Fedi Hassine

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EDUCATION

Pre-Engineering Program *October 2023 - May 2025*
Higher Institute of Computer Science and Multimedia of Sfax,Tunisia Sfax, Tunisia
- Relevant Coursework: Algorithms; Mathematics; Competitive Programming; Operating Systems

Baccalaureate in Mathematics *Sep 2019 – Jun 2023*
Taher Sfar High School *Mahdia, Tunisia*
- Final Grade: 15.93 / 20 (Good Grade)

PROJECTS

Smart Grid Failure Prediction Using Deep Learning *Jan 2025 – Apr 2025*

- Developed a deep learning model to predict potential failures in smart grids using real-time sensor data and historical incident logs.
- Utilized LSTM (Long Short-Term Memory) neural networks for time-series prediction, achieving over 90% accuracy in identifying early failure signs.
- Implemented using Python, TensorFlow, and Pandas, with a dashboard for visualizing predictions and aiding utility teams in decision-making.
- Presented as part of the TSYP 25 event, showcasing innovation in sustainable tech and AI applications.

Energy-Harvesting Wearables – Bracelet & Shoe Prototypes *Nov 2024 – Jan 2025*

- Designed and prototyped two wearable devices that generate electricity from environmental and human activity:
  - Thermoelectric Bracelet: Converts temperature gradients (body heat vs. ambient air) into usable electrical energy using Peltier modules.
  - Piezoelectric Shoe: Captures kinetic energy from walking to power small electronics or sensors.
- Prototypes featured at TSYP 25, demonstrating practical applications of energy harvesting in wearable tech.
- Built with Arduino, piezo sensors, and custom 3D-printed designs, with plans for future IoT integration.

AI-Powered Agricultural Assistant – Chatbot for Farmers *Mar 2025 – May 2025*

- Built an intelligent chatbot designed to assist farmers in choosing the most suitable crops based on real-time soil measurements such as pH, moisture, and nutrient levels.
- Integrated AI models trained on agricultural datasets to suggest optimal crops and provide alerts for potential soil imbalances or recommendations for soil treatment.
- Used Natural Language Processing (NLP) and Dialogflow to create a user-friendly conversational interface that supports Arabic and French.
- Designed for deployment via mobile or web platforms, with plans for IoT sensor integration in future versions.

AIAvatarKit – Real-Time Voice Agent Framework for Multimodal Interaction **Jul 2025 – Present**

- Developed a modular, speech-to-speech conversational AI framework supporting multimodal input/output for real-time interaction in metaverse platforms and standalone applications.
- Integrated components such as Voice Activity Detection (VAD), Speech-to-Text (STT), Large Language Models (LLM), and Text-to-Speech (TTS), with support for providers like Google, OpenAI, Azure, and VOICEVOX.
- Enabled ultra-low latency communication using WebSocket and Server-Sent Events (SSE), with extensibility for edge devices (e.g., Raspberry Pi) and telephony services (e.g., Twilio).

- Designed the system to be AI agent-native, supporting dynamic tool calls and progress-aware operations for complex task execution.
- Maintained compatibility with platforms like VRChat, Vket Cloud, and custom applications through a unified backend interface.

n8n-Puppeteer Node – Browser Automation for Web Scraping and Testing

- Developed a custom n8n community node leveraging Puppeteer to enable advanced browser automation within no-code/low-code workflows.
- Implemented operations such as automated login, authenticated session persistence using cookies, web scraping, and PDF/screenshot generation.
- Supported execution of custom scripts with full access to Puppeteer's API and n8n's Code node, enabling flexible automation scenarios across headless or remote browser setups.
- Designed for production-ready deployments using Docker, including support for remote Chrome instances (via WebSocket) and stealth mode for anti-bot evasion.
- Enabled proxy support, binary data handling, and automated interactions with dynamic web content, improving testability and automation of modern web applications.

Canvas PDF Merger – Automated Lecture Notes Aggregator **Feb 2025 – Mar 2025**

- Built a Python tool to automate the retrieval and merging of lecture notes from Canvas LMS into a single, well-organized PDF document.
- Implemented dynamic file collection across multiple courses/modules using Canvas API, supporting flexible authentication via environment variables.
- Designed for reusability and ease of deployment, enabling students to consolidate class materials efficiently for offline review and long-term archiving.
- Improved accessibility and productivity by centralizing scattered course documents into a structured, single-file format.

GenAI Workflow Hub – Community Platform for Intelligent Automation **Jun 2025 – Present**

- Collaborated on a community-driven platform built with Next.js, TypeScript, and TailwindCSS, delivering a fully custom UI/UX designed from scratch.
- Integrated 7+ GenAI-powered automations to streamline common creative and academic workflows, including a Gemini-based assignment generator and reviewer.
- Connected Figma's API to generate on-demand design-to-PDF exports and embedded real-time web crawlers for live content insights.
- Designed for extensibility and innovation, with an open beta inviting users to co-create and explore next-gen productivity tools.

