Omar ALIBI

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Profile

- Electrical Engineering student at ENIT specializing in Advanced Reconfigurable and Real-Time Microelectronic Systems, and currently pursuing a Master of Science in Information System Techniques. Passionate about FPGA design, AI, embedded systems, and IoT, with hands-on experience in firmware development, mobile applications, and connected smart solutions. A fast, self-driven learner who enjoys exploring cutting-edge technologies and contributing to innovative, challenging projects.

Technical Skills

Embedded Systems & Electronics
- Arduino, ESP32/8266, STM32, Raspberry Pi, BeagleBone, Jetson Nano, Zybo Z7
- UART, SPI, I2C, CAN
- ModelSim, QuestaSim, Eagle PCB, PSpice, PSIM, ADS, LTSpice, Cadence
- C, C++, Rust, VHDL

IoT, Automation & Data
- MQTT, WebSocket, Node-RED, Grafana, MATLAB

Software & Web Development
- Python, JavaScript, HTML/CSS, SQL
- React, Next.js, Node.js, Electron.js
- Firebase, Supabase, MongoDB, Git/GitHub, Docker, Linux, VPS
- Active GitHub with open-source and personal projects (embedded, IoT, web)
- Full-stack web development: production websites (ashe.tn, youandme.tn), REST APIs, authentication, deployment

Professional Experience

Engineering Intern, OnWireWay *(June – July 2025)*
- Developed ESP8266 C++ firmware with an embedded web server, REST API, and automated solar-time scheduling for smart IoT control.
- Built a cross-platform Flutter app with Firebase (auth, Firestore), enabling QR-based provisioning and remote MQTT device management.

Technical Intern, STEG *(July 2024)*
- Conducted comprehensive analysis of electrical installations and distribution networks; performed preventive maintenance and troubleshooting on industrial equipment to ensure operational reliability and safety compliance.

Technical Projects

RISC-V System-on-Chip Implementation in VHDL
- Designed and implemented an RV32I SoC with AXI4, memory, UART/GPIO peripherals, and a custom coprocessor; verified in QuestaSim and deployed on Xilinx FPGA.

Real-Time Edge Detection on FPGA (Deriche Filter)
- Implemented a complete real-time edge detection pipeline on the zynq 7000 FPGA board, including Deriche recursive smoothing (1st and 2nd order filters) and gradient-based contour extraction; optimized architectures through critical-path reduction, bit-width minimization, and interlaced filter designs for high-frequency operation.

Real-Time DC Motor Control on BeagleBone Black
- Implemented a real-time DC motor speed control system on the BeagleBone Black using embedded RT Linux and a custom kernel module, integrating ADC feedback, encoder measurement, PWM generation, and a PID controller to achieve stable and responsive closed-loop speed regulation.

Inertial Navigation of a Drone (IMU Fusion)
- Implemented an IMU with sensor fusion using EKF on an STM32 with a custom Qt/C++ simulation environment.

IoT Dashboard for Connected Machines
- Built a real-time industrial monitoring dashboard using Electron, MQTT, JWT auth, WhatsApp alerts (Twilio), and automated PDF reporting.

Real-Time Sign Language Translation System with Deep Learning
- Developed and deployed an edge-based AI system on the NVIDIA Jetson Nano for real-time sign language interpretation, using MediaPipe/OpenCV for precise hand tracking, a TensorRT/CUDA-optimized MLP for high-speed gesture recognition, and a PyQt5 interface enabling seamless video-to-text translation.

Multi-Threaded Real-Time Embedded System
- Designed a FreeRTOS STM32 system integrating OLED, USB HID, and ESP8266 with concurrent tasks for email, computation, and mini-games.

STM32 Digits classifier
- Created a Real-time handwritten digit recognition using neural networks on STM32 microcontroller. Draw digits in a desktop GUI and get instant predictions powered by on-chip AI inference with X-CUBE-AI.

Multimodal AI Voice Assistant with Vision Capabilities
- Built a sophisticated multi-threaded voice assistant in Python combining offline Vosk speech recognition, Piper neural text-to-speech synthesis, BLIP vision-language model for image understanding, and LangChain framework with Ollama LLM for context-aware conversational AI with multimodal input processing.

PCB DC Motor Speed Control System
- Designed and simulated a closed-loop motor control circuit using Eagle PCB and PSpice, incorporating voltage regulation, PWM generation, and feedback control for precise DC motor speed management and stability.

Education

National Engineering School of Tunis (ENIT) *(Present)*
- Master of Science in Information System Techniques

National Engineering School of Tunis (ENIT) *(2023 - Present)*
- Engineering Degree in Electrical Engineering - Advanced Reconfigurable and Real-Time Microelectronic Systems

Preparatory Institute for Engineering Studies El Manar *(2021 - 2023)*
- Successfully admitted through National Engineering Schools Entrance Examination 2023

Carthage Présidence High School, Baccalaureate in Technical Sciences *(2019 - 2021)*
- Graduated with Highest Honors (17.43/20)

Languages

- Arabic (Native), English (B2), French (B2)

Leadership & Extracurricular Activities

Securinets ENIT *(2025)* - Founding Member
ENIT Junior Enterprise *(2023 - 2025)* - Online mission head
Fablab ENIT *(2023 - 2025)* - Senior Member
INJAZ Company Program - Econics *(2024)* - Marketing Manager
Ashe - Clothing Brand Owner