

Kacem Mathlouthi

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Education

National Institute of Applied Science and Technology (INSAT)

Engineering Degree in Software Engineering

Sept 2022 – May 2027

Experience

Software Engineer

Callab AI (YC P26)

On Site

Jun 2025 – Present

- Shipped features **end to end** across backend, AI, frontend and DevOps, and owned production systems in a multi-service platform, delivering dozens of features and resolving production incidents and bugs.
- Built the **Omnichannel AI Agent** serving Slack, Telegram, Teams, WhatsApp and web, with **human-in-the-loop** approvals, a flow engine, long-term memory, scheduled tasks, knowledge-base retrieval, MCP tools and skills, and conversation compaction.
- Delivered **human call supervision** end to end, letting operators watch live calls, listen in and take over from the AI agent mid-conversation, with agents escalating to a human when they cannot resolve a call.
- Built an **in-product AI assistant** that answers product questions and drives the app for the user, reading and acting on the live **DOM** through a browser tool family, so it can navigate, fill and complete tasks on the user's behalf.

Google Summer of Code Developer

NRNB (National Resource for Network Biology)

Remote

May 2025 – Sep 2025

- Collaborated with the VCell team to develop and deploy **VCell-AI**, an AI agent platform with **tool calling** capabilities, built on a **Next.js** frontend and **FastAPI** backend, enabling researchers to query, explore, and create biological models.
- Integrated **RAG** system using **Qdrant** to provide contextual information about VCell software, tutorials, and guidelines, with **LLM observability** via **Langfuse** to track agent interactions, monitor performance, and improve reliability.
- Enabled AI agent to analyze diagrams and VCML files using multimodal capabilities, supporting biological model interpretation.

Machine Learning Engineering Intern

Orange

Tunis, Tunisia

Aug 2024 – Oct 2024

- Developed lightweight **CNN model** for plant disease classification optimized for **edge devices** using **knowledge distillation**.
- Built **AI agentic workflow** for automated report generation, streamlining data collection, analysis, and research extraction.
- Achieved **4th place** in Orange Summer Challenge, pitching the solution to both technical and non-technical stakeholders.

Publications

Generalization Measures under Controlled Covariate Shift: A Regime-Aware Benchmark

Accepted at Transactions on Machine Learning Research (TMLR), 2026

[OpenReview](#)

- Evaluated 40+ generalization measures on CIFAR-10-C/P under controlled covariate shift, finding that predictivity is strongly regime-dependent and that IID performance does not reliably transfer to distribution shift or model selection.

Projects

Animus: TypeScript, React, Hono, Bun, AI SDK, Daytona, Manim, PostgreSQL, R2

[Live](#) | [GitHub](#)

- Built and deployed an interactive AI agent that researches topics and iteratively writes, renders, diagnoses, and repairs narrated explainer videos in persistent Daytona sandboxes.
- Engineered a tool-calling workflow with ElevenLabs narration, FFmpeg music mixing, R2 storage, and public share links.

Metis AI: FastAPI, React, Celery, Redis, PostgreSQL, GitHub App, GCP

[GitHub](#)

- Built and deployed a full-stack **GitHub App** that automates pull request reviews using **AI agents** in a sandboxed environment.
- Designed asynchronous processing with **Celery + Redis** for webhook-driven review workflows and issue-to-PR coding tasks.

Achievements

1st place at Orange x Hexabot Conversational AI Hackathon

[devpost/x2x-Submission](#)

- Built extensions for Hexabot visual editor, enabling multimodal capabilities like text-to-speech, speech-to-text, and vision.

2nd place at IEEE TSYP 12 CS Technical Challenge

[Smartshield-INSAT](#)

- Earned 2nd place at the Tunisian Students and Young Professionals Computer Science Challenge by creating an AI-powered platform for automated cybersecurity threat detection and response, Smartshield.

Volunteering

Technical Manager

Artificial Intelligence National Summit 3.0 (AINS)

[AINS 3.0](#)

Dec 2024 – Jun 2025

- Led AINS 3.0 for IEEE Computer Society INSAT SBC: designed a three-track hackathon, organized a data science competition, coordinated speaker talks and panels, and co-organized four hands-on workshops spanning NLP and computer vision.

Technologies

Languages: Python, TypeScript, Go, SQL

Tools & Technologies: Git, Linux, Docker, Kubernetes, NGINX, AWS, GCP, PostgreSQL, MongoDB, Redis, Qdrant, Vector Databases, React, Next.js, FastAPI, Express.js, Hono, Bun, Celery, PyTorch, AI SDK, MCP, RAG Systems, Langfuse