# Hassane AZZI

# Software Development Engineer | Operations Research | Optimization | Machine Learning



Mobility: Île-de-France, Toulouse,

Activities: Software Development, Operations Research, Optimization Machine Learning

Github

**M**al

RG

Research Gate

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ENAC Alumni

LinkedIn

Youtube



Stack Overflow

#### **Professional Profile**

Computer Science Engineer, option:
Operations Research & Optimization
(M2INFO\_RO - 2016) from ENAC (Ecole
Nationale de l'Aviation Civile), I apply my
expertise in operations research,
Machine Learning and software
development (C++, Java, Python) to
projects across various industrial
sectors. My combined scientific and
technical skills enable me to develop
robust and optimized solutions tailored
to challenges of performance, reliability,
and operational efficiency.

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# Experiences

# Optimization & Machine Learning Engineer

#### Naldeo Digital for Climate - Since May 2024 - Temporary Work - Tarnos



As part of a temporary increase in activity for various projects with the Naldeo company, my role during this mission is to support different clients (Omexom, Valorem and Urbasolar) in the development of optimal management solutions for hybrid energy systems in non-interconnected zones (ZNI), in particular overseas departments and regions (Corsica, Martinique, Guadeloupe, Reunion Island and Mayotte). This advanced energy management solution is capable of maximizing the revenues of hybrid power plants, by optimizing production in real time according to the announced program, the actual state of the plant and the updating of production forecasts.

## Software Development Engineer | C++ Back-End Developer



SCLE SFE - March 2022 to April 2024 - Full-time - Toulouse - France

For the client SCLE SFE, and within the "Reliability" team, the mission consists of developing a software application (Vcard) for simulating high-voltage substation cards.

# Software Engineer (C++/Java)



SEGULA Technologies - December 2018 to February 2022 - Freelancer - Brest

As part of the continuation of the internship carried out in Cherbourg for the E3S (Energy Smart Sailing Ship) project, this assignment involved completing the development phase of the project.

### Research & Innovation Engineer



SEGULA Technologies - March 2018 to August 2018 - Internship - Cherbourg

Mission: As part of the E3S (Energy Smart Sailing Ship) project led by the Naval Engineering and Energy Research & Innovation Unit at SEGULA Technologies, the objective of this mission was to implement a hybrid intelligent energy management system (EMS) capable of managing the production and consumption flows of electric energy on board a long-distance cruising sailboat.

The sailboat is equipped with renewable energy sources (solar panels, wind turbines, a hydrogenerator, a diesel generator, and a battery bank) installed on board, ensuring safety during navigation and maximum comfort for passengers (air conditioning, internet, television, shower, etc.).

# Operations Research Developer (Student Project)



École Nationale de l'Aviation Civile (ENAC) - October 2016 to January 2017 - Student Project - Toulouse

Project: resolution of air traffic conflicts using exact and approximate methods (metaheuristics).

In air traffic management, separation distances must be respected to avoid any risk of collision between aircraft. Two aircraft are considered to be in conflict if the distance separating them is less than 5 nautical miles (NM) horizontally or 1,000 feet (ft) vertically. In other words, an air conflict corresponds to a loss of separation between two or more aircraft that find themselves too close to each other, in violation of predefined safety standards. The resolution of air conflicts is based on the implementation of avoidance maneuvers, such as changes in speed, altitude, or heading, in order to reestablish minimum separation distances. Each maneuver generates a cost, particularly in terms of kerosene consumption, depending on its nature. The objective of this project is precisely to minimize the total cost of maneuvers applied to aircraft, while ensuring compliance with safety standards.

### Scheduling of landings at an airport



École Nationale de l'Aviation Civile (ENAC) - October 2016 to January 2017 - Student Project - Toulouse

Airport traffic management poses many optimization challenges, making air traffic difficult to predict. In this context, assigning parking stands to aircraft, finding optimal landing sequences on one or multiple runways, as well as planning strategic taxi routes are major issues for air navigation services. The goal of this mini-project is to develop a flight sequencing strategy for arrivals at airports to avoid congestion caused by closely spaced aircraft arrivals.

## One-Class Support Vector Machine (1-class SVM)



ISAE-SUPAERO - October 2016 to January 2017 - Student Project - Toulouse

This project aims to develop and implement a Machine Learning algorithm able to detecting anomalies in a system, using novelty detection and outlier detection techniques.

