Mohsen Bahrami

Postdoctoral Research Associate
MIT Connection Science, Institute for Data, Systems, and Society

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Academic & Research Experience

Massachusetts Institute of Technology *Cambridge, MA*
MIT Connection Science, SSRC, IDSS
Postdoctoral Research Associate *Nov 2019 - Present*

Supervisor: Prof. Alex 'Sandy' Pentland

- Have been conducting various research projects in computational social science context.
- Focused on topics concerning human behavior such as mobility, social interactions and influence, commercial activity, and how their behavior can impact the economic outcomes.
- Lead researcher od the **'MIT Big Data Living Lab'** in Adelaide, Australia (https://dti.sa.gov.au/industry/big-data-living-lab). - Developed a website that can be used by the government, residents, academics, and the private and public sectors in South Australia to make informed decisions.
- A first version of the **'Atlas of Opportunity'** that aims to help local small businesses is already deployed and available at https://opportunity.mit.edu/.

This website is being used by 'South Australia Small business commission' and individuals who are planning to start or expand their businesses and need detailed information that could potentially help them make informed decisions.
- Worked as project advisor of the **'VoyageViewer'** platform. VoyageViewer is an online and open source interactive tool, specially designed to study human mobility and migration, available at https://voyageviewer.mit.edu/
- Working with students and researchers with diverse specializations and backgrounds located in eight countries from four continents.

Sabani Business School, Sabanci University *Istanbul, Turkey*
Postdoctoral Research Fellow *Sep 2018 - Nov 2019*

Supervisor : Prof. Burcin Bozkaya

- Conducted research on sales forecasting, market potential prediction, and economic well-being evaluation using spatio-temporal and behavioral features
- Developed mobility models that are capable of predicting future sales for small businesses
- Contributed to the research project on relating mobility behavior to health outcomes, investigating how the visits to fast-food outlets can predict obesity and cardiovascular disease prevalence at neighborhood level.

Massachusetts Institute of Technology *Cambridge, MA*
MIT Media Lab, Human Dynamics Group
Visiting Researcher *Oct 2017 - Apr 2018*

Advisors : Prof. Alex 'Sandy' Pentland, Prof. Burcin Bozkaya, & Prof. Selim Balcisoy

- Conducted research on understanding urban economics and financial well-being using big data analytics under supervision of Prof. Alex 'Sandy' Pentland.
- Developed a gravity model of human flows that can accurately predict the flows in mobility network taking into account the diversity of consumption and ease of access to the amenities.
- Worked as MIT team member in Data for Refugee (D4R) challenge. Investigated multidimensional integration of Syrian refugees in Turkey, using mobile phone metadata and won an honorable mention award in the Social Integration category.

Behavioral Analytics and Visualization Lab, Sabanci University   *Istanbul, Turkey*
Ph.D. Research   *May 2015 - Nov 2019*

Advisors : Prof. Burcin Bozkaya & Prof. Selim Balcisoy

- Worked as a key member of the lab research team since it was founded.
- Led research projects on behavioral analytics using large-scale datasets from finance, insurance, and telecommunication sectors.
- In a joint research with industry, developed a model that could predict the customers invoice payment and could recommend the actions that could potentially decrease the probability of default and delinquency.
- Used credit card transactions to validate the performance of the gravity models for customer patronage behavior.

RESEARCH
INTERESTS

Behavioral Analytics, Business Analytics, Big Data Analytics, Social Networks, Feature Engineering, Supervised & Unsupervised Learning, Predictive Modeling.

RESEARCH
COLLABORATION
WITH INDUSTRY

Financial Organizations: MasterCard (AI Garage initiative), BankSA-Westpac Australia, BBVA Bank Turkey and Mexico, Akbank Turkey.

Telcos, Location Intelligence, & IT Companies: Safegraph USA, DSpark-Optus Australia, Turktelekom, i2i Systems Turkey.

Manufacturing & Sales: Filli Boya Turkey, Tramontina Brazil, Althoff Chain Supermarket Stores Brazil.

