Mohammad Amin Ansari

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Education

B.Sc. in Electrical Engineering, Sharif University of Technology, Tehran, Iran   Sep. 2021 – May 2025
- GPA: 17.63/20
- Thesis: Spatial Super-Resolution of EEG Signals Using Modern Deep Generative Models
- Advisor: Prof. M. B. Shamsollahi

Diploma in Math & Physics, Shahid Madani High School, Tabriz, Iran   Sep. 2019 – May 2021
- GPA: 19.96/20

Research Interests

My curiosity about how the brain processes information inspired me to pursue neuroscience and its intersection with machine learning and deep neural networks. My current research focuses on applying state-of-the-art generative models to synthesize EEG signals, including those that are unrecorded or corrupted by artifacts. The inherently low spatial resolution of EEG signals limits the accuracy of source localization and restricts the amount of information that can be extracted about brain activity, making enhancement of spatial fidelity a key challenge. I found the deep learning approach of *Kwon et al.* and the GAN-based method proposed by *I. A. Corley et al.* particularly interesting and I am replicating them to better understand their mechanisms and advantages in biomedical signal processing. These works have shaped my approach toward developing generative frameworks that enhance EEG signal fidelity and support downstream applications like motor imagery classification.

Projects

Spatial Super-Resolution of EEG Signals Using Deep Generative Models   2025-present

Under the supervision of Prof. M. B. Shamsollahi, I addressed the challenge of low spatial resolution in EEG signals by developing and evaluating state-of-the-art deep generative models to enhance their spatial quality. I implemented and compared multiple architectures to assess both their reconstruction performance and computational efficiency. This work aimed to improve motor imagery (MI) task analysis, advance brain–computer interface (BCI) systems, and achieve higher accuracy in multi-class classification and disease diagnosis. Through this project, I gained practical experience in generative modeling, model evaluation, and real-world EEG signal processing.

From Cross-Task to Cross-Subject EEG Decoding   2025-present

Supervised by Prof. M. B. Shamsollahi, I applied advanced deep learning and transfer learning techniques to decode EEG signals across different tasks and subjects. Specifically, I developed models capable of predicting active-task performance from passive-task EEG data and employed representation learning to extract subject-invariant and psychologically meaningful features. Conducted as part of the EEG Foundation Challenge (accepted to NeurIPS 2025 Competition Track), this project allowed me to explore cutting-edge neural architectures to enhance generalization, interpretability, and robustness in large-scale EEG decoding.

Big Data Classification Engine with Adaptive Boost Algorithm   2024

Supervised by Prof. M. B. Shamsollahi, I developed a scalable classification engine using the AdaBoost algorithm to enhance performance on large datasets. This project provided hands-on experience in adaptive learning and ensemble methods. Conducted as part of the "Machine Learning" course.

Network Switch Vulnerability Analysis via DoS Attack Simulation   2024

Conducted under the guidance by Dr. M. R. Pakravan, this project assessed Layer 2 network switch security against DoS attacks. I developed an automated Python platform to identify vulnerabilities, finding several security and performance bugs that informed subsequent product improvements.

High-Performance Real-Time Data Analysis with FPGA-based FFT Module   2024

Supervised by Dr. M. Shabani, I designed a high-performance FFT module with serial communication ports on FPGA for real-time data analysis, gaining practical experience in FPGA design and signal processing. Conducted as part of the "FPGA/ASIC Systems Design" course using Vivado (Verilog) and MATLAB.

Text Recognition Engine (OCR)   2023

Supervised by Dr. H. Behroozi, this project aimed to design an optical character recognition (OCR) engine using machine learning techniques. Developed as part of the "Signals and Systems" course, the project involved implementing algorithms in MATLAB to automatically recognize and classify text, providing hands-on experience in signal processing, feature extraction, and pattern recognition.

Designing a MOS-based Amplifier   2022

Supervised by Prof. M. Sharif Bakhtiar, this project involved the design and analysis of a MOS-based amplifier. Conducted as part of the "Electronics II" course, the work provided practical experience in analog circuit design and deepened understanding of transistor-level implementation.

Designing a Communication Application   2022

As part of the "Object-Oriented Programming" course, I developed a social media–style application using Java and MySQL for database management. The platform, similar to Instagram, enabled users to share posts with attached photos and provided practical experience in both front-end and back-end development.

2D Soccer Game: SUT Legends   2021

I developed a 2D soccer game in C++, featuring characters with special abilities inspired by *Apex Legends*, as part of the "Fundamentals of Programming" course taught by Dr. Bijan Vosoughi Vahdat. The project strengthened my skills in object-oriented programming, modular design, and game logic implementation.

Technical Skills

Languages: Python, C/C++, Java, Verilog, LaTeX, Assembly

Tools: Git, PyTorch, TensorFlow, MATLAB, SPICE, Vivado

Teaching Assistant Experience

- Head TA – Signals & Systems (Instructor: Dr. H. Behroozi) — 2024-Fall, 2025-Spring, 2025-Fall
- Head TA – Communication Systems (Instructor: Dr. H. Behroozi) — 2025-Spring, 2025-Fall
- Lab Head TA – Computer Architecture (Instructor: Dr. S. Bagheri Shouraki) — 2025-Spring
- Lab & Project TA – Computer Architecture (Instructor: Dr. S. Bagheri Shouraki) — 2024-Fall
- TA – Machine Learning (Instructor: Dr. M. B. Shamsollahi) — 2025-Spring
- TA – Electromagnetics (Instructors: Prof. A. Banaei, Dr. M. Akbari) — 2024, 2025
- TA – Signals & Systems (Instructor: Dr. M. M. Mojahediyan) — 2024-Fall
- TA – Probability and Statistics (Instructor: Dr. M. M. Mojahediyan) — 2023-Fall
- TA – Engineering Mathematics (Instructor: Dr. D. Pooreh) — 2023-Fall

Achievements

- Ranked **31st** among ~10,000 participants in the National University Entrance Exam for Electrical Engineering master's Programs. — 2025
- Achieved top team status in the competitive internship program at Parto Tamase Novin Company, focused on enhancing the reliability and security of Layer 2 switches. — 2024
- Ranked **4th** in the HARDWAR competition at Sharif University of Technology, focused on developing microcontrollers for specialized tasks. — 2022
- Ranked **41st** among ~165,000 participants in the National University Entrance Exam for bachelor's programs. — 2021
- Iranian National Computer Olympiad, **2nd** division qualified — 2020
- Iranian National Physics Olympiad, **2nd** division qualified — 2020
- Ranked **1st** in PAYA national mathematics competition — 2017

- Ranked **1st** in State mathematics competition (twice)   2016
- Ranked **1st** in Meraat national IQ test between ~10,000 middle school students   2016

Coursework

- Signals & Systems 20/20   2023-Fall
- Basic Programming 20/20   2021-Fall
- Electromagnetism 20/20   2023-Fall
- Machine Learning 20/20   2024-Spring
- Computer Architecture 19.8/20   2023-Fall
- Communication Systems 19.5/20   2024-Spring
- Neuroscience 18.9/20   2025-Fall
- Object Oriented Programming 18.6/20   2022-Spring
- Data Structure & Algorithm 17.5/20   2025-Spring
- Data Science   (in progress...)
- Deep Generative Models   (in progress...)

Language

- English C1 (Advanced) — TOEFL planned for December 2025
- Persian (Native)
- Azerbaijani (Native)