salsabil hachem Mechatronics Engineering Student

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Profil

Mechatronics student specializing in robotics and industrial automation. Experienced in robotics (ROS, Gazebo, SolidWorks) and automation systems (Ladder logic, EtherCAT, MQTT). Seeking to apply my skills in industrial automation and robotic systems to a challenging PFE internship.

Professional Experience

Robotics Intern, *Ktix-Lab* 06/2025 – 08/2025
Sousse, Tunisia

- Developed and implemented a **real-time C++** control system for industrial robot servo-drives using the **EtherCAT** protocol.
- Engineered a deterministic control loop on a **PREEMPT-RT Linux** kernel using a **Raspberry Pi**.
- Configured PDO mapping and **DS402** state machines for precise speed and position control.
- *Technical Stack*: *C++, EtherCAT, Embedded Linux, Raspberry Pi, DS402, Debugging, Agile.*

Robotic Design Engineer - Academic Project, *Ktix-Lab* 03/2025 – 05/2025
Sousse, Tunisia

- Designed and dimensioned a 5-axis robot using **SolidWorks** through rigorous analysis.
- Optimized the mechanical design, reducing production costs by **30%**.
- Simulated cable routing in SolidWorks and implemented homing procedures with reference frames.

Mechatronics Intern, *XPERT-MECA* 06/2024 – 07/2024
Sousse, Tunisia

- Assembled special machines and installed electrical control cabinets.
- Managed component inventory and performed quality control tests.
- Applied 5S methodology for workplace organization.

Technical Skills

Programmation: Python (Expert) • C++ (Intermediate) • Java • ROS2 • C • MATLAB • PLC Ladder • HTML/CSS • Programmation Orientée Objet | **Tools:** Git • Docker • Linux • SolidWorks • Cura Ultimaker • MATLAB/Simulink • OpenCV • Rasberry Pi • ESP32 • CNC | **AI:** Machine Learning • LLM • NLP • Deep Learning • Reinforcement Learning • Computer Vision | **Methodologies:** Agile Methodology • Technical Leadership • Teamwork

Education

Diploma in Mechatronics Engineering, *National Engineering School of Sousse* 2023 – 2026
Coursework: *Robotics, System Control, Automation, Power Electronics, Sensors & Instrumentation, Mechanical Design.* Sousse, Tunisia

Preparatory Cycle for Engineering Schools, *Ipeik* 2021 – 2023
Coursework: *Applied Mathematics, Fundamental Physics, Engineering Sciences, Solid Mechanics.* Kairouan, Tunisia

Projects

EduBot Autonomous Navigation with Nav2 09/2025 – Present

- Implemented an autonomous navigation system using ROS2 Nav2, optimizing Behavior Trees for efficient path planning.
- Developed a web-based control interface via WiFi for remote robot operation.

Franka Robot - Reinforcement Learning Control 10/2025 – 11/2025

- Developed RL algorithms for using MoveIt and ROS2
- Trained RL agents for pick-and-place tasks using PyTorch/TensorFlow

Agent LLM ROS2 avec Ollama 09/2025 – 10/2025

- Engineered a ROS2 agent integrating the Ollama LLM to process natural language commands.
- Enabled autonomous execution of robotic tasks through intuitive voice or text input.

Mobile Robot Design & Fabrication 09/2024 – 01/2025

- Designed and fabricated a mobile robot using SolidWorks, involving complete mechanical dimensioning and mechatronic integration.

Traffic sign detection 10/2024 – 12/2024

- Developed a detection model using OpenCV, implemented on a Raspberry Pi 3

Certifications

- 2025 ROS 2 Concepts - Basics (Level 1), Udemy
- 2024 Application of Al for Predictive Maintenance, NVIDIA
- 2024 Fundamentals of Deep Learning, NVIDIA
- 2024 Building Transformer-Based Natural Language Processing Applications, NVIDIA

Languages

French: B2 | **English:** B2 | **Arabic:** Native