Ebrahim Pichka

M.A.Sc. Student/Research Assistant

Windsor, Ontario, Canada
pichka@uwindsor.ca • +1 (226) 961 6480
Personal Website • GitHub • LinkedIn • Medium

Education

University of Windsor Windsor, ON, Canada
Master of Applied Science • Industrial Engineering (**CGPA:** 4.0/4.0) Jan 2023 – Present (Jan 2025)
- **Supervisor:** Dr. Guoqing Zhang

Amirkabir University of Technology (Tehran Polytechnic) Tehran, Iran
Bachelor of Science • Industrial Engineering (**CGPA:** 3.2/4.0) Sept 2017 – Dec 2022
- **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 (independent personal projects)
- **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): Implemented the Deep Deterministic Policy Gradient (DDPG) algorithm for reinforcement learning with continuous action-/state-space environments using PyTorch. **[GitHub]**

Machine Learning Research Projects (independent personal 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 pricing model as a baseline. **[GitHub]**

Skills

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

Experience

Machine Learning Intern • Astyage Apr 2021 – Sept 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.

Certificates

- Machine Learning Engineer Nanodegree - Udacity
- 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
- Computer Science Fundamentals Specialization - Coursera (University of Illinois - Urbana-Champaign)

SELECTED COURSEWORK

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

TEST SCORES

GRE (Graduate Record Examinations) General: Oct 2021

- Quant. Reasoning: **169**/170
- Verbal Reasoning: **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**

OTHER

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

Teaching Experience: Worked as teaching assistant during undergrad and grad-school for courses such as operations research, intelligent systems, and numerical analysis.

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