GRANTS

FAPERGS: Research Funding Agency of the State of Rio Grande do Sul, Brazil, "Development of a low-cost method for sales and demand forecasting based on spatial models". Amount: R$81,460.00 (2019).

Go2Gov SA: South Australian government's grant for 'Peak', an early stage startup for proof of concept development. Amount: AUD 150K. Helped secure the grant as advisor (2021).

TEACHING
INTERESTS

Business & Data Analytics, Data Mining, Machine Learning, Predictive Modeling, Probability and Statistics, Econometrics, Stochastic Processes.

TEACHING
EXPERIENCE

Sabanci Business School, Sabanci University   *Istanbul, Turkey*
Course Title: Introduction to Data Analysis & Research in Business   *Summer 2019*
Role: Course Instructor
Syllabus: Available here

Management Undergraduate and Business Analytics Minor Programs

- **Audience:** Sophomore and Junior students
- **Course Capacity:** 60 Students
- **Course Type:** Required Course
- **Area Elective course** for undergraduate students in Computer Science & Engineering program
- **Content:** This course teaches practical perspectives on research design, data collection, and analysis useful for managers.
- **Responsibilities:** Designed and wrote the syllabus, presented the lectures and led both teaching and recitation sessions, designed and prepared course projects, homework and exam problems.

Sabanci Business School, Sabanci University *Istanbul, Turkey*
Course Title: Operations Management *Summer 2018*
Role: Course Instructor
Syllabus: Available here

Management Undergraduate Program

- **Audience:** Junior and Senior students
- **Course Capacity:** 30 Students
- **Course Type:** Core Elective course
- **Content:** This course exposes the students to issues such as product and process design, capacity planning, inventory planning, and quality management at varying levels of decision making from strategic to operational.
- **Responsibilities:** Designed and wrote the syllabus, presented the lectures and led both teaching and recitation sessions, designed and prepared course projects, homework and exam problems.

TEACHING
(UPCOMING)

New College of Florida *Sarasota, FL*
Course Title: Applied Machine Learning *Spring 2022*
Role: Course Instructor
Syllabus: TBD

Applied Data Science Graduate Program

- **Audience:** Graduate Students (Master's Degree)
- **Course Capacity:** 25 Students
- **Course Type:** Required Course
- **Content:** The course will cover major techniques in machine learning with hands on programming exercises on example datasets
- **Responsibilities:** to design the syllabus, present the lectures, hold office hours, prepare homework, class projects, quizzes and exams

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PUBLICATIONS
(REFEREED
JOURNALS)

Bahrami, M., Bozkaya, B., & Balcisoy, S. (2020). "Using Behavioral Analytics to Predict Customer Invoice Payment", *Big Data, 8(1), 25-37.*

Chong, S. K.*, **Bahrami, M.***, Chen, H., Balcisoy, S., Bozkaya, B., & Pentland, A., (2020). "Economic outcomes predicted by diversity in cities", *EPJ Data Science, 9(1), 17.*

Ak, R., **Bahrami, M.**, & Bozkaya, B. (2020), "A Time-Based Model and GIS Framework for Assessing Hazmat Transportation Risk in Urban Areas", *Journal of Transport & Health, 19, 100943.*

Suhara, Y., **Bahrami, M.**, Bozkaya, B., & Pentland, A. S. (2021). "Validating gravity-based market share models using large-scale transactional data". *Big Data, 9 (3), 188-202.*

