Simayon Thampi

EMBEDDED SYSTEMS DESIGN ENGINEER

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"Robotics and Embedded Systems Engineer with expertise in autonomous systems, AI deployment, and IoT frameworks"

Key Achievements

- Developed a MIPI CSI-2 Linux kernel driver for thermal imaging, enabling seamless camera integration for robotics applications.
- Designed an AI-powered autonomous shopping cart, reducing checkout times by 60% and staffing needs by 30%.
- Presented a novel path planning algorithm at a national conference, leveraging AMCL and SLAM for mobile robot navigation.

Experience

Embedded Design Engineer

Digital Core Technologies Pvt. Ltd., Ernakulam | July 2023 – Present

- Developed MIPI CSI-2 Linux kernel driver for a thermal camera and custom bare-metal UART, I2C, and SPI drivers.
- Deployed AI models on Xilinx and custom FPGA boards
- Designed a custom IoT framework using MQTTS protocol
- Created a dual-core webserver on RTOS and STM32 platform
- Developed a Qt-based desktop application for device configuration
- Built LLM-based Python applications to automate workflows

Robotics Intern

Trizlabs Pvt Ltd., Thiruvananthapuram | September 2022 – June 2023

- Designed and programmed an indoor mobile robot with ROS-based autonomous navigation and threat detection using LiDAR, OAK-D camera, and ultrasonic sensors.
- Developed robot control interfaces with web visualization and completed chassis design in Fusion360.

Automation & Robotics Intern

Various Organizations (FANUC, Bosch Rexroth) | November 2021 – December 2021

- Programmed industrial robot manipulator arms using **Teach Pendant** and simulated assembly tasks.

- Designed and programmed **electro-hydraulic and electro-pneumatic circuits** for industrial automation.
- Developed PLC programs and **performance monitoring systems** for automated processes.

Projects

Autonomous Shopping Cart (Prototype), NESTO Group | April 2022 – October 2022

- Developed an autonomous shopping cart with RFID-based billing and customer-following capabilities, reducing checkout times by 60%.
- Integrated the cart with shop billing software and presented the implementation roadmap to stakeholders.

Speech Assist Module, NISH | June 2021 – August 2021

- Designed a low-cost Augmentative and Alternative Communication (AAC) device, achieving 80% cost reduction compared to commercial options; finalist at NISH competition.

Smart Cold Storage System | October 2021 – January 2022

- Developed an IoT-based Real-Time Intelligent Monitoring System (RT-IMNS), potential reducing in spoilage by 35% through automated control of temperature, humidity, CO2, and light conditions.

Custom LLM based Web Crawler, Personal Project | October 2024 – November 2024

- Built an LLM-based web monitoring system with a custom scraping engine for real-time website change detection and analysis.
- Designed a multi-agent architecture utilizing interconnected LLM chains for parallel processing and enhanced data insights.

Education

BTech in Robotics & Automation | July 2019 – March 2024

TocH Institute of Science and Technology | Ernakulam, India

- Minors in **Electronics & Communications**
- Current CGPA: 9.02/10.0
- Relevant Coursework: Embedded Systems, Machine Learning, Robot Kinematics, Real-Time Systems

Technical Skills

Programming Languages

- **Proficient**: C, C++, C#, JavaScript, Python, Lua, Shell Scripting
- **Learning**: Rust, Cybersecurity, Hardware Hacking

Embedded Development

- **Platforms**: Arduino (Nano, UNO R5), ARM (STM32H7, Teensy 4.x), ESP32/8266, ATtiny, RISC-V, Raspberry Pi
- **Specialties**: Real-Time OS, Bare-metal Programming, Custom Board Development

Robotics & Automation

- Industrial PLC Programming
- Robotic Manipulator Systems
- ROS Development (SLAM, Navigation)
- CAD Design for Robotic Systems

Web & Application Development

Frameworks: Django, Astro JS, Streamlit

Tools: Qt, Flutter

Development Ecosystem

- Linux Development (Buildroot, Yocto)
- Docker Containerization
- CMake, Cron Automation
- TUI Development

Edge AI & Hardware

- FPGA AI Implementation
- Vitis Framw
- GStreamer & OpenCV Pipelines
- Edge Impulse Model Deployment

Tools & Prototyping

- **Design**: Figma, KiCAD, Fusion360
- **Testing**: Oscilloscopes, Logic Analyzers

Conferences

National Conference on Information Communication & Intelligent Systems | June 2023

Paper Presentation: Path Planning Algorithm for Indoor Autonomous Mobile Robot

- Presented a path planning algorithm for indoor mobile robots, incorporating AMCL for precise navigation, SLAM for dynamic mapping, and a JavaScript-based HMI for real-time control.