

Aymen Mabrouk

AI Engineer | Computer Vision & LLM Architect

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🌐 Aymen Mabrouk

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ABOUT ME

AI Engineer with a dual background in Software Engineering and Data Science, specializing in **Computer Vision** and **Generative AI**, with strong proficiency in **Software Engineering**. Expert in the full AI lifecycle from **data curation, cleaning, and model training** to deploying scalable solutions on Cloud (Azure/AWS/OCI) and Edge devices. Master of **OpenCV** and **YOLO** workflows, combined with advanced **NLP skills** and **Agentic RAG systems** to build intelligent systems. Proven ability to architect production-grade software utilizing **MCP** and robust coding standards to turn complex algorithms into reliable products.

EDUCATION

Polytechnique 🌐, *Engineering in Data Science & AI*

Sep 2024 – Jun 2026 | Sousse

ISIMM 🌐, *Master's in Software Engineering*

Sep 2023 – Oct 2025 | Monastir

ESSTHS 🌐, *Bachelor's degree in Computer Science*

Sep 2020 – Jun 2023 | Sousse

PROFESSIONAL EXPERIENCE

SeekMake 🌐, *AI Engineer — 3D Generative AI & Text-to-3D Systems*

Feb 2026 – Present | Tunisia | Remote

- Led the integration of a **Text-to-3D system** into the **SeekMake ecosystem**, enabling users to generate **3D models from prompts** and refine results through follow-up requests.
- Built an **intelligent query router** that interprets user prompts and selects the right workflow: **Text-to-3D generation, Text-to-CAD creation, 3D library retrieval, Blender scene editing, or model repair**.
- Connected the agent to **Gemini LLMs, MCP, Blender, Trellis 2, Rodin3D, and 3D model libraries** to support generation, editing, retrieval, and repair workflows.
- Integrated a **Qdrant-based RAG database** containing **Blender API documentation**, enabling the agent to retrieve accurate context for Blender code execution and **reducing hallucinations** in generated workflows.
- Built a **Text-to-CAD pipeline** for **parametric mechanical part generation**, including brackets, enclosures, fixtures, and manufacturing-ready components.
- Developed **3D printability analysis** features including geometry, wall thickness validation and automated mesh repair & orchestrated **Docker-based microservices** with **Redis** and **Celery** to process tasks asynchronously.

Tech: Python, FastAPI, Blender MCP, Trellis2, LLMs, RAG, Text-to-3D/CAD, Angular, Three.js, Docker, Redis, Celery

ByteClick 🌐, *Freelance AI Automation Engineer*

Jul 2025 – Jan 2026 | Germany | Remote

- Devised and deployed **AI automation pipelines** using n8n and multiple **LLMs** (OpenAI, Claude, Gemini) for intelligent document and **invoice processing**.
 - **Developed Intelligent OCR pipelines**, combining **Computer Vision** pre-processing with LLMs to clean and extract structured data from complex invoice layouts and Wrote highly efficient Python scripts for data parsing.
 - Orchestrated an automated **SharePoint integration** to send structured invoice data directly to client Office SharePoint repositories.
 - Architected end-to-end **RAG-enabled systems** with LangChain and vector databases
 - **Developed Intelligent OCR pipelines** combining **Computer Vision** pre-processing, LLMs, and a **human-in-the-loop** verification system to clean, validate, and extract structured data from complex invoice layouts.
 - Unified custom **SaaS workflows** (billing, CRM, ERP) to streamline business operations and **reduce manual effort**
- Tech:** n8n, LangChain, LLMs, RAG, REST APIs, Vector Databases, Docker, Azure, Cursor, Lovable

LEONI 🌐, *AI & Full Stack Engineer (Intern)*

Feb 2025 – Aug 2025 | LEONI TNS

- Developed an **access management platform** for **500+ employees and vehicles**, featuring **real-time tracking**, alerts, and analytics to improve operational efficiency and campus security.
 - Built a **Next.js web portal** for administration and **analytics**, enabling live system monitoring across **12+ critical endpoints** and **Flutter mobile app** with **NFC/QR Code attendance**, improving check-in speed by **40%**.
 - Integrated **AI Vision Suite**, a **computer vision-based parking automation system** for **vehicle plate recognition** and **ID card extraction** and automated vehicle entry/exit registration.
 - Deployed **OpenVINO-accelerated object detection models** with **Python** and **Flask APIs** to automate recognition workflows and reduce manual errors.
 - Led a secure **microservices architecture** using **gRPC** and **JWT-based security**, improving scalability and reliability within an **Agile/Scrum** framework.
 - Achieved a **30% reduction in vehicle entry time** and **15% improvement in space allocation efficiency**.
- Tech:** Next.js, Flutter, PostgreSQL, Node.js, Python, OpenVINO, TensorFlow, Flask, gRPC, JWT, NumPy, Pandas

Freelance Software Developer

Jun 2024 – Nov 2024 | Sousse

- Crafted responsive product pages using Next.js with **SSR** and **API integrations**, improving real-time data updates and boosting page load speed by **35%**.
- Deployed a conversational AI assistant leveraging **LLMs** and **RAG** for personalized customer interactions, increasing user engagement by **20%**.
- Produced reusable UI components, accelerating development by **25%** and **improving maintainability**.
- Delivered optimized and responsive **cross-device** user experiences, contributing to a **20%** increase in user engagement and ensuring **alignment with client** brand identity.