BOOK CHAPTERS	Bakker, M. A., Piracha, D. A., Lu, P. J., Bejgo, K., **Bahrami, M.**, Leng, Y., ... & Bozkaya, B. (2019). "Measuring fine-grained multidimensional integration using mobile phone metadata: the case of Syrian refugees in Turkey", *In Guide to Mobile Data Analytics in Refugee Scenarios (pp. 123-140)*. Springer, Cham. **NOTE:** This research won an **'honorable mention award'** in Data for Refugee challenge (D4R). Loaiza Saa, I., Serena Chen, Sánchez Sarmiento, G. A., **Bahrami, M.**, & Pentland, A. "Voyage Viewer: A Visual Multivariate Dynamic Exploration Tool for Migration and Mobility Studies", *To be Published in "Data Science for Migration and Mobility" book by Oxford University Press. (Expected publication date is February 2022).*
CONFERENCE PROCEEDINGS PAPERS	Boz, H. A., **Bahrami, M.**, Suhara, Y., Bozkaya, B., & Balcisoy, S. (2020). "An Exploratory Visual Analytics Tool for Multivariate Dynamic Networks", *EuroVis Visual Analytics* (EuroVA 2020).
MANUSCRIPTS UNDER REVIEW	Netto, C. S. F., **Bahrami, M.**, Brei, V. A., Bozkaya, B., Balcisoy, S., & Pentland, A., "Gravitational Sales Prediction", *under review by Marketing Science Journal*. **Bahrami, M.**, Findik, Y., Bozkaya, B. & Balcisoy, S. "Twitter Reveals: Using Twitter Analytics to Predict Public Protests", *under review by SNAM, (arXiv preprint arXiv:1805.00358 (2018).)* Maleki, M.*, **Bahrami, M.***, Menendez, M., & Balsa-Barreiro, J., "People in Pandemic: Factors Impacting Compliance with Interventions", *under review by Sustainability Journal*.
WORK IN PROGRESS	**Bahrami, M.**, Xu, Y., Tweed, M., Bozkaya, B., & Pentland, A., "Making Hard Decisions: Which Stores to Close?". **Bahrami, M.***, Suhara, Y.*, Boz, H. A., Balcisoy, S., Bozkaya, B., & Pentland, A., "Merchant Life in the Network: Predicting Merchant Financial Well-being Using Network Features". Boz, H. A., **Bahrami, M.**, Mazar, N., Nicholas, A., Bozkaya, B., Balcisoy, S., & Pentland, A. "A network analysis perspective to understanding the impacts of the COVID-19 pandemic". Haupt, A.*, **Bahrami, M.***, Salhab, R.*, & Pentland, A., "Limitations and Opportunities of Global and Local Pandemic Closure Policies". Tanvir, A., Kaya, E., **Bahrami, M.**, Monti, F., Balcisoy, S., Lepri, B., Bronstein, M., & Bozkaya, B., "Customer Churn and Co-churn Prediction Using Geometric Deep Learning". **Bahrami, M.**, Bishnoi, V., Mulay, N., Saraswat, A., Katyal, Y., Rajput, N., Moro, E., & Pentland, A., "Effects of Stimulus Payments on Consumer Spending During COVID-19 Pandemic". **Bahrami, M.**, Bishnoi, V., Mulay, N., Saraswat, A., Katyal, Y., Rajput, N., Moro, E., & Pentland, A., "Understanding The Relocation of Economic Activities as a Result of COVID-19 Pandemic". Horn, A., Bell, B., Garcia Bueno, B., **Bahrami, M.**, Bozkaya, B., Cui, Y., Wilson, J., Pentland,

A., Moro, E., & de la Haye, K., " Investigating whether visits to fast food outlets observed in population-level mobility data are a meaningful indicator of dietary intake and diet-related disease!".

Garcia Bueno, B., Horn, A., De La Haye, K., **Bahrami, M.**, Bell, B., Bozkaya, B., Pentland, A., & Moro, E., "Leveraging Big Mobility Data to Understand Food Access and Eating Behavior Beyond the Neighborhood".

SEMINARS &
INVITED TALKS

Leveraging Big Mobility Data to Understand Food Access and Eating Behavior Beyond the Neighborhood, *SAHMRI Scientific Seminar, Adelaide, South Australia* (May 2021).

A network analysis perspective to understanding the impacts of COVID-19 on mobility patterns, *Placekey Seminar Series* (April 2021).

Making hard decisions: Which stores to close?, *Placekey Seminar Series* (November 2020).

Understanding Social and Economic Impact of the Outbreak using Mobility Data, COVID-19: An Interdisciplinary Approach to the Understanding of a Pandemic course offered at *New College of Florida* (September 2020).

Data-driven insights for Tourism Industry, *'Tourism Meets Tech' Seminar by FOMENT, Adelaide, South Australia* (June 2020).

