

CHERISH VIJJAGIRI

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SUMMARY

Embedded Systems Engineer with a B.Tech in Electronics (ECE) and an M.S. in Computer Science, offering a strong hybrid background in Circuit Design and Software Development (C/C++, Python). Experienced in developing firmware for ARM controllers, analyzing hardware schematics, and building robotic systems using ROS 2 and Linux. Skilled in bridging the gap between hardware (Circuits, Sensors) and high-level software (Machine Learning, Nvidia Ecosystem). Authorized to work in the U.S. and eager to contribute to drone and system component development in a fast-paced startup environment.

EXPERIENCE

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| • Embedded Software Engineer
<i>Laxmiteja Controls and Instrumentation</i> | 2019 – 2022
<i>Hyderabad, India</i> |
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- Led the full-cycle development of embedded system components, handling everything from circuit analysis to firmware deployment on 8051 and ARM architectures.
 - Designed and implemented robust C/C++ firmware for industrial controllers, optimizing code for resource-constrained microcontrollers.
 - Utilized electrical engineering fundamentals to troubleshoot custom circuit boards using Oscilloscopes and Logic Analyzers, resolving complex signal integrity issues.
 - Collaborated with PCB design teams to review EagleCAD schematics and layouts, ensuring seamless hardware-software integration during bring-up.
 - Integrated various sensors (IR, Proximity, Temperature) and communication protocols (I2C, UART) to build responsive, real-time control systems.

PROJECTS

ROS 2 Robotics Perception System (University of Dayton)

- Developed a C++ and Python-based perception pipeline on Linux (Ubuntu), designed for real-time object detection and tracking in robotic systems.
- Leveraged the Nvidia ecosystem (CUDA) and OpenCV to accelerate image processing tasks, demonstrating readiness for Nvidia Jetson-based drone platforms.
- Implemented modular ROS 2 nodes to handle sensor fusion, enabling the system to make autonomous navigation decisions in dynamic environments.
- Optimized inter-process communication for low latency, a critical requirement for flight control and stability in drone applications.

ARM Embedded Driver Library (Personal Portfolio)

- Architected a modular driver library for ARM Cortex-M controllers using Embedded C, focusing on direct register manipulation and hardware abstraction.
- Wrote low-level drivers for standard drone/robotics peripherals including I2C, UART, and GPIO, ensuring high-reliability hardware control.
- Validated driver performance through rigorous testing, using logic analyzers to verify timing accuracy against datasheet specifications.
- Demonstrated proficiency in Linux-based development workflows, utilizing Makefiles and Git for version control and build automation.

IoT Object Tracking Bot (Undergraduate Capstone)

- Designed and built an autonomous tracking bot, integrating IR sensors and motor controllers to follow objects in real-time.
- Programmed the navigation logic in C on an embedded microcontroller, tuning control loops for smooth movement and response.
- Designed the power distribution and sensor interface circuits, ensuring stable operation of the bot's electromechanical components.
- Conducted extensive field testing to optimize sensor placement and code logic, achieving reliable tracking performance.

Reverse Engineering & Circuit Analysis (Laxmiteja Controls)

- Reverse-engineered the circuitry of a legacy control card, tracing signal paths and analyzing component behavior without original schematics.
- Reconstructed the hardware design and firmware logic, enabling the creation of a modern replacement system with enhanced functionality.
- Applied deep knowledge of digital and analog circuits to identify and replicate critical safety features in the new design.

SKILLS

Core Languages: C, C++ (Embedded Systems), Python, Assembly

Hardware & Circuits: ARM Controllers, Circuit Design/Analysis, Oscilloscope, Logic Analyzer, EagleCAD Concepts

Systems & OS: Linux (Ubuntu), Nvidia Ecosystem (CUDA), ROS 2, Real-Time Systems

Machine Learning: Computer Vision (OpenCV), PyTorch, Object Detection, Sensor Fusion

Protocols & Tools: I2C, SPI, UART, GPIO, Git, CMake, VS Code, Hardware Debugging

EDUCATION

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| • University of Dayton
<i>Master of Science in Computer Science</i> | Dec 2024
<i>Dayton, OH</i> |
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| • Keshav Memorial Institute of Technology (JNTUH)
<i>Bachelor of Technology in Electronics and Communication Engineering (ECE)</i> | May 2019
<i>Hyderabad, India</i> |
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