

Ahmed Khadrane

Electronics and Embedded Systems Engineer

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Summary

Experienced and specialized in Embedded Systems, Industrial Automation, Networking Infrastructure, IoT, and Web Development. Passionate about robotics, intelligent technologies, and modern digital solutions. Experienced in designing and developing integrated hardware and software systems that solve real-world industrial and technological challenges. Skilled in firmware development, embedded programming, industrial communication, hardware/software integration, network troubleshooting, system validation, and creating innovative solutions across industrial automation, smart devices, networking infrastructures, robotics, IoT, and web-based applications, with a strong focus on connectivity, real-time systems, and intelligent system integration.

Education

- 2024–2026 **Master's Degree in Electronics and Information Processing**, *University Hassan 2 / FSBM*, Casablanca
- 2021–2024 **Licence en Électronique**, *University Hassan 2 / FSBM*, Casablanca
- 2017–2020 **Baccalauréat Scientifique**, *Abdelmalek Essaadi*, Casablanca

Experience

- 6 mo. | 2026 **Industrial Network Infrastructure and Access Management Intern**, *Pharma 5 Officiel*
Supported industrial network infrastructure, access management, and industrial communication activities in a pharmaceutical environment. Managed user accounts, access rights, and connectivity while providing technical support, diagnosis, and troubleshooting for industrial machines and network equipment. Coordinated interventions with external service providers and industrial machine users to resolve technical issues and maintain operational continuity. Contributed to server management, system monitoring, equipment connectivity, OT/IT integration.
- 4 mo. | 2025 **Electronics & PCB Designer**, *MyPYLI RH*
Developed advanced skills in electronic schematic design and custom PCB layout using KiCad. Implemented projects integrating microcontrollers, sensors, displays, communication interfaces, and data acquisition systems, with efficient server-side data processing and hardware/software integration.

Technical Skills

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| Embedded | Embedded systems, C/C++, Python, firmware development, microcontroller programming, ARM Cortex-M, STM32, RTOS/FreeRTOS, Embedded Linux, GPIO, PWM, UART, SPI, I ² C, ADC/DAC, CAN/CAN-FD, hardware/software integration, real-time systems, embedded debugging. |
| Electronics | Circuit design, analog and digital electronics, PCB layout (KiCad, Proteus, Eagle), signal processing, OLED/LCD/TFT programming, sensors and actuators, motor control (DC, stepper), power electronics, hardware testing and troubleshooting. |
| Industrial Automation | SCADA, HMI, PLC systems, Siemens SIMATIC, SIMATIC Manager, PCS 7, WinCC, CFC/SFC, CEMAT, S7-400H, CPU 410-5H, industrial supervision, Runtime simulation, PLC diagnostics, system validation, migration and standardization. |
| AI & Data | Machine learning (TensorFlow), deep learning, data processing and visualization (Jupyter, Colab), cloud tools, local LLM experimentation, Qwen2.5-Coder, Ollama, Edge AI concepts. |
| IoT | IoT development, sensors, multi-microcontroller systems, MQTT, Modbus RTU/TCP, Ethernet, machine-to-machine communication, Industrial IoT (IIoT), edge computing, data acquisition and transmission, connected monitoring and control systems. |
| Networking | TCP/IP, IPv4/IPv6, TCP/UDP, Ethernet, Wi-Fi, LAN, ARP, DHCP/DNS, VLANs, network segmentation, PROFINET, PROFIBUS, OPC UA, EtherCAT, Modbus TCP, RS232/RS485, industrial Ethernet, network security, network configuration and troubleshooting, Nmap, arp-scan. |

Software	C/C++, Python, JavaScript, TypeScript, Bash, MATLAB, AutoCAD, Quartus, ModelSim, CMake, Make, GCC, KiCad, Proteus, Eagle, Adobe Suite (Photoshop, Illustrator), Git/GitHub, CI/CD, VS Code, PlatformIO, LaTeX, Overleaf, Microsoft Office.
Web Development	Python, PHP, Node.js, JavaScript, TypeScript, HTML5, CSS3, SQL; Flask, Django, Django REST Framework, React, Next.js, Tailwind CSS, REST APIs, frontend/backend development, responsive interfaces, dashboards, and full-stack web development.
Databases	PostgreSQL, MySQL, SQLite, SQL, relational database design, backend/database integration, data management and application data storage.
Linux & Servers	Linux, Embedded Linux, Raspberry Pi OS, Bash, SSH, terminal/CLI, package management, Python virtual environments, Linux networking, system services, NTP/Chrony, VPS deployment and server administration.

Certifications

Networks	CCNA Cisco, HCIA-Datcom: Routing, switching, network security, and industrial communications fundamentals.
AI	HCIA-AI, AI Technology and Application: Machine learning, deep learning, and Huawei AI platforms.
5G	HCIA-5G, 5G Network Architecture: Training on NR, eMBB, mMTC, and URLLC.
Energy/Dev	Digital Power Smart Grids, Python Programming and Scripting, IoT Technology and Applications.
Web Stack	Python, PHP, Node.js, JavaScript, TypeScript, HTML5, CSS3; Flask, Django, Django REST Framework, React, Next.js, Tailwind CSS, REST APIs, and modern full-stack web development practices.

Key Projects

Multi-Protocol SCADA Hub	Built a distributed telemetry platform linking Raspberry Pi nodes with microcontroller-based devices using Modbus RTU and MQTT for live dashboard monitoring, data acquisition, processing, and transmission.
Serial Fieldbus Testing	Validated RS232 and RS485 communication links to confirm reliable long-distance transmission and strong noise immunity, including serial interface configuration, communication testing, and TX/RX troubleshooting.
Sun Tracker	Developed a tracking system using photoresistors and stepper control to optimize solar panel positioning.
Lighting Sys	Designed a motion-sensor-based LED activation system for high energy efficiency.
Sensor Hub	Built a sensor-based station with integrated climate control for environmental monitoring and stability.
Web Services	Developed web-based services and dashboards for connected systems, including data processing, REST APIs, SQL databases, deployment, and interactive responsive user interfaces.
Game Dev	Coded a classic Snake game using stage-based logic and enhanced UI mechanics.

Languages

Arabic	Native
English	C1 Advanced
French	B1 Intermediate