Navid (David) Kalantari, PhD

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I have **17+ years** of experience in **statistical Modeling** and **machine learning**. Although most of my experience is related to transportation system modeling, I have applied most **statistical Modeling**, **machine learning, data center modeling,** and **marketing** tools to diverse applications such as **marketing, real estate**, **economy**, and **socioeconomic** prediction. I have a solid understanding of statistics in various fields, including **Statistical Modeling, Sequence Modelling, Natural Language Processing, Image Processing, and Big Data**. I do not need sponsorship and am pursuing a **machine learning**, **data scientist, modeler,** or **visualizer position**.

# Technical Skills

## Skilled in:

* **Data Management and Data Base** Development
* **Statistical Modeling** in marketing and socioeconomic systems
* **Computer Programming** and developing scripts for data analysis, management, and visualization
* **Cloud Computing** to apply machine learning tools

#### **Machine Learning and Artificial Intelligence** and developing supervised and unsupervised learning and optimization models in time series (sequence) models, Natural Language Processing (NLP, transformers including BERT, T5, XLNET, etc.), Image Processing (convolutional networks, object detection with RESNET, LENET, YOLO, MASK RCNN, MobileNet, style transfer, etc.).

* **Mathematical Optimization** includes linear, nonlinear Optimization, and heuristic algorithms

## **Project Management**

* **Big data**

## Experienced in:

* Worked with **R**, **Python** (Scikit, TensorFlow, etc.) to model travel demand, marketing, real estate, and socioeconomic data and apply Machin Learning algorithms (including **Neural Networks (CNNs, RNNs, and Transformers), Support vector Machin, K-Nearest Neighborhood**, **Regression Tree, Random Forest, Booting methods, Generalized Additive Models,** etc.
* Worked with **Power BI, Tableau, QGIS,** and **ArcGIS** for data visualization and presentation
* Formulated and implemented numerous **Mathematical Optimization** models using

#### **GAMS** and customized codes

* Hands-on experience in **Project Management** at different levels (lead, manager, and CEO)
* **Client Interaction** and **Presentation,** including public meetings and meetings with local, State, Federal, and International Stakeholders

#### Experience in Maintaining and Modification of **Software Codes** in C++, Java, and C#.

* Developing **Statistical Models** including **regularized regression**, **time series and state-space models**, **discrete choice**, and **simulation** models in many different disciplines.

#### Hands-on experience in working with **AWS** machines, redshift, s3, ec2.

* Big Data analysis with **scala/spark, dask, vaex,** and **pyspark**.

## Software Capabilities

GIS Tools: **QGIS**, Arc GIS Database Tools: **SQL**, Access

Machin Learning Tools: **R**, **Python**, Matlab, **TonsorFlow, Pytorch,**

Cloud Computing Tool: **AWS**, **MS Azure, GCP**

Econometrics Tool: R, Python, **SPSS**, LINDEP, GUASS, **SAS**, PythonBiogem, NLogit Programming Tools: **C/C++,** C#, Batch Programming, Python, R, Scala, Matlab, Visual Basic, FORTRAN

Operation Research Tools: GAMS, Lingo Data Visualization Tools: **Power BI**, **Tableau**

General Software Tools: MS Office, Photoshop, MS Project, Jira Big Data Tools: **Spark, Dask, Vaex**

# Work Experience

#### The work experiences listed below are classified based on the subject matter. I chose this way of presentation because of the wide domain of data analysis and modeling work in the projects that I was involved in and to add clarity to the methods and tools I have used in them—just naming the title of the projects my not completely convey all the work and tools that were used in each project. More information and details could be provided upon request. Some of my **more recent** project experiences include:

Project: ChatBot Finetuning for Healthcare

Role: Lead Data Scientist

Location: Snowrelic, Remote, USA

Duration: Ongoing

This is an ongoing project that has been recently started. In this project we are gathering some example chats from transcripts of the existing CRM. There chats are being used to finetune Open AI ChatGPT using LoRA.

Project: Churn Prediction Modeling

Role: Lead Data Scientist

Location: Snowrelic, Remote, USA

Duration: 6 Months

Description: In this project, I developed a churn prediction model and implemented a retraining and inference pipeline on AWS. The project involved model error analysis and monitoring as well as classification modeling.

