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*

- 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
- Designed **startup code, linker scripts, and Makefile-based build systems** using the **GCC toolchain**; Enforced **clock tree** and **peripheral clocks** for deterministic real-time operation
- Debugged low-level embedded firmware using **GDB and OpenOCD**, analyzing memory maps, registers, stack usage, and **interrupt execution flow**

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

- Developed low-level embedded firmware on the **NXP MPC5674F microcontroller** using **S32 Design Studio**; configured **eQADC (ADC), eSCI (UART), FlexCAN, PIT timers, system clocks, NVSRAM**, and **interrupt routines** for deterministic signal acquisition
- Implemented gain- and offset-compensated **eQADC drivers** and **DMA-driven eSCI (UART)** communication, achieving **100% verified sampling precision** across 10+ sensor channels
- Verified **interrupt latency** and **ADC sampling timing** using breakpoints, watch variables, and **oscilloscope-based signal tracing**, reducing end-to-end data latency by **20%**

Projects

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

GitHub: https://github.com/hrsas/Infineon-Hackathon

- Designed a multi-rate embedded bare-metal control system on **Infineon PSoC 4100S Plus** using dual **TCPWM timers** to decouple ADC sampling (1 kHz) from lighting control updates (100 Hz)
- Configured **clock tree**, **12-bit SAR ADC (12 MHz)**, **GPIO**, and interrupt-driven control with 10 ms averaging for deterministic execution

•Bare-Metal Analog Joystick *Dec 2025*

GitHub: https://github.com/hrsas/psoc4100sPlus-baremetal-analog-joystick

- Designed a timer-driven bare-metal embedded system where **ADC**-sampled potentiometer input was translated into LEFT/RIGHT control decisions and transmitted via **UART**
- Implemented **SAR ADC, TCPWM interrupts, GPIO** routing, and **SCB UART** using direct register-level programming

•Wearable Fitness Watch *Jan 2025 – May 2025*

GitHub: https://github.com/hrsas/SmartFitnessWatch

- Built and programmed an **ESP32**-based embedded fitness tracker for heart-rate monitoring, step counting, and workout tracking
- Integrated **MPU6050 IMU** and **MAX30102** heart-rate sensor; engineered dynamic threshold calibration improving motion-detection precision by 15% and achieving >95% rep-count accuracy

Certifications

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

Certificates: https://drive.google.com/drive/u/0/folders/1Id1LHFHQ8csiz_6tFxis3i-dqS3905nd

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, Interrupt Handling, Timers, PWM, ADC (SAR, eQADC), DMA, UART, SPI, I^2C, CAN
Programming: C, Embedded C, C++, Verilog
Tools: GCC Toolchain, Linker Scripts, GDB/OpenOCD, S32 Design Studio, Git, Linux