Mahdi Ghaznavi

Education

2022–2024 **M.Sc.**, *Sharif University of Technology*, Tehran - Iran, *AI & Robotics*.
Under Supervision of Dr. Rohban & Dr. Soleymani Baghshah

2019–2022 **B.Sc.**, *Sharif University of Technology*, Tehran - Iran, *Mathematics and Applications*.

2017–2022 **B.Sc.**, *Sharif University of Technology*, Tehran - Iran, *Computer Engineering*.
Thesis Title: Domain Adaptation in Digital Mammography Image Processing
Under Supervision of Prof. H. Rabiee, Prof. H. Asadi, R. Ghavami.

Work Experience

Jul 2022 –Sep 2022 **Research Assistant**, *Aalto University*, Finland.
I was a research assistant at Aalto University under the supervision of Dr. Vikas Garg. I was working on interpretable molecular optimization, and other related topics to proteins and molecules.

Jul 2021 –May 2022 **ML Engineer & Researcher**, *AIMed*.
AIMed is a multidisciplinary research consortium utilizing artificial intelligence (AI) technologies to improve the quality and accuracy of digital health services. We were working on diagnosing breast cancer and determining its malignancy by mammography screening images, which is a hard task in medical image analysis. I designed various models based on Inception, ResNet, etc., for various tasks, e.g. image segmentation, tumor classification, etc. I implemented many of these visual models with Pytorch. My work contained using representation learning methods (like Contrastive Representation Learning), assessing generative models to generate more data, applying few-shot learning and domain generalization techniques, etc. Mywas under the supervision of Rassa Ghavami, CSO of AI-Med, and Ph.D. student of prof. Rabiee.

2018–2020 **AI Researcher & Developer**, *Shenakht Pajouh*.
Shenakht-Pajouh (SP) is a non-profit institute that works on AI from the perspective of cognitive science. In about two years, I have been involved in many projects at SP, including
- Implementing various NLP models for paragraph generation task of our mental health assistant agent by Tensorflow and Keras. I read about various NLP architectures (like ELMo, recurrent entity networks, attention-based models and transformers like BERT, various language models, etc).
- Studying perception in neuroscience to apply intuitions in that field to our AI work.
- Researching hardware requirements for AI development and the impacts of these requirements on technology development.

My scientific supervisor at SP was Hosein Fooladi, a Ph.D. student at the University of Vienna.

Oct 2020 **Contest Designer**, *Edalatkhane Data Analysis Contest*, Quera.
I was a member of the design team of Edalatkhane data analysis contest, held by Quera. It was one of the first public data analysis contests in Iran.

2017–2018 **Problem and Educational Content Creator**, *Mobtakeran Institution*, Tehran.
I designed mathematics problems (mostly in the fields of combinatorics and number theory) for middle school students. I also wrote educational notes to teach them.

2017 **Olympiad in Informatics Teacher**, *National Organization for Development of Exceptional Talents (Sampad)*, Zahedan.
I was a combinatorics, graph theory, and algorithm teacher of high school students that were participating in the first stage of the Iran National Olympiad in Informatics.

Teaching Assistant

Spring 2023 **Security & Privacy in ML**, *Graduate*, Dr. Sadeghzadeh, Head TA.
Spring 2023 **Modern Information Retrieval**, *Undergraduate*, Dr. Soleymani Baghshah, Head TA.
Spring 2023 **Game Theory**, *Undergraduate*, M. Nilipour.
Fall 2022 **Deep Learning**, *Graduate*, Dr. Fatemizadeh.
Spring 2022 **Game Theory**, *B.Sc./M.Sc*, Dr. Alishahi.
Spring 2022 **Machine Learning**, *Graduate*, Dr. Peyvandi.
Spring 2022 **Information Theory**, *B.Sc/M.Sc.*, Dr. Ebrahimi Broojeni.
Spring 2022 **Engineering Probability & Statistics**, *Undergraduate*, Dr. Jafari-Siavoshani.
Fall 2021 **Information Theory and Coding**, *Graduate*, Dr. Jafari-Siavoshani.
Fall 2021 **Introduction to Bioinformatics**, *Undergraduate*, Dr. Sharifi-Zarchi & Dr. Koohi.
Fall 2021 **Design of Algorithms**, *Undergraduate*, Dr. Zarrabi-Zadeh.
Fall 2021 **Computer Networks**, *Undergraduate*, Dr. Jafari-Siavoshani.
Spring 2021 **AI**, *Undergraduate*, Dr. Rohban.
Spring 2021 **Computer Networks**, *Undergraduate*, Dr. Jafari-Siavoshani.
Spring 2021 **Linear Algebra**, *Undergraduate*, Dr. Motahari.
Fall 2020 **Engineering Probability & Statistics**, *Undergraduate*, Dr. Sharifi-Zarchi.
Fall 2020 **Information Theory & Coding**, *Graduate*, Dr. Jafari-Siavoshani.
Fall 2020 **Introduction to Bioinformatics**, *Undergraduate*, Dr. Sharifi-Zarchi & Dr. Koohi.
Fall 2019 **Engineering Probability & Statistics**, *Undergraduate*, Dr. Sharifi-Zarchi.

Honors and Awards

2021 **Gold Medal (Ranked 1st)**, *Iran's Computer Engineering Olympiad.*.
It is held by the national organization of educational testing, among top computer science and engineering students that introduced by all universities in the country.
2016 **Bronze medal**, *National Olympiad in Informatics*.
It is the national stage of IOI, and medalists join Iran's national elites foundation.

Research Interests

AI Explainable/Interpretable AI, Privacy & Security in ML, Statistical ML, Probabilistic and Bayesian ML, ML Theory, Interpretable/Causal/Disentangled Representation Learning, AI Applications in bio and medicine (like molecular optimization, protein design, bioinformatics, and biomedical image processing), Geometric DL, NLP

Computer Science Information Theory, Algorithm Design, Game Theory, Complexity Theory, Graph Theory

Mathematics Probability, Statistics, Bayesian Methods, Information Geometry, Combinatorics, Using mathematics (from various fields, e.g. Topology, Algebra, Calculus, Differential Equations, etc) to formulate problems in AI, bio and cognitive science

Cognitive Science	Interdisciplinary approaches in AI from the perspective of cognitive science, The basis of intelligence and how the brain works

Advanced Cources

AI/ML	Security and Privacy in ML, ML Theory, Modern Information Retrieval
Bio/Medicine	Computational Drug Design, Bioinformatics
Statistics	Bayesian Methods in Statistics and Learning, Information Theory
Mathematics	Galois Theory, Algebraic Topology
Computer Science	Probabilistic Methods in Combinatorics, Complexity Theory Seminar, Algorithmic Game Theory, Embedded Systems

Programming Skills

Languages	C/C++, Java, Python, R, MATLAB.
Python Libraries	Pytorch, Tensorflow, Numpy, Pandas, Keras.