Ebrahim Pichka

M.A.Sc. Student/Research Assistant

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Personal Website • GitHub • Medium

EDUCATION

University of Windsor Windsor, ON, Canada
M.A.Sc. • Industrial Engineering Jan. 2023 – Present
- **CGPA:** 4.0/4.0
- **Supervisor:** Dr. Guoqing Zhang

Amirkabir University of Technology (Tehran Polytechnic) Tehran, Iran
B.Sc. • Industrial Engineering Sept. 2017 – Dec. 2022
- **CGPA:** 3. 2/4.0
- **Thesis:** Algorithmic Trading in Financial Markets using Deep Reinforcement Learning Algorithms.
- **Supervisor:** Dr. Masoud Mahootchi

RESEARCH INTERESTS

- Graph Representation Learning & Geometric Deep Learning.
- Deep Reinforcement Learning & Sequential Decision-making.
- Optimization & Operations Research.
- Learning to Optimize & Decision-focused Learning.

SELECTED PROJECTS

Re-implementations
- **"Graph Attention Networks"** (Veličković et. al., 2017): Implemented the Graph Attention Network architecture for graph representation learning and node classification task using the PyTorch framework. **[GitHub]**
- **"Attention Is All You Need"** (Vaswani et. al., 2017): Implemented the Transformer encoder-decoder architecture for sequence-to-sequence modeling completely with PyTorch **[GitHub]**
- **"Learning Heuristics for the TSP by Policy Gradient"** (Deudon et. al., 2018): Developed, tested, and experimented on a PyTorch implementation of an attention-based Policy Gradient agent for learning to solve Travelling Salesperson Problem. **[GitHub]**
- **"Continuous control with deep reinforcement learning"** (Lillicrap et. al., 2015): An implementation of the Deep Deterministic Policy Gardient (DDPG) algorithm using the Pytorch framework. **[GitHub]**

Machine Learning Projects
- **Knowledge Distillation in Neural Networks:** Distilled a trained ResNet50 model into a ResNet18 on CIFAR10 dataset. And compared results with ResNet18 when trained from scratch and the fine-tuned pre-trained ResNet50 itself. **[GitHub]**
- **Deep Convolutional Autoencoder:** Implemented deep convolutional autoencoder for image noise reduction and dimensionality reduction using Pytorch framework. **[GitHub]**
- **Options Pricing with Machine Learning:** Applied three different machine learning methods, namely LightGBM, Multi-layer Perceptron, and Support Vector Machine to estimate the market price of option contracts and compared their performance to that of the Black-Scholes model as a baseline. **[GitHub]**

SKILLS

- **Programming Languages:** Python, Julia, C++, MATLAB
- **Frameworks:**
  - **ML:** PyTorch, JAX, TensorFlow, Keras, PyTorch-Geometric, TorchRL, Scikit-learn
  - **Optimization:** Gurobipy, Pyomo, CVXOpt, PuLP
- **Software:** Linux, Git, Docker, MongoDB

EXPERIENCE

Machine Learning Intern • Astyage Apr. 2021 – Sep. 2021 • Tehran, Iran

- Contributed to a team collaboration in researching and developing an intent-based conversational chat-bot assistant system for enterprise customer support management using TensorFlow and transformer-based natural language understanding models.

Data Science Intern • Dayche Data Mining Group Jan. 2021 – Apr. 2021 • Tehran, Iran

- Contributed to developing an end-to-end market segmentation system using unsupervised learning methods based on user transactions in a team of interns in python.

TEACHING EXPERIENCE

Teaching Assistant

- Operations Research I	University of Windsor	Fall 2023
- Production Analysis	University of Windsor	Summer 2023
- Numerical Analysis	University of Windsor	Winter 2023
- Fuzzy Intelligent Systems	University of Tehran	Fall 2021
- Statistical Quality Control	Amirkabir University of Technology	Fall 2021
- Corporate Finance	Amirkabir University of Technology	Spring 2020

TEST SCORES

GRE (Graduate Record Examinations) General: Oct. 2021

- Quant: **169**/170 - Verbal: **153**/170 - Analytical Writing: **3.5**/6

IELTS (International English Language Testing System) Academic: (band score of 9) June 2021

Overall: **8** Reading: **9** Listening: **8.5** Writing: **7** Speaking: **7**

CERTIFICATES

- Deep Learning Specialization	Coursera (DeepLearning.ai)
- Reinforcement Learning Specialization	Coursera (University of Alberta/AMII)
- TensorFlow Developer	Coursera (DeepLearning.ai)
- Machine Learning	Coursera (Stanford Online)
- Machine Learning Fundamentals	DataCamp
- Deep Learning	DataCamp

SELECTED COURSEWORK

- Computational Intelligence	(A)	- Artificial Intelligence	(A+)
- Data & Information Analysis (Statistical Learning)	(A+)	- Optimization I (Operations Research)	(A+)
- Principles of Simulation	(A+)	- Optimization II	(A)

OTHER

Technical Blogging: Wrote in-depth technical posts on different topics in machine learning and optimization algorithms.

Open Source: Contributed to development of open-source projects such as Pytorch, Pytorch-geometric, etc.