

Swapnil Jadhav

Embedded Software Engineer | Firmware Developer | Embedded System Engineer

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GitHub: github.com/swapnil-2503 | Portfolio Website: Swapnil-2503.github.io

Summary

Motivated and detail-oriented Embedded Software Developer with over 1 year of industry experience and hands-on experience in delivering cutting-edge embedded system projects. I excel in designing and implementing innovative, scalable, and high-performance tech solutions, driven by a passion for efficiency and problem-solving.

Skills

Programming: Embedded C, C++, Python, Java | **Theoretical Knowledge:** Data Structures, Algorithms, Object-Oriented Programming, Database Management | **Hardware:** Arduino, ESP32, Raspberry Pi, Shakti pinaka 35T and parashu 100T RISC-V (CDAC microcontroller board), FT232H, SPI Flash, ADC/DAC IC, ESP01 WiFi module, SIM800 GSM module | **Tools:** VS Code, Arduino IDE, Git, Bash, MakeFile, Datasheets, DMM, DSO | **Protocols:** UART, I2C, SPI, TCP/UDP, HTTP, IP, MAC | **Other:** Linux, Cybersecurity, Circuit Design

Experience

Embedded Software Engineer

Jan 2024 – Present

AnshumanTech, Pune, India

- Developed firmware for the **XPO-SEM** project, programming the Shakti controller to interface WiFi and GSM through **UART** and RS485 using **MODBUS**. Designed a static website integrated with Firebase for real-time data visualization alongside a SCADA dashboard on Windows.
- Built a GUI for the **XPO-CSEH** project using Python Tkinter, integrating Bash and Python scripts to execute cybersecurity tasks on Kali Linux. Created servers and static websites for demonstration purposes.
- Designed a GUI tool to program the AT25SF081 Flash by interfacing an **FT232H** chip through **SPI**, enabling uploads of .bit and other binary files to the Flash.
- Developed programs to gather data from sensors connected in an I2C bus topology using **FT232** through **I2C**.
- Debugged** and fixed firmware issues that arose during production. Resolved four major bugs caused by prior projects within the organization.
- Managing and mentoring** an intern in R&D, focusing on Arduino and ESP32 programming, and checklisting PCB designs on KiCad. Provided hands-on guidance in firmware design & debugging.

Projects

- XPO-SEM:** A smart energy meter trainer leveraging **Shakti 35T/100T, ESP01 WiFi, SIM800 GSM, and RS485**. Data is collected from smart energy meters via RS485 and transmitted through WiFi or GSM, with the firmware providing selection flexibility. The SCADA dashboard (built with Python Tkinter) showcases real-time data on Windows and uploads it to Firebase, displayed on a static website (HTML, CSS, JS). **3 PLIC Interrupts** are assigned for these all UART for seamless communication on both sides controller(DC and HUB).
- XPO-CSEH:** A cybersecurity and ethical hacking trainer designed using **3 RPI with kali linux os** for professionals to gain practical experience. It has 3 nodes which can communicate each other using **socket programming**(TCP communication) Features include: Network Administration: Python and Bash scripts for network tasks. Threat Protection: GUI and Bash scripts for firewalls and malware prevention. Hacking Simulation: Practical malware demonstrations. Cryptography: Implementation of symmetric/asymmetric encryption and PKI.
- Inverted Pendulum Using PID:** Designed and implemented a PID-controlled inverted pendulum as a college major project. Used Arduino with stepper motors for precise control, ensuring system stability through optimized PID parameters.

Education

Bachelor of Technology in Electronics and Telecommunication Engineering

2020 - 2024

Government College of Engineering, Karad, India | CGPA: 7.4

Languages

English: Proficient | **German:** Beginner | **Hindi:** Fluent | **Marathi:** Native

Interests

Hobbies & Interests: Firmware Development, IoT Application Development, Robotics, Trekking