# Modeling and Solving Industrial Optimization Problems Using Solvers (3-day training at ENAC)



École Nationale de l'Aviation Civile (ENAC) - December 2016

- Case study and application to solve real-world industrial problems: Crew Pairing Problem (CPP), Crew Scheduling Problem (CSP), Capacitated Vehicle Routing Problem (CVRP, CVRPTW)
- Modeling and solving optimization problems using solvers
- Technical Environment: IBM ILOG CPLEX Optimization Studio, LocalSolver, Pyomo, Mathematical Modeling, Combinatorial Optimization, Linear Programming

# Skills

## Operating systems (OS)

Linux (Ubuntu, Debian, Red Hat), Windows, Unix

### **Programming Languages**

C/C++, Rust, Java, Python, Javascript, SQL, CSS, HTML

#### Frameworks

- Spring Boot, Hibernate, STL, Boost, Qt6, QML, MLflow
- NumPy, Pandas, SciPy, PuLP, Matplotlib, Scikit-Learn, Tensorflow, Apache Airflow

## Parallel and High-Performance Computing

MPI, OpenMP, CUDA

## Integrated Development Environments (IDE)

Eclipse, Netbeans, Intellij IDEA, Qt Creator, Visual Studio Code, PyCharm

# Continuous integration (CI/CD) / DevOps tools

Git, GitLab CI, GitHub, Jenkins, CMake, Maven, Ansible

#### Software Testing and Quality (TDD, BDD)

SonarQube, Cucumber, CppUnit, Google Test, JUnit, Mockito, Pytest

## Microservices and Cloud Computing

Docker, Kubernetes, Apache Kafka, API REST, GraphQL, AWS, Azure, Google Cloud Platform (GCP)

## Databases (SQL and NoSQL)

SQL Server, MySQL, Oracle, PostgreSQL, MongoDB

## Scientific Computing /Solvers

MATLAB/ Simulink, GLPK, Gekko, Pyomo, IBM ILOG CPLEX Optimization Studio

#### Networks, Protocols & Software Standards

CAN, MQTT, TCP/IP, DO-178, ED-109, ED-12C, ARINC 429

## Office Tools and Scientific Writing Software

LaTeX, Beamer, Microsoft Word, Excel, PowerPoint, Outlook.

#### Soft Skills

Autonomy, Leadership

#### Methodology

Agile Scrum, SAFe, V-Cycle

# Education

#### **Applied Data Science**

#### Columbia Engineering & Emeritus Institute of Management

January 2019 to May 2019

Training in Data Science and Machine Learning:

- -Data analysis and visualization:
- -Use of Python Frameworks (NumPy, Pandas, Scikit-Learn, Matplotlib);
- -Study of some Machine Learning algorithms: Random Forest, Text Mining, Linear Regression, Decision Trees, K-Means, SVM, Gradient Descent, Neurals Networks.

# Master's degree in Computer Science: Operations Research & Optimization (M2INFO RO)

### ENAC | ENSEEIHT | ISAE-SUPAERO | INSA | Université Toulouse III - Paul Sabatier

September 2016 to September 2018

A master's degree in Operations Research (M2RO) at ENAC (École Nationale de l'Aviation Civile) is a high-level program specializing in modeling, optimization, operations research and the solving of complex problems related to transportation, aeronautics, logistics, and other industrial sectors.

#### Modules & courses

 $Applied\ Mathematics \cdot Operations\ Research \cdot Optimization \cdot Mathematical\ modeling \cdot Linear\ programming \cdot Mathematical\ modeling \cdot$  $Combinatorial\ Optimization \cdot Mathematical\ Programming \cdot Graphs\ and\ networks \cdot Optimization\ applications\ in\ the\ air\ networks \cdot Optimization\ applications\ in\ the\ air\ networks\ optimization\ applications\ in\ the\ air\ networks\ optimization\ application\ in\ networks\ optimization\ application\ application\ in\ networks\ optimization\ application\ ap$  $transportation \cdot Constraint \ programming \cdot Optimization \ under \ uncertainty \cdot Algorithmic \ complexity \cdot Air \ Traffic$ Management (ATM) · Machine Learning Algorithms

# Languages



Fluent (Level B2, TOEIC 864: reading, writing and speaking)



Lower-intermediate (Level B1 of the CEFR)



Bilingual (Level C2 of the CEFR, TCF 667: Reading, writing and speaking)

# Interests

## Arts

Chess games

#### **Sports**

Swimming, Jogging

# Conferences and events



sep. 2021 - déc. 2022 · 1 an - Professional Mentor for ENAC Alumni (Volunteer)

As a member of the ENAC Alumni Association, I volunteered to support new graduates as well as current students in refining their academic or career plans.

# Certifications



Discrete Optimization (Georgia Institute of Technology)

(View certification)



Recherche opérationnelle: optimiser ses décisions (University of Montreal) (View certification)



**Machine Learning Specialization (Stanford** University)

(View certification)



Advanced Learning Algorithms (Stanford University) (View certification)

Stanford Supervised Machine Learning: Regression and Classification (Stanford University) (View certification)



Machine Learning (Columbia University) (View certification)

