Samin Mahdipour

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EDUCATION

- **Amirkabir University of Technology** — Tehran, Iran
  B.Sc., Computer Engineering — *Feb 2020 - Aug 2024*
  - **Top Student**: GPA: 3.86 / 4.00 (U.S. grading system)

- **Farzanegan 2 High School (National Organization for Development of Exceptional Talents)** — Tehran, Iran
  Diploma of Mathematics, Grade: 18.7 / 20.0 — *Class of 2018*

RESEARCH INTERESTS

- **AI and Brain Sciences**
  - Neuroscience in AI
  - Cognitive Science in AI
  - Neurotechnology
- **Machine Learning**
  - Deep Learning
  - Reinforcement Learning
  - Natural Language Processing
- **Generative AI**
  - Foundation Models
  - Large Language Models
  - Multimodal Models

SKILLS SUMMARY

- **Languages:**
  - Python
  - C/C++
  - Java
  - SQL/TSQL

- **Python Libraries:**
  - Seaborn
  - TensorFlow
  - Transformers
  - Gensim
  - Pandas
  - PyTorch
  - OpenCV
  - spaCy
  - Matplotlib
  - Keras
  - Scikit-learn
  - SciPy

- **Tools:**
  - JupyterLab
  - Hugging Face
  - Docker
  - SQL Server
  - Google Colab
  - Github
  - Minikube
  - MySQL
  - Anaconda
  - Linux
  - Apache Hadoop
  - PostgreSQL

- **LLMs:**
  - BERT
  - GPT-3
  - BLOOM
  - LLaMA
  - RoBERTa
  - T5
  - PaLM

WORK EXPERIENCE

- **Research Assistant — Natural Language Processing Lab at AUT** — July 2023 - Current
  - **PI**: Dr. Saeedeh Momtazi
  - **Achievement**: Gained hands-on experience in fine-tuning NLU models (BERT, RoBERTa), implementing text classification, sentiment analysis, and enhancing conversational AI systems with T5 and BLOOM. Collaborated with NLP experts to stay updated on the latest trends and advancements in the field.

- **Machine Learning Intern — Institute for Research in Fundamental Sciences (IPM)** — July 2022 - Aug 2022
  - **Achievement**: Studied the mathematics and principles of machine learning, gained experience working with datasets, and applied supervised, unsupervised, and deep learning techniques in various projects.

- **Teaching Assistant — Department of Computer Engineering at AUT** — Aug 2021 - Current
  - **Cloud Computing**: **Supervisor:** Dr. Javadi **Role:** Content Creator
  - **Applied Linear Algebra**: **Supervisor:** Dr. Nazerfard **Role:** Exam and Homework Designer
  - **Advanced Programming**: **Supervisor:** Dr. Nazerfard **Role:** Exam and Homework Designer
  - **Computer Networks**: **Supervisor:** Dr. Sabaei **Role:** Exam and Homework Designer
  - **Microprocessors and Assembly Language**: **Supervisor:** Dr. Farbeh **Role:** Exam and Homework Designer

Academic Projects

- **Brain Tumor Detection - Summer 2024(code)**: This project detects brain tumors using machine learning techniques. The project involves preprocessing medical images, training a model, and evaluating its performance on detecting tumors.
- **Counseler Chatbot- Summer 2024(code)**: This chatbot is designed to interact with users' mental health issues and provide responses based on predefined conversational intents.
- **Designing and Implementing Dialogue State Tracking in Chatbot Development - Summer 2024(code)**: Designed a dialogue state tracker for an open-domain chatbot using fine-tuned BERT and RoBERTa models combined with supervised machine learning approaches.
- **Chit-Chat Conversational System - Summer 2023**: Developed an open-domain chitchat system by fine-tuning BERT and RoBERTa models for intent detection and slot filling, and leveraging T5 and BLOOM models for answer generation.
- **Introduction to Python Libraries**: Explored the functionality and usage of common Python libraries for data mining, focusing on improving preprocessing steps with speed and accuracy.
- **EDA and Visualization**: Conducted statistical analysis and visualizations to explore and classify heart attack occurrences in a biological dataset.
- **Data Cleaning and Feature Engineering**: Applied feature engineering techniques like selection, reduction, and extraction to enhance model performance on linear regression, decision tree, and random forest algorithms.
- **Frequency Pattern Detection:**: Compared Apriori and FP-Growth algorithms, showing FP-Growth's superior efficiency in detecting patterns in large datasets.
- **Advanced Methods in Classification**: Utilized algorithms like Random Forest, SVM, and Naive Bayes to classify gas sensor data, employing model stacking and hyperparameter sensitivity analysis.
- **Advanced Methods in Clustering**: Performed cluster analysis using KMeans, Agglomerative Clustering, and DBSCAN, with PCA and t-SNE used for dimensionality reduction and visualization.
- **Identifying Data Outliers and Anomalies**: Implemented techniques such as One-Class SVM and Local Outlier Factor for anomaly detection, applying data balancing methods and LSTM for temporal pattern recognition.
- **Machine Learning using Map reduce - Spring 2023**: The goal of this project is to execute big data ML projects using map reduce on a Hadoop cluster. (code)
- **Multilayer Perceptron Neural Network - Spring 2023**: Implemented a neural network from scratch, incorporating layers such as Fully Connected (FC), Conv2D, and Max Pooling. Utilized popular optimizers including Adam and Gradient Descent, as well as loss functions such as Binary Cross Entropy and Mean Squared Error. Different activation functions like Sigmoid, ReLU, and Linear were implemented. The project applied unsupervised learning on the MNIST dataset. (code)
- **Coin Price Monitoring Project - Spring 2023**: This project is a cryptocurrency price monitoring app. The project focuses on Docker, and Kubernetes deployment, and offers optional Docker Compose support. (code)
- **Super Mario Game - Spring 2023**: In this project a genetic algorithm is implemented to excel in the Super Mario game by evolving an optimal "goal chromosome" strategy. (code)
- **Pacman - Fall 2022**: In this project, a Pacman game is implemented using artificial intelligence algorithms based on CS221's projects at Stanford University. (code)
- **Handwriting Detection**: The project utilized PCA for dimensionality reduction on a dataset containing handwritten numbers and employed SVM as the primary model to classify and recognize these numbers into their respective groups.(code)
- **Online Retail**: The project aimed to achieve optimal clustering of U.S. housing data using k-means, DBScan, and Mean Shift algorithms.(code)
- **Ad Click Prediction**: This project involved analyzing a dataset of website advertisements to predict customer click-through rates using classification algorithms like SVM, Naive Bayes, and KNN.(code)
- **Heart Disease Health indicators**: The project utilized a dataset containing medical information about patients to predict their risk of experiencing a heart attack.(code)
- **Titanic Survivor Predictor**: This project worked on a dataset about Titanic ship passengers and tried to predict which passengers survived.(code)
- **HDB Flat Prices Predictor**: In this project, using the dataset of different houses and their characteristics in the US states, we tried to estimate their approximate prices.(code)

