Mohsen Bahrami
Research Scientist

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Summary

I am a data scientist and business analyst with 9+ years of experience. My work revolves around the integration of data science tools, systems, and mathematical modeling, leveraging diverse data sources, to discover determinants of human decision processes and behavioral patterns to infer and predict outcomes across different operational settings. My work has significant implications for business owners, helping them make well-informed decisions, backed by data-driven evidence.

Areas of Expertise

- Business and marketplace analytics
- Behavioral analytics and consumer choice models
- Predictive modeling focused on firm performance
- Data-driven location decision & accessibility optimization

Professional Experience

Massachusetts Institute of Technology **Cambridge, MA**
Research Scientist (MIT Connection Science) *10/2019 - present*

- Spearheaded the development of the "Atlas of Opportunity", an interactive GIS-based platform, that leverages state-of-the-art computational models and large-scale datasets to make predictions, provide recommendations, and support hypothetical scenario analyses for clients (**Explore V0 at opportunity.mit.edu**).
- Designed and optimized retail space allocation using LLMs and NLP models, that can predict the customer flow 48% more accurate than distance-based models, resulting in tailored business mix strategies that maximize customer engagement.
- Proposed and designed a machine learning model and a behavioral customer scoring system with up to 98% accuracy in predicting timely invoice payments and customer reliability in settling outstanding balances by the due date.
- Initiated privacy-safe data-driven methodologies for SME performance forecasting, and information sharing without sharing data.
- Developed advanced data-driven models for location decision-making and market potential estimation, including new approaches for estimating disaggregated market potential in new markets, enhancing accuracy and applicability.
- Engineered a new method for store closure decision-making to optimize strategic decisions while minimizing customer loss.
- Created innovative methodologies for marketplace and accessibility analyses, benefiting both public and private entities through enhanced strategic planning.
- Guided the evolution of the "VoyageViewer", an open-source tool for studying human mobility, optimized for enhanced data analysis.
- Led strategic initiatives to conduct joint research with major players in finance, telecommunications, and retail, securing over $3,000,000 in sponsored projects, thereby significantly enhancing research impact and practical application. The partners are listed below:
  - Financial Organizations: MasterCard (AI Garage initiative), M&T Bank, BankSA-Westpac, BBVA Bank, Akbank.
  - Telcos, Location Intelligence, & IT Companies: Safegraph, DSpark-Optus, Turktelekom, i2i Systems.
  - Manufacturing & Retail: Filli Boya, Tramontina, Althoff Chain Supermarket Stores.
  - Non-academic Entities: Government of South Australia (Department for Trade & Investment, Department for Infrastructure & Transport, SA Pathology), UNICEF (Big data initiative).

Peak Metrics **Adelaide, South Australia**
Advisory Team Member *06/2020 - 06/2022*

- Drove strategic planning and ideation, leading to the successful acquisition of a $150k government grant for concept development.
- Facilitated regular strategic discussions, driving forward the development of innovative app features and partnerships.

SafeGraph/Placekey **Denver, CO**
Advisory Board Member *05/2021 - 05/2022*

- Advised on key initiatives to enhance data quality and usability for the research community, directly influencing improvements in products and services.

Pak Afzar Aria **Tehran, Iran**
CEO, Co-founder, and Directorate Board Member *10/2010 - 05/2014*

- Directed comprehensive business strategies leading to market segment leadership in electronic manufacturing, recognized with the "Superior Managers of Electricity and Electronics Industry" award in 2011 for a 700% increase in sales.
- Administered critical operations from supplier engagement to product sales, increasing market penetration and brand reputation through strategic presence at more than 10 international and regional exhibitions.

Control Afzar Tabriz **Tehran, Iran**
Machine Software Engineer *09/2007 - 03/2009*

- Prepared programming solutions for production machines, reducing operational time by around 30%.

Poortan **Tehran, Iran**

CRM Software Design & Deployment Team *03/2007 – 08/2007*

- Facilitated the design and implementation of a CRM platform that achieved over 200% increase in sales through strategic telephone marketing, supported by in-depth data analytics.

