Jorge Hernández Ramos

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Junior developer in constant growth, focused on web backend, C++, IoT, and embedded systems. Experienced in both high-level and low-level environments, from web applications to kernel-level programming. In the backend and web domain, I mainly work with Node, and use technologies like Vite, React, Tailwind CSS, and Astro, integrating CI/CD flows for automation and continuous deployment. In systems and low-level development, I program in C++, Python, and Assembly (ASM), develop for embedded and IoT systems, and have experience in ring 0 programming, including Windows driver development. Although I have limited professional experience in companies, I have invested a great deal of time in personal projects and self-taught learning, acquiring hands-on skills in device programming, web development, and systems management. My approach is to learn quickly, collaborate effectively, and contribute innovative technological solutions with humility and dedication. I seek opportunities to apply my knowledge and grow professionally in dynamic and challenging teams.

PROFESSIONAL EXPERIENCE

IoT Project

ESP32 Device Monitoring and Management System

> This project was developed to provide a comprehensive IoT solution that optimizes monitoring and control of indoor crops such as strawberries, using ESP32 devices and modern technologies like Node.js, MQTT, WebSockets, and advanced security systems, with future integration of artificial intelligence for personalized recommendations.

Key Features and Actions

- Design and implement a backend architecture in Node.js with Express and the MVC pattern, where all business logic is centralized to facilitate system maintenance and scalability.

- Develop a robust authentication system based on JSON Web Tokens (JWT) with automatic token rotation to enhance security and maintain active sessions without compromising integrity.

- Strengthen system security by implementing session fingerprints, preventing impersonation and unauthorized access.

- Integrate an MQTT server for efficient, bidirectional communication with ESP32 devices, enabling real-time data sending and receiving..

- Implement WebSockets to instantly display data captured by sensors (temperature, ambient humidity, CO2, soil moisture) and the status of multiple relays, optimizing the user experience with near real-time information.

- Develop controls for critical cultivation variables, allowing users to activate or deactivate relays that manage irrigation, ventilation, and other actuators.

- Design an AI-based advisor that, using historical and real-time sensor data, provides personalized suggestions to optimize crop performance and reduce environmental impact, promoting more efficient and sustainable farming.

Technologies and architecture used

- Backend: Node.js with Express following the MVC pattern, for a clear and modular structure.

- Security: JSON Web Tokens with automatic rotation and fingerprints to strengthen sessions.

- IoT Communication: MQTT server to channel messages between the backend and ESP32 devices..

- Visualization: WebSockets for real-time data transmission with minimal latency.

- Sensors: ESP32 equipped with sensors for temperature, humidity, CO_2, and soil moisture.

- Actuators: Relays remotely controlled from the platform.

- AI: Data-driven artificial intelligence module for intelligent recommendations.

EDUCATION

(UGR) University of Granada   **Granada, España**
Bachelor's Degree in Computer Engineering (Incomplete).   *June 2017*

ADDITIONAL SKILLS
- Strong knowledge in cybersecurity, including techniques and mitigation of attacks such as Cross-Site Scripting (XSS), SQL injections, Distributed Denial of Service (DDoS) attacks, privilege escalation, brute-force attacks, ARP spoofing, among others.
- Native in Spanish. Fluent in English.