SUJAL LADDE

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EDUCATION

B.Tech ECE	2025	PES University, Bangalore
Class XII	2020	Sainik School Kodagu, Kodagu
Class X	2019	Sainik School Kodagu, Kodagu

SKILLS

- **Languages** : C | C++ | x86 & ARM Assembly
- **OS** : Linux | RTOS | Windows
- **Frameworks**: Arm GNU Gebugger | CMSIS | ROS | Isaac Sim
- **Communication protocols**: UART | RS 485 | I2C
- **Technical Skills**: Data Structures | Embedded systems(HW and SW) | Debugging | IOT | Machine Learning | LLM
- **Version Control & Build Automation:** Git | Make
- **Soft Skills:** Problem Solving | Analytical Thinking | Communication | Leadership | Adaptability | Critical Thinking
- **Dev Boards-** Jetson Nano | Raspberry Pi ,Arduino | Arm® Cortex®-M0+

INTERNSHIP EXPERIENCE

Embedded Systems apprentice, Infineon Technologies: ***Embedded C | UART*** **Oct - Dec 2024**

- Developed application packages for the commercial development board Psoc 4100 s plus, which included driver development and product debugging.
- Developed board support package which included ADC,PWM,GPIO,Clock drivers for Psoc 4100 s plus.
- Gained a deeper understanding of microcontroller architecture (Arm® Cortex®-M0+).

Project Intern, IEEE CRAIS, PES University (github) ***ROS | Gazebo | Python | Rviz*** **June – July 2024**

- Simulation of an Autonomous Flying Quadcopter Mapping System using Gazebo and ROS to map the environment using depth camera and LIDAR sensor for the input for autonomous navigation.
- Applications: Automated warehouse management, increased accessibility to high shelves, improved safety.

Project Intern, CIE, PES University ***PyTorch | OpenCV*** **June – July 2023**

- Designed and built a rover to identify and classify crop diseases using PiCam and computer vision.
- Applications: early detection of crop diseases and reduced manwork.

PROJECTS

Charizard OS(github): ***C | x86 Assembly | GRUB | GCC | QEMU | Git***

- End-to-end monolithic-kernel OS demonstrating protected-mode boot, core kernel services, memory & storage management, device drivers and multitasking.
- **Version 1:** BIOS → protected-mode entry; GDT/IDT setup; PIC/IRQ initialization; VGA text console; simple round-robin process scheduler.
- **Version 2:** Physical & paging-based virtual memory allocator; RAM-disk–backed, FAT-inspired filesystem; built-in CLI shell (`ls`, `cat`, `echo`)
- **Version 3:** Modular driver framework with PS/2 keyboard & VGA modules; timer-interrupt–driven preemptive multitasking; Task State Segment (TSS) context switches,

The bear BareMetal (Drive) : ***C | Arm GNU Compiler | Cortex Debugger | UART | Driver***

- Developed bare metal application to control the speed of the motor via analog Light dependent resistor.
- Used the previously built projects Sally and ADC to enhance the use case of the current and previous projects.
- The main objectives of the projects involved developing the application from the ground up, including the register configuration for the Arm® Cortex®-M0+ microcontroller architecture on the PSoC 4100S Plus Developer Board.

SALLY : ***C | Arm GNU Compiler | Cortex Debugger | UART | Driver***

- Developed a UART driver named sally for the (Arm® Cortex®-M0+) microcontroller.
- The driver includes added functions of ring buffer and DMA(Direct memory access) Controller.

IOT device for Precision agriculture: ***SVM | Sklearn | XGBoost | Numpy | Jetson Nano***

- In association with the **Indian Council of Agricultural Research** to make a real-time soil nutrient monitoring system using sensor modules and machine learning for precision agriculture.
- Created a deployable prototype by interfacing UART communication protocol over the sensors and the server.

MiniScope: ***Oscilloscope | Logic analyzer | Raspberry pi pico***

- MiniScope is an oscilloscope and logic analyzer powered by Raspberry Pi Pico or Pico W.
- Oscilloscope - Max. Sampling rate: 500kS/s, Max.Analog bandwidth:150kHz, 2 channels.
- logic analyzer - 8 channels, Max. Sampling rate: 25MS/s/channel at divisions of 50ns to 100ms.

Donna The record manager (github): ***Arrays | Linked lists | map***

- Developed a Contact Record Manager application with progressive optimizations across three versions.
- **Version 1:** Implemented using arrays; achieved basic functionality with O(n) time complexity, but had high memory usage.
- **Version 2:** Upgraded arrays to linked lists, improving memory efficiency while maintaining O(n) lookup time.
- **Version 3:** Performance significantly improved by upgrading to a map data structure, which reduced lookup time to O(1).

CERTIFICATIONS-

Embedded Systems for Undergrad Students (Infineon technologies).

- Extensive learning and deeper understanding of microcontroller Architecture and programming.
- Gained experience with industrial-grade development boards, PSoC series microcontrollers, and designing systems for critical applications.

POSITIONS OF RESPONSIBILITY

- **Convener : PES debate tournament 2024**
- **Head PR and Design : PES Debating Society**

OTHER INFORMATION

Languages: English, Hindi, Kannada
Hobbies: Basketball