Samira **Hajizadeh**

Electrical and Computer Engineering · Student

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Education

B.Sc. in Electrical Engineering — *2019 - Present*

College of Electrical and Computer Engineering, University of Tehran — *Tehran, Iran*

- Control Engineering Speciality
- **Cum. GPA: 3.82/4 (17.38/20)**

Minor in Computer Engineering — *2021 - Present*

College of Electrical and Computer Engineering, University of Tehran — *Tehran, Iran*

- **Cum. GPA: 3.7/4 (17.8/20)**

High School Diploma in Mathematics and Physics — *2013 - 2019*

National Organization for Development of Exceptional Talents — *Bushehr, Iran*

- **Cum. GPA: 4.0/4.0**

Research Interests

- **Machine Learning**
- **Computer Vision**
- **Medical Imaging**
- **Autonomous Vehicles**
- **Reinforcement Learning**
- **Augmented and Virtual Reality**

Honors & Awards

June 2019 **Ranked 359 (Top 0.2%) amongst 164000 participants**, National Mathematics Entrance Exam

June 2019 **Ranked 39 (Top 0.02%) among 165500 participants**, National Foreign Languages Entrance Exam

Jul. 2016 **Accepted in the first round (Acceptance Rate of 9.3%)**, Iran National Mathematics Olympiad

Publications

Deep Learning for Anomaly Detection in Retinal Scans

- Under preparation
- Using convolutional neural networks and anomaly detection algorithms to classify retinal diseases from fundus photographs
- Supervised by Prof. Vahabie, NBIC Research Center, University of Tehran, Iran

Reinforcement Learning from Expert Demonstration for Autonomous Driving with IsoCost

- Under preparation
- Implementing a novel algorithm for providing the agent with demonstration
- Supervised by Dr. Ahmad Kalhor, University of Tehran, Iran

Reseach Experience

Roman Provincial Coin Diffusion Model Project — *Remote*

Python programming | Generative models | Web scraping techniques to gather and process data — *May 2023 – Present*

- Developed a diffusion model to analyze and predict the distribution of Roman provincial coins based on their descriptions and images
- Implemented a diffusion model to generate coin descriptions from images and vice versa
- Python programming | Generative models | Web scraping techniques to gather and process data
- Lancaster University, The United Kingdom
- Supervised by Dr. Hossein Rahmani

Reinforcement Learning Project on Trajectory Planning — *Tehran, Iran*

Deep Reinforcement Learning | Learning from Expert Demonstration | Isocost Algorithm | Trajectory Planning | Python Programming — *Jul. 2023 – Present*

- Developing a reinforcement learning model for trajectory planning using expert demonstration
- Using Isocost Algorithm as demonstration for RL agent
- Working under the supervision of Dr. Ahmad Kalhor

Deep Learning Project on Detecting Diseases by Retinal Image | Research Assistant — *Tehran, Iran*

Deep Learning | Computer Vision | Anomaly Detection | Medical Image Analysis | Python Programming | Pytorch — *Sep. 2021 – Present*

- Applied deep learning and computer vision techniques to analyze retinal fundus images for disease detection and overall health assessment
- Implemented anomaly detection algorithms and medical image analysis methods to improve diagnostic accuracy
- Utilized Python programming for model development and data processing
- Collaborated with a team of researcher as research assistant
- Under the supervision of Dr. Abdol-hossein Vahabie at the NBIC Research Center, University of Tehran

Summer Internship on Anomaly Detection and Localization *Tehran, Iran*

Deep Learning | Computer Vision | Anomaly Detection | Python Programming *July 2022 – October 2022*

- Conducted research on state-of-the-art image and video anomaly detection and localization techniques
- Explored and compared various approaches to improve the performance of detection algorithms
- Worked under the supervision of Dr. Mohammad Hossein Rohban at Sharif University of Technology

Summer Internship on Anomaly Detection and Localization *Tehran, Iran*

MATLAB | Arduino | Biomedical Signal Processing | ECG | PPG *2021 - 2022*

- Designed a portable device that can receive PPG and ECG signals simultaneously using MATLAB, Arduino, and the MAX30100 and MAX86150 sensors.
- Processed the received signals using signal processing techniques.
- Explored and compared various approaches to improve the performance of detection algorithms
- Worked under the supervision of Dr. Saeed Akhavan

Courses & Certificates

University of Tehran

- **Term 8**: Game Theory, Computer Networks, Digital Control Systems, Data Structure
- **Term 7**: Intelligent Systems, Instrumentation, Operational Research, Modern Control Systems
- **Term 6**: Neural Networks and Deep Learning, Mechatronics, Industrial Automation, Artificial Intelligence
- **Term 5**: Linear Control Systems, Engineering Economy
- **Term 4**: Signals and Systems
- **Term 3**: Advanced Programming, Engineering Probability and Statistics, Engineering Mathematics, Numerical Computation
- **Term 2**: Introduction to Computing Systems and Programming, Differential Equations

Coursera

Machine Learning, (Instructor: Andrew Ng)

