

Ravi Kumar Upadhyay

Embedded C/C++, Linux, IoT, and Multimedia Systems

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SUMMARY

Embedded Software Engineer with 2.7 years of experience in firmware development, device drivers, Linux system programming, and IoT solutions for multimedia and sensor-based applications.

- Specialized in Embedded C/C++, Linux, and IoT protocols (MQTT, HTTP, TCP/IP).
- Good understanding of SoC performance areas – Multimedia, Modem, AI/Machine Learning and performance/power trade-offs on SoCs.
- Proficient in Linux Kernel Programming and porting Linux/Android onto embedded processors and SoCs.
- Knowledge of compiler optimization techniques used for embedded systems.
- Developed and optimized video/audio streaming (H.264, H.265) for surveillance cameras.
- Familiar with SoC performance indicators and performance concepts.
- Strong understanding of computer and memory architecture concepts.
- Integrated AWS IoT Core for secure, scalable cloud communication.
- Implemented OTA updates with fail-safe rollback to ensure system reliability.
- Automated testing and debugging using Python and Shell scripting.
- Worked with real-time operating systems (RTOS) and multithreading.

EXPERIENCE

Senior Associate Product Development | Kent Cam Technologies | Dec 2021 - July 2023 | Noida, Uttar Pradesh
Project: Kent HomeCam CamEye 360/Genie

- Developed and optimized embedded software using Embedded C/C++ for smart surveillance cameras, ensuring real-time performance and reliability.
- Designed middleware to facilitate seamless communication between hardware and software components.
- Enhanced device security through the integration of secure boot, factory key provisioning, and encryption techniques.
- Created REST APIs and utilized IoT protocols (MQTT, HTTP) for backend integration and real-time device management.
- Optimized video and audio streaming algorithms (H.264, H.265) for low-latency, high-quality performance.
- Implemented OTA update mechanisms featuring fail-safe recovery and rollback options.
- Leveraged AWS IoT Core for device connectivity, utilizing AWS Lambda, S3, and DynamoDB for cloud-based data processing.
- Conducted unit and system integration testing, focusing on performance optimization and product quality.
- Analyzed SoC performance indicators, optimizing power efficiency while maintaining high computing performance.
- Collaborated with cross-functional teams to troubleshoot hardware-software issues and enhance overall system efficiency.

Product Development Engineer | Astra Microwave Product Limited | Dec 2020 - Dec 2021 | Hyderabad
Projects: Water Level Measurement (Bubbler/Radar Sensor) & Automatic Rain Gauge (ARG)

- Designed and developed firmware for water level measurement and rain gauge systems using Embedded C/C++.
- Integrated sensors with microcontrollers using I2C, UART, and SPI protocols for real-time data acquisition.
- Implemented TCP/IP and UDP protocols for secure remote data transmission.
- Developed and optimized signal processing algorithms for precise calibration and event detection.
- Automated data analysis and device testing using shell scripts to enhance deployment efficiency.
- Conducted comprehensive unit testing and system integration testing to validate device performance under diverse environmental conditions.
- Worked on embedded system power analysis, ensuring energy-efficient sensor operations.
- Created detailed technical documentation, including system design specifications and user manuals.

Freelance Developer | EION Technologies Pvt. Ltd. July 2023 – Present | Bengaluru, Karnataka
Project: Surveillance Camera

- Designed and maintained embedded software for surveillance cameras utilizing Embedded C/C++.
- Integrated cameras with AWS IoT Core for real-time device management, employing AWS Kinesis, Lambda, and S3 for video storage and analytics.
- Optimized video encoding/decoding algorithms (H.264) for real-time streaming with minimal latency.
- Implemented TLS encryption and secure communication protocols to ensure data integrity and privacy.
- Developed Python automation scripts for testing, debugging, and analyzing camera performance.
- Created JSON-based APIs for remote device control and real-time event notifications.
- Familiar with ARM-based SoCs and debugging tools like Trace32, perf, PMU.
- Conducted unit and integration testing to ensure the reliability of software solutions.

EDUCATION

B.Tech in Electronics and Telecommunications

08/2015 - 06/2019

Bhubaneswar

C. V. Raman College of Engineering

TECHNICAL SKILLS

- **Embedded Programming:** Embedded C, C++, Linux system programming, RTOS.
- **Multimedia Processing:** H.264, H.265, GStreamer, FFmpeg.
- **IoT & Cloud:** AWS IoT Core, MQTT, HTTP, TCP/IP, WebSockets.
- **Linux & Android Kernel Development:** Device Driver Development, Porting Linux/Android onto SoCs.
- **Security & Cryptography:** TLS, Secure Boot, Encryption techniques.
- **SoC Performance & Power Optimization:** Performance modeling on ARM simulators.
- **Development Tools:** GDB, Valgrind, Git, Jenkins CI/CD, Shell Scripting, Trace32, perf, PMU.