Project: Impact Tracking

Role: Lead Data Scientist

Location: Snowrelic, Remote, USA

Duration: 6 Months

Description: In this project, I developed an analysis procedure to investigate the effect of some health incentives on patients. The model scored the control and treatment samples, estimated the propensity score, and developed multiple classification models.

Project: Pipeline Optimization

Role: Lead Data Scientist

Location: Snowrelic, Remote, USA

Duration: 12 Months

Description: In this project, I developed an optimization model to optimize the scheduling of commodities in the pipeline. In addition, machine learning models were developed to identify parcels within each batch of the commodity shipped. This was developed using statistical modeling techniques. The model also involved a metaheuristic model sitting on top of a simulator developed by the team. I was responsible for developing all the methodologies and oversight the development.

Project: Data Center Simulation

Role: Lead Data Scientist

Location: Snowrelic, Remote, USA

Duration: 6 Months

Description: In this project, I developed a Deep learning model to expedite the simulation of data in large-scale data centers. The model replicated the results of the NS3 simulator. The deep learning model was implemented in C++.

Project: Stock Market Manipulation Identification

Role: Senior Data Scientist

Location: Snowrelic, Remote, USA

Duration: 5 Months

Description: In this project, I developed and validated different machine learning and deep learning model to identify various market manipulation patterns such as Marketing the Close, Layering, Front Running, and Resting Orders. The model included Random Forest, Autoencoders, Deep Learning and Bayesian Neural Networks.

Project: Text Summarization Model and Classification

Role: Senior Data Scientist

Location: Snowrelic, Remote, USA

Duration: 1 Month

Description: In this project, I developed a text summarization model based on BERT, XLNet, and T5 models to summarize comments and classify them based on the departments within the client’s organization.

Project: Quantization of Deep Neural Network Models

Role: Senior Data Scientist

Location: Snowrelic, Remote, USA

Duration: 3 Months

Description: In this project, I implemented different quantization and model pruning techniques on DNN models. In particular, I worked on the BERT model and the RESNET model. The project was an R&D model for implementation in new hardware.

Project: Production Line Monitoring using Computer Vision

Role: Senior Data Scientist

Location: Snowrelic, Remote, USA

Duration: 3 Months

Description: A computer vision model (YOLO) was used to identify production line issues such as missing pieces is the production line. The model finetuning involved multiple data augmentation methods.

Project: New Vehicle Sales Projection

Role: Senior Data Scientist

Location: Autometrics, Remote, USA

Duration: 21 Months

Description: In this project, I developed an ensemble model of an LSTM, UCM, and Profit model to predict the sale of new vehicles. The projection was targeted for a 3-month prediction. A GAM model was used to aggregate the results.

**Some other projects**

**AECOM**, Arlington, VA, USA, Feb 17- Oct 2019, *Modeling Consulting Manager*

* Estimation of TransForm Activity Base Model, Prince George County, MD
* Freight Corridor Analysis
* Denver Regional Transportation District COMPASS Model Update, Denver, CO
* Rhodes Island Statewide Travel Demand Model Update, RI
* MIXMASTER Travel Demand Forecasting, Waterbury, CT
* Metro Station Studies, Washington DC, WMATA
* Impact of Autonomous Vehicle in the DC Area
* TradeMark East Africa (TMEA) IMPACT model, World Bank
* Australian Capital Territory (ACT) Travel Demand Forecasting Model, Canberra, Australia

**ATCS P.L.C.,** Washington DC, USA, May 15- Feb 17**,** *Senior Modeler*

* Removal of Harrison Street Connector in Town of Leesburg
* Traffic Study of US29/US15 in Prince William County
* Preparation of Multiple Project Proposals
* Conversion of the HOV Designation of I-66 Outside the Beltway
* Safety Analysis of I-66 Inside the Beltway Widening
* Design Exceptions and Waivers of I-66 Inside the Beltway Widening
* Analysis of Alternative Technical Concepts for I-66 outside the Beltway
* Toll and revenue study of I-66 outside loop
* Toll and revenue study of I-66 Inside loop

