Jaafer Ben Romdhan

FINAL-YEAR MECHATRONICS AND EMBEDDED SYSTEMS ENGINEERING STUDENT

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ACADEMIC BACKGROUND

Engineering Cycle in Mechatronics – ENICarthage — *2023 – Present*
Preparatory Classes – Mathematics and Physics – IPEIM — *2021 – 2023*

PROFESSIONAL EXPERIENCE

Sofiatech – Engineering Internship — *July 2025 – August 2025*

- Designed and developed an automated calibration tool in Python for multi-protocol IoT boards (LoRa, LoRaWAN, ZigBee).
- Built a modern graphical interface using PyQt6 for dynamic parameter configuration via UART communication.

Opus Lab – Summer Internship — *July 2024 – August 2024*

- Development of a Full-Stack MERN web application (Netflix Clone)

PERSONAL PROJECTS

- **Smart Home Automation System – STM32 + FreeRTOS (IoT & Real-Time Embedded):**

Designed a real-time home automation system on **STM32F407** using **FreeRTOS** for multitask management :

- Implemented control of **RGB lighting**, intrusion detection, and intelligent ventilation.
- Integrated environmental sensors: temperature, light, motion, humidity.
- Implemented communication protocols: **UART** (**Wi-Fi, Bluetooth**), **I²C** (multi-sensor readings), **SPI** (**flash memory or TFT screen interface**).

- **Parkinson AI (AI + Computer Vision):**

Detection of Parkinson's disease from spiral and wave drawings:

- Image processing using **OpenCV** for feature extraction.
- **CNN** model development with **data augmentation** and **early stopping**.
- Integrated into a **React** + **FastAPI** web interface for live testing.

- **Bare-Metal Driver Development – STM32:**

Development of embedded drivers in **C** for **STM32**.

- Design and full implementation of **GPIO**, **I²C**, **SPI**, and **UART** modules.
- Direct manipulation of hardware **registers** and deep understanding of the **STM32 architecture**.
- Management of **interrupts**, **timing**, and **low-level** hardware **synchronization**.

CERTIFICATIONS

- **Embedded Software and Hardware Architecture – University of Colorado Boulder (Coursera) :** Hardware/software architecture understanding, memory management, CPU organization.
- **Mastering Microcontroller and Embedded Driver Development – Udemy :**
  Bare-metal development in C for STM32.
  Implementation of low-level drivers (GPIO, I2C, SPI, UART, USART).
- **Microcontroller Embedded C Programming: Absolute Beginners to Advanced – Udemy :**
  Embedded C programming applied to microcontrollers.
  Management of registers, interrupts, and timers.

TECHNICAL SKILLS

Languages : C, C++, Python, Embedded C | **Microcontrollers:** STM32 | **IDE :** STM32CubeIDE | **RTOS** : FreeRTOS | **Communication :** UART, SPI, I²C | **GUI :** PyQt6 | **Tools :** Git/GitHub

LANGUAGES

ANGLAIS(C1) FRANCAIS(B2)

ASSOCIATIVE LIFE

- Melkart Junior Enterprise – ENICarthage: Treasurer (2024–2025)
- GMCx – GoMyCode: Training and digital project practice