Alex Quiroga Jaldín

Madrid, Spain | +34 640 854 507 | alex.c.quiroga.jaldin@gmail.com
linkedin.com/in/alex-quiroga-jaldin-6485a42a7 | github.com/AlexQuirogaJ | alex-quiroga.com

PROFILE

Aerospace engineer with a Master's degree in Aeronautical Engineering and postgraduate training in Artificial Intelligence. Experience developing and evaluating traditional Machine Learning and Deep Learning models, and integrating AI and LLM solutions into backend applications using FastAPI and Flask, with local deployment through Docker. Projects in NLP, computer vision, and signal processing.

EXPERIENCE

Data Science Intern Apr. 2025 – Jul. 2025
Kerox Technology *Madrid*

- Researched **NLP and LLM** approaches to identify concepts in Spanish clinical text and normalize them to **SNOMED CT**, including post-coordinated expressions.
- Designed and implemented a concept extraction pipeline with dynamic segmentation, embeddings, **Elasticsearch** retrieval, semantic similarity, and fuzzy matching.
- Evaluated the system on a combination of public clinical datasets, obtaining **over 70 % exact or hierarchically related matches** against reference concepts (including parent/child relationships, not just exact matches).
- Built post-coordination prototypes and generated synthetic examples to explore concept relationships where annotated clinical data was limited.

Master's Internship – Machine Learning Oct. 2024 – Mar. 2025
DMAIA, Universidad Politécnica de Madrid *Madrid*

- Developed an **ECG signal processing** and feature extraction pipeline covering morphological, statistical, and temporal features using Python, **NeuroKit2, SciPy, and Pandas**, with public PhysioNet datasets.
- Trained and compared **traditional ML** models and convolutional networks for arrhythmia classification; best evaluated model, HistGradientBoosting, achieved **macro F1 of 0.921 and AUC of 0.991**.
- Built a **Flask** application to upload ECG recordings, visualize signals, classify rhythms, and generate reports, using SQLite for storage.
- Experimentally integrated a commercial ECG monitor and an **Arduino**-based prototype for real-time signal acquisition and visualization.

Undergraduate Internship – AI Research Mar. 2021 – Aug. 2021
SRM Consulting *Madrid*

- Researched and experimentally evaluated **Neural Radiance Fields (NeRF)** for novel-view synthesis and 3D scene reconstruction using synthetic, real-world, and aerial images.
- Developed **Python** tools to prepare images and camera poses, as well as a **PySide6** desktop interface to configure and run training experiments.
- Compared NeRF with traditional photogrammetry: NeRF offered advantages for **novel-view synthesis**, but the methods evaluated had limitations for **3D mesh extraction**.

PROJECTS

Oct. 2025 – Present

Twitter/X Insights – AI News Analysis Python · FastAPI · Hugging Face · Gemini · Docker

- Built an **NLP** pipeline to collect posts, estimate relevance and neutrality through **zero-shot classification**, and group related posts using embeddings and **HDBSCAN**.
- Generated titles, summaries, and structured reports with **LLMs**, incorporating ranking criteria and mechanisms to reduce redundancy across related posts.
- Developed the application with **FastAPI**, background processing workers, Pydantic validation, **SQLite/SQLAlchemy** persistence, and a **React** frontend; ran the stack locally using **Docker Compose**.

Chess Game Reconstruction PyTorch · YOLOv8 · InceptionV3 · OpenCV

- Designed a **computer vision** system to digitize live chess games from video by detecting pieces and reconstructing successive board positions.
- Trained and adapted **YOLOv8 and InceptionV3** models for piece detection and classification, with image processing using OpenCV.
- Implemented an algorithm combining model probabilities with **chess rules and legal moves** to select consistent moves and limit accumulated errors during a game.

Autonomous Aircraft Control with RL Python · Gymnasium · PPO · Stable-Baselines3

- Implemented a custom **flight dynamics simulator** based on linearized equations of motion and **fourth-order Runge–Kutta (RK4)** numerical integration.
- Built a custom **Reinforcement Learning** environment with Gymnasium, defining observations, control actions, and rewards for waypoint navigation.
- Adapted and trained a **PPO** agent using Stable-Baselines3 to follow **arbitrary trajectories defined by waypoints** in simulation.

SKILLS

Programming and data: Python, SQL, NumPy, Pandas, SciPy.

Machine Learning: scikit-learn, PyTorch, Keras, Hugging Face; classification, Deep Learning, NLP, computer vision, and Reinforcement Learning.

LLMs and generative AI: LangChain, RAG, embeddings, semantic retrieval, and vector databases.

Backend and tools: FastAPI, Flask, Docker, Git, Elasticsearch, SQLite, SQLAlchemy, Pydantic, React, OpenCV.

EDUCATION

Postgraduate Course in Artificial Intelligence for Aerospace Engineering Feb. – Jun. 2025
Universidad Politécnica de Madrid

Master's Degree in Aeronautical Engineering (Aircraft specialization) Sep. 2022 – Sep. 2025
Universidad Politécnica de Madrid

Bachelor's Degree in Aerospace Engineering Sep. 2017 – Jul. 2023
Universidad Politécnica de Madrid

Certification: CS50x: Introduction to Computer Science (Harvard/edX).

Languages: Spanish (native); English C1 certified in listening and reading (Linguaskill).