Merchant Life in the Network: Predicting Financial Well-being Using Network Features, *Sabanci University Science Seminars: 'Science Never Stops'* (May 2020).

Economic outcomes predicted by diversity in cities, *MIT Connection Science Trusted Data* (March 2020).

Good Cities Are Goods, *CITIES4PEOPLE: INTELLIGENT DATA ANALYTICS FOR NEXT-GEN CITIES, JADS campus in 's-Hertogenbosch, The Netherlands* (November 2018).

Using Predictive Analytics to Learn and Predict Customer Invoice Payment Behavior, *Seminar Series #2, BAV Lab, Sabanci University, Istanbul, Turkey* (October 2016).

CONFERENCES

Bahrami, M., Xu, Y., Tweed, M., Bozkaya, B., & Pentland, A., Making Hard Decisions: Which Stores to Close?, *European Conference on Operational Research (EURO 2021), Athens, Greece*, (July 2021).

Bozkaya, B., Netto, C.F.S., Bahrami, M., Brei, V., Balcisoy, S., & Pentland, A., Gravitational Forecasting Reconciliation: Sales prediction without historical data, *LOD 2020 – The Sixth International Conference on Machine Learning, Optimization and Data Science* (July 2020).

Bahrami, M., Horn, A., De La Haye, K., Pentland, A., & Moro, E., Leveraging Big Mobility Data to Understand Food Access and Eating Behavior Beyond the Neighborhood, *IC2S2, Cambridge, MA, USA* (July 2020).

Bahrami, M., Suhara, Y., Boz, H. A., Balcisoy, S., Bozkaya, B., & Pentland, A., Merchant Financial Well-being Prediction Using Network Features, *IC2S2, Cambridge, MA, USA* (July 2020).

Netto, C.F.S., Bahrami, M., Brei, V., Balcisoy, S., Bozkaya, B., & Pentland, A., GRAVITATIONAL FORECAST RECONCILIATION, *42nd Annual ISMS Marketing Science Conference,*

Durham, NC, USA (June 2020).

Bahrami, M.., Chong, S. K., Chen, H., Balcisoy, S., Bozkaya, B., & Pentland, A., *International Conference of Social Computing, Beijing, China* (August 2019).

Bozkaya, B., Chong, S.K., Bahrami, M., Chen, H., Balcisoy, S. & Pentland, A., Exploring Drivers for Economic Growth Using Mobility and Transactional Data, *Challenges of Europe 2019, Bol, Croatia* (May 2019).

Bozkaya, B., Bahrami, M., Suhara, Y., Chong, S.K., Chen, H., Balcisoy, S. & Pentland, A., Human Mobility Networks: Using Gravity Models to Explain Food Foraging Behavior and More, *NetSci 2019, Burlington, VT, USA* (May 2019).

Suhara, Y., Bahrami, M., Bozkaya, B., & Pentland, A., A Gravity Model Of Market Share Based On Transaction Records, *Ninth International Conference on Complex Systems, ICCS 2018, Cambridge, MA, USA* (July 2018).

Bahrami, M., Findik, Y., Bozkaya, B. & Balcisoy, S., Twitter Reveals: Using Twitter Analytics to Predict Public Protests, *NERCCS 2018: First Northeast Regional Conference on Complex Systems. Binghamton, NY, USA* (April 2018).

Suhara, Y., Bahrami, M., Bozkaya, B. & Pentland, A., A Gravity Model of Market Share Based on Transaction Records, *INFORMS Business Analytics Conference, Baltimore, MD* (April 2018).

Bahrami, M., Bozkaya, B. & Balcisoy, S., Using Predictive Analytics to Learn and Predict Customer Invoice Payment Behavior, *IC2S2 2017, Cologne, Germany* (July 2017).

WORKSHOPS

Boz, H. A., Bahrami, M., Suhara, Y., Bozkaya, B., & Balcisoy, S., An Exploratory Visual Analytics Tool for Multivariate Dynamic Networks. *11th Workshop on Visual Analytics (EuroVA), a co-lacted event in EuroVis* (May 2020).

