

Alireza Heidari

✉ alirezaheidari.cs@gmail.com | [🌐 LinkedIn](#) | [🐙 GitHub](#) | [🌐 Webpage](#) |

Education

Sharif University of Technology

Tehran, Iran

Bachelor of Science in Computer Engineering – GPA: 17.63/20 (3.53/4.00)

Sep. 2019 – Present

- **Thesis:** “Enhancing Vision-Language Models’ Classification Performance with Hierarchical Semantic Labels”
- **Graduate-Level Courses:** Deep Learning (20/20), Machine Learning (20/20)
- **Relevant Undergraduate Courses:** Artificial Intelligence (20/20), Advanced Information Retrieval (20/20), Linear Algebra (19.4/20), Probability and Statistics, Computer Simulation, Game Theory

Research Interests

- Multimodal Learning
- Generative Modeling
- Machine Learning Theory
- Computer Vision
- Self-Supervised Learning
- Representation Learning

Publications

Unlabeled Out-of-Domain Data Improves Generalization

- A. Saberi, A. Najafi, **A. Heidari**, M.H. Movasaghinia, A. Motahari, B. Khalaj
- *International Conference on Learning Representations (ICLR)*, 2024. [[OpenReview](#)] [[Spotlight Presentation](#)]

Research Experience

Research Assistant In Multimodal Learning

Sharif University of Technology

Supervised by *Dr. Mahdieh Soleymani Baghshah*

Jul. 2023 - Aug. 2024

- **Description:** Vision-language models like CLIP often exhibit inconsistencies in processing concepts across