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[No visa sponsorship required]

Hesam Talebiyan

Ph.D., Data and Applied Scientist

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Postdoctoral associate with 8+ years of experience in designing algorithms to enhance the reliability and resilience of complex systems. Proficient in Machine Learning, Bayesian predictive modeling, network analysis & design, optimization, data processing, and scripting languages, including Python and C++. Capable of employing rigorous statistical tools to design and deploy scalable, adaptive algorithms that solve real-world problems.

SKILLS

Programming Python, C++, Git, HTML, CSS
Software & Tools **Machine learning** Scikit-learn, PyMC3, Tensorflow, Keras, **Data querying** SQLite, Pyspark, **Visualization** Matplotlib, Seaborn, Plotly, **Optimization** Gurobi, Pyomo, **Network analysis** Networkx, Gephi, **Data analysis** Numpy, Scipy, Pandas, ..., **Drafting** \LaTeX , Jupyter Notebooks, MS Office, **Other** AWS, ArcGIS, MATLAB
Communication English, Farsi

TECHNICAL EXPERIENCE

Postdoctoral Associate Sep 2021 — Present
NIST Center of Excellence for Community Resilience / Rice University Houston, TX

- **Project:** Decision support algorithms to guide retrofit & restoration decisions for networks, applied to infrastructure in Lumberton, NC, and Seaside, OR (Led an interdisciplinary team of engineers, social scientists, and economists)
- **Method:** Mixed-integer programs as the decision model whose parameters are predicted by logistic regressions
 - XGBoost to predict household dislocation after earthquake/tsunami based on building damage and socio-economic data
 - Markov random fields and logistic regressions to build ensemble surrogate models for high-fidelity optimization models
- **Implementation:** **IN-CORE: Interdependent Networked Community Resilience Modeling Environment** (Python)

Research Assistant Aug 2016 — Aug 2021
Rice University Houston, TX

- **Project A:** Data-driven, online resource allocation for restoration of networks
- **Method:** Artificial neural network to approximate optimal restoration time based on 280,000 restoration strategies
- **Project B:** Decentralized decision algorithms for interdependent networks
- **Method:** Game-theoretic models of decision behaviors by network managers with interdependent and conflicting objectives
 - Hierarchical Bayesian models for predicting decision-maker's future decisions (spatio-temporal data)
 - Global moment-independent sensitivity analysis of complex decision algorithms to quantify their quality and influential inputs
- **Implementation:** **IN-CORE** (Python)

Research Assistant Sep 2014 — Jan 2016
Sharif University of Technology Tehran, Iran

- **Project:** Ranking an asset portfolio based on maximizing return on investment and minimizing the risk, applied to a building portfolio with seismic risk
- **Method:** Monte Carlo-based reliability sensitivity analysis to find the return on investment per dollar spent on risk mitigation
 - Bayesian regressions to model the chain of events from earthquake to building damage to property loss
- **Implementation:** **Rtx: Reliability | Risk | Resilience tools** (C++, Qt)

EDUCATION

Doctorate of Philosophy in Civil and Environmental Engineering, Rice University, Houston, TX Aug 2021
Master of Science in Risk and Earthquake Engineering, Sharif University of Technology, Tehran, Iran Jan 2016
Bachelor of Science in Civil Engineering, Sharif University of Technology, Tehran, Iran July 2013

CERTIFICATES

University of Michigan: Applied Data Science with Python Specialization Spring 2022
University of Davis: SQL for Data Science, Distributed Computing with Spark SQL Spring 2022
Rice University: Statistical Machine Learning (COMP 540) Spring 2018

SELECTED PUBLICATION (CLICK FOR FULL LIST)

Resource Allocation for Infrastructure Resilience using Artificial Neural Networks ICTAI 2020 (DOI)
Accelerating Utility Restoration Planning with Ensemble Statistical Models ICOSAR 2021-2022 (accepted)
Interdependent Network Restoration Games with Incomplete Information and Bounded Rationality Risk Analysis (under review)
Risk-Based Prioritization of a Building Portfolio for Retrofit ASCE Journal of Structural Engineering (DOI)
Probabilistic Modeling Framework for Prediction of Seismic Retrofit Cost of Buildings ASCE J. of Construction Engineering (DOI)