Bahrami, M., Findik, Y., Bozkaya, B. & Balcisoy, S., Twitter Analytics Predict Public Protests, *ECSCW 2019 Materializing Activism Workshop, Salzburg, Austria,* (June 2019).

Bahrami, M., Chong, S. K., Chen, H., Balcisoy, S., Bozkaya, B., & Pentland, A., Good Cities are Goods, *2019 Workshop on Business Analytics, Sabanci University, Istanbul, Turkey* (April 2019).

EDUCATION

Sabani Business School, Sabanci University   *Istanbul, Turkey*
Ph.D. in Operations and Information Management   *2018*
Dissertation Title: Behavioral Analytics: Understanding Individual and Group Behavior Using Transactional Big Data
Advisors: Prof. Burcin Bozkaya, Prof. Selim Balcisoy, and Prof. Alex 'Sandy' Pentland

Amir Kabir University of Technology (Tehran Polytechnic)   *Tehran, Iran*
Master of Business Administration   *2012*
Project Title: A Risk Breakdown Structure for New Telecom Operator "RighTel"
Advisor: Prof. Hooman Attar

Sharif University of Technology   *Tehran, Iran*
B.S. in Electrical Engineering   *2007*
Thesis Title: Computational Methods for Calculating Electromagnetic Fields of Geometric Shaped Wires
Advisor: Prof. Bijan Vosooghi Vahdat

Reviewer Services

Big Data Journal (Marry Ann Liebert), International Journal of Forecasting (Elsevier), International Journal of Information Management (Elsevier), Journal of Transport & Health (Elsevier), Array (Elsevier), Complexity (Hindawi).

Community Services

Program Committee Member for International Workshop on Modelling Uncertainty in the Financial World (MUFin21), 30th ACM International Conference on Information and Knowledge Management (CIKM2021), Gold Coast, Australia (November 2021).

Program Committee Member for Workshop on Business Analytics, Sabanci University, Istanbul, Turkey (April 2019).

Poster Session Moderator for International Conference on Computational Social Science (IC2S2 2020), Cambridge, MA, USA (July 2020).

Industry & entrepreneurial Experience

Peak
Startup for the tourism, events & Festival space   *Adelaide, South Australia*
Advisory Team Member   *June 2020 - Present*

- Peak is a new digital product for the tourism, events & festival space. It is a big data dashboard that can be used by tourism agencies, festivals, and event organizers to gain insights about visitors.
- Actively involved in conceptualizing and idea generation for this startup.
- Attend regular meetings with the team and founders to discuss the next steps and further development of the app.
- Helped secure a grant of $150k as advisor from the government of South Australia (Go2Gov) for proof of concept development.

Safegraph
A location intelligence company   *Denver, CO*
Advisory Board Member   *May 2021 - Present*

- Provide feedback on the existing initiatives & help the team with ideas that can improve their services and better support the research community.

Pak Afzar Aria PJS co.
An electricity management products assembly and sales company   *Tehran, Iran*
CEO, Co-founder, and Member of Directorate Board   *October 2010 – May 2014*

- Recommended financial, marketing, and competition strategies.
- Managed the task related to finding suppliers, importing goods, assembly, and sales of the products including: transformers, UPS, voltage stabilizers, and small sized CNC machines.
- Participated in more than ten International Exhibitions.
- Achieved the award of "Superior Managers of Electricity and Electronics Industry" conference in Tehran, Iran, at 2011.

Poortan Ltd.
A call center based sales company *Tehran, Iran*
CRM Software Implementation Project Manager *March 2007 – July 2007*

- Contributed to design and implementation of a CRM system for a call center and telephone marketing company
- Performed statistical analysis and helped with model building for the system

PROFESSIONAL
AFFILIATIONS

National Postdoctoral Association (NPA) *July 2021 - Present*

Marketing Science Institute (MSI) *July 2021 - Present*

UNICEF big data initiative, Magic Box *April 2020 - Present*

Beta Gamma Sigma (BGS) *November 2019 - Present*

INFORMS *March 2018 - Present*
Institute for Operations Research and the Management Sciences