AHMED ABDELMALEK

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"Simplicity is deceptively complicated."

Data Science Master student @ EPFL.

EDUCATION

École polytechnique fédérale de Lausanne, *MSc major in Data Science, minor in Cybersecurity* | Lausanne, CH — 2024 - Today

École polytechnique fédérale de Lausanne, *BSc in Communication Systems* | Lausanne, CH — 2021 - 2024

EXPERIENCE

Johnson Electric, *Data Scientist & AI Engineer Intern* | Murten, CH — Jun 2025 – Sep 2025

- Summer internship focusing on multiple data science and AI engineering projects.

EPFL, *Student Assistant – COM-304 Communication Project* | Lausanne, CH — Feb 2025 – May 2025

- Radar track: assisted students with TI millimeter-wave radars (project page).
- Foundation Models track: assisted students with LLMs, VLMs, and LMMs platforms (project page).

Swiss Solar Boat, *Member of the Electronic Hardware Team* | Lausanne, CH — Sep 2023 - Feb 2024

- Used C++ to test sensors before connecting them to the boat's electronic system.

UBCI, *Engineer Intern* | Tunis, Tunisia — Feb 2021

- Internship in IT systems management.

SKILLS

Programming Languages	Go, Python, C/C++, Java, R, SQL, VHDL, Assembly, Scala, Matlab
Tools and Technologies	Git, LaTeX, ROS2, Arduino, Linux, OpenCV, VSCode

Projects

CS-552 Generative Reasoning Tutor — Quantized Models Lead (Qwen3-0.6B) — Apr 2025 - Jun 2025

- Led the Quantized track for EPFL's CS-552 LLM tutor, starting from Qwen3-0.6B-Base and delivering an efficient MCQA-ready model compatible with the course evaluation interface.
- Implemented post-training quantization pipelines (4-bit QLoRA fine-tuning and 8/4-bit PTQ) to reduce VRAM/latency while preserving accuracy on the private STEM MCQA benchmark.
- Packaged and released models/datasets on Hugging Face with fully reproducible training scripts (`train_quantized.sh`); ensured loading via `AutoModelForCausalLM` and provided a `quantization_config` file.
- Coordinated data formatting, evaluation runs, and ablations (precision vs. quality), documenting trade-offs and integration with the team's DPO/MCQA/RAG components.

Multi-Scale GCN-LSTM for EEG Seizure Detection — Feb 2025 - May 2025

- Designed and implemented a multi-branch deep learning model combining Graph Convolutional Networks (GCN) and BiLSTMs for seizure detection from EEG signals.
- Developed a multi-scale temporal pipeline (0.5s, 1s, 2s windows) with dynamic functional connectivity graphs and attention-based feature fusion.
- Achieved Macro-F1 $\approx$ 0.82 on the TUH Seizure Corpus Kaggle subset, outperforming baseline methods.
- Built end-to-end workflows for feature extraction, model training, evaluation, ensembling, and Kaggle submission.
- Used Python, PyTorch, NumPy, and Scikit-learn on EPFL's SCITAS HPC cluster for large-scale experimentation.

SafetyFirst: Chicago Crime Visualization & Routing Tool — Feb 2025 - May 2025

- Built an interactive website to explore 20+ years of Chicago crime data using advanced visualizations and user-driven filtering.
- Developed a dynamic heatmap with time and year filters using React, Leaflet, and custom JSON data pipelines.
- Integrated Google Maps API to enable safe route planning with real-time mode selection and custom map styling.
- Engineered a responsive UI featuring crime type statistics, scroll controls, and data-driven insights aligned with user needs.