Honors and Awards

- Passed first stage of National Chemistry Olympiad - 2014, 2015, 2016 (Certificate)
- Admitted to Exam High School under Iranian National Organization for Development of Exceptional Talents (NODET)
- Iranian Undergraduate Scholarship - Full-ride funding for B.Sc. at Amirkabir University of Technology
- Ranked 129th among the top GitHub users in Iran
- Successfully advanced to the commercialization phase in the AUT THINK event with the Persian Chatbot Assistant project supervised by Saeedeh Momtazi
- B.Sc. project nominated as best project award among all undergraduate students, Amirkabir University of Technology
- Admitted to M.Sc. at Amirkabir University of Technology without entrance exam for outstanding academic performance in B.Sc.

Courses

- Calculus I and II Courses - GPA: 4.0 / 4.0 (U.S. grading system)
- Discrete Mathematics Course - GPA: 4.0 / 4.0 (U.S. grading system)
- Data Structure Course - GPA: 4.0 / 4.0 (U.S. grading system)
- Applied Linear Algebra Course - GPA: 4.0 / 4.0 (U.S. grading system)
- Information Retrieval Course - GPA: 4.0 / 4.0 (U.S. grading system)
- Principles and Applications of Artificial Intelligence - GPA: 4.0 / 4.0 (U.S. grading system)
- Data Mining Course - GPA: 4.0 / 4.0 (U.S. grading system)

Certificates

- Programming in Python by Meta - (Certificate)
- Introduction to Artificial Intelligence (AI) by IBM - (Certificate)
- Introduction to Deep Learning Neural Networks with Keras by IBM - (Certificate)
- Building Deep Learning Models with TensorFlow by IBM - (Certificate)
- Deep Neural Networks with PyTorch by IBM - (Certificate)
- Introduction to Large Language Models by Google - (Certificate)
- Finetuning LLMs by DeepMind - (Certificate)
- Transformer Models and BERT Model by Google - (Certificate)
- Attention Mechanism by Google - (Certificate)
- Introduction to Generative AI by Google - (Certificate)
- Fundamental Neuroscience for Neuroimaging by Johns Hopkins University - (Certificate)
- Computational Neuroscience: Neuronal Dynamics of Cognition by EPFL - (Certificate)
- Digital Signal Processing 1: Basic Concepts and Algorithms by EPFL - (Certificate)

Extracurricular Activities

Volunteer Columnist, Pouyesh Magazine   *Tehran, Iran*
Official magazine of the Computer Engineering student community at Amirkabir University of Technology   *2020 - 2023*

Language Proficiencies

English Full Proficiency	**Persian** Native	**French** Beginner	**Arabic** Beginner
IELTS Band 7.0			

References

Saeedeh Momtazi, Associate Professor
Member of Artificial Intelligence group, Computer Engineering Dept., AUT, Tehran, Iran.
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Ehsan Nazerfard, Associate Professor
Member of Artificial Intelligence group, Computer Engineering Dept., AUT, Tehran, Iran.
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Hamed Farbeh, Associate Professor
Member of Computer Architecture group, Computer Engineering Dept., AUT, Tehran, Iran.
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