Crypto Price Predictor – Serverless ML API for Financial Forecasting **Mar 2025 – Apr 2025**

- Built and deployed a serverless Machine Learning pipeline to forecast cryptocurrency price movements using real-time data.
- Trained baseline and advanced ML models with CometML for experiment tracking, hyperparameter tuning, and model registry integration.
- Deployed the final model as a scalable REST API via Cerebrium, eliminating infrastructure management and ensuring production readiness.
- Automated the CI/CD pipeline using GitHub Actions to enable safe, continuous model updates from the registry to deployment.
- Designed as a practical MLOps project to demonstrate modern ML lifecycle management beyond Jupyter notebooks.

Unified MCP Tool Graph – Intelligent Tool Retrieval for Agentic AI Systems

- Led a research-driven project to aggregate and structure 11,000+ tool APIs from over 4,000 MCP servers into a centralized Neo4j graph database, enabling dynamic tool retrieval for LLMs and autonomous agents.
- Engineered dynamic MCP server orchestration with just-in-time spin-up based on user queries, reducing resource usage and improving responsiveness.
- Implemented a semantic, vendor-agnostic knowledge graph to map inter-tool relationships (e.g., overlaps_with, preferred_for_task) and support minimal-context, task-optimized agent execution.
- Integrated with agentic frameworks like LangGraph and A2A, allowing agents to load only the most relevant tools per query and avoid confusion or infinite tool loops.
- Built automated config extraction from GitHub READMEs and fallback error handling to ensure fault-tolerant tool server connectivity.
- Enabled modular chatbot integrations and planned support for tool categorization, visualization playgrounds, and vector-based semantic search across tools/vendors.

EXPERIENCES

Tata Data Visualisation: Empowering Business with Effective Insights Job Simulation July 2025

- Completed a simulation involving creating data visualizations for Tata Consultancy Services
- Prepared questions for a meeting with client senior leadership
- Created visuals for data analysis to help executives with effective decision making

Electronic Arts Software Engineering virtual experience program - July 2025

- Proposed a new feature for the EA Sports College Football and wrote a Feature Proposal describing it to other stakeholders.
- Built a class diagram and created a header file in C++ with class definitions for each object.
- Patched a bugfix and optimized the EA Sports College Football codebase by implementing an improved data structure.

Citi ICG Technology Software Development Job Simulation - July 2025

- Completed a job simulation involving hypothetical tasks to improve Citi's loan management system and stock market risk reporting
- Created a state diagram of the loan management process using the Unified Modeling Language (UML)
- Researched potential machine learning systems to assess credit risk and provided recommendations for next steps
- Used Java to build an internal tool visualizing stock market risk in real time

ACTIVITIES

Interact Club Mahdia *Mahdia, Tunisia*
Oct 2023 – sept 2024

Media Manager → Head of Personal & Professional Development Relations

- Designed and managed the club’s digital media presence, creating promotional content and event highlights across social media platforms.
- Transitioned into a leadership role focused on building partnerships for training programs, workshops, and networking events that support members’ soft skills and career growth.

- Led several initiatives to promote civic engagement, youth leadership, and self-development within the community.

IEEE CS Chapter – ISIMS Student Branch *Sfax, Tunisia*
Active Member *Mar 2025 – Present*

- Participated in tech-focused events and workshops related to software engineering, cybersecurity, and AI.
- Contributed to a series of programming challenges and knowledge-sharing sessions aimed at enhancing members' coding proficiency and algorithmic thinking.

IEEE CAS Chapter – ISIMS Student Branch *Sfax, Tunisia*
Active Member *Mar 2025 – Present*

- Engaged in circuit design and embedded systems activities, including hands-on hardware projects and tutorials.
- Supported workshops and public talks that explore modern applications of analog and digital systems in robotics and smart devices.

Skills & Certifications

Technical Skills:

✔ AI & Machine Learning: Python, TensorFlow, Pandas, LSTM, Time-Series Forecasting, Natural Language Processing (NLP), Dialogflow

✔ Embedded & IoT Systems: Arduino, Piezoelectric & Thermoelectric Sensors, Peltier Modules, 3D Printing, Sensor Integration

✔ UI/UX & Creative Tools: Figma, Adobe XD

✔ General: Problem Solving, Linux, Git, Agile Development

Languages: Arabic (Native) · French (Professional) · English (Intermediate) · German (Basic)

Certifications & Training:

✔ NVIDIA Certificate – Deep Learning Essentials

✔ MITx (edX) Certificate – Fundamentals of Artificial Intelligence

✔ Arduino Certification – Foundations of Embedded Systems

✔ AI for Everyone – DeepLearning.AI

✔ Intro to TensorFlow for Deep Learning – Google / Udacity

✔ DevOps Pre-Requisite Course

Awards:

✔ **Project Showcase Recognition** : TSYP 25 (Energy Wearables & Smart Grid AI)