Ermal BELUL

PhD Operations Research and AI in Supply Chain Management

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Upwork Profile Link

Profile

I am an Operations Research and Applied Scientist with 5+ years of experience in algorithm design, software development, and mathematical modeling. Expertise in translating complex Operations Research (MILP, CP, heuristics) and Machine Learning methodologies into scalable software architectures. Proven track record of designing distributed, algorithmic solutions that orchestrate physical-world constraints, reducing operational compute bottlenecks by up to 21% in massive-scale (20,000+ node) environments.

Experience

Savoye | R&D Operations Research Scientist (*Industrial PhD Candidate*) | 12/2023 – Present | Dijon, France

- **Algorithm Engineering & Optimization:** Engineered a set-variable Mixed-Integer Linear Programming (MILP) model in Python for an automated warehouse dataset of 21,877 SKUs. Shifted optimization criteria to zone-visit minimization, reducing daily mechanical stops by 13.7% (2,198 fewer visits/day) and recovering 9 full operating days per quarter.
- **Large-Scale System Design:** Designed and developed a 3-stage flow-based decomposition software framework to solve the Mergeable Storage Location Assignment Problem (MSLAP). Bypassed branch-and-bound combinatorial explosions to activate 278 dynamic slot merges, cutting total operational costs by 21% across a 3,600-location grid.
- **Production-Ready Deployments:** Formulated and implemented a mathematically bounded "limited-reassignment" algorithm that captured maximum throughput gains by relocating merely 2.2% of the inventory catalog (500 SKUs), ensuring zero disruption to continuous daily fulfillment operations.
- **Technical Leadership:** Directed and mentored an R&D student software task force to build a hybrid layout heuristic. Delivered a production-ready strategy that reduced daily station transitions by 8% (saving 5.4 working days per quarter) while maintaining strict workload equilibrium.

Upwork | Data Manager & Decision Systems Architect | 02/2023 – Present | Remote

- **Architected** robust and scalable cloud data pipelines on GCP, BigQuery, and Databricks (Azure) for global SaaS platforms, reducing data processing time by 40%.
- **Deployed** AI-assisted reporting ecosystems and GenAI architectures (RAG systems via LLM APIs) to automate decision support, generating a 33% increase in operational efficiency.
- **Integrated** DBT into client infrastructures to modularize analytical logic, improving data traceability and reducing reporting errors by 80%.

Savoye | AI & Operations Research Intern | 02/2023 – 11/2023 | Dijon, France

- **Designed and deployed** network flow algorithms to solve the Storage Location Assignment Problem (SLAP) using historical WMS data, simulating a 25% reduction in total operational picking and replenishment costs.
- **Engineered** statistical models to evaluate inventory reorganization scenarios, proving that a targeted reallocation of just 20-40% of critical SKUs achieves near-optimal throughput while minimizing physical warehouse disruption.

Université de Technologie de Compiègne | Teaching Assistant (Operations Research & Python) | 07/2024 – Present | Compiègne, France

- Instructed engineering classes on foundational Operations Research literature, focusing heavily on Graph Theory and combinatorial optimization.
- Designed and taught Python programming labs that translated theoretical mathematical logic and graph algorithms into executable software code.
- Bridged the gap between academic theory and software engineering by teaching applied data structures and algorithmic problem-solving.

Engage3 | *Data Delivery Engineer & Project Manager* | 05/2021 – 08/2022 | Tirane, Albania

- Managed the delivery of complex data pipelines and market analyses utilizing PostgreSQL, JavaScript, and Python.
- Engineered automated web extraction agents to ingest and transform competitive retail datasets into actionable reporting metrics.
- Supporting teams in managing change: local training and operational support for new employees.

Education

Université de Technologie de Compiègne (UTC)

Ph.D. in Operations Research, AI, and Computer Science | 12/2023 – Present

Master 2: Complex Systems, Machine Learning, and Optimization | 09/2022 – 09/2023

Polytechnic University of Tirana

Master's in Software Engineering | 09/2021 – 07/2023

Bachelor's in Electronic Engineering | 09/2018 – 07/2021

Selected Publications

E. Belul, M. Bouznif, D. Nace, A. Jouglet, "Optimizing Automated Warehouse Operations: A Novel Approach to the Correlated Storage Location Assignment Problem (CSLAP)," 20th Annual System of Systems Engineering Conference (SOSE), 2025.

E. Belul, D. Nace, A. Jouglet, M. Bouznif, "Optimizing Warehouse Storage: The Location Assignment Problem," 2nd International Conference on Information Technologies and Educational Engineering (ICITEE), 2023.

Volunteer work

1. IVANAJ FOUNDATION | 2. SAVE THE CHILDREN | 3. RED CROSS ALBANIA

Technical Skills

- **Languages:** Python, C/C++, SQL (PostgreSQL), JavaScript, R, MATLAB.
- **Algorithms & OR:** Mixed-Integer Linear Programming (MILP), Constraint Programming, Flow-based Decomposition, Heuristics, CPLEX, Hexaly, Gurobi.
- **Software Engineering:** Algorithm Design & Architecture, Data Structures, System Testing, Data Pipelines, Google Cloud Platform (GCP), BigQuery.
- **Machine Learning:** Predictive Modeling, Scikit-learn, Stochastic Modeling, Simulation.