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Introduction

6+ Years of Expertise in Embedded Systems & Firmware Development

Core Expertise:-

- RTOS & Microcontrollers: Skilled in FreeRTOS, Zephyr, and various microcontrollers (ESP32, TI, Renesas, NXP).
- IoT & Embedded Solutions: Developed optimized solutions, focusing on latency, power management, and real-time data processing.
- Communication Protocols: Proficient in UART, SPI, I2C, WiFi, BLE, ZigBee, LoRa, NB-IoT.
- System Integration: Experience in cross-functional collaboration to deliver scalable, high-performance projects.

Key Achievements:-

- Optimized Firmware: Reduced latency by 30% in IoT applications.
- System Integration: Successfully integrated systems across multiple platforms, enhancing performance and efficiency.
- Leadership: Led teams in developing end-to-end solutions for IoT and industrial applications.

Professional Milestones:

- Embedded Development: Developed embedded solutions with optimized firmware
- Project Management: Managed cross-functional teams to deliver scalable projects
- Performance Tuning: Reduced system power consumption and latency

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Professional Milestones:

- Embedded Development: Developed embedded solutions with optimized firmware
- Project Management: Managed cross-functional teams to deliver scalable projects
- Performance Tuning: Reduced system power consumption and latency significantly

Skills & Expertise

Core Skills:
- Embedded Programming: Embedded C, C++, Python
- Microcontrollers: ESP32, TI series, Renesas, NXP
- RTOS: FreeRTOS, Zephyr
- Communication Protocols: UART, SPI, I2C, I2S, WiFi, BLE, ZigBee, LoRa, sub-1 GHz, NB-IoT

Additional Expertise:
- IoT Systems: Smart devices, data loggers, automation
- PCB Design & Circuit Analysis
- Sensor Integration & Control Systems
- Optimization: Firmware performance tuning and debugging

Project Portfolio:-

Smart Switch:- Developed intelligent control systems for home automation with touch interfaces and remote management.

Smart Helmet:- Designed safety and communication systems for construction workers, integrating sensors and Bluetooth for real-time data.

Smart Parking:- Created an IoT-based parking system with indoor navigation and QR code scanning for seamless user experience.

Wearable Smart Watch:- Designed wearable technology focused on health monitoring and emergency alert systems for elderly users.

Neo Pixel LED for Programmable Lighting Control:- Developed advanced RGB lighting systems with customizable effects for artistic and functional purposes.

Mini Computer:- Created a compact computing system featuring a Pico projector and laser-based keyboard for mobile computing.

MMWave Sensor-based:- ADAS, 2D/3D People Counting, and Vital Sign Monitoring. Integrated mmWave sensors into ADAS systems for enhanced driver assistance, and developed people counting and vital sign monitoring.

5G-Based Fixed Wireless Access (FWA):-Led the development of a high-speed wireless network system using 5G for fixed locations.

5G-Based Dongle:-Developed a 5G dongle for enhanced mobile internet connectivity.

5G-Based Drone Application:-Designed a high-performance drone system leveraging 5G for low-latency communications and advanced features.

Renewable Energy:- Solar Charging Controller and Multi-Source Input Control. Developed a multi-source controller system for optimizing solar energy usage and integrating different renewable energy inputs.

Data Logger:-Designed a data logging system for tracking environmental conditions in seafood storage and transportation.

Smart Pendrive for Textile Industry:- Created a smart USB device for tracking inventory and managing operations within the textile industry.

Lactic Sensor and ECG:- Developed a medical device for monitoring lactate levels and ECG in pregnant women to ensure their health and safety during pregnancy.

Smart Parking Project

(Industrial-based Solution)

Technologies Used:-

- WiFi
- BLE (Bluetooth Low Energy)
- Indoor Navigation

Benefits:-

- Seamless Parking Experience: Automated entry, slot guidance, and exit process.
- Efficient Space Management: Automated slot assignment and navigation.
- Enhanced Security: QR code-based access control and exit validation.
- Real-Time Navigation Assistance: Accurate, BLE-based indoor navigation.

Key Features:-

Indoor Navigation & Tracing:-

Enables real-time tracking and navigation for workers in complex or hazardous environments. Ensures workers are always on the right path and reduces the risk of getting lost in large industrial spaces.

Safety Sensors Integration:

Oxygen (O2) Sensor:-Continuously monitors oxygen levels, ensuring workers are in a safe breathing environment.

Temperature Sensor:-Detects abnormal temperature changes to prevent heat stress or exposure to extreme temperatures.

Humidity Sensor:-Monitors humidity levels, alerting workers of potentially unsafe or uncomfortable conditions.

Benefits:-

Enhanced safety with real-time environmental monitoring.
Reduced risks in high-risk industries through precise indoor navigation.
Increased worker confidence and productivity.


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