ADARSH JAGADISH KAMINI

EMBEDDED SOFTWARE ENGINEER

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CAREER PROFILE

- **Patent Holder** with expertise in **Embedded Systems** with hands-on expertise in **C**, **C++**, **MATLAB, FPGA**, **Python**, and **RTOS**, driving real-time solutions across **IoT**, controllers, and sensor integration.
- Specialized in **PCB design**, system architecture, and power management tools like **Altium** and **KiCad** to optimize performance and efficiency.
- Proven ability in project management, including sprint planning, **stakeholder communication**, and documentation, delivering successful industrial and research projects.
- Adept in firmware development for microcontrollers such as ESP32 and STM32, leveraging RTOS and **CI/CD** pipelines to enhance system scalability and responsiveness.

TECHNICAL SKILLS

Tools: C, C++, RTOS, MATLAB, Vivado, Altium, Confluence, Jira, GIT version control, Python, Java, Bash, Assembly
Specializations: Embedded Systems, IoT, Controllers, Sensor Integration, Research and Development, Real-Time Systems, Zephyr, Power Electronics, Circuit and PCB designing, CI/CD, BLE, MQTT

EDUCATION

Uppsala University, Sweden **Aug 2023-Present**
Master of Science in Embedded Systems
Coursework: OS, Parallel Programming, Real-Time Systems, Programming Embedded Systems, Wireless Communications, Accelerating Systems with Programmable Logic Components, Model Based Design of Embedded Software

Vellore Institute of Technology, Chennai, India **Jun 2019-April 2023**
Bachelor of Technology in Electrical and Electronics Engineering

PROFESSIONAL EXPERIENCE

Automation Research Assistantship | Centre of Automation, VIT Chennai **Aug 2022-July 2023**
- Automated the manufacturing of collagen sheets by integrating machinery, and evaluating design choices, resulting in a **30%** reduction in production time.
- Developed an AI-based smart kitchen system using image processing, enabling real-time food monitoring, which improved cooking efficiency by **25%**.

Embedded Software Engineering Intern | Firewires Oneiot Pvt Ltd **Aug 2022-April 2023**
- Engineered firmware for ESP32 and STM32 using RTOS, OTA, and MQTT, increasing system responsiveness by **20%**.
- Led wireless Matter protocol projects, enhancing IoT connectivity by **15%**, improving device interoperability and reducing development cycles.

Embedded Systems Intern | Teqnezma Electronics Pvt. Ltd. **Feb 2022-Jun 2022**
- Designed and prototyped an Emergency Solar Portable Spotlight, leveraging buck-boost converters to increase battery efficiency by **40%**.
- Conducted extensive testing on microcontrollers and wireless networks, achieving a **15%** improvement in signal range.

PROJECTS

Smart Vehicle Tracking and Diagnostics System
- Achieved **real-time vehicle telemetry** by integrating **Wi-Fi** with an **MQTT server**, resulting in seamless remote monitoring and data transfer.
- Enabled **remote diagnostics** by implementing **CAN** with **MCP2515** and **ESP32**, improving vehicle issue detection through web-based interfaces.
- Reduced setup time by **30%** through **BLE commissioning**, enhancing user experience for mobile app-based device configuration.
- Enhanced system responsiveness by integrating **interrupt handlers** and **semaphores (FreeRTOS)**, prioritizing high-priority tasks like engine temperature monitoring and speed violation alerts.

Smart Agriculture System Using Zephyr RTOS and Raspberry Pi Pico
- Engineered an **IoT**-based agriculture system using Raspberry Pi Pico microcontroller, incorporating BME680 for temperature and pressure, LTR390 UV sensor, and a soil moisture sensor, interfaced via **I2C** bus.
- Utilized **Zephyr RTOS** to manage **real-time** sensor data collection and processing, enabling efficient resource allocation on the sensor node.
- Established communication between sensor and base nodes using **UART** protocol, with interrupt-driven **ISR** (Interrupt

Service Routine) to trigger alerts for low soil moisture via GPIO-controlled LED.
- Designed a scalable architecture, with the potential to integrate **MQTT** protocol for wireless data transmission over ESP32 or similar modules.

BME680 Breakout Board PCB Design
- Designed a custom PCB using **KiCad** for the BME680 sensor with optimized routing for **I2C/SPI** to ensure signal integrity and minimize trace lengths.
- Implemented power management using decoupling capacitors for stable operation.
- Conducted comprehensive **Design Rule Checks (DRC)** to ensure compliance with industry standards.
- Applied thermal reliefs for effective heat management and improved solderability.

Line Follower and Obstacle Avoidance Robot using Real Time Systems Concept (ADA Programming)
- Integrated sensors for **line detection** and **obstacle avoidance**, enhancing the robot's autonomous functionality.
- This project exemplifies my expertise in **real-time systems**, robotics, and ADA programming, showcasing my ability to innovate and solve complex technical challenges.

PUBLICATIONS
- Optimal Power Management for Sustainable Multipurpose Smart EV Charging Stations
- Ocean Surface Cleaning Autonomous Robot (OSCAR) using object classification techniques
- Product Review System with BERT for Sentiment Analysis and Implementation of Administrative Privileges on Node-RED

PATENT
- System for controlling temperature of cooking, and method thereof (Published) – Intellectual Property India (CGPDTM) – (AI in Embedded Systems)

AWARDS
- Top 10 in International Planetary Aerial System (IPAS) - Mars Society South Asia (MSSA)
- Top 15 in International Rover Design Challenge (IRDC) - Mars Society South Asia (MSSA)