Education

Ph.D. Operations and Information Management **Sabanci University,** *Istanbul, Turkey (2018)*

MBA Operations Management **Amir Kabir University of Technology,** *Tehran, Iran (2012)*

B.Sc. Electrical Engineering (EECS) **Sharif University of Technology,** *Tehran, Iran (2007)*

Technical Skills

- **Programming Languages:** Python, R, MATLAB.
- **Business Intelligence Tools:** Tableau
- **Databases:** MySQL, PostgreSQL
- **Web Developement Tools:** HTML, CSS
- **Others:** Cloud Computing (AWS), Machine Learning, Deep Learning, Natural Language Processing, Statistical Inference, Time Series, Geographic Information Systems (GIS) & Geospatial analysis.

Selected Publications

- **Bahrami, M.**, et al. (2024). "Investigating Neighborhood Adaptability Using Mobility Networks: A Case Study of the COVID-19 Pandemic.", *Nature Humanities and Social Sciences Communications, 11(1), 1-11.*
- Bueno, B.G.B., Horn, A.L., Bell, B.M., **Bahrami, M.**, et al. (2024). "Effect of mobile food environments on fast food visits.", *Nature Communications, 15, 2291.*
- **Bahrami, M.**, et al. (2023). "Predicting merchant future performance using privacy-safe network-based features.", *Scientific Reports, 13(1), 10073*
- Netto, C. F. S., **Bahrami, M.**, et al. (2023). "Disaggregating Sales Prediction: A Gravitational Approach.", *Expert Systems with Applications, 217, 119565.*
- Horn, A. L., Bell, B. M., Garcia Bulle Bueno, B., **Bahrami, M.**, et al. (2023). "Population mobility data provides meaningful indicators of fast food intake and diet-related diseases in diverse populations.", *npj Digital Medicine 6.1, 208.*
- **Bahrami, M.**, et al. (2022). "Using Gravity Model to Make Store Closing Decisions: A Data Driven Approach.", *Expert Systems with Applications, 205, 117703.*
- Maleki, M., **Bahrami, M.**, et al. (2022). "Social Behavior & COVID-19: Analysis of the Social Factors behind Compliance with Interventions across United States.", *International Journal of Environmental Research & Public Health, 19(23), 15716.*
- Chawla, A., Mulay, N., **Bahrami, M.**, et al. (2022), "Post-pandemic Economic Transformations in the United States of America.", *International Conference on Data Mining Workshops (ICDM 2022), IEEE, 1186-1190.*
- Loaisa, I., South, T., Sanchez, G., Chan, S., Yu, A., Montes, F., **Bahrami, M.**, & Pentland, A. (2022), "Voyage Viewer: Empowering human mobility at a global scale.", *EuroVis Visual Analytics* (EuroVA 2022).
- Suhara, Y., **Bahrami, M.**, et al. (2021). "Validating gravity-based market share models using large-scale transactional data.", *Big Data, 9(3), 188-202.*
- Mulay, N., Bishnoi, V., Katyal, Y., **Bahrami, M.**, et al. (2021), "Effects of Stimulus Payments on Consumer Spending During COVID-19 Pandemic.", *International Conference on Data Mining Workshops (ICDM 2021), IEEE, 873-877.*
- **Bahrami, M.**, et al. (2020). "Economic outcomes predicted by diversity in cities.", *EPJ Data Science, 9(1), 17.*
- **Bahrami, M.**, et al. (2020). "Using Behavioral Analytics to Predict Customer Invoice Payment.", *Big Data, 8(1), 25-37.*
- Ak, R., **Bahrami, M.**, & Bozkaya, B. (2020). "A Time-Based Model & GIS Framework for Assessing Hazmat Transportation Risk in Urban Areas.", *Journal of Transport & Health, 19, 100943.*
- Boz, H. A., **Bahrami, M.**, et al. (2020). "An Exploratory Visual Analytics Tool for Multivariate Dynamic Networks.", *EuroVA.*
- **Bahrami, M.**, et al. (2018). "Twitter Reveals: Using Twitter Analytics to Predict Public Protests.", *NERCCS 2018.*