Mehrdad Aksari Mahabadi

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Research Interests

- Algorithms
- Database Systems
- Machine Learning
- Deep Learning

Education

Amirkabir University of Technology (Tehran Polytechnique) *2020 - Present*
BS in Computer Science
GPA: 18.71 / 20

Relevant Coursework: Advanced Programming 19.52/20, Data Structures & Algorithms 19.75/20, Design & Analysis of Algorithms 17.75/20, Probability Theory 18.82/20, Graph Theory 19.25/20, Numerical Linear Algebra 19.5/20, Numerical Analysis 20/20, Mathematical Analysis 20/20, Linear Optimization 20/20, Artificial Intelligence 20/20, Operating Sys. 18/20, Databases 20/20, Computational Intelligence 19/20, Deep Learning 20/20, Computational Geometry 18.75/20, Bioinformatics 18.1/20, Cryptography 19/20

Experience

Sharif University *Undergraduate Research Assistant* *Jul 2024 - Present*
I'm working on backdoor attacks under the supervision of Dr. Rohban and Dr. Soleymani. We've developed a simple multi-trigger attack that can bypass Anti-Backdoor Learning, a state-of-the-art defense. Currently, we are testing our attack against other defenses, and we hope to publish the results soon.

Amirkabir University *Undergraduate Research Assistant* *Sep 2023 - Dec 2023*
Studied machine learning with graphs under the supervision of Dr. Rahmati. During this time, I learned about graph neural network architectures and gained hands-on experience by implementing them in Pytorch. Furthermore, I studied knowledge graph embeddings and their applications within drug interaction networks.

Snapp *Software Engineer* *Jan 2023 - Mar 2024*
Snapp is the leading company in providing online taxi services with over 30 million users in Iran. As part of the Routing team, we were responsible for providing estimated time of arrival (ETA) and navigation services.

- Added a post-processing procedure to the map matching algorithm, which significantly improved coverage.
- Integrated traffic speeds into routing algorithms, enabling time-dependent routing.
- Redesigned ETA benchmarking service leveraging concurrency, which increased throughput by x10.

Honors & Awards

Ranked among **top 3** students between 70 students who began their studies in Sep. 2020 at Amirkabir University of Technology, Dept. of Comp. Sci. and consequently recognized as an **outstanding** student. *Feb 2022*

Eligible to choose a **second major** due to outstanding performance. *Feb 2021*

Ranked among the **top 2%** between all applicants in the University Entrance Nationwide Exam known as Konkur (approximately 150,000 applicants). *Sep 2020*

Selected for study in schools of National Organization for the Development of Exceptional Talents *Sep 2013*

Technical Reports

Fuzzy Linear Algebra *report for numerical linear algebra course in Farsi* *link*
Used Sympy to solve fuzzy linear systems with Gaussian and Jacobian iterative methods

Bounds for Pancake Problem *report for graduate course in bioinformatic* *link*
Introduced sorting by subset prefix reversal problem and its theoretical bounds

Teaching Experience

Computational Geometry, Dr. Rahmati *Fall 2024*
Numerical Linear Algebra, Dr. Dehghan *Fall 2024*
Fundamentals of Programming, Dr. Rahmati *Fall 2023*
Algorithm Design & Analysis, Dr. Seyed javadi *Fall 2022*
Fundamentals of Programming, Dr. Salari *Fall 2021*

Selected Projects

JNotes *link*
Implementation of a diverse array of deep learning algorithms in Pytorch, Including GAN, VAE, DDPM, LSTM, and GPT architectures, along with applications of CLIP, DINO, and StableDiffusion.

Evolucopter *link*
An evolutionary agent that masters a simplistic helicopter game using genetic algorithms and neural network.

Diffnet *link*
A tiny neural network framework that works with reverse mode automatic differentiation.

Xv6 *link*
A fork of xv6 operating system that supports copy-on-write and lazy page allocation.

Coyote *link*
A routing engine that uses Dijkstra, A*, and ATL algorithms to compute the shortest path on a road network.

Camel *link*
An interpreted programming language that supports arrays, dictionaries, functions, and closures.

Online Courses

Machine Learning Specialization, Standford University
Machine Learning with Graphs, Standford University
Deep Learning, Sharif University
Security & Privacy in Machine Learning, Sharif University
Intro. to Database Systems, Carnegie Mellon University

Technical Skills

- **Languages** Python, Go, Java, C
- **AI** PyTorch, PyTorch Geometric, Jax, HuggingFace, Numpy, Pandas, Matplotlib
- **Database** Postgresql, Redis
- **Cloud/MLOps** Docker, Kubernetes
- **Tools** Git, Vim

Test Scores

- **TOEFL iBT** 111/120 (reading 28/30, listening 28/30, speaking 27/30, writing 28/30)

References

Dr. Rahmati	Head of Comp. Sci. Dept., Amirkabir University	zrahmati@aut.ac.ir
Dr. Soleymani Baghshah	Professor Comp. Eng. Dept., Sharif University	soleymani@sharif.edu
Dr. Salari	Professor of Comp. Sci., Razi University	f.salari@razi.ac.ir