Matin Moezzi

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Education

- **University of Toronto** **2022 – Present**

  Master of Applied Science in Information Engineering

  GPA 4.0/4.0

CSC2626: Imitation Learning for Robotics	A	**MIE1615: Markov Decision Processes**	A
CSC2506: Probabilistic Learning & Reasoning	A+	**MIE1628: Cloud-Based Data Analytics**	A

- **Amirkabir University of Technology (Tehran Polytechnic)** **2016 – 2021**

  Bachelor of Computer Science — Minor in Mathematics

  Selected Courses GPA: 4.0/4.0

Research Experience

- **Applied Machine Learning Intern**, Vector Institute [PDF][Code] **Jan 2023 - Apr 2023**
  - Trained and hyper-parameter tuned algorithms in parallel via WandB in Vector's cluster using SLURM
  - Developed a benchmarking framework for tabular and deep RL algorithms in the context of HVAC control for data centers using Sinergym library
  - Published a paper titled *"A Comparison of Classical and Deep Reinforcement Learning Methods for HVAC Control"* in the 2023 IEEE Smart World Congress

- **Graduate Research Assistant**, DORL, University of Toronto **Jan 2022 – Present**
  Under Supervision of Prof. Chi-Guhn Lee

  1. **DynamicsDiffusion: Offline Model-based RL with Score-based Diffusion Models** [Code]
     - Implemented four classes of diffusion models including DDPM, Score-based generative models, Score SDEs and consistency models
     - Customized them for model-based RL, specifically, generating transition probability function
     - Developed an uncertainty-aware diffusion model for model-based RL
  2. **Imitation Learning and Sim-to-Real Transfer Learning** [Code]
     - Assembled MyCobot, a 6-DoF robotic arm, in Solidworks and implemented it in Mujoco in URDF format from scratch
     - Developed an interface to do robotics tasks in Mujoco based on Gym framework
     - Generated expert-like trajectories using inverse kinematics for the pick-and-place task
     - Experimented imitation learning methods like Behavioral Cloning and GAIL approaches
     - Implemented a Python interface to transfer the learned policy in Mujoco to physical robot
     - Resulted in a complete RL and Sim-to-Real pipeline to train a 6-DoF robotic arm (MyCobot) to do several tasks e.g., pick and place and transfer to the physical robot using Mujoco, Gym, Stable-Baselines3

- **Mitacs Accelerate Internship Program** [Report][Code]
  Under Supervision of Prof. Chi-Guhn Lee
  - Successfully implemented virtual model of MyCobot, a 6 DOF robotic arm, in Nvidia Create and Isaac Sim
  - Implemented "slide", "push" and "pick-and-place" tasks in Nvidia Isaac Gym
  - Developed a benchmarking pipeline to compare continuous RL algorithms like DDPG, PPO, TQC in the simulated environment
  - Led 5 undergraduate students in three phases: Physical Robot, Simulation and RL to complete this project

- **Undergraduate Research Assistant**, Amirkabir University of Technology **2019 – 2021**
  Under Supervision of Prof. Mostafa Abbaszadeh & Prof. Mohammad B. Menhaj

  1. **Data-Efficient Hierarchical Deep Q-Network using Importance Sampling** [PDF][Code]
     - Developed an approach to improve data-efficiency of the hierarchical deep Q-network algorithm (h-DQN) using the importance sampling methods
  2. **An Uncertainty-Aware Pseudo-Label Selection Framework using Regularized Conformal Prediction** [PDF][Code]
     - Employing uncertainty sets yielded by the conformal regularization algorithm in the uncertainty-aware pseudo-label selection framework to fix the poor calibration neural networks, reducing noisy training data
  3. **Solving the System of ODEs of the Control Spread of Ebola Virus Epidemic using Deep Neural Networks** [Code]
     - Implemented a second-order optimization method, L-BFGS, to address the convergence issue.
     - Implemented regularization and initialization methods and adjusted hyper-parameters and network architecture to mitigate the overfitting and generalization problems
  4. **Adding L-BFGS Optimization Algorithm for Training Deep Neural Networks to *NeuroDiffEq* library** [Code]

Teaching Experience

- Graduate Teaching Assistant, University of Toronto
  - **CSC2516: Neural Networks and Deep Learning** [Winter 2023]
  - **MIE567: Dynamic and Distributed Decision Making** [Winter 2023]
  - **APS1080: An Introduction to Reinforcement Learning** [Fall 2022, Winter, Summer 2023]
  - **MIE1615: Markov Decision Processes**
  - **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 **2018 – 2019**
  - Implemented enterprise B2B Restful Web Services with microservice architecture
  - Developed Asp.Net Core Web Apps & Web APIs
  - Project planning and management under the Scrum principle
- **Web Developer**, Parsian Insurance Co., Tehran, Iran **2017 – 2018**
  - Effectively refactored previous projects based on Design Patterns & SOLID principles
  - Successfully Developed an Asp.Net web application for the insurance management system

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 Programming:** .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

Online Degrees & Courses

- **Artificial Intelligence Nanodegree** Peter Norvig & Sebastian Thrun, Udacity [See the Certificate]
- **Reinforcement Learning Specialization**, University of Alberta, Coursera [See the Certificate]
- **Practical Reinforcement Learning (with honors)**, HSE, Coursera [See the Certificate]
- **Deep Learning Specialization**, Andrew Ng, deeplearning.ai, Coursera [See the Certificate]
- **Cutting-Edge AI: Deep Reinforcement Learning in Python**, Udemy [See the Certificate]
- **Natural Language Processing Specialization**, deeplearning.ai, Coursera [See the Certificate]
- **TensorFlow Developer Specialization**, deeplearning.ai, Coursera [See the Certificate]
- **Machine Learning**, Andrew Ng, Stanford University, Coursera [See the Certificate]
- **Network Function Virtualization**, Georgia Institute of Technology, Coursera [See the Certificate]
- **Software Defined Networking**, The University of Chicago, Coursera [See the Certificate]
- **Generative Adversarial Networks Workshop**, [See the Certificate]

Activities

- **Editorial Board Member of Student Scientific Journal**, Mathematics & Computer Science Faculty
  Amirkabir University of Technology, **2020 - 2022**

Updated by Aug 2023