

# Suraj Ajjampur

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## EDUCATION

Master of Science, <b>Electrical, Computer and Energy Engineering (Embedded Systems and Internet of Things)</b> University of Colorado Boulder, Boulder, CO	<b>Aug 2022 - May 2024</b> GPA – 3.6 / 4.0
<ul style="list-style-type: none"><li>Major Coursework: Advanced Embedded Software Development, Embedded System Design, IOT Embedded Firmware</li></ul>	
Bachelor of Engineering, <b>Electronics and Communication Engineering</b> Visvesvaraya Technological University, Bangalore, India	<b>Aug 2017 - Sept 2021</b> GPA – 3.8/4.0
<ul style="list-style-type: none"><li>Major Coursework: Embedded System Design, Logic Design, Programming in C, Digital Signal Processing</li></ul>	

## WORK EXPERIENCE

### University of Colorado Boulder, CO

Graduate Student Assistant of Advanced Embedded Software Design

Dec 2023 - Present

- Configuring and building the **Linux kernel** from **source** as well as using **Buildroot** and **Yocto** frameworks and deploying to **QEMU** and physical targets.
- Using Linux System Programming concepts such as **File I/O, Threading, Signals, IPC, network sockets** and timing related **POSIX APIs** and write **TCP/IP socket servers**.
- Created a **custom Linux Device Driver** for a Camera input through debugging, timing analysis and memory allocation for buffering images in kernel space.
- Debugging concurrent software applications with command line **GDB, Valgrind**, and other software tools for debug and profiling.

### Analog Devices, Dallas, Texas

Microcontrollers Intern, SDK Team

May 2023 – Aug 2023

- Restructured the **Command Line interface** for all examples in the MAX32xxx and MAX78xxx series SDK, while receiving Asynchronous UART transactions from the terminal, performing **Lexical Analysis** and using a **command table** to store function pointers and strings.
- Wrote the **driver code** for the MAX31825 temperature sensor interfaced with **1-wire serial protocol** with **CRC** check.
- Implemented a **Bluetooth beaconing model** with **AES encryption** broadcasting through **BLE advertising packets** using RF Control Software.
- Created a 1-wire Async Transaction function** using the One wire Master function, which is now added as a new feature in the Maxim SDK.
- Designed an interactive application with the following features: **set breakpoint, get memory dump and profiling data**.

### Trane Technologies Bangalore, India

Embedded Software Engineer

Jul 2021 – Jul 2022

- Programmed controls application of electric refrigeration units integrated on battery electric chassis via electric power takeoff.
- Performed Model Code Integration, Data Base Generation and CAN J1939 connection with MCU and Inverter-Converter.

## TECHNICAL SKILLS

- Software Skills:** Embedded Linux | Firmware | System Software | Device drivers | Shell scripting | Yocto | Buildroot | Real-Time Embedded Systems |
- Processor Families:** TI C2000 | ARM Cortex-M4F | ARM Cortex-M3 | 8051 | ARM Cortex-M0+ | ARM Cortex-A57 |
- Protocols and peripherals:** | I2C | SPI | UART | Bluetooth Low Energy (BLE) | 1-Wire | TCP/IP | DMA | ADC | DAC | RTC | JTAG | SWD | RS-232 |
- Software Tools:** Quartus | ModelSim | Jenkins | Git | SCM | Libero | Docker | Cheddar |
- Programming Languages:** C | C++ | Python | x86 assembly | Bash | Make | Node.js |
- Hardware Debugging Tools:** Logic Analyzer | Oscilloscopes | Protocol Analyzer | Waveform Generator | Spectrum Analyzer | Multimeter |

## PROJECTS

Real-Time Scheduling Optimization on Jetson Nano	Jan - Feb 2024
<ul style="list-style-type: none"><li>Developed a <b>synthetic load generator</b> for the <b>Jetson Nano Board</b>, leveraging <b>Linux 4 Tegra OS</b>, to evaluate and compare the performance of leading scheduling policies (<b>Rate Monotonic, Deadline Monotonic, Earliest Deadline First, and Least Laxity First</b>) using precise time measurements <b>clock_gettime(Wall clock and NTP clock)</b>.</li><li>Implemented thread management using <b>pthreads, binary semaphores, and mutexes, and enhanced task precision with CPU core affinity adjustments</b>.</li><li>Conducted <b>feasibility tests and simulations using the Cheddar tool</b>, validating theoretical models against empirical data to <b>identify optimal scheduling approaches</b>.</li></ul>	
NanoVision AI	Oct - Dec 2023
<ul style="list-style-type: none"><li>Executed a sophisticated AI and computer vision project using <b>NVIDIA Jetson Nano 2GB Devkit, Yocto BSP, and NVIDIA's NGC Docker container registry</b>, focusing on people count analytics in a defined area. The project entailed configuring a <b>Yocto-based OS image</b>, enhancing it for <b>DeepStream AI</b> capabilities, and deploying the image on <b>Jetson Nano hardware</b>.</li><li>Developed and tested <b>Docker containers</b> for AI applications and integrated a <b>camera device driver</b>. Incorporated a feature to track the <b>number of people crossing a virtual line</b>, updating both <b>cumulative and per-frame counts</b> within the object metadata.</li><li>Enabled output streaming of this data using <b>Real-Time Streaming Protocol (RTSP)</b>.</li></ul>	
Incremental 8051 board	Jan - Apr 2023
<ul style="list-style-type: none"><li>Built an <b>8051-development board</b> using <b>KiCad</b> for <b>PCB Design</b> and utilized the <b>AT89C51RC2</b> chip with a <b>32KB NVSRAM</b> to increase the storage.</li><li>Interfaced an <b>EEPROM</b> using <b>I2C bit-banging</b> by developing <b>drivers</b> and integrated a <b>SPI-based DAC</b> module to generate various analog waveforms.</li><li>Allocated <b>memory for different Segments</b> such as Bootloader, Code segment, data segment, BSS segment, heap, and stack in the NVSRAM.</li></ul>	

## HOBBIES

Surfing | Waterpolo | Hiking | Running | Soccer | Watching Formula 1 | Karting |