

OULAD ALI Ayoub

📍 Île-de-France, France | ✉ ayoubouladali30300@gmail.com | 📞 0782922341
🌐 linkedin.com/in/ayoub-o-275472251 | 🐙 github.com/Ayouboa30

EDUCATION

- **Master 2: Statistics, Learning, Algorithm** Sept 2025 - Present
Sorbonne University
Validated 75 ECTS with honors, including 15 additional ECTS (5 extra courses).
 - **Coursework:** Data Science, Non-parametric Estimation, Simulation and Generative AI, Non-convex Optimization, Statistical Learning, Topological Data Analysis, Privacy and Algorithmic Fairness, Modern ML Research, Neural Networks and Adaptive Approximation, Graph Statistics, Time Series, AI for Health, CUDA and Large-Scale Parallel Computing.
- **Master 1 Applied Mathematics** Sept 2024 - May 2025
Sorbonne University
- **BS in Mathematics and Computer Science** Sept 2022 - May 2024
University of Nîmes
- **1st year of CPGE MPSI** Sept 2021 - May 2022
Daudet

PROJECTS AND EXPERIENCES

- **ENS x Collège de France Data Challenge – Toxic Gas Identification** *Winner*
 - Won the challenge among 150+ participants by developing a robust pipeline for toxic gas identification.
 - Built advanced feature engineering and SOTA ensembling methods to improve predictive performance on sensor data.
- **Generative AI & Explainability (VAEAC vs Diffusion)** *Research Project*
 - Achieved the top performance in the Generative AI and Explainability course unit.
 - Implemented a **VAEAC** (Variational Autoencoder with Arbitrary Conditioning) from scratch to model conditional distributions $p(x_S|x_{\bar{S}})$ for exact Shapley value estimation.
 - **Theoretical Analysis:** Proved that standard ELBO/ L_2 optimization leads to "conditional blurring" in multimodal settings. Proposed a novel **Geometric Modal Regularization** to anchor predictions.
 - Extended the study to **Diffusion Models (DAC)**, demonstrating superior sharpness (PSNR +5.5dB) on MNIST compared to VAE approaches.
- **Nasa SpaceApp and GenHack Polytechnique Hackathons**
 - Implemented a data pipeline and trained an XGBoost Classifier to detect exoplanets (>80% accuracy).
 - Improved downscaled weather datasets for urban areas to capture heat dome effects using statistical bias correction, reached SOTA results, outperformed baseline and submitted a genuine research paper.
- **Study of Irreducible Polynomials over Finite Fields**
University of Nîmes
Conducted research on irreducible polynomials over finite fields $\mathbb{F}_q$ (with q prime), culminating in a formal research paper and an oral defense. The project focused on characterization theorems and construction methods for high-degree irreducibles.
- **Machine Learning Project - Logistic Regression from Scratch**
Sorbonne University
Developed a multi-class logistic regression model from scratch, generalizing it to K-class problems through Softmax integration and cross-entropy loss. I also engineered a custom optimization algorithm, providing a formal mathematical proof of its convergence and demonstrating its efficiency compared to standard gradient descent methods.

INTERNSHIP

- **CMAP, École Polytechnique** April 2026 - September 2026
Subject: Development of a physically informed Mueller image generator
- **Teaching Internship - High School BTS** 2024
Lycée Dhuoda
Tutoring high school and BTS students.

TECHNOLOGIES

- **Languages:** Python, C++, Java, SQL
- **Technologies:** Colab, Jupyter Notebook, Pandas, Numpy, Pytorch, Keras, Tensorflow

CERTIFICATIONS

- Learning AI through Visualization, Columbia University (2025)
- edX Verified Certificate - Data Science and Health (2025)
- Google DeepMind: AI Research Foundations (2025)

OTHERS

- Private tutor