Bahman Madadi

Linkedin | Github | Googlescholar

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Summary

PhD-level Research Scientist with extensive experience (5 years post-PhD) in designing, developing, and applying Machine Learning (ML) and Operations Research (OR) techniques to solve complex problems in transportation networks, mobility systems, and logistics. Proven expertise in network optimization, predictive modeling, simulation, and spatial data analysis using Python (incl. PyTorch, Gurobi, Geopandas). Seeking a challenging scientist position focused on ML/OR where I can leverage advanced analytical skills to drive innovation and impact.

Technical Skills

- **Programming:** Python, MATLAB (Proficient), R, SQL, Java (Intermediate), C++ (Familiar)
- **ML & AI Frameworks:** PyTorch, Tensorflow, Scikit-learn, Langchain, Huggingface, LlamaIndex
- **Optimization & OR:** Gurobi (Gurobipy), CPLEX (Docplex), OR-Tools, Pyomo, GAMS
- **Data Analysis & Visualization:** Pandas, GeoPandas, NetworkX, Shapely, Fiona, Folium, PowerBI, SPSS
- **GIS & Spatial Analysis:** QGIS, ArcGIS, GeoPandas
- **Simulation & Transport Modeling:** Arena, AnyLogic, Vensim, OmniTRANS
- **DevOps, Version Control & Cloud**: Git, GitLab, GitHub (proficient), Microsoft Azure (Familiarity)

Professional Experience

ASSISTANT PROFESSOR | ENTPE & UNIVERSITÉ GUSTAVE EIFFEL | LYON, FRANCE | DEC 2023 – PRESENT

- Leading research focused on applying machine learning and optimization techniques to enhance sustainability in transport and energy systems.
- Developed a novel hybrid deep learning-metaheuristic framework (GNNs with Python, PyTorch) for complex bi-level network design problems reducing computation times by a factor of 1000 making extra-large networks computationally feasible; published in *Expert Systems With Applications*.
- Initiating projects using AI/OR for transportation applications.
- Securing research funding through grant proposal writing (e.g., EU Horizon, ANR).
- Teaching graduate-level courses in Machine Learning, Optimization, and Transport Networks.
- Supervising PhD & MSc student theses on multimodal mobility networks and AI applications.

POSTDOCTORAL RESEARCHER | DELFT UNIVERSITY OF TECHNOLOGY | DELFT, NETHERLANDS | JAN 2022 – DEC 2023

- Led Work Package for the DIREC project, investigating digital road infrastructure for connected and automated vehicles (CAVs), with stakeholder engagement, reporting and two conference presentations.
- Developed data-driven methods and optimization models (Python, Gurobi) to assess and enhance transport infrastructure readiness for emerging technologies like CAVs.
- Contributed expertise to a national report on the impacts of vehicle automation for the Netherlands Environmental Assessment Agency (PBL).
- Instructed optimization module for MSc engineering course and assisted Transport Engineering courses.
- Supervised multiple BSc/MSc student theses in Transport, Infrastructure & Logistics.

RESEARCHER & LECTURER | HZ UNIVERSITY OF APPLIED SCIENCES | VLISSINGEN, NETHERLANDS | JAN 2021 – DEC 2021

- Led research Work Packages for large-scale EU & national projects (5G-Blueprint, CATALYST) focused on automated transport and logistics.
- Analyzed business cases and technical requirements for tele-operated transport solutions in logistics as a transition towards full automation showcasing solutions with 25% labor cost reduction while keeping a high level of service (Python simulation tool and visualizations available on my Github).
- Investigated the role of 5G connectivity and regional road authorities in facilitating CAV deployment.
- Developed and coordinated a minor program on "Developing Autonomous Transport Solutions".
- Supervised logistics engineering projects and theses.

RESEARCHER & PHD CANDIDATE | DELFT UNIVERSITY OF TECHNOLOGY | DELFT, NETHERLANDS | AUG 2016 – JAN 2021

- PhD Research Topic: "Design and Optimization of Road Networks for Automated Vehicles".
- Developed novel bi-level optimization models (mixed-integer programming) and highly efficient solution algorithms (evolutionary, local search, stochastic approximation) to design optimal road network configurations for mixed manual/automated traffic and dedicated AV infrastructure in large networks.
- Implemented models using Python (Gurobipy, Docplex), MATLAB, CPLEX, and Gurobi.
- Analyzed spatial and transport impacts of different network design strategies for automated driving using simulation and modeling tools (OmniTRANS, QGIS) with visualizations (matplotlib, folium, QGIS).
- Published findings in leading journals (Computers & Operations Research, Computer-Aided Civil and Infrastructure Engineering, Journal of Advanced Transportation).
- Assisted in teaching graduate courses (Transport Engineering & Optimization, Spatial Modeling).

Education

PHD, CIVIL ENGINEERING (TRANSPORTATION SCIENCE AND TECHNOLOGY) | DELFT UNIVERSITY OF TECHNOLOGY, NETHERLANDS | JAN 2021

Dissertation: Design and optimization of road networks for automated vehicles

MSC, SYSTEMS ENGINEERING (GPA: 3.93/4) | ISTANBUL SEHIR UNIVERSITY, TURKEY | 2016
BSC, INDUSTRIAL ENGINEERING (CUM LAUDE) | ISTANBUL SEHIR UNIVERSITY, TURKEY | 2014

Publications and Presentations

- Authored numerous peer-reviewed articles in high-impact journals (e.g., Expert Systems With Applications, Computers & Operations Research, Computer-Aided Civil and Infrastructure Engineering)
- Presented research at leading international conferences (e.g., TRB, IFORS, EWGT, ITS World Congress). Full list available at: Googlescholar

Languages

- Farsi (Persian): Mother tongue
- Azeri: Bilingual / C2
- English: Full working proficiency / C2
- Turkish: Advanced / B2+
- Dutch: Intermediate / B1+
- French: Basic user / A2