Tech: Next.js, React, Tailwind CSS, API, SSR, WIX, LLMs, RAG

SKILLS

Soft Skills

- Proactive & Self-Motivated
- Technical Analysis & Collaboration
- High Attention to Detail
- Passion for R&D
- Agile Methodologies
- Quality-Driven Delivery
- Collaborative Problem-Solving & Teamwork

Technical Skills:

- **AI & Data Science:** Python, R, FastAPI, SQL, Machine Learning, Deep Learning, LLMs, RAG, LangChain, NLP, GenAI, PyTorch, TensorFlow, Scikit-learn, CatBoost, OpenCV, Pandas, NumPy, MLOps
- **Backend & Databases:** Node.js, Flask, REST APIs, PostgreSQL, Firebase, MongoDB, Vector Databases
- **Frontend & Mobile:** React.js, Next.js, *React Native*, Flutter, Dart, Tailwind CSS, C++, Vuejs
- **DevOps & Tools:** Docker, Git, n8n, CUDA, LandingAI

CERTIFICATES

- OCI Data Science Professional
 - Azure AI-900
 - NVIDIA Fundamentals of Deep Learning for Computer Vision
- OCI Generative AI Professional
 - Cisco CyberOps Associate Certification

LANGUAGES

English	● ● ● ● ●	French	● ● ● ● ●
Arabic	● ● ● ● ●	German	● ● ● ● ●

PROJECTS

TuniJuris-AI – Enterprise Legal & Financial Intelligence System

- **Hybrid Multi-Agent RAG:** Architected a "Virtual Law Firm" utilizing **Mixture of Experts (MoE)** to route queries across 15 specialized agents (Legal & Finance). Utilized **Hybrid Search (Dense Embeddings + Sparse BM25)** to index **180+ PDFs (5000+ pages)** delivering citation-backed answers in AR/FR/ENG with **94.2% precision**.
- **Expert-Level Interaction:** Engineered an experience mirroring a **senior lawyer or certified accountant**, by using a **semantic router** to direct intents to specific vector stores, providing responses **strictly grounded** in official texts. Achieved **94.2% precision** with **advanced prompt engineering**, effectively eliminating hallucinations.
- **Cloud & DevOps:** Deployed on **Google Cloud Platform (GCP)** with **GitHub Actions** for CI/CD, ensuring scalable, enterprise-grade performance and automated workflows for the published research system.

Tech: Python, LangChain, Hybrid RAG, RAGAS, Gemini, TTS, STT, Vector DBs, GCP, GitHub Actions, NLP, PERN.

Tennis & Padel Analysis

- Spearheaded an **integrated AI** system for automated tennis and padel match analysis combining **deep learning**, **computer vision**, and **data science** pipelines.
- **End-to-End Vision Pipeline:** Engineered an automated match analysis system combining **TrackNet (U-Net)** for 95%+ ball tracking and **Faster R-CNN** for precise player detection.
- **Event & Spatial Intelligence:** Optimized **CourtKeypointNet** (+8% accuracy) for homography mapping and applied **CatBoost** for robust shot **event classification**.
- **High-Performance Analytics:** Computed real-time heatmaps and movement stats using **Pandas/NumPy**, training models on **CUDA GPUs** with **Albumentations** for data robustness.
- Spearheading development of a **mobile application** to provide real-time, on-court access to analytics.
- Published and awarded Best **Project of the Semester**

Tech: Python, PyTorch, OpenCV, NumPy, Pandas, Albumentations, CatBoost, scikit-learn, CUDA

AeroGuard – Intelligent Engine Prognostics (Predictive Maintenance)

- **Hybrid RUL Prediction:** Engineered a unified model fusing **Survival Analysis (Cox Proportional Hazards)** with **XGBoost**, achieving a **63% accuracy improvement (RMSE 18.64)** on high-dimensional NASA C-MAPSS data.
- **Multi-Regime Forensics:** Utilized **K-Means Clustering** and statistical signal processing to disentangle complex sensor dynamics, successfully **isolating distinct failure modes** across operating regimes.

Tech: R, Tidyverse, XGBoost, Survival Analysis (Cox PH), K-Means, Quarto, Statistical Modeling.