# Matin Aghaei

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## Research Interests

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

## Education

**Master's in Computer Science** Sep. 2022 – Present
*Simon Fraser University* *Burnaby, BC, Canada*
- GPA: 3.5 /4

**Bachelor's in Computer Engineering** Sep. 2017 – Apr. 2022
*Amirkabir University of Technology* *Tehran, Iran*
- GPA: 18.33 /20

**Mathematics and Physics High School Diploma** Sep. 2014 – Jun. 2017
*National Organization for Development of Exceptional Talents* *Karaj, Iran*

## Research Experience

**Graduate Research Assistant** Jan. 2023 – Present
*Supervisor: Prof. Vaswani* *Simon Fraser University*
- Proved Convergence Guarantees for Policy Gradient Algorithms
- Designed Entropy Regularized RL Algorithms
- Experimented Bandits and RL Algorithms

**Undergraduate Research Assistant** Mar. 2021 – Apr. 2022
*Supervisor: Prof. Ebadzadeh* *Amirkabir University of Technology*
- Implemented Deep RL Algorithms
- Used Deep RL Algorithms for Portfolio Management [code]

## 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)**.

## 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]

**Computational Intelligence**

- Genetic Algorithm for solving Knapsack [code] and Traveling Salesman [code] problems
- Fuzzy C-means Clustering [code]

**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]

## Teaching Experience

**Teaching Assistant, Probability and Computing** Jan. 2024 – Present
*Lecturer: Sharan Vaswani* *Simon Fraser University*

- Helped students to understand the concepts of Combinatorics and Probabilities

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

- Taught students how to analyze the computational complexity of algorithms

**Teaching Assistant, Introduction to Artificial Intelligence** Sep. 2022 – Dec. 2022
*Lecturer: Hazra Imran* *Simon Fraser University*

- Designed AI programming problems, and helped students with the assignments

**Head Teaching Assistant, Artificial Intelligence** Sep. 2021 – Jul. 2022
*Lecturer: Mahdi Javanmardi* *Amirkabir University of Technology*

- Supervised 8 teaching assistants, and gave additional lectures on RL and Bayes Nets

**Head Teaching Assistant, Computational Intelligence** Sep. 2020 – Jan. 2022
*Lecturer: Mehdi Ebadzedeh* *Amirkabir University of Technology*

- Supervised 7 teaching assistants, and designed assignments and quizzes

**Head Teaching Assistant, Data Mining** Feb. 2021 – Jun. 2021
*Lecturer: Ehsan Nazerfard* *Amirkabir University of Technology*

- Supervised 5 teaching assistants, and designed assignments and projects

## Honors & Awards

- Paper accepted for an oral presentation **(top-5% contribution)** in NeurIPS OPT Workshop, 2023
- Elected as the Educational Manager of Students' Scientific Chapter of Computer Engineering at Amirkabir University of Technology, 2019
- Ranked **top 2%** among more than 150,000 Iranian students in the National University Entrance exam in Engineering and Applied Mathematics, 2017
- Advanced to the 3$^{rd}$ 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, VHDL, SQL, JavaScript
**Developer Tools**: Git, Numpy, Scipy, TensorFlow, PyTorch, Pandas, Matplotlib

## Languages

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