University of Tehran IEEE Student Branch

- Deep Reinforcement Learning Workshop
- Atmel AVR Microcontroller Practical Learning

National Brain Mapping Lab (NBML)

Brain Stimulation Course taught by Hamed Ekhtiari

Notable Projects

Game Theory Course Project | Python, Multi-Agent Reinforcement Learning, Markov Games *2023*

- *Python implementation of the paper A New Policy Iteration Algorithm For Reinforcement Learning in Zero-Sum Markov Games*

Intelligent Systems Course Projects | Python, Artificial Intelligence, Machine Learning, Computer Vision *2022*

- *Video object detection*: Using YOLOv3 and COCO dataset
- *Teaching a taxi cab to drive around*: Using moodel free reinforcement learning, Q-learning, and OpenAi Gym.
- *Titanic dataset classification*: Using bagging decision tree and random forest methods.
- *Iris dataset clustering*: Using normal and advanced k-means algorithms.
- *CIFAR-10 dataset classification*: MLP and CNN *Using EfficientNet for Transfer Learning*
- *Classifying data using Naive Bayes*

Instrumentation Course Projects | ESP32 Microcontroller, Arduino, MQTT, Node-Red *2022*

- *Smart Weather Station*: Monitoring temperature and humidity using SHT20 sensor and publishing it on server by MQTT and Node-Red.
- *Temperature Chamber Design*: Creating a temperature chamber from scratch to test the sensitivity of the former project in various temperatures.

Modeling a Magnetic Levitation System | MATLAB, Simulink, Control theory, PID Controller *2022*

Simulating the behavior of a levitating object in a magnetic field, using a combination of differential equations and control theory to accurately represent the dynamics of the system.

Neural Networks and Deep Learning Course Projects | Python, Deep Learning, Computer Vision, NLP, GAN *2021 - 2022*

- Offensive Language Detection with BERT and Hatebert Networks
- Harry Potter and the Goblet of Fire Text Generation using LSTM
- Apple and Google Stock Price Prediction using LSTM network
- Creating abstract artworks using DCGAN
- Role prediction using Bidirectional Associative Memory (BAM)
- Face Recognition Using Discrete Hopfield Network
- Pattern Association using Hebbian Learning Rule and Auto-associative Nets
- Classification and Regression of CIFAR-10 dataset Using MLP Networks

Artificial Intelligence | Python, Search Algorithms, Decision Trees *2021 - 2022*

- *Gandalf the Grey and the Fellowship of the Ring*: Using BFS, IDS, and A* Search Algorithms to help Gandalf deliver the fellowship to Gondor.
- *Text Decryption*: using genetics algorithm.
- *Persian Text Label Detection*: Using Stemming, Lemmatization, Bag of Words, and Naive Bayes method.
- *Spotify Dataset Music Genre Classification*: Using Decision Tree and Random Forest.

Automated Warehouse | Ladder Programming, TIA Portal, Factory I/O *2021 - 2022*

Simulating an Automated Warehouse using TIA Portal's ladder programming and Factory I/O software. The program automates conveyor belts, sensors, and robots to optimize efficiency, reduce errors, and minimize downtime.

Rate Monotonic Scheduler | Arduino, C++ *2021 - 2022*

Implementing a priority assignment algorithm used in real-time operating systems (RTOS) with a static-priority scheduling class.

Soccer Stars Simulation | C++, Object Oriented Programming, Clean Coding *2020*
Developed a Soccer Stars Game Simulation using C++ and RSDL library, featuring object-oriented design, event-driven programming, and physics simulation, providing a realistic gameplay experience for users.

Skills

Programming	Python, C++, C, Verilog/System Verilog, Familiar with OOP and Clean Coding
Machine Learning	CNNs, Clustering and Classification, Anomaly Detection, Diffusion Models, Reinforcement Learning
Machine Learning Tools	Pytorch, Keras, Pandas, NumPy, Scikit-Learn, Matplotlib
Computer Vision	OpenCV, YOLO
Robotics	VPython, Simcape, ROS
Applications	MATLAB, Octave, TIA Portal, Factory IO, Modelsim, Quartus, Multisim, Proteus, CodeVisionAVR, Visual Studio
Microcontroller	Atmel AVR, Arduino
Other	Linux, HTML and CSS, LaTeX

Languages

English	**Proficient, TOEFL iBT of 111/120**
Farsi	**Native**

Volunteer Experience

Teaching Assistant | University of Tehran, Iran *2021 - present*
- **Engineering Probability and Statistics Course** - Prof. Mohammad-Reza Abolghasemi Dehaqani
- **Electric Machines Course** - Prof. Moein Abedini

Astronomy Educator | Mehr observatory, Bushehr, Iran *2013 - 2017*
- Developed and led tours about space science for student groups
- Performed nightly observations of observatory's telescopes and explained relevant physics concepts to visitors
- Researched and delivered presentations on astrophysics topics aimed at a general audience
- Gained hands-on experience with calibration and maintenance of troubleshooting of telescopes and other instrumentation.