Sakthivel Ponnampalayam Sivakumar

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EDUCATION

Northeastern University – Boston, USA Dec 2026
Master of Science in Electrical and Computer Engineering **GPA: 3.5**
Coursework: Computer Architecture, Operating Systems, Hardware and System Security, Computer Networks

Anna University - Chennai, India May 2024
Bachelor of Engineering in Electronics and Communication Engineering **GPA: 3.6**
Coursework: Digital Design, Embedded Systems, RTES, Digital Signal Processing (DSP), Internet of Things (IoT)

TECHNICAL SKILLS

Languages: C, C++, Python, Assembly (RISC-V), Verilog/System Verilog, Shell/Bash Scripting
Test Equipment & Tools: Logic Analyzer, Oscilloscope, Multimeter, Debugger, Soldering, CMake, Git
Boards & EDAs: RPi, Xilinx FPGA, STM32 Nucleo, Arduino, ESP8266, Wireshark, KiCAD, Vivado
Protocols: UART, SPI, I2C, CAN, HTTP, TCP/IP, DNS **| OS**: Linux, Windows

WORK EXPERIENCE

Northeastern University – Boston, USA

Teaching Assistant - Digital Design & Computer Organization **June 2025 – Aug 2025**

- Facilitated 10+ students to build a RISC-V like single cycle processors on TUL PYNQ Z2 boards using **Xilinx Vivado**
- Conducted weekly recitation sessions covering digital logic fundamentals including ALUs, register files, memory units, and instruction decoders resulting in 90% of the class completing the lab experiments on time

Teaching Assistant - Fundamentals of Networks **May 2025 – June 2025**

- Guided 15+ students in learning the OSI fundamentals with conceptual and Wireshark based laboratory assignments
- Assisted students on a biweekly basis on socket programming in python, routing protocols (TCP/IP) and access networks

Emertxe – Bangalore, India

Embedded and IoT Engineer Intern **Mar 2023 – May 2023**

- Developed a low-cost (<$15) RT-Health monitoring system using ESP32, MAX30102, & OLED to measure SpO2, BPM, body temperature, and saving it on ThingSpeak to maintain a cloud-based patient record
- Implemented a RPi-based smart traffic control system using YOLOv5 and OpenCV, dynamically adjusting signal timing based on vehicle count and reducing average simulated wait time by 27%

Team Sakthi Racing – Coimbatore, India

SAE Formula Student (Electronics Team) **Aug 2021 – Sept 2022**

- Optimized a Real-Time DAQ system using Arduino Nano to log data from 6+ sensors with less latency and improved accuracy
- Integrated I2C, UART and ADC interfaces to capture and synchronize data from ECU, GPS, and other onboard sensors
- Volunteered with the management team and created 5+ Canva designs for the business plan pitch at SUPRA SAE 2022

PROJECTS

Firmware Development for TMS (C++, Xenomai RTOS, RTXi, Linux) **July 2025 – Present**

- Exploring and building **hard real-time plugins in C++** within the RTXi framework, gaining hands-on understanding of data flow, execution loops, and latency-sensitive control structures critical for neurophysiological feedback systems

Development of OS Primitives (C, Linux CLI, SSH, Xen) **Feb 2025 – Mar 2025**

- Developed a **bare-metal OS implementation** in C, creating custom system call wrappers (read, write, exit), ELF executable loader, and memory management functions using mmap and achieving successful execution of dynamically loaded programs through custom syscall tables
- Engineered multi-threaded context switching mechanism with stack management, implementing yield functions and custom stack allocation (4096-byte stacks) to enable seamless thread switching between two processes

Reliable Data Transfer Protocol (C++, Ubuntu, WSL, SSH, Vim) **Oct 2024 – Dec 2024**

- Implemented ABT and GBN in C++, achieving **95%+ packet delivery rates** under various loss and corruption scenarios while maintaining protocol correctness through comprehensive checksum validation and timeout management
- Conducted comprehensive performance analysis comparing two transport protocols across 1000+ message transmissions, under 6+ different network conditions and window sizes as test cases