JAYA SHANKAR NALANAGULA
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Summary: Embedded Software Engineer with hands-on experience in developing real-time firmware, optimizing embedded systems, and integrating software for cellular and wireless technologies. Proficient in C/C++, RTOS (FreeRTOS, Zephyr), embedded Linux, and hardware debugging (JTAG, Lauterbach Trace32). Passionate about low-power system design, multi-threaded processing, and wireless communication stacks in consumer electronics.

EDUCATION

MS in Computer Engineering (Computer Systems), Arizona State University, USA. **Dec 2024.**
BTech in Electronics and Communication Engineering, Koneru Lakshmaiah University, India. **May 2021.**

TECHNICAL SKILLS

Programming Languages: C, Embedded C, C++, Python, Assembly (ARM, RISC-V), Bash.
Embedded Systems & RTOS: FreeRTOS, Zephyr, Embedded Linux, Real-Time Kernel Development, Multi-threaded Programming, Inter-Processor Communication (IPC), Low-Latency Scheduling.
Hardware & Platforms: ARM Cortex (M/R/A), RISC-V, 8051 Microcontroller, ESP32, Raspberry Pi, FPGA-based Prototyping, In-Circuit Emulators, Lauterbach Trace32, JTAG Debuggers, Logic Analyzers.
Wireless & Communication Protocols: Cellular (4G/5G), Bluetooth LE, Wi-Fi, NFC, Ethernet, USB, I2C, SPI, UART, CAN, CAN-FD, MQTT.
Low-Power & Performance Optimization: Dynamic Voltage Scaling (DVS), Power Management Techniques, Clock-Gating, Sleep-State Optimization, Always-On Systems.
Testing & Debugging: DS-5, Intel VTune, Lauterbach Trace32, VectorCAST (unit testing), System Profiling, Hardware-in-the-Loop (HIL) Testing, Performance Analysis.
Firmware & Software Development: Device Drivers, Bootloader Development, Secure Firmware Updates, Sensor Fusion, DSP Algorithms for Signal Processing.
Automation & CI/CD: Python Scripting for Test Automation, Jenkins for CI/CD, Automated Embedded Software Testing, Hardware Validation Frameworks.

PROFESSIONAL EXPERIENCE

Smart Point of Care Pharmacogenetic Testing Device Developer - OneDrug Inc. **Feb 2025 - Present.**

- Currently contributing to embedded software development for medical devices. Due to a non-compete agreement, project details cannot be disclosed.
- Focus on real-time firmware optimization and hardware integration in resource-constrained embedded systems.

Freelance Embedded Software Engineer – Self-Employed **Oct 2022 – May 2023.**

- Developed multi-threaded embedded applications using RTOS (Zephyr, FreeRTOS) and C/C++ for real-time control systems.
- Designed and optimized Linux device drivers for SPI, I2C, CAN, and UART, ensuring efficient hardware-software integration.
- Integrated real-time control software for sensor fusion, motor control, and embedded AI applications, achieving high system reliability.
- Worked with ARM Cortex (M/R/A), RISC-V, and SPARC architectures, testing with JTAG debuggers and oscilloscopes for precise debugging and performance optimization.

Embedded Systems, Intern - Arete IT Services **Jul 2020 - Nov 2020.**

- Designed and implemented a high-precision Weighing Scale Machine using Arduino Uno, HX711 Load Cell Amplifier, and ESP32-CAM, optimizing firmware for low-power operation.
- Integrated IoT-based image capture for weighbridge applications, improving data reporting accuracy by 30%.
- Debugged hardware/software interactions using JTAG and Logic Analyzers.

Mobile App Developer - Web4Site **Sep 2024 – Feb 2025**.

- Developed Hawkeye EDS, Engineered FanFindr and Weather Driver applications, Created automated test scripts to validate mobile app functionality.

ACADEMIC PROJECTS

Autonomous Vehicle with Local and Global Positioning Systems **Aug 2023 - Dec 2023.**

- Designed and implemented an autonomous vehicle prototype using MPU6050 (accelerometer/gyroscope) and GPS modules, optimizing C++ algorithms for low-power operation and reducing power consumption by 15%.
- Integrated sensor data (MPU6050) and debugged hardware/software interactions using JTAG.
- Visualized vehicle location with ±3m precision using Google Maps API.

Surveillance Bot **Jan 2022 – May 2022.**

- Developed a surveillance bot using Raspberry Pi 3 and Arduino Uno, integrating ultrasonic sensors and OpenCV for obstacle detection and facial recognition with 85% accuracy.
- Optimized firmware for low-power operation, enabling 24/7 remote monitoring with minimal power consumption.
- Debugged hardware/software interactions using JTAG and Logic Analyzers.

Apple Ecosystem Experience:

- Experience with real-time embedded firmware development for wireless and cellular technologies, optimizing Layer1 control software.
- Strong understanding of low-power embedded system design, contributing to Always-On platform energy efficiency.
- Developed iOS applications using Swift and Xcode, gaining hands-on experience in Apple's development ecosystem.