Matin Aghaei

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RESEARCH INTERESTS

- Deep Reinforcement Learning
- Optimization for Machine Learning
- Quantitative Trading
- Robotics
- Multi-Agent Systems

EDUCATION

Master of Science, Computer Science — Sep. 2022 – Present
Simon Fraser University, Burnaby

Bachelor of Science, Computer Science — Sep. 2017 – Apr. 2022
Amirkabir University of Technology, Tehran

Diploma, Mathematics and Physics — Sep. 2014 – Jun. 2017
National Organization for Development of Exceptional Talents, Karaj

RESEARCH EXPERIENCE

Graduate Research Assistant — Jan. 2023 – Present
Research Topic: Convergence Guarantees for Policy Gradient Algorithms
Supervisor: Prof. Vaswani
Simon Fraser University, Burnaby

Undergraduate Research Assistant — March. 2021 – Apr. 2022
Research Topic: Portfolio Management using Reinforcement Learning Algorithms
Supervisor: Prof. Ebadzadeh
Amirkabir University of Technology, Tehran

PUBLICATIONS

"On the Convergence Rates of Log-Linear Policy Gradient Methods" [PDF], **Matin Aghaei**, Anderson de Andrade, Qiushi Lin, Sharan Vaswani. In preparation.

"Practical Principled Policy Optimization for Finite MDPs" [PDF], Michael Lu, **Matin Aghaei**, Anant Raj, Sharan Vaswani. "Optimization for Machine Learning" workshop, NeurIPS, 2023 **(Oral Presentation)**.

SELECTED COURSE PROJECTS

Computer Vision

- Designed and trained CNN models to perform Object Detection, Semantic Segmentation, and Instance Segmentation on the iSAID dataset.[code]

Robotics

- A robot controller which follows oval and spiral paths [code]
- A robot controller which constructs an obstacle map using VFH algorithm and avoids the obstacles in a Gazebo environment using a polar histogram [code]

Data Mining

- An image compressor (Using K-Means algorithm to reduce the number of colors in an image by clustering them) [code]

Information Retrieval

- A search engine for Persian language using inverted index and TF-IDF [code]

Principles of Computational Intelligence

- A 2-layer Neural Network [code]
- Genetic Algorithm for solving Knapsack [code] and Traveling Salesman [code] problems
- Fuzzy C-means Clustering [code]

Principles and Applications of Artificial Intelligence

- Natural Language Processing using n-grams [code]
- Genetic Algorithm & Simulated Annealing Algorithm for solving Constraint Satisfaction Problem [code]
- A*, Bi-directional and IDS algorithms for solving Rubik's Cube [code]
- AC-3 algorithm for solving Constraint Satisfaction Problem [code]

WORK EXPERIENCE

Teaching Assistant, Probability and Computing Jan. 2024 – Present
Instructor: Prof. Vaswani, Simon Fraser University, Burnaby

Teaching Assistant, Data Structures and Algorithms Jan. 2023 – Apr. 2023
Instructor: Mohammad Jahanara, Simon Fraser University, Burnaby

- Helped students with the assignments

Teaching Assistant, Introduction to Artificial Intelligence Sep. 2022 – Dec. 2022
Instructor: Prof. Imran, Simon Fraser University, Burnaby

- Designed novel programming problems
- Helped students with the assignments

Head Teaching Assistant, Artificial Intelligence Sep. 2021 – Jul. 2022
Instructor: Prof. Javanmardi, Amirkabir University of Technology, Tehran

- Created tutorial videos about RL and Bayes nets
- Designed assignments & projects
- Helped students with the assignments
- Supervised 8 other teaching assistants

Head Teaching Assistant, Computational Intelligence Sep. 2020 – Jan. 2022
Instructor: Prof. Ebadzadeh, Amirkabir University of Technology, Tehran

- Designed assignments & quizzes
- Helped students with the assignments
- Supervised 7 other teaching assistants

Teaching Assistant, Operating Systems Sep. 2020 – Jan. 2022
Instructor: Prof. Zarandi, Amirkabir University of Technology, Tehran

- Designed assignments
- Created problem-solving content for students
- Helped students with the assignments

Head Teaching Assistant, Data Mining Feb. 2021 – Jun. 2021
Instructor: Prof. Nazerfard, Amirkabir University of Technology, Tehran

- Designed assignments & projects
- Helped students with the assignments
- Supervised 7 other teaching assistants

Educational Manager Mar. 2019 – Sep. 2020
Students' Scientific Chapter of Computer Engineering
Amirkabir University of Technology, Tehran

- Elected by students of the department
- Organized extracurricular courses and presentations
- Cooperated in holding programming contests

HONORS & AWARDS

- Paper accepted for an oral presentation (top-5% contribution) in NeurIPS OPT Workshop, 2023
- Ranked top 2% among more than 150,000 Iranian students in the National University Entrance exam in Engineering and Applied Mathematics (Regional rank of 815 and nationwide rank of 2991), 2017
- Advanced to the 3$^{\text{rd}}$ stage of the Iranian National Olympiad in Informatics (Only 80 students reached this stage), 2015
- Qualified as a member of the National Organization for Development of Exceptional Talents, 2010

SKILLS

- *Programming Languages:* Python, Java, C, C++, MATLAB, SQL, JavaScript
- *Frameworks & Libraries:* Numpy, Scipy, TensorFlow, PyTorch
- *Development tools:* Git, VS Code, Visual Studio, PyCharm, IntelliJ, Vivado

LANGUAGES

- *Persian:* Native
- *English:* Advanced

REFERENCES

- Sharan Vaswani
  Assistant Professor in the School of Computing Science
  Simon Fraser University, Burnaby
  Email: sharan_vaswani@sfu.ca
- Mohammad Mehdi Ebadzadeh
  Professor and Head of the Computer Engineering Dept.
  Amirkabir University of Technology, Tehran
  Email: ebadzadeh@aut.ac.ir
- Hamid Reza Zarandi
  Associate Professor in the Computer Engineering Dept.
  Amirkabir University of Technology, Tehran
  Email: h_zarandi@aut.ac.ir
- Mahdi Javanmardi
  Assistant Professor in the Computer Engineering Dept.
  Amirkabir University of Technology, Tehran
  Email: mjavan@aut.ac.ir