[**Rahbord Taradod Farda (RTF) Consultant**](http://www.fa.rtf.ir/), Tehran, Iran, Apr 11 – May 15, *Head of Modeling and Data Science Department*

* Transportation Comprehensive Plan (TCP) of [Kish](http://en.wikipedia.org/wiki/Kish_Island) Island
* Transportation Comprehensive Plan (TCP) of the City of [Gorgan](http://en.wikipedia.org/wiki/Gorgan)
* Traffic study of Sayad Shirazi Tunnel in [Tehran](http://en.wikipedia.org/wiki/Tehran)
* Travel time estimation of arterials using transit probe vehicles in the City of Tehran
* Traffic studies of district #14 of Tehran
* Integrated pricing of transportation system in the City of Tehran
* Peer review of Urban Freight Planning Manual of Iran
* Sustainable evaluation system for the City of Tehran
* Analysis of the traffic data in the City of [Mashhad](http://en.wikipedia.org/wiki/Mashhad)
* Sensitivity analysis of travel demand to different transportation system variables in the City of Tehran
* Estimation of the systemic cost of different modes of transport in the City of Tehran
* Air and noise pollution master plan of the City of Tehran
* Design of the earthquake emergency transportation network of the City of Tehran
* Calibration of traffic simulation software for the City of Tehran
* Calibration of pedestrian simulation models for the City of Tehran
* The design of underground areas in the City of Tehran
* Traffic Impact Study of 3 different sites in the City of Tehran:

[**Tarh-e-Haftom Consultant**](http://www.tarhehaftom.com/en_index.htm), Tehran, Iran, Apr 09 – Apr 11, *Senior Modeler*

* Ground access comprehensive plan of Imam Khomeini International Airport ([IKIA](http://en.wikipedia.org/wiki/Tehran_Imam_Khomeini_International_Airport))*.*
* Transportation Comprehensive Plan (TCP) of the City of Mashhad, [Urmia](http://en.wikipedia.org/wiki/Urmia), and [Arak](http://en.wikipedia.org/wiki/Arak,_Iran)
* Comprehensive Plan of the City of [Quchan](http://en.wikipedia.org/wiki/Quchan)
* Design of the BRT network of the City of Tehran

[**Tehran Transportation and Traffic Organization**](http://trafficorg.tehran.ir/), Tehran, Iran, Apr 07 – Apr 09, *Modeler*

* Modification of Tehran’s bus network
* Rule and regulation of taxies cabs in the City of Tehran
* Planning of school bus operation in Tehran
* Traffic studies
* Peer review of Road Safety Audit Manual of Iran*.*
* Feasibility study of disaster management in Iran’s road network

[**Atyeh Saz Consultant**](http://www.atiesaz.com/pages/darbare.htm), Tehran, Iran, Apr 05 – Apr 07, *Traffic Engineer* ,

* Traffic studies

# Education

BS in Civil Engineering*, Tehran Central University*, Tehran, Iran, May 2003. Some specific activities include:

* Transportation and traffic engineering: *Signal Setting, Geometric Design, and Marking*
* Pavement design and Soil Mechanics: *Using AASHTO*
* Design and analysis of steel and concrete structures: *Design of 6 Story Buildings*
* Structural analysis: *Matrix Analysis*

MSc in Transportation Planning*, Iran University of Science and Technology*, Tehran, Iran, Feb2006 Thesis with [Dr. Shariat,](http://www.iust.ac.ir/find.php?item=32.6143.7365.en) Subject: *Identification of a risk index for the road network in case of major disasters*. Some specific researches include:

* Public transportation network design:
* Traffic simulation and Modeling: *Car Following, Lane Changing, Shock Wave Analysis*
* Intelligent Transportation Systems: *Probe Vehicles, Travel Time Estimation, APTS*

Ph.D. in Transportation Planning*, Iran University of Science and Technology*, Tehran, Iran, Nov 2012 Dissertation with [Dr. Afandizadeh](http://www.iust.ac.ir/find.php?item=32.6111.7217.en), Subject: *Multi-modal network design in urban transportation networks*. Some specific researches include:

* Econometric modeling and advance travel demand modeling: *Activity Base Modeling, Trip Scheduling, Discrete choice modeling*
* Congestion pricing: *First Best and Second-Best Pricing, Multiclass Pricing, Cordon Pricing*
* Public transport planning: *Route Design, Network Modification, Time Table setting, Fleet Assignment*
* Micro and Macroeconomics: *Welfare Economy, Taxation, Subsidies, Consumer Surplus, Social Welfare*
* Transportation network analysis: *Traffic Assignment, Dynamic Traffic Assignment, Public Transport Assignment, Network Design*

PostDoc Associate, *University of Maryland*, College Park, MD, USA March 2019.

