Swapnil Jadhav

Embedded Software Engineer | Firmware Developer

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Summary

Embedded Software Engineer with **1.7+ years of professional experience** in firmware development, hardware–software integration, and IoT solutions. **Skilled in C/C++, Python, RTOS**, and debugging complex embedded systems, with additional exposure to **cybersecurity**.

Professional Experience

Embedded Software Engineer AnshumanTech, Pune
Jan 2024 – Present

- Write firmware for **Shakti Pinaka/Parashu RISC-V based microcontrollers** to interface **Modbus RTU** for real-time data collection, as well as **Wi-Fi** & **GSM** modules for communication; use **embedded C with Makefile** for build process **OpenOCD** for flashing. Created a static website with Firebase integration for real-time data visualization and SCADA dashboard on Windows.
- Install **Kali Linux OS on RaspberryPi 4** to build a **cybersecurity** trainer; write Python scripts Tkinter GUIs to demonstrate cybersecurity experiments; write Python code to interface **I2C based ADC** IC collect data & forecast on website using firebase.
- Develop a universal GUI for the **FT232H FTDI module** to interface hardware via **SPI, I2C, UART & JTAG**; write driver code for SPI flash, I2C-based ADC, a custom UART console.
- Program **Atmega 328p & ESP32-C3 wroom** to interface I2C, UART, SPI based sensors and ADC ICs using Arduino IDE & PlatformIO.
- Write firmware for **P89C668** microcontroller to interface **WiFi** module; 4 diffrent nodes can able to communicate each other over WiFi.
- Troubleshoot resolve production-level firmware issues; fixed the baud rate mismatch in Wi-Fi communication on **89v51RD2** also resolved the Modbus RTU communication failure.
- Use **Git & Github** for version control across all projects to manage code changes release tracking.
- Managed & mentored R&D interns in Arduino and ESP32 programming, and reviewed PCB designs on KiCad; Provided guidance on firmware debugging.

Skills

Programming: Embedded C, C++, Python, Assembly
Microcontrollers: STM32, ESP32, Arduino, Raspberry Pi, RISC-V, ARM Cortex-M, 8051
Protocols: UART, SPI, I2C, CAN, Modbus RTU, JTAG, TCP/UDP, Wi-Fi, GSM
OS: FreeRTOS, Embedded Linux, Bare-Metal Programming
Tools: Git/GitHub, Doxygen, Word, Makefile, Oscilloscope, Logic Analyzer, KiCad, Keil

Projects

Inverted Pendulum with PID Control — Arduino, Stepper Motor, PID Algorithm
Implemented PID controller for pendulum stabilization; tuned parameters for optimal response.

Weather Forecasting IoT System — Raspberry Pi, Python, ThingSpeak
Integrated ultrasonic & DHT11 sensors for real-time weather data uploaded to cloud dashboard.

Education

B.Tech in Electronics and Telecommunication Engineering 2020 – 2024
Government College of Engineering, Karad — CGPA: 7.4

- Led team to 4th place in Smart India Hackathon.
- Member, Robotics Club.
- **Relevant Coursework:** Embedded Systems, Microcontrollers, OS, Computer Networks, VLSI, Data Structures.

Languages

English (Proficient) — German (Beginner) — Hindi (Fluent) — Marathi (Native)