Harshvardhan R

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Education

- **Vellore Institute of Technology, Chennai** *2022 – Present*
  Bachelor of Technology in Electronics and Computer Engineering *CGPA: 9.23*
- **Senior Secondary Education (CBSE)** *2022*
  Central Board of Secondary Education *Percentage: 89.8*

Experience

•Embedded Systems Trainee (Cohort 3) - Infineon Technologies *Sep 2025 – Dec 2025*

- Completed a rigorous, industry-grade embedded systems training program conducted by Infineon engineers, focused on **bare-metal** firmware development
- Developed embedded bare-metal firmware for an **ARM Cortex-M0+** microcontroller (Infineon PSoC 4100S Plus), implementing **GPIO, TCPWM timers, PWM, SAR ADC**, and **interrupt handling** at register level
- Built and debugged the complete firmware stack by designing **startup code, linker scripts, and Makefile-based builds** using the **GCC toolchain**, and debugging with **GDB** and **OpenOCD** to analyze memory maps, stack usage, and interrupt execution flow

•Embedded Systems Intern – DRDO (Gun Health Monitoring System) *May 2025 – Jun 2025*

- Developed real-time firmware for acquisition and diagnostics of weapon subsystem signals
- Implemented low-level embedded firmware on the **NXP MPC5674F** using **S32 Design Studio**, configuring **eQADC, DMA-driven eSCI (UART), FlexCAN, PIT timers, system clocks, NVSRAM**, and **interrupt service routines** for deterministic multi-channel data acquisition
- Verified **interrupt timing** and **ADC sampling behavior** by instrumenting firmware with GPIO toggles and validating delays via **oscilloscope**-based signal probing

Projects

•🔗 Auto Street Lamp Control System - Infineon Hackathon (3rd Place) *Dec 2025*

- Engineered **LDR**-based illumination control with progressive activation of **9 LEDs** for day–night simulation
- Designed a multi-rate bare-metal control system on the **PSoC 4100S Plus** using dual **TCPWM** timers to decouple **SAR ADC** sampling (1 kHz) from lighting control updates (100 Hz) with deterministic execution
- Architected noise-tolerant ambient light detection by **averaging** ADC samples over a 10 ms window and controlling **9 GPIO-driven LEDs**, with flag-based **ISR coordination** and precise clock and peripheral configuration

•🔗 Bare-Metal Analog Joystick *Dec 2025*

- Designed a **game controller** by converting potentiometer position into discrete LEFT/RIGHT control commands and transmitting them to a PC game over **UART**
- Implemented **SAR ADC, TCPWM interrupts, GPIO routing**, and **SCB UART** using direct register programming to ensure low-latency, deterministic control behavior
- Validated real-time behavior through deterministic 20 ms sampling, interrupt-driven execution, and end-to-end **human-in-the-loop** testing

•🔗 Wearable Fitness Watch *Jan 2025 – May 2025*

- Built and programmed an **ESP32**-based fitness tracker for heart-rate, step-count, and workout tracking
- Integrated **MPU6050 IMU**, **MAX30102**, **touch input**, **buzzer**, and **OLED** for step counting and exercise detection
- Engineered **dynamic threshold calibration**, significantly improving motion-detection consistency and repetition-count reliability

Certifications

- 🔗 **Etalvis Certifications:** C Programming Foundation, Electronics Foundation, Embedded Hardware, Embedded Software - (GPIO, Controller), Microprocessors Internals, ARM Foundation

Achievements

•3rd Place - Infineon Embedded Systems Hackathon *Sep 2025 - Dec 2025*

•Top-5 Finalist out of 1000+ teams at DVCon India 2025 *Feb 2025 - Aug 2025*

Technical Skills

- **Embedded Systems:** ARM Cortex-M, GPIO, NVIC, interrupts, timers (TCPWM, PIT), PWM, ADC (SAR ADC, eQADC), DMA, UART, SPI, I2C, CAN
- **Programming:** C, Embedded-C, C++
- **Tools:** GCC toolchain, linker scripts, GDB, OpenOCD, S32 Design Studio, Git, Linux