Sina Shid-Moosavi

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Summary

Doctoral researcher with 4 years of expertise in smart city technologies, focused on leveraging machine learning and artificial intelligence to optimize structural and mobility monitoring systems. Demonstrated proficiency in data analysis, project management, and facilitating evidence-driven decision-making.

Education

Northeastern University — Boston, MA
Ph.D. Student in Civil Engineering - Data and Systems — *Sep. 2023 – Present*

University of Central Florida — Orlando, FL
M.Sc. in Smart Cities — *Aug. 2021 – Aug. 2023*

AmirKabir University of Technology — Tehran, Iran
M.Sc. in Structural Engineering — *Sep. 2014 – Feb. 2017*

Shiraz University — Shiraz, Iran
B.Sc. in Civil Engineering — *Sep. 2010 – Sep. 2014*

Experience

Doctoral Researcher — Sep. 2023 – Present
Northeastern University — *Boston, MA*

- Applied ML and CV techniques for vibration-based damage detection in offshore wind turbines.
- Developed AI-driven framework using time-image features and cepstral coefficients for pattern recognition.
- Enhanced data analysis to identify key factors in structural fatigue and malfunction.
- Conducted data-driven analysis on wake effects and fatigue in offshore wind turbines using real-time sensor data.
- Applied multi-dimensional sensitivity analysis for optimizing wake modeling parameters.
- Leveraged ML to improve predictions of wake-induced fatigue, enhancing turbine performance monitoring.

Graduate Research Assistant — Aug. 2021 – Aug. 2023
University of Central Florida — *Orlando, FL*

- Implemented YOLO for real-time passenger detection and DeepSORT for multi-object tracking.
- Applied OSNet for passenger re-identification, with transfer learning on custom datasets.
- Deployed edge computing solutions using Nvidia Jetson TX2 for real-time processing.
- Integrated GPS and video data for Origin-Destination (OD) pair identification.
- Fine-tuned models to handle environmental challenges like lighting and occlusions.
- Developed 3D deformation sensing using multi-camera photogrammetry to quantify structural deformations.
- Applied UAVs for surface water network sensing in densely vegetated areas, estimating water surface areas.

Technical Skills

Programming: Python (Tensorflow, PyTorch, Keras, OpenCV, Scikit-Learn, Numpy, Pandas, Matplotlib, Seaborn) | MATLAB | Machine Learning (Decision Trees, RF, SVM, KNN, ANN) | Deep Learning (RNN, CNNs, LSTM, GNN, Transformers, YOLO, R-CNN, FPN, U-Net, ResNet, OSNet, DeepSORT) | Neural Networks | Computer Vision (Image Classification, Object Detection, VAE, GAN) | Time-series analysis.
Software: OpenSees | ABAQUS | VecTor2 | CSI Software (Safe, Etabs, Sap, Bridge) | Floris | Seismosignal | AutoCAD | and ArcGIS, DJI Terra | Agisoft Metashape | TrueView EVO / LP360.

Relevant Courses

Machine Learning and Pattern Recognition, Reinforcement Learning, Computer Vision, 3D Computer Vision, Image Processing, Time Series and Geospatial Data Sciences, and System Identification.

Honors and Academic Achievements

Best Poster Award at CEE Graduate Research Expo, Northeastern University	2024
Northeastern University CEE Fellowship Recipient	2023
University of Central Florida ORCGS Fellowship Recipient	2021
Ranked 7th among approximately 3000 participants in the nationwide university entrance exam in Structural Engineering for the Ph.D. Degree	2018
Ranked 6th among 30 students in master's program at AmirKabir University of Technology	2017
Merit-based admission to M.Sc. Structural Engineering program at AmirKabir University of Technology without the need to take the university entrance exam due to the high GPA as a Gifted Student	2014
Ranked 3rd among 50 students in undergraduate study at Shiraz University	2014
2nd ranked student award among the graduated students of Civil and Environmental Engineering Department of Shiraz University based on GPA and academic activities	2014
Ranked among the top 1% of students out of 500,000 participants in the National University Entrance Exam	2010
Awarded to study in National Organization for Development of Exceptional Talents (NODET) for High School and Middle School	2006 2003

