

## Research Profile

---

My research focuses on applying statistical and machine learning techniques to real life problems, particularly in energy research. I am interested in problems involving forecasting (particularly time series), classification, using deep learning and tree based methods. My research interests further include an array of multidisciplinary research involving methods of machine learning in fields ranging from railway industry, energy industry, hydrology and flood prediction, civil engineering systems, and pharmaceutical science.

## Education

---

**Heriot-Watt University****Oct 2019 – Dec 2022 (Expected)***PhD in Civil Engineering**Edinburgh, United Kingdom*

- Advisors: Dr Sandhya Patidar and Dr David Jenkins
- Thesis: Developing a hybrid system of data-centric approaches for energy demand analytics.

**University of Tehran****Oct 2015 – Oct 2018***MSc in Engineering Geology**Tehran, Iran*

- Advisors: Dr Jafar Hassanpour and Dr Akbar Cheshomi
- Thesis: Evaluating interaction of underground excavations and groundwater resources based on experiences gained from long water conveyance tunnelling projects in Iran.

**University of Tehran****Mar 2011 – Oct 2015***BSc in Geology**Tehran, Iran*

- A four-year degree where I've studied courses such as Optical Mineralogy, Environmental Geology, Structural Geology, Palaeontology, Tectonics, Stratigraphy, Petroleum Geology, Hydrogeology, Rock Mechanics and Engineering Geology.

## Experience

---

**Siemens****May 2022 – Present***Researcher (Part-time)**London, United Kingdom*

- Developing a deep neural network based approach for rolling bearing fault diagnosis of high speed trains.
- Investigating effectiveness of various preprocessing methods (i.e. FFT and WT) on vibration measurements in improving the model classification accuracy.
- launching a transfer learning framework to diagnose bearing fault of unlabelled acoustic datasets.

**Heiort-Watt University****Oct 2019 – Present***PhD Researcher**Edinburgh, United Kingdom*

- Developing a residential load forecasting framework utilising CNN-LSTM network with empirical mode decomposition and bayesian optimisation
- Designing a machine learning based system for data imputation in energy demand analytics

**Heiort-Watt University****Sep 2021 – Jan 2022***PostDoc Researcher**Edinburgh, United Kingdom*

- Worked for four months on a hydrology project in collaboration with Indian Institute of Technology, Roorkee on developing a riverflow forecasting system.
- Developing a daily and weekly riverflow forecasting model for River Dee in Aberdeenshire, Scotland using a Gradient Boosting Regression algorithm.

**Samsung****Jun 2017 – Sep 2019***Senior Data Analyst**Tehran, Iran*

- Developed and reviewed business KPI's and analysing data.
- Developed and implemented databases, data collection systems.
- Developed new interactive dashboards in Power BI and Excel.
- Prepared reports based on country-wide surveys (Price Monitoring, Customer Behaviour, and Products Availability)

**University of Tehran****Oct 2016 – May 2017***Teacher Assistant**Tehran, Iran*

- Performed academic tutoring in Engineering Geology course under the supervision of Dr Hassanpour.
- Performed all regular duties of a TA for a class size of 32 including Preparing and conducting weekly tutorials for classes.

## Publications

---

- [1] Jafar Hassanpour; Ashkan Lotfipoor; Massoud Morsali. "Introduction of an empirical classification system for evaluating tunneling impact on the discharge of springs (TIS) in the surrounding areas". In: *Bulletin of Engineering Geology and the Environment* (2021). ISSN: 1435-9537.
- [2] Ashkan Lotfipoor; Sandhya Patidar; David Jenkins. "Short-term Forecasting of Residential Electricity Demand Using CNN-LSTM". In: *2nd IBPSA-Scotland uSIM Conference*. Edinburgh, 2020.
- [3] Ashkan Lotfipoor; Jafar Hassanpour; Akbar Cheshomi; Masoud Morsali. "Evaluating the Risk of Springs Drawdown in Kerman Water Conveyance Tunnel". In: *36th National Geosciences Symposium*. Tehran, 2018.
- [4] Ashkan Lotfipoor; Jafar Hassanpour; Akbar Cheshomi; Masoud Morsali. "Determination of the effect of tunnel boring activities on Sarab-Garm spring drawdown in Bazi-Deraz water conveyance tunnel". In: *35th National Geosciences Symposium*. Tehran, 2017.
- [5] Ashkan Lotfipoor; Jafar Hassanpour; Akbar Cheshomi; Masoud Morsali. "Development of a Program for Probabilistic Analysis of Water inflow into Tunnels". In: *12th Iranian and 3rd Regional Tunneling Conference*. Tehran, 2017.

## Invited Talks

---

- 8th International Conference on Time Series and Forecasting** | *Gran Canaria, Spain* **June 29th, 2022**
- CNN-LSTM Network with Empirical Mode Decomposition and Bayesian Optimisation for Residential Load Forecasting.
- EGIS Symposium 2021 - Innovations That Inspires** | *Edinburgh, United Kingdom* **May 6th, 2021**
- Machine Learning Based System for Missing Data Imputation and Energy Demand Forecasting.
- Heriot-Watt University IEE Seminar** | *Edinburgh, Scotland* **April 21th, 2021**
- Application of Machine Learning Approaches for Energy Demand Analytics.
- 2nd IBPSA-Scotland uSIM Conference** | *Edinburgh, Scotland* **November 12th, 2020**
- Short-term Forecasting of Residential Electricity Demand Using CNN-LSTM.
- Iranian Tunnels Association Monthly Speeches** | *Tehran, Iran* **August 15th, 2018**
- Introducing an Empirical Methodology for Evaluation of Tunnelling Impacts on Water Resources.
- 12th Iranian and 3rd Regional Tunnelling Conference** | *Tehran, Iran* **February 22th, 2017**
- Development of a Program for Probabilistic Analysis of Water inflow into Tunnels
- Iranian Tunnels Association Monthly Speeches** | *Tehran, Iran* **January 25th, 2017**
- Probabilistic Analysis of Water Inflow Into Tunnels.

## Honours and Awards

---

- [1] James Watt Scholarship from Heriot-Watt University, covering tuition fees and stipend, in 2019
- [2] Ranked forth in Nationwide MSc program entrance examination in Engineering Geology in 2014
- [3] Graduating from University of Tehran in masters with Distinction and ranked 1st
- [4] Ranked top %1 among more than 465,000 participants in 2011 nationwide BSc program entrance examination

## Technical Skills

---

**Machine Learning:** PCA, SVR/SVM, KNN, Decision trees (XGboost, LightGBM), Deep learning, Time series analysis  
**Data Analysis Tools:** Excel (VBA), Power BI (DAX – MDX)  
**Languages:** Python, R, HTML/CSS, SQL, Unix/BASH, git, LaTeX  
**Developer Tools:** VS Code, Google Colab, Google Cloud Platform, HPC