Fuzzing Project Workspace: OSS-Fuzz for libpcap Apr 2025 - May 2025

- Conducted fuzz testing on `libpcap` using the OSS-Fuzz framework, analyzing coverage with and without seed corpora.
- Designed and integrated custom fuzzing harnesses (e.g., `fuzz_findalldev.c`) to target specific functions and improve code coverage.
- Automated build and fuzzing pipelines with Docker and shell scripts, enabling reproducible benchmarks and crash reproduction.
- Identified vulnerabilities, reproduced crashes with Proof-of-Concept inputs, and generated detailed coverage reports to evaluate improvements.

Predictive Analysis of Movie Box Office Success Sep 2024 - Jan 2025

- Conducted a data-driven analysis of the CMU Movie Summary Corpus to find key factors influencing box office revenue.
- Preprocessed and cleaned large-scale movie metadata, integrating additional datasets to enhance predictive accuracy.
- Performed exploratory data analysis using visualizations and statistical methods.
- Developed predictive models to forecast movie success based on chosen features.
- Built an interactive data story website, featuring dynamic visualizations.

Decentralized NameCoin System on Peerster Network Sep 2024 - Jan 2025

- Implemented a peer-to-peer communication using Go and integrated a gossip protocol for message broadcasting and private messaging using a custom UDP socket.
- Implemented a Paxos-based naming consensus system and blockchain for global agreement, leveraging cryptographic techniques for security.
- Built blockchain functionalities including transactions, proof-of-work consensus, and robust domain management.
- Conducted extensive testing (unit, integration, performance) to ensure system correctness, scalability, and security.

Road Segmentation from Satellite Imagery Using Deep Learning Nov 2024 - Dec 2025

- Developed and compared state-of-the-art deep learning models (RFE-LinkNet, ResNet, DeepLabV3) for semantic segmentation of roads in satellite imagery.
- Preprocessed and augmented datasets to enhance model generalization.
- Implemented custom training pipelines with Dice loss, cross-entropy loss, and Adam optimizer.

Predicting Coronary Heart Disease Risk Using Machine Learning Sep 2024 - Oct 2024

- Developed predictive models to assess coronary heart disease risk using the Behavioral Risk Factor Surveillance System (BRFSS) dataset.
- Implemented and optimized machine learning algorithms from scratch.
- Conducted extensive data preprocessing to improve model performance.

Simulation and Source Detection of Infectious Processes on Networks Feb 2024 - June 2024

- Used graph-based models to simulate infectious disease spread and identify outbreak sources using centrality measures.
- Analyzed epidemiological metrics using differential equations and stochastic modeling.
- Enhanced model realism by incorporating stochastic elements, improving prediction accuracy.

Real-Time SLAM with Radar Feb 2024 - June 2024

- Designed and implemented a real-time SLAM system using ROS2 and TurtleBot4 IMU for odometry data.
- Captured and processed radar data for real-time environment mapping and object tracking.
- Optimized point cloud data to reduce noise and improve system accuracy.
- Conducted comparative analysis against deep learning-based odometry methods.

Snake Game in Assembly Language Sep 2023

- Developed the Snake game in Assembly and load it onto an FPGA using Quartus and VHDL, running on a Nios II processor.

JaVelo: Bicycle Route Planner in Java Feb 2022 - Jun 2022

- Developed a user interface bicycle route planner for Switzerland with interactive map controls and detailed statistics, using Java and JavaFX.
- Integrated SwissALTI3D elevation data from swisstopo to provide accurate terrain information for cyclists.

CERTIFICATIONS

French Baccalaureate highest honors

Languages

English	Professional proficiency
French	Native proficiency
Arabic	Native proficiency

VOLUNTEERING

Student Assistant | Students 4 Students - EPFL Sept 2024

- Assisted in tutoring Analysis and Linear Algebra, supporting students' transition into their first semester.

International Relations Specialist | Interact: Rotary Sponsored Club Jul 2019 - Jun 2020

- Collaborated with international and african Interact clubs.

Secretary General | Interact: Rotary Sponsored Club Jul 2018 - Jun 2019

- Gather the necessary information.
- Find the most appropriate medium to transmit the information.