Selected Publications

Journal Papers

1. Di Cioccio, F., **Shid-Moosavi, S.**, Haghi, R., Tronci, E., Moaveni, B., Liberatore, S., and Hines, E., (2024). "Seasonal Calibration of Turbulence Intensity in FLORIS for Optimized Wind Farm Modeling: A Case Study of Block Island Wind Farm." *(In progress)*
2. **Shid-Moosavi, S.**, Di Cioccio, F., Haghi, R., Tronci, E., Moaveni, B., Liberatore, S., and Hines, E., (2024). "Modeling and Experimentally-Driven Sensitivity Analysis of Wake-Induced Power Loss in Offshore Wind Farms: Insights from Block Island Wind Farm." *Renewable Energy*, 122126.
3. Sun, P., **Shid-Moosavi, S.**, Iraniparast, M., Lynch, J., and Goodspeed, R., (2024). "Affordable Vision-Based Sensing System for Passenger Origin-Destination Flow Tracking for Bus Route Optimization in Resource-Limited Areas." *(In progress)*
4. **Shid-Moosavi, S.** and Rahai, A., (2018). "The Performance of Integral and Semi-integral Pre-tensioned Concrete Bridges under Seismic Loads in Comparison with Conventional Bridges." *Amirkabir Journal of Civil Engineering*, Volume 2, Issue 2, Page 219-226.

Conference Presentations

1. Tronci, E., and **Shid-Moosavi, S.**, (2025). "Pattern Recognition and Damage Detection in Wind Turbine Monitoring Using Cepstral Coefficients." *11th International Conference on Experimental Vibration Analysis of Civil Engineering Structures (EVACES 2025)*, Porto, Portugal. (Upcoming)
2. **Shid-Moosavi, S.**, Speciale, C., and Tronci, E., (2025). "Dynamic Recognition of Damage States in Wind Turbines Using Cepstral Coefficients and ANOVA Analysis." *11th International Operational Modal Analysis Conference (IOMAC 2025)*, Rennes, France. (Upcoming)
3. **Shid-Moosavi, S.**, Speciale, C., and Tronci, E., (2025). "Damage Identification Strategy in Time-Varying Dynamic Systems Combining Cepstral and Image-Based Features." *International Modal Analysis Conference (IMAC-XLIII)*, Orlando, FL, USA. (Upcoming)
4. **Shid-Moosavi, S.**, Di Cioccio, F., Haghi, R., Tronci, E., Moaveni, B., Liberatore, S., and Hines, E., (2025). "Assessing Wake-Induced Fatigue in Offshore Wind Turbines Using Dynamic and SCADA Data." *International Modal Analysis Conference (IMAC-XLIII)*, Orlando, FL, USA. (Upcoming)
5. **Shid-Moosavi, S.**, Di Cioccio, F., Haghi, R., Tronci, E., Moaveni, B., Liberatore, S., and Hines, E., (2024). "Experimentally Driven Sensitivity Analysis of Operational Parameters for Wake-induced Power Loss in the Block Island Offshore Wind Farm." *North American Wind Energy Academy Conference (NAWEA/WindTech 2024)*, New Brunswick, NJ, USA.
6. **Shid-Moosavi, S.**, Partovi Mehr, N., Tronci, E., Moaveni, B., and Hines, E., (2024). "Pattern Recognition in Offshore Wind Turbine Dynamics: Unveiling Fatigue and Damage Signatures." *Engineering Mechanics Institute Conference and Probabilistic Mechanics & Reliability Conference (EMI/PMC 2024)*, Chicago, IL, USA.
7. **Shid-Moosavi, S.**, Hassan, Z., and Sun, P., (2022). "Towards Full-field Sensing of 3D Deformation in Structural Components using Multi-camera Photogrammetry." *8th World Conference on Structural Control and Monitoring (8WCSCM)*, Orlando, FL, USA.