Matin Moezzi

matin.moezzi@mail.utoronto.ca Google Scholar matinmoezzi.github.io github.com/matinmoezzi

Education

M.A.Sc. in Industrial Engineering, University of Toronto — **Toronto, ON** — **Jan 2022 – 24 (Expected)**

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 and enhanced sample complexity of model-based reinforcement learning (RL) using denoising and score-based diffusion models in multi-goal and task-based environments. This work involved stochastic value gradient and differential dynamic programming methods. (Master's Thesis)
– Developed a end-to-end 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**

Benchmarked classical and deep RL methods in the HVAC problem for data centers where the state space slightly changes. This work has been 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. This method performs comparable on these domains. [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 (e.,g. DDPG, PPO, and TQC) to perform pick-and-place task by MyCobot, a 6-DoF robotic arm in Nvidia IsaacSim and 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 in solving the Ebola Virus control spread DEs. [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. We demonstrated our method achieving similar returns to classical hierarchical DQN but at a faster rate in Montezumas Revenge game [PDF][Code]

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, Fall 2023]
- **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. I was involved in project planning and management, adhering to the Scrum principles to ensure agile, effective, and timely project execution. Developed unit testing for microservices APIs using xUnit.

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

Updated by Nov 2023