Shadan Golestan

PhD in Computer Science, University of Alberta

+1-5879378919 golestan@ualberta.ca https://linkedin.com/in/shgolestan Google Scholar

SUMMARY

I am a Machine Learning Scientist at Alberta Machine Intelligence Institute (Amii). I focus on advancing research in sequential decision-making, optimization, and autonomous systems. My expertise lies in Reinforcement Learning (**RL**), Bayesian Optimization (**BO**), Generative Models (**GM**), and LLM-Agents (**LA**). I lead team members, guiding them in applying these techniques to real-world problems such as **robotics**. I am a skilled communicator with a proven track record of publishing research and delivering compelling presentations.

EDUCATION

Doctor of Philosophy, Computer Science — Sep 2017 – Jun 2023

University of Alberta

- Research Areas: Machine Learning, Sequential Decision-Making, and Black/Grey-box Bayesian Optimization.

Master of Science, Artificial Intelligence and Robotics — Sep 2014 – Sep 2017

University of Tehran

- Research Areas: Machine Learning, Human-centered AI

Bachelor of Science, Computer Software Engineering — Sep 2008 – Nov 2013

Arak University

- Final Project: Sign-language Detection with Microsoft Kinect and Dynamic Time Warping

JOB EXPERIENCE

Machine Learning Scientist, Alberta Machine Intelligence Institute (Amii) — Jan 2025 – current

Full-time permanent

- **GM**: Contrastive active learning for improving sample efficiency of downstream tasks.
- **GM**: Proposed WINFlowNets, a training architecture to optimize the performance (by **1.56x**) and generalization capabilities of standard Generative Flow Networks for adaptation to out-of-distribution situations
- **RL**: Prior skills for improving the adaptation efficiency of deep RL agents for out-of-distribution situations
- **RL+LA**: LLM-assisted Reward Design for more effective adaptation to out-of-distribution situations
- **ML**: Influence functions for explaining meta-learning, addressing computational challenges and demonstrating their effectiveness in task distinction
  - **Collaborators:** Osmar Zaiane, Zahin Sufiyan, Golnaz Mesbahi, Yoshihiro Mitsuka
  - **Mentorship:** Supervising and mentoring five ML residents on industrial ML projects and two research interns on RL, GM, and LA research projects.

Postdoctoral Researcher, University of Alberta — Jan 2024 – Jan 2025

Full-time contract

- **RL+LA**: RL frameworks incorporating large language and vision-language models.
- **GM**: Generative Flow Networks for robots with up to **25%** higher reward compared to SOTA.
- **LA**: Adaptive iterative feedback prompting for LLM-agents with up to **33%** more success rate in path planning than naive prompting.
- **RL**: GNN and Layer-wise Relevance Propagation for explainable Deep-RL in robotic tasks.
- **RL**: Enhancing hardware fault tolerance in machines using knowledge transfer for Deep-RL algorithms.
  - **Collaborators:** Osmar Zaiane, Yoshihiro Mitsuka, Mehran Taghian
  - **Mentorship:** Supervised and mentored three graduate students.

Machine Learning Scientist Intern, ShopHopper — (four months) May 2022 – Aug 2022

- Designed a model using **CNN** and **transfer learning** to detect products specifications. We obtained up to **88%** prediction accuracy by combining the results with those generated by **NLP** techniques.
  - **Mentorship:** Supervised and mentored five computer science interns.

Data Scientist Intern, Visier INC. — (eight months) Sep 2020 – Apr 2021

- 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.

SELECTED PUBLICATIONS (click for full list)

Conferences

- Sufiyan, Z., **Golestan, S.**, Miwa, S., Mitsuka, Y., Zaiane, O. *WINFlowNets: Warm-up Integrated Networks Training of Generative Flow Networks for Robotics and Machine Fault Adaptation*, submitted to ECAI 2025.
- Schoepp, S., Jafaripour, M., Cao, Y., Yang, T., Abdollahi, F., **Golestan, S.**, Sufiyan, Z., Zaiane, O., Taylor, M.E. *The Evolving Landscape of LLM- and VLM-Integrated Reinforcement Learning*, IJCAI 2025.
- **Golestan, S.**, Ardakanian, O., Boulanger, P. *Grey-box Bayesian Optimization for Sensor Placement in Assisted Living Environments*, AAAI 2024.
- Mitsuka, Y., **Golestan, S.**, Sufiyan, Z., Schoepp, S., Miwa, S., Zaiane, O. *TLXML: Task-Level Explanation of Meta-Learning via Influence Functions*, preprint 2024.
- **Golestan, S.**, Kazemian, S., Ardakanian, O. *Data-Driven Models for Building Occupancy Estimation*, ACM e-Energy 2018.

Journals

- Sufiyan, Z., **Golestan, S.**, Miwa, S., Mitsuka, Y., Zaiane, O. *A Study of the Efficacy of Generative Flow Networks for Robotics and Machine Fault Adaptation*, EAAI 2025.
- Taghian, M., Miwa, S., Mitsuka, Y., Gnther, J., **Golestan, S.**, Zaiane, O. *Explainability of Deep Reinforcement Learning Algorithms in Robotic Domains via Layer-wise Relevance Propagation*, EAAI 2024.
- **Golestan, S.**, Nikolaidis, I., Stroulia, E. *Towards a Simulation Framework for Smart Indoor Spaces*, Sensors 2020.
- Schoepp, S., Taghian, M., Miwa, S., Mitsuka, Y., **Golestan, S.**, Zaiane, O. *Enhancing Hardware Fault Tolerance in Machines with Reinforcement Learning Policy Gradient Algorithms* preprint 2024

Workshops

- Mesbahi, G., **Golestan, S.**, Brown, B., Ton, J., Cranston, J. *DDHC: Domain-Driven Hierarchical Classification Framework for Stream Type Identification*, AI4S @ IJCAI 2025.
- Jafaripour, M., **Golestan, S.**, Miwa, S., Mitsuka, Y., Zaiane, O. *Adaptive Iterative Feedback Prompting for Obstacle-Aware Path Planning via LLMs*, LM4Plan @ AAAI 2025.

RESEARCH EXPERIENCE

PhD Research, University of Alberta — Sep 2017 – Jun 2023

- **BO**: A novel grey-box Bayesian optimization to learn the spatial distribution of inherent knowledge in the objective function. Our algorithm identifies high-quality solutions while requiring on average **51.3%** fewer expensive function queries.
- **BO**: A novel black-box Bayesian optimization framework that produces sensor configurations capable of detecting indoor activities significantly more accurate than SOTA methods.
- **RL+BO**: Designed a deep-RL framework that dynamically learns acquisition functions for Bayesian optimization.
- **ML**: Used Probabilistic Random Forest (PRF) for predicting occupants activities using motion sensors. We found that occupants leave distinct enough trace in sensor readings
- **ML**: Particle Filter and Neural Networks were used for occupancy estimation. The models accurately temporally predict the number of occupants in each room
- **ML**: A high-fidelity simulator that models human and sensor behaviours using rule-based methods
  - **Collaborators:** Omid Ardakanian, Pierre Boulanger, Sepehr Kazemian, Yoshihiro Mitsuka
  - **Mentorship:** Supervised and mentored three computer science interns.

TECHNICAL SKILLS

Professional Tools: Gym, PyTorch, Stable-Baselines3, BoTorch
Development Tools: Git, Docker, AWS Sagemaker