Atabak Mardan, PhD

Senior Data Scientist | Applied AI Product Builder

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PROFESSIONAL SUMMARY

Senior Data Scientist with 8+ years of experience architecting, building, and deploying production-grade AI, Machine Learning, and spatial analytics products across enterprise technology, hospitality, transportation, and the public sector. Proven track record of translating complex operational signals into scalable, cost-efficient systems with measurable P&L impact, including predictive models informing $100M+ marketing campaigns, enterprise entity resolution, and automated Vision-LLM pipelines. Holds a PhD in Transportation Systems and a dual MS in Data Science from George Mason University.

WORK EXPERIENCE

Forward Networks — Santa Clara, CA (Remote)
Data Scientist — **August 2026 - Present**

Choice Hotels International — Rockville, MD
Data Scientist - Applied AI & Customer Analytics — **February 2023 - July 2026**

- **B2B Sales Lead Scoring Product:** Architected an end-to-end AI product to score and rank prospective B2B customers, cutting sales lead research time from an hour to minutes for teams managing 6,000 hotel properties. Delivered an integrated Tableau application merging Salesforce, internal performance data, and third-party vendor APIs, backed by engineered ML and LLM features driving a unified sort score.
- **Predictive Customer Lifetime Value (CLV) Engine:** Developed a cohort-based XGBoost predictive analytics product on 50M+ transaction records with an automated deduplication pipeline, improving customer segment accuracy by 25% and driving targeting decisions for $100M+ in seasonal marketing campaigns.
- **Vision-AI Brand Compliance Product:** Architected an automated Vision-LLM pipeline via AWS Bedrock Batch Inference to evaluate 300,000 marketing images across 6,000 franchised properties for under $1K per full-portfolio run, eliminating $45K in manual contractor audit costs (97% cost reduction) with a projected $5M annual revenue lift.
- **Enterprise Entity Resolution Service:** Shipped a multi-stage data matching pipeline on AWS Glue to reconcile external vendor datasets against 60,000 US hotels using fuzzy matching, geospatial proximity, and LLM-based vector similarity for edge cases, boosting match rates from 50% to 96%.
- **GenAI Climate Risk Application:** Built a portfolio intelligence application for area directors managing 6,000 properties, translating raw climate, solar, EV charging, and national park datasets into intuitive KPIs and integrating Claude via AWS Bedrock to generate actionable, property-specific summaries.

ICF International — Arlington, VA
Lead Transportation Networks Data Scientist — **September 2021 - February 2023**

- **Statewide Traffic Reliability Product:** Built a Python and R analytics engine to compute statewide travel-time reliability KPIs across millions of road segments for the Virginia Office of Intermodal Planning and Investment (OIPI), partnering directly with leadership to deliver a production data asset and methodology reports for statewide planning.
- **Urban Mobility Impact Simulator:** Architected a Python and QGIS isochrone-based spatial modeling engine for NYSDOT along the Bronx Highway corridor to map transit access gaps and quantify how proposed north/south access restrictions would impact resident walking and biking access to transit.
- **National GTFS Evaluation Service:** Engineered an automated Python and GeoPandas spatial buffering pipeline to audit GTFS transit network geometry across nearly 3,000 regional operators for FHWA, ranking structural errors by severity to prioritize national remediation.

C&M Associates — Arlington, VA
Transportation Systems Data Modeler — **August 2019 - September 2021**

- **Predictive Forecasting Pipeline:** Owned the Python, GIS, and data warehouse ingestion pipeline powering long-term traffic and revenue forecasts for state DOT projects including the I-495 toll road extension, automating cleaning, missing-value imputation, outlier detection, and model calibration across 500+ sensor stations.
- **Revenue Scenario Simulator:** Built 30-year traffic and revenue forecasting and sensitivity models in Python and advanced Excel for the Dulles Toll Road strategic plan, modeling toll rate variations and demand elasticities directly with VDOT stakeholders.

George Mason University Fairfax, VA

Data Science Graduate Research Assistant **August 2017 - May 2020**

- **Predictive Modeling & Data Architecture:** Engineered automated API and web-scraping pipelines to construct a centralized spatial traffic inventory, structuring sensor datasets for machine learning, Bayesian and Markov algorithms, and Monte Carlo simulations in peer-reviewed research.
- **Executive Intersection Analytics Dashboard:** Built a public-facing VDOT Tableau application visualizing intersection-level traffic flows, seasonal variation, and data reliability KPIs across 200+ Fairfax sensor stations backed by a relational sensor database.

SKILLS

- **Programming & Querying:** Python (Pandas, NumPy, SciPy, boto3), SQL, R, PySpark, Bash/Linux, Git
- **Generative AI & Agentic Workflows:** Large Language Models (LLMs), AWS Bedrock (Claude, AgentCore, Batch Inference), Agentic Frameworks, Retrieval-Augmented Generation (RAG), Vector Databases & Embeddings, Vision-Language Models (VLMs), Prompt Engineering, LLM Feature Generation & Cost Optimization
- **Machine Learning & Statistical Modeling:** Scikit-learn, XGBoost, PyTorch, TensorFlow, Classification, Regression, Time-Series Forecasting, Bayesian Methods, Hidden Markov Models, Discrete-Choice Modeling, Monte Carlo Simulation, Entity Resolution
- **Data Engineering & Cloud Infrastructure:** AWS (Glue, Redshift, Lambda, S3), Apache Spark, Apache Airflow, ETL/ELT Pipelines, Data Warehousing, Docker, CI/CD, DevOps, Production ML Deployment
- **Product Analytics, BI & Experimentation:** Tableau, Power BI, Streamlit, Plotly, Advanced Excel, A/B Testing & Experimental Design, KPI Design, Customer Lifetime Value (CLV), B2B Lead Scoring, Customer Segmentation, Demand & Revenue Forecasting
- **Geospatial & Network Science:** GeoPandas, Shapely, NetworkX, OSMnx, QGIS, ArcGIS, OpenStreetMap, Isochrone & Routing Optimization

EDUCATION

George Mason University Fairfax, VA

Doctor of Philosophy (PhD), Transportation Systems **June 2025**

George Mason University Fairfax, VA

Master of Science (MS), Data Science (Dual Degree) **May 2019**

Middle East Technical University

Master of Science (MS), Transportation Systems **January 2015**

Azad University

Bachelor of Science (BS), Civil Engineering **May 2009**

SELECTED PUBLICATIONS

- Mardan, A., Qi, Z., Zhu, Z., & Zhu, S. (2026). A theoretic analysis of expressed toll lane pricing policy targeting for a guaranteed level of service. *Transportmetrica A: Transport Science*, 22(1), 2368003.
- Farias, A. V., Zhu, S., & Mardan, A. (2024). An overview of dynamic pricing toll roads in the United States: Pricing algorithms, operation strategies, equity concerns, and funding mechanism. *Case Studies on Transport Policy*, 17, 101226.
- Zhu, Z., Zhu, S., Sun, L., & Mardan, A. (2024). Modelling changes in travel behaviour mechanisms through a high-order hidden Markov model. *Transportmetrica A: Transport Science*, 20(1), 2130731.
- Zhu, Z., Mardan, A., Zhu, S., & Yang, H. (2021). Capturing the interaction between travel time reliability and route choice behavior based on the generalized Bayesian traffic model. *Transportation Research Part B: Methodological*, 143, 48-64.