Matin Moezzi

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Education

M.A.Sc. in Industrial Engineering, University of Toronto — **Toronto, ON** — **Jan 2022 – Expected 2024**

Thesis: DynamicsDiffusion: Model-based Reinforcement Learning with Diffusion Models
Advisor: Prof. Chi-Guhn Lee
GPA: 4.0/4.0

B.Sc in Computer Science – Minor in Mathematics, Amirkabir University of Technology — **Tehran, Iran** — **Sep 2016 – 21**

Thesis: Solving the System of ODEs of the Control Spread of Ebola Virus Epidemic using Deep Neural Networks
Advisors: Prof. Mostafa Abbaszadeh & Prof. Mohammad B. Menhaj

Publication

Wang, M. and Willes, J. and Jiralerspong, T. and Moezzi, M. (2023) **"A Comparison of Classical and Deep Reinforcement Learning Methods for HVAC Control"** in IEEE Smart World Congress, arxiv.org/abs/2308.05711

Research Experience

Graduate Research Assistant, University of Toronto, Advisor: Prof. Chi-Guhn Lee — **Toronto, ON** — **Jan 2022 – Present**

– Tackled the model-bias problem of model-based reinforcement learning (RL) using diffusion models in task-based environments. (Master's Thesis)
– Developed an RL framework to control a 6-DoF robotic arm to perform the pick-and-place task in both Mujoco simulator and physical robot [Code]

Applied Machine Learning Intern, Vector Institute, Mentor: John Willes — **Toronto, ON** — **Jan – Apr 2023**

– Surveyed and benchmarked classical and deep RL methods in the HVAC problem for data centers, published at the 2023 IEEE Smart World Congress. [Paper][Code]

Imitation Learning for Robotics Course Research Project, Advisor: Prof. Florian Shkurti — **Toronto, ON** — **Sep – Dec 2022**

– Extended the implementation of planning with diffusion to be able to handle the high-dimensional.
– Experimented in complex environments like Adroit, MitAtar and Humanoid. [PDF][Code]

Mitacs Accelerate Intern, Advisor: Prof. Chi-Guhn Lee — **Toronto, ON** — **May – Aug 2022**

– Led a team of undergraduate students to benchmark continuous policy gradient and distributional RL methods to perform pick-and-place task in Nvidia IsaacGym simulator. [Report][Code]

Undergraduate Research Assistant, Amirkabir University of Technology — **Tehran, Iran** — **2020 – 21**

– Tackled the instability training of deep neural networks in solving differential equations (DEs) using L-BFGS optimiation method. Showed that the proposed method outperform Euler method [Code]

Deep Reinforcement Learning Course Project (Audit), Advisor: Prof. M. M. Ebadzadeh — **Tehran, Iran** — **Sep – Dec 2021**

– Developed an approach to improve data-efficiency of the hierarchical deep Q-network algorithm (h-DQN) using the importance sampling.
– Achieved similar returns to classical hierarchical DQN but at a faster rate in Montezumas Revenge game [PDF][Code]

Grants Received

NSERC Alliance-Mitacs Accelerate Grant, (PI, 75%; Collaborator, 25%) — **Accepted May 2022**

PI: Prof. Chi-Guhn Lee, Collaborator: Cobionix Corporation, Duration: 4 years
Project Title: Reinforcement Learning Framework of Sim2Real for Robotic Applications

Open-source Contribution

Contributed to the *NeuroDiffEq* library to support L-BFGS Optimization Algorithm [Code]

Teaching Experience

Graduate Teaching Assistant, University of Toronto

- **CSC2516: Neural Networks and Deep Learning** [Winter 2023 by Prof. Jimmy Ba, Fall 2023 by Prof. Colin Raffel]
- **MIE567: Dynamic and Distributed Decision Making** [Winter 2023]
- **APS1080: An Introduction to Reinforcement Learning** [Fall 2022, Winter, Summer 2023]
- **MIE1615: Markov Decision Processes** [Winter 2023]
- **MIE236: Probability** [Fall 2022, 2023]
- **CSC369: Operating Systems** [Fall 2022]

Teaching Assistant, Amirkabir University of Technology

- **Neural Networks (Graduate Level)** [Spring 2021]
- **Operating Systems** [Fall 2019, Spring 2020, Spring 2021]
- **Numerical Linear Algebra** [Spring 2020]

Work Experience

Software Developer, iTours Online Travel Agency Co. **Tehran, Iran**
Jun 2018 – 19

– Implemented enterprise B2B Restful Web Services using a microservice architecture and Asp.Net Core Web APIs.
– Involved with project planning and management, adhering to the Scrum principles to ensure agile, effective, and timely project execution.

Web Developer, Parsian Insurance Co. **Tehran, Iran**
May 2017 – 18

– Effectively refactored previous projects based on Design Patterns & SOLID principles.
– Successfully Developed an Asp.Net web application for the insurance management system.

Services

Linux Server Administrator of Our Research Group, University of Toronto **Toronto, ON**
2022 – Present

Editorial Board Member of Student Scientific Journal, Mathematics & Computer Science Faculty
Amirkabir University of Technology **Tehran, Iran**
2020 – 22

Skills

Programming Languages: C/C++, Python, MATLAB, R, Java, C#, SQL, Javascript

Libraries: Pandas, Seaborn, Scikit-learn, PyTorch, TensorFlow, Keras, OpenAI Gym, Mujoco Physics Engine, Nvidia Isaac Sim, WandB, Stable-Baselines3, RLLib, RoboGym, Robosuite

Software Engineering: .Net/ Asp.Net, Microservices, SOLID Principles, SOAP & Restful Web Services

Computer Network: TCP/IP, SDN & NFV, Mininet Emulator, Wireshark, Boson

Operating Systems: Linux Server Administration, Bash Scripting, SLURM, Docker, Kubernetes

Others: LaTeX, Git, Raspberry Pi, ROS, MySql, Cloud-based data analytics tools in Azure

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