Marouane Ait El Faqir

Machine Learning Engineer — AI & Applied Mathematics Specialist

Toulouse, France — +33 6 60 18 50 15 — m.aitelfaqir@gmail.com

GitHub: github.com/MarouaneAEF — **Website:** marouaneaef.github.io

Professional Summary

Machine Learning Engineer with **10+ years of experience** in **probabilistic machine learning, numerical optimization, and AI-driven solutions**. Expertise in **Python, TensorFlow, PyTorch**, with a strong background in **Bayesian inference, deep learning, and time-series forecasting**. Proven ability to develop **ML models for space technology, aeronautics, embedded electronics, and robotics**.

Work Experience

Data Scientist — AI & Machine Learning Specialist
CS Group, Toulouse, France **December 2020 - Present**

- Developed **deep learning and probabilistic models** for space technology applications.
- Designed **image super-resolution models** for **CNES (French Space Agency)**.
- Built **satellite maneuver prediction models** for CNES and **DGA (Defense Agency)**.
- Contributed to **Python libraries** for ESA's **Copernicus program**.
- Implemented **Variational Inference and Adversarial Generative Models** for advanced data analysis.

Applied Mathematics Engineer
CHAUVIN-ARNOUX, Annecy, France **March 2018 - December 2020**

- Designed **numerical algorithms for embedded electronics** using **Python, C, and C++**.
- Developed **Bayesian deconvolution techniques** for image filtering and **2D IIR filters** for signal processing.
- Built **Gaussian process-based models** for **thermal camera image analysis**.
- Led **ML-based electromagnetic modeling** for a **portable current measurement device** (patent filed).

Consulting Engineer — Machine Learning & Robotics
ALTRAN, Toulouse, France **October 2015 - March 2018**

- Developed a **Supervised Learning (SVM) model** for **turbulence prediction** (Airbus R&D).
- Designed **ML-based drone control systems** using deep learning and **Jacobian inverse kinematics**.
- Contributed to **quality validation in aeronautics control laws engineering**.

PhD Researcher — Stochastic Optimization & AI
CNRS/INRA, Lyon-Paris, France **October 2012 - October 2015**

- Developed **stochastic optimization algorithms** for large-scale biological systems.
- Applied **Bayesian Optimization and Gradient-Based Methods** for high-dimensional problems.
- Published findings in **IEEE CDC conference**.
- Developed a systematic method for proving algorithms used in optimization problems, with a particular focus on large-scale optimization challenges in systems biology.

Education

PhD in Applied Mathematics & Systems Biology **2012 - 2015**
Ecole Centrale de Lyon, France
Specialization: **Numerical Optimization, Probabilistic Machine Learning, Bayesian Inference**

Skills

Machine Learning & AI

- Supervised & Unsupervised Learning (SVM, Decision Trees, KNN, Neural Networks)
- Deep Learning (TensorFlow, PyTorch, Variational Inference, GANs)
- Time-Series Forecasting (LSTM, Bayesian Inference, ARIMA)
- Anomaly Detection & Predictive Maintenance
- Model Optimization & Hyperparameter Tuning (Bayesian Optimization)
- End-to-End ML Pipelines (Scikit-Learn, Pandas, NumPy)

Mathematics & Optimization

- Numerical Optimization (Gradient Descent, Stochastic Methods)
- Probabilistic & Bayesian Modeling
- Signal Processing (Adaptive Filtering, Blind Deconvolution)

Programming & Tools

- **Languages:** Python, C++, C, MATLAB, BASH scripting (Linux), LaTeX
- **ML Frameworks:** TensorFlow, PyTorch, Scikit-Learn
- **DevOps/MLOps:** Git, Docker, GitLab, PyTest

Languages

French: Native/Bilingual — English: Advanced — Arabic: Fluent