Shadan Golestan

PhD in Computer Science, University of Alberta

SUMMARY

I am a Postdoctoral Researcher in the Computer Science department at the University of Alberta, where I focus on advancing research in sequential decision-making, optimization, and autonomous systems. My expertise lies in Bayesian Optimization, Reinforcement Learning and Simulation Methodologies. I mentor team members, guiding them in applying these technologies to complex, real-world problems. Additionally, I am a skilled communicator with a proven track record of publishing research and delivering compelling presentations.

EDUCATION

Doctor of Philosophy, Computer Science

University of Alberta

• Research Areas: Machine Learning, Sequential Decision-Making, Black/Grey-box Bayesian Optimization, and Sensor and human behavior modeling.

Master of Science, Artificial Intelligence and Robotics

University of Tehran

• Research Areas: Machine Learning, Intelligent Rehabilitation Systems, Human-centered AI

Bachelor of Science, Computer Software Engineering

Arak University

• Final Project: An HCI Framework for deaf-mute people: Sign-language Detection with Microsoft Kinect and **Dynamic Time Warping**

JOB EXPERIENCE

Postdoctoral Researcher, University of Alberta

Reinforcement Learning

- Sequential decision making algorithms for machine adaptation.
 - * Tools Python, MuJoco, Gym

Deep Learning Intern, ShopHopper

- Designed a model using **CNN** and **transfer learning** to detect products specifications. Significant performance improvement was observed by combining these predictions with those generated by **NLP** techniques.
 - * Tools Python, PyTorch, scikit-learn, SpaCy, YOLO
 - * **Supervised** a group of five computer science interns to reach milestones.

Data Scientist Intern, Visier INC.

- Analysed machine learning model accuracy with respect to data features
- Studied causality of features with respect to the performance of prediction models. We found important features for different groups of customers
 - * Tools Python, AWS Sagemaker

Jan 2024 – current

(eight months) Sep 2020 – Apr 2021

(four months) May 2022 - Aug 2022

Sep 2008 - Nov 2013

Sep 2017 – Jun 2023

Sep 2014 – Sep 2017

SELECTED PUBLICATIONS (see the complete list)

- Golestan, S., Ardakanian, O., and Boulanger, P. "Grey-box Bayesian Optimization for Sensor Placement in Assisted Living Environments," AAAI, 2024.
- Taghian, M., Miwa, S., Mitsuka, Y., Gnther, J. **Golestan, S.**, Zaane, O. "Explainability of deep reinforcement learning algorithms in robotic domains by using Layer-wise Relevance Propagation," Engineering Applications of Artificial Intelligence, 2024.
- Schoepp, S., Taghian, M., Miwa, S., Mitsuka, Y., **Golestan, S.**, Zaane, O. "Enhancing Hardware Fault Tolerance in Machines with Reinforcement Learning Policy Gradient Algorithms," Engineering Applications of Artificial Intelligence, 2024 (under review).
- Sufiyan, Z., Golestan, S., Miwa, S., Mitsuka, Y., Zaane, O. "A Study of the Efficacy of Generative Flow Networks for Robotics and Machine Fault-Adaptation," Engineering Applications of Artificial Intelligence, 2024 (under review).
- Golestan, S., Stroulia, E., and Nikolaidis, I., "Smart Indoor Space Simulation Methodologies: A Review," IEEE Sensors Journal, 2022.
- Golestan, S., Nikolaidis, I., and Stroulia, E., "Towards a Simulation Framework for Smart Indoor Spaces." Sensors, 2020.
- Golestan, S., Kazemian, S., and Ardakanian, O., "Data-Driven Models for Building Occupancy Estimation," ACM e-Energy, 2018.
- Golestan, S., Mahmoudi-Nejad, A., and Moradi, H., "A Framework for Easier Designs: Augmented Intelligence in Serious Games for Cognitive Development," IEEE Consumer Electronics Magazine, 2019.
- Golestan, S., Soleiman, P., and Moradi, H., "Feasibility of using Sphero in rehabilitation of children with autism in social and communication skills," ICORR, 2017.

RESEARCH EXPERIENCE

Sequential Decision-Making

- Reinforcement Learning for Robot Fault Adaptation: 🖉 Explainability of deep reinforcement learning algorithms 🖉 Ablation Study of Reinforcement Learning Policy Gradient Algorithms 🖉 Generative Flow Networks and Reinforcement Learning Comparison
- 🔀 Bayesian Optimization: Proposed a novel black-box optimization framework using Bayesian Optimization. Our framework produces sensor configurations that can detect indoor activities significantly more accurate than state-of-the-art methods.
 - * Tools: Python, OpenBox, PyTorch, scikit-learn
- C Grey-box Bayesian Optimization: Proposed a novel grey-box Bayesian optimization to learn the spatial distribution of inherent knowledge in the objective function. Our algorithm finds optimal solutions with significantly less number of expensive function queries.
 - * Tools: Python, OpenBox, PyTorch, scikit-learn

Data-driven Predictive Modelling

- 🛃 Indoor Activity Recognition: Used Probabilistic Random Forest (PRF) for predicting occupants activities using motion sensors. We found that occupants leave distinct enough trace in sensor readings
 - * **Tools:** Python, scikit-learn
- 🔀 Data-Driven Models for Occupancy Estimation: Particle Filter and Neural Networks were used for occupancy estimation. The models accurately temporally predict the number of occupants in each room.
 - * Tools: MATLAB, Neural Network Time Series Toolbox

Simulation Methodologies

- 🖉 Smart Indoor Space Simulation Methodology: Designed a high-fidelity simulator that models human and sensor behaviours
 - * Tools: Unity3D, C#

TECHNICAL SKILLS

Programming Languages: Python, R, MATLAB, C++, C#
Professional Tools: Gym, BoTorch, PyTorch,
Development Tools: VS Code, Jupyter Notebook, Git, AWS Sagemaker