Miles Akbarnezhad

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Education

Rice University Expected Dec 2022
PhD in Earthquake Engineering, GPA: 3.92/4.00 *Houston, United States*
Coursework – Statistical Machine Learning, System Reliability Methods, Applied Monte Carlo Analysis, Nonlinear FEM

Sharif University of Technology May 2017
MSc in Earthquake Engineering, GPA: 18.10/20.00 *Tehran, Iran*
Coursework – Structural Reliability and Probabilistic Modeling, Applied Stochastic Mechanics, Finite Element Analysis

Sharif University of Technology May 2014
BSc in Structural Engineering, GPA: 18.00/20.00 (Summa Cum Laude) *Tehran, Iran*

Experience

Graduate Research Assistant, Rice University, Houston, TX Aug 2017 – Present

- Develop an innovative design for bridge columns using shape memory alloy (SMA) material, namely SMA-Restrained Rocking (SRR) columns to prevent excessive damage under 2475-year earthquake
- Evaluate the monotonic and cyclic response of SRR columns using numerical model in Abaqus software
- Implement the trigger-line model for behavior of SMA material in OpenSees finite element package (C++)
- Develop probabilistic seismic demand model for bridge using five different machine learning methods, namely, kernel ridge regression, neural network, support vector machine, adaboost decision tree, and random forest
- Conduct fragility analysis of the bridges of SRR columns using machine learning techniques
- Interpretation of machine learning model on seismic demand prediction of bridge using PDP, ALE, LIME, and SHAP
- Develop design-aid tools using reinforcement learning to facilitate seismic design of bridge columns
- Develop post-earthquake risk assessment using kernelized support vector machine
- Perform life-cycle assessment of the bridges of SRR columns
- Presented research works at scientific meetings to 20+ attendees

Teaching Assistant for Adv. Earthquake Engineering, Rice University, Houston, TX Aug. 2019 – Dec. 2020

- Led exam review and final project review sessions for a graduate level course
- Explained ground motion prediction models, probabilistic seismic hazard analysis (PSHA), and fragility analysis to students

Research Assistant, Sharif University, Tehran, Iran Aug. 2015 – May. 2017

- Compiled damage data of damaged bridges during 1994 Northridge earthquake in California
- Developed damage models using a Bayesian regression modeling methodology

Skills

Programming Python, C++, MATLAB.

Tools Machine Learning, Deep Neural Network, Scikit-learn, TensorFlow, familiar with SQL.

Certificate

Introduction to Scripting in Python Specialization Consisted of 4 Courses: Python Programming Essentials, Python Data Representations, Python Data Analysis, Python Data Visualization [by Coursera], Credential ID: VPF9ASNLLN8L

Deep Learning Specialization Consisted of 5 Courses: Neural Networks and Deep Learning, Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization, Structuring Machine Learning Projects, Convolutional Neural Networks, Sequence Models [by Coursera], Credential ID: QBB3WVSPPAWM

Statistical Machine Learning Subjects covered: Supervised and unsupervised machine learning, Reinforcement learning [by Computer science at Rice University]

SELECTED PUBLICATIONS

[J2] Akbarnezhad , M., Salehi, M., DesRoches, R. (2021). "Seismic Performance Assessment of Bridges of SRR Columns Through Interpretable Machine Learning", *Journal of Structural Engineering*, (*in review*)

[J1] Akbarnezhad, M., Salehi, M., DesRoches, R. (2021). "Design and Numerical Evaluation of Shape Memory Alloy-Restrained Rocking Bridge Columns.", *Engineering Structures*, (*in review*)