







Soroush Mahdi

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 Statistical Data Analysis Laboratory-CEIT building-Amirkabir University of Technology-Hafez Ave-Tehran-Iran

Education

Master of Science in Artificial Intelligence

Amirkabir University of Technology (Tehran Polytechnic)

Cumulative **GPA: 4/4** or 17.61/20.0

Tehran, Iran

Sep 2020 – Present

Bachelor of Computer Engineering

Bu-Ali Sina University

Cumulative GPA: 15.90/20.0

Hamedan, Iran

Sep 2016 – Sep 2020

Research Interests

Adversarial Robustness

Trustworthy AI

Computational Neuroscience

Deep Learning Theory

Computer Vision

Generative AI

Honors & Awards

- **2nd** Place in [The National fNIRS Data Analysis Competition](#) focusing on brain-computer interface systems to help patients with movement disorders, National Brain Mapping Laboratory, Tehran, Iran, 2022.
- Ranked **61st Among More Than 15,000 Participants** in Iranian University Entrance Exam For Masters In Artificial Intelligence, Iran, 2020.
- Ranked **36st Among More Than 15,000 Participants** in Iranian University Entrance Exam For Masters In Algorithms and Computation, Iran, 2020.
- Ranked **22nd** Place in [National Collegiate Scientific Olympiad in Computer Engineering](#), Iran National Organization of Educational Testing, Tehran, Iran, 2020.
- **1st** Place in the Provincial Programming Contest of Hamedan, Hamedan University of Technology, Hamedan, Iran, 2019.
- selected as a member of Bu-Ali Sina University's team for the West Asia Regional ACM-ICPC Contest, Iran, 2019 & 2017.
- **2nd** Place in [2019 Programming Contest, Iran West Region \(WICPC\)](#), Bu-Ali Sina University, Hamedan, Iran, 2019.
- Ranked 14th in the [West Asia Regional ACM-ICPC Contest](#), Tehran, Iran, 2017
- **1st** Place in [2017 Programming Contest, Iran West Region \(WICPC\)](#), Bu-Ali Sina University, Hamedan, Iran, 2017.

Academic Projects

• Robust Supervised contrastive learning

Independently executed the implementation of adversarial training coupled with supervised contrastive learning loss using PyTorch. I thoroughly explored diverse approaches within the PyTorch framework, experimenting to enhance the model's performance and resilience against adversarial attacks. [Github link](#)

• PSO-SGD Hybrid Optimizer

Developed a custom PyTorch optimizer by designing a novel optimization algorithm that combines the strengths of Stochastic Gradient Descent (SGD) and Particle Swarm Optimization (PSO). [Github link](#)

• multivariate HMM

Utilizing my programming abilities, I implemented a range of algorithms for Hidden Markov Models (HMMs) in the multivariate case from scratch, leveraging the capabilities of NumPy. These algorithms encompassed alpha recursion, beta recursion, expectation maximization, and viterbi. Through the application of these algorithms, the project aimed to efficiently model and analyze sequential data with hidden states. [Github link](#)

• Typicality-Based Collaborative Filtering Recommendation

Implemented a collaborative filtering recommendation algorithm based on the paper "Typicality-Based Collaborative Filtering Recommendation". Leveraged item typicality and user preference data to generate personalized recommendations. Tested the algorithm on movieLens-latest-small and TagGenome datasets. [Github link](#)

• Kohonen Self Organizing Map

Implemented Kohonen Self-Organizing Map (SOM) neural network from scratch utilizing NumPy. Implemented key algorithms including winner-takes-all, neighborhood function, and weight update. Designed a framework to facilitate training, visualization and cluster analysis. Leveraged SOM for unsupervised dimensionality reduction on the YaleFaces dataset. Clustered and visualized high-dimensional face data in 2D space. [Github link](#)

• Other Projects Developed from Scratch

- ADALINE and Perceptron units
- Disparity map from stereo images

Research Experiences

Thesis Based M.Sc. Student and Research Assistant

Statistical Data Analysis Laboratory

Under the supervision of Maryam Amirmazlaghani

June 2021 – Present
Tehran, Iran

Explored improving the robustness of Artificial Neural Networks against adversarial attacks through bettering and comprehending adversarial training. Specially worked with different loss functions, including TRADES and supervised contrastive learning, to enhance the models' ability to withstand adversarial examples.

Computer Vision Researcher

[HARA.ai](#)

Under the supervision of Ali Karimi

Jan 2022 – Jan 2023
Tehran, Iran

- Conducted research as a Computer Vision researcher, focusing on biometrics projects.
- Specialized in face anti-spoofing and liveness detection using deep learning techniques.
- Developed blink detection and blink counter models using semi-supervised approaches.

Teaching Assistantships

Statistical Machine Learning

AmirKabir University of Technology (Tehran Polytechnic)

Instructor: Maryam Amir mazlaghani (Assoc. Prof.)

Graduate Course

Tehran, Iran
Spring 2023

Machine Vision

AmirKabir University of Technology (Tehran Polytechnic)

Instructor: Reza Safabakhsh (Prof.)

Graduate Course

Tehran, Iran
Fall 2022

Algorithm Design

Hamedan University of Technology

Instructor: Mir Hossein Dezfoulian (Asst. Prof.)

Undergraduate Course

Hamedan, Iran
Spring 2020

Artificial intelligence & Expert Systems

Bu-Ali Sina University

Instructor: Mir Hossein Dezfoulian (Asst. Prof.)

Undergraduate Course

Hamedan, Iran
Fall 2019

Other Undergraduate Courses: Data Structures (2018), Discrete Structures (2017), Fundamental Of Computer Programming (2017)

Professional Skills

• Programming Languages:

Python, C++, Matlab

- **Libraries/Frameworks:**
PyTorch, NumPy, OpenCV, scikit-learn, Tensorflow, JAX
- **Tools:**
Git, LATEX, Visual Studio Code
- **Operating Systems:**
Linux, Windows
- **Languages:**
English: Fluent, TOEFL iBT to be taken in October
Persian: Native

Major Courses

Machine Vision	19.9/20	Stochastic Processes	19.28/20
Machine Learning	18.6/20	Neural Networks	16.8/20
Optimization	16.21/20	Computational Intelligence	20/20

References

Maryam Amir mazlaghani (Assoc. Prof.)	mazlaghani@aut.ac.ir	Homepage
Mir Hossein Dezfoulan (Asst. Prof.)	dezfoulan@basu.ac.ir	Homepage
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More references are available upon request.