JOAN SALVÀ SOLER

Machine Learning and Optimization | Vienna, Austria
+34 633335694 | jsalvasoler@hotmail.com

EDUCATION

TECHNISCHE UNIVERSITÄT WIEN — Vienna, Austria
MSc. Data Science — *Sep 2022 – Jan 2024*

- Minors: (1) Machine Learning and Statistics, (2) Optimization and High-Performance Computing. Current GPA: 1.13
- Member of **Lumos Student Data Consulting**, a junior enterprise focused on DS consulting.

POLYTECHNICAL UNIVERSITY OF CATALONIA — Barcelona, Spain
BSc. Mathematics — *Sep 2017 – Dec 2021*

- Received **Accenture Scholarship** for academic merits.
- Key topics: Probability and Statistics · Optimization and Operations Research · Financial Mathematics · Discrete Mathematics · Numerical Calculus · ODE, PDE and SDE
- Bachelor Thesis: Linear Programming and Genetic Algorithms for the Berth Allocation and Crane Assignment problem in maritime ports.

PROFESSIONAL EXPERIENCE

QUANTAGONIA — Vienna, Austria (Remote)
Research Engineering Intern — *March 2023 – Present*

- ***LLM-based mathematical modelling tool:*** I work in the development of a tool that mathematically models and solves optimization problems. Implemented with LangChain, it leverages the principles of Chain-of-thought and multi-agent systems.
- ***MIP and QUBO solver development****:* I implement new features and I do research and experimentation with improvement for our developed MIP and QUBO solvers. For instance, I implemented the Feasibility Jump pre-root heuristic into our MIP solver.
- Technology and stack used: **Python, C++, LangChain, Jenkins, Git VC, Jira**

SBA RESEARCH — Vienna, Austria
Machine Learning Researcher — *March 2023 – Present*

- ***Landslide detection on satellite imagery:*** As part of the state-funded project gAia, I take part in the ideation and development of a Machine Learning solution for Landslide Detection based on change-detection methods on satellite imagery.
- Technology and stack used: **Python, QGIS, Tensorflow**.

ACCENTURE — Barcelona, Spain
Data Scientist — *April 2021 – Oct 2022*

- ***Price Optimization:*** Implemented solution that optimizes the selling price of cars for a renowned car manufacturer. Solution includes a forecasting model (75% accuracy) and an optimization engine that increased profits by 10-15%.
- ***Demand Forecasting:*** Deployment and maintenance of a forecasting solution for a multinational company in the consumer-goods sector. Worked on continuous improvements, refactoring, fixes, and Covid correction logics.
- Technology and stack used: **Python, R, Git VC, PowerBI, Excel, CPLEX, Gurobi, Pyomo**

PERSONAL PROJECTS

My personal GitHub (https://github.com/jsalvasoler) contains many examples of projects that I develop for university or for my personal learning and use. Most of them relate to Optimization: from theoretical experiments to useful day-to-day solutions. Take a look!

- **Exact SARP** is a long-term university project with the goal of developing exact algorithms for the **Site Assessment Routing Problem**. Not only have I achieved outstanding computational results compared to state-of-the-art algorithms, but I have also mathematically proven the theoretical dominance of our proposed formulation in this novel routing problem. Available here.
- **A0C4** is an implementation of **AlphaZero for the game of Connect 4**. Using PyTorch and without the help of any other existing framework, I managed to get a working version of the famous DeepMind algorithm. Available here.
- **RL for Racetrack Optimization** solves the problem of finding the optimal (fastest) trajectory in a curve. We use the Q-learning for optimizing the RL formulation of the problem. Available here.
- In **k-MST through MILP Optimization**, I solve the **k-Minimum Spanning Tree** problem comparing five different Mixed Integer Linear Programming (MILP) formulations. Available here.
- **s-Plex heuristics** is a university project in which I co-developed and compared the most common heuristics and metaheuristics the Weighted s-Plex Editing Problem. Included: Var Neigh Descent, GRASP, GA, Simulated Annealing, Ant Colony Opti. Available here.

SKILLS & PERSONAL

Languages: English (full professional proficiency), Catalan (native), Spanish (native), German (intermediate)
Tech stack: Advanced in *Python, R, Git VC, PowerBI, Excel, SQL, MATLAB.* Experience in C++. Notions and learning Java, JavaScript, Vue framework, AMPL, Tableau, AWS, Azure, GCP. Experience with the solvers Gurobi, CPLEX, SCIP, GLPK, and Highs.