Abdelkhalek Mammeri

Electronics Engineer — Building Automation, Industrial IoT & Embedded Systems

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PROFESSIONAL SUMMARY

Electronics engineer — Licence in Industrial Equipment Electronics (June 2026) — with a practical profile in smart buildings, building automation (BMS/KNX), industrial IoT and embedded systems.

Final-year project delivered a Smart Room management system (graded 19.5/20): an Arduino-based prototype with occupancy sensors and a live web dashboard, extended into a building automation architecture built on ESP32, KNX, MQTT, Node-RED, Home Assistant and edge/server infrastructure (ZimaBoard, Proxmox, Docker, Linux).

Industrial internship at SAEGD provided exposure to SCADA systems and industrial automation environments.

Projects cover the full chain — electronics, embedded firmware, communication protocols, automation platforms and web dashboards (React, TypeScript) — with working code published on GitHub.

TECHNICAL SKILLS

Electronics & Embedded Systems: Electronics, Arduino, ESP32 / ESP32-S3, Microcontrollers, Sensors, Embedded systems, Hardware/software integration

Industrial Automation: Industrial automation, Control systems, PLC concepts, SCADA, Automation logic, Industrial communication

Smart Building / BMS: KNX, ETS6, Building automation, BMS, Smart buildings, Lighting control, Blind/shutter control, HVAC concepts

IoT & Communication: MQTT, WebSockets, REST APIs, IoT, Industrial IoT, Edge computing, Connected devices

Automation Software: Node-RED, Home Assistant, Mosquitto MQTT, Docker

Infrastructure: Linux, Proxmox VE, Virtualization, ZimaBoard

Web Development: HTML, CSS, JavaScript, TypeScript, React, Vite, Tailwind CSS, Git, GitHub

Computer Vision: Python, OpenCV, MediaPipe

PROJECTS

Smart Room — Room Management System — *Final Year Project — graded 19.5/20*

- Built the final-year smart room prototype: dual occupancy detection (PIR motion + ultrasonic) on Arduino, with live room status and manual light control streamed to a web dashboard via a Node.js server (USB serial bridge, WebSocket/HTTP updates).
- Extended the prototype into a building automation architecture: ESP32 nodes, KNX (ETS6) and Shelly devices, MQTT messaging, Node-RED automation flows, Home Assistant dashboards, and edge/server infrastructure on ZimaBoard (Proxmox, Docker, Linux).
- Covers the full chain — sensors → microcontrollers → KNX/MQTT → edge infrastructure → automation logic → user dashboard — integrating hardware, firmware and software.

Technologies: Arduino, ESP32, HC-SR04, PIR, LCD, WS2812, Node.js, WebSockets, KNX, ETS6, Shelly, MQTT, Node-RED, Home Assistant, ZimaBoard, Proxmox, Docker, Linux

GitHub: github.com/Ab40D/Smart-Room-Management-System-prototype

Smart Building & Room Dashboard — *In progress*

- Developing a centralized home-lab dashboard for building management: room/device overview, real-time occupancy tracking and energy monitoring across the KNX, MQTT, ESP32 and Shelly ecosystem.
- Defined the architecture — React/TypeScript/Tailwind frontend with WebSocket/REST data layer, Mosquitto MQTT broker, Node-RED flows and Home Assistant integration — documented in the repository.

Technologies: React, TypeScript, Tailwind CSS, WebSockets, REST APIs, MQTT, Node-RED, Home Assistant, KNX, ESP32, Shelly

GitHub: github.com/Ab40D/smart-building-dashboard

AI Hand-Gesture Control for Smart Home Automation

- Built a real-time computer vision application (Python, OpenCV, MediaPipe Hands) that recognizes open-hand/closed-fist gestures from a webcam and toggles smart-home devices via the Home Assistant REST API.
- Gesture detection triggers Home Assistant service calls (e.g., Shelly relay) on the local network — no cloud dependency.

Technologies: Python, OpenCV, MediaPipe, Home Assistant REST API, Shelly

GitHub: github.com/Ab40D/AI-Hand-Gesture-Control

KNX ↔ Shelly Lamp Control

- Implemented a KNX bus to Shelly relay integration for ON/OFF lamp control: KNX push button → KNX IP Interface (KNXnet/IP) → bridge → Shelly relay HTTP commands.
- Applied the BMS retrofit pattern: extending an existing KNX installation with low-cost Wi-Fi IoT actuators without replacing bus wiring or reprogramming ETS.

Technologies: KNX, KNXnet/IP, ETS6, Shelly, HTTP / REST
GitHub: github.com/Ab40D/knx-shelly-lamp-control

IoT MQTT Command System

- Built an end-to-end IoT command pipeline: commands sent from a Node-RED dashboard are published over MQTT (Mosquitto) and executed on an Android device via Tasker + Termux (demo: music control; generic and extendable).
- Deployed on home-lab edge/server infrastructure: Node-RED on ZimaBoard 832, MQTT broker in an LXC container on Proxmox VE.

Technologies: MQTT, Mosquitto, Node-RED, ZimaBoard, Proxmox VE, LXC, Linux, Tasker, Termux
GitHub: github.com/Ab40D/iot-mqtt-command-system

Additional Projects

- Smart Light Control — Tasker + Home Assistant REST API + Shelly relay: room-light automation based on phone screen state, 100% local — github.com/Ab40D/Smart-Light-Control-Using-Tasker-and-Home-Assistant
- Se7enX Player — browser-based local music player (drag-and-drop, multi-format, 5-band EQ, playlists) — github.com/Ab40D/SE7ENX-Player-Premium-Local-Audio-Experience
- Personal portfolio website (HTML/CSS/JS) + React/Vite portfolio app — github.com/Ab40D/Abdelkhalek-Mammeri

EDUCATION

Licence in Electronics — Industrial Equipment Electronics
[UNIVERSITY] — Algeria | Graduated June 2026
Final Year Project: “Réalisation d’un système de gestion des salles – Smart Room” (Smart Room management system) — grade 19.5/20

EXPERIENCE & INTERNSHIP

Industrial Internship — SAEGD — El Bayadh, Algeria
2025

- Industrial internship with exposure to SCADA systems and industrial automation environments.

CERTIFICATIONS & TRAINING

Meta Full Stack Developer — Meta — completed
Google IT Support — Google — completed
Responsive Web Design — freeCodeCamp — completed
Node-RED Fundamentals — completed
Node-RED Advanced — completed
KNX / ETS eCampus training — KNX Association — completed
Design of Power Distribution for Highrise Building — L&T EduTech — completed

LANGUAGES

Arabic: Native
French: B1
English: Improving toward C1