** and **STM32G4RE6**, integrating advanced communication and sensor technologies:

- Utilized **UWB (DWM100)** for inter-controller communication and **BLE (HC-08)** for external connectivity.
- Incorporated sensors such as **SHT41**, **VL53L8CX**, **BME280**, **MPU9250**, thermistor, and moisture sensor for environmental and motion monitoring.

VCSEL Laser Driver

Engineered a **STM32G4RE6-based system** for precise laser control with continuous monitoring and advanced temperature regulation:

- Designed a thermal management system using **TEC controllers**, **Peltier modules**, and a **Nextion display** for real-time visualization.
- Implemented USB-based controls for efficient data transfer and monitoring of temperature, current, and voltage.

Touchless Bell

Built a **proximity-sensor-based bell system** using **ESP8266** or Arduino for contactless operation:

- Designed a pulley mechanism driven by a geared motor to simulate ringing.
- Ensured system responsiveness for improved user convenience and safety.

Water Bottle Vending Machine

Created an automated vending machine using **Arduino** for bottle dispensing and recycling:

- Integrated a **color sensor** to detect paper colors for authentication.
- Designed a conveyor belt mechanism to vend bottles and a servo motor system to dispense refunds upon bottle returns.

Home Automation System

Developed a smart home automation system based on **ESP8266**, leveraging **MQTT protocols** and **IFTTT templates**:

- Enabled voice-controlled device management through Google Assistant integration.
- Provided seamless control of multiple appliances via IoT.

Farm Ally

Designed an **Arduino-based agricultural monitoring system** to assist landowners:

- Monitored soil moisture, alkalinity, wind speed, temperature, and humidity using integrated sensors.
- Implemented GSM messaging to notify landowners with actionable insights for improved crop health and productivity.



Education

- **Bachelors of Technology - Electronics And Communication**
Rajasthan Technical University (2021)