Research on Statistical Modeling, Discrete Choice models, Data mining, and Activity-Based Modeling.

# Certificates

* Data Science Certificate*: John Hopkins University*, Washington DC, USA.
* Machine Learning Certificate: *Stanford University*, USA.
* TensorFlow Certificate: *Deeplearning.ai*.
* Deep Learning Specialization: *Deeplearning.ai.*
* Natural Language Processing: *Deeplearning.ai.*
* Machine Learning Engineering for Production (MLOps): *Deeplearning.ai.*
* Advance Data Science with IBM: IBM
* AWS Certificate: Certified in Machin Learning and Amazon SageMaker.

# Some Papers

### Peer Review Journal Papers

* 1. Shahriar Afandizadeh, Diyako Sharifi, Navid Kalantari, Hamid Mirza Hossien, Using Machine Learning Methods to Predict Electric Vehicles Penetration in the Automotive Market, Scientific Reports, 2023
  2. Hamid Mirza Hossein, Ali Bakhtiari, Navid Kalantari, Inferring Socioeconomic Characteristics from Travel Patterns, Journal of Regional and City Planning, 2023.
  3. Navid Kalantari, Hamid Mirzahossein, Pooyan Najafi, Travis Waller, and Xiang Zhang Continuous Network Design Using Partial Linearized Subgradient Methods, Transportation Research Record, 2023
  4. Mohammad Ali Arman, Navid Kalantari, Abolfazl Mohammadian- Joint Modelling of Household Vehicle and Activity Allocation: Statistical analysis and discrete choice modeling approach, *Transportation research record,* 2015
  5. Navid Kalantari, S. Jusseph Sajedi, Ramin Khavarzade, Abolfazl Mohammadian Willingness-to-Pay Method to Estimate Effect of Accessibility on Property Price, *Transportation research record,* 2014
  6. Hojjat Rezaeiestakhruie, Navid Kalantari, Mohsen Babaei- New Methodology for Synthesizing Population in Metropolitans- *Journal of Traffic and Transportation Engineering*, 2014
  7. Shahriar Afandizadeh, Mohammad Ali Arman and Navid Kalantari – An ant colony system algorithm for the time-dependent network design problem- *International Journal of Optimization in Civil Engineering*, 3(4), pp: 511-526., 2013
  8. Shahriar Afandizadeh, Navid Kalantari, and Hojjat Rezaeestakhruie- A Partial Linearization Method for Multi-Objective Continuous Network Design Problem with Environmental Considerations - *International Journal of Environmental Research*, Volume 6, Number 2, Spring 2012
  9. Shahriar Afandizadeh, Arash Jahangiri, Navid Kalantari -Identifying the optimal configuration of one-way and two-way streets for contraflow operation during an emergency evacuation, Natural *hazards*, 2012
  10. Shahriar Afandizadeh, Seyed Bahman Moghimidarzi and Navid Kalantari- Presenting an Optimization Model for Signal Setting - *Asian Journal of Industrial Engineering*, Volume: 4, Issue: 1, 2012
  11. Shahriar Afandizadeh, Maryam Yadak, Navid Kalantari -Simultaneous Determination of Optimal Toll locations and Toll Levels in Cordon-Based Congestion Pricing Problem (Case Study of Mashhad City)- *International Journal of Civil Engineering*, Volume 9, Number 1, 2011
  12. Arash Jahangiri, Shahriar Afandizadeh, Navid Kalantari - The Optimization of Traffic Signal Timing for Emergency Evacuation using the Simulated Annealing Algorithm - *Transport*, Volume 26 Number 2, 2011
  13. Shahriar Afandizadeh, Amir Hossein Zahabi, and Navid Kalalntari- Estimation of Logit models by Simulated Annealing: Case study of Isfahan- *International journal of civil engineering, Iran University of science and technology*-March 2010

### Conference Papers

* 1. Samaneh Khazraeian, Farshad Koohifar, Navid Kalantari - A Nonlinear Optimal Static Controller for Ramp Control (NOSCO) - *Transportation Research Board 96th Annual Meeting, 2017*
  2. Ramin Khavarzadeh, Navid Kalantari - Trip Purpose Estimation by Canonical Discriminant Analysis - *Transportation Research Board 94nd Annual Meeting, USA, 2015*
  3. Mohammad Hossein Zamanian, Navid Kalantari, Mehdi Amiripour- Bus Network Modification Problem: New Approach to Bus Network Design - *Transportation Research Board 93nd Annual Meeting, 2014*
  4. Hojjat Rezaeestakhruie, Navid Kalantari and Mohsen Babaei-Modelling Framework for Airport Access Mode Choice Behavior considering the Effect of Meeters and Greeters - *Transportation Research Board 92nd Annual Meeting, USA, 2013*
  5. Mohammad Ali Arman and Navid Kalantari - Statistical Modelling of Children's Travel Behaviour: Some Evidence on Cultural Effects- *Transportation Research Board 92nd Annual Meeting, USA, 2013*
  6. Hojjat Rezaeestakhruie, Mohsen Babaei, and Navid Kalantari – Mode Specific Value of Time and Value of Reliability for Different User Classes in Iran- *Transportation Research Board 92nd Annual Meeting, USA, 2013*
  7. Shariar Afandizadeh, Hasan Khaksar, and Navid Kalantari - Bus Network Design by Considering the Location of Depots: A Case Study of Mashhad - *Transportation Research Board 92nd Annual Meeting, USA, 2013*
  8. Mohammad Ali Arman and Navid Kalantari, - Statistical and Analytical Modeling of Children's Travel Behavior: Some Evidence on the Cultural Effects - *Transportation Research Board 92nd Annual Meeting, USA, 2013*
  9. Hojjat Rezaeiestakhruie, Navid Kalantari, Mohsen Babaei- New Methodology for Synthesizing Population in Metropolitans- *Australasian Transport Research Forum,* 2013
  10. Shahriar Afandizadeh, Hajar Hajmohammadi, Navid Kalantari, A Meta-Heuristic Approach to Optimal Coordinated Design of Variable Speed Limits and Ramp Metering, *10th International Congress on Advances in Civil Engineering, Middle East Technical University, Ankara, Turkey, 2012*
  11. Shahriyar Afandizadeh, S.A.H. Zahabi, Navid Kalalntari- Forecasting the traffic share and environmental impacts of BRT using discrete choice models case study of Isfahan- *8 international conferences on civil engineering, 2011*
  12. Navid Kalantari, Shahriar Afandizadeh, Hassan Khaksar- fleet optimization in urban public transportation networks- *International conference on transportation engineering- Swiss, 2008*
  13. Navid Kalantari, Afshin Shariat, Morteza Khashaypour- Urban transportation network prioritization and importance for emergency rescue- *International conference on urban disaster reduction, Taiwan 2006*
  14. Navid Kalantari, Afshin Shariat, Masoud Khodadadiyan- Routing of Hazmats for risk reduction- *International conference on urban disaster reduction, Taiwan, 2006*
  15. Navid Kalantari, Shahriar Afandizadeh-Multi modal accessibility assessment of the urban area in disasters- *International conference on urban disaster reduction, Taiwan 2006*
  16. Navid Kalantari, Afshin Shariat Risk Assessment of Road Transportation Network Based on Accessibility- *International conference on disaster management, 2005*
  17. Navid Kalantari, Afshin Shariat Road Network Accessibility Reliability in Incidents-

*International conference on supply chain management, Germany, 2004*

* 1. Navid Kalantari, Afshin Shariat-Prioritization of Road network Seismic retrofitting -

*International conference on highway and bridge retrofitting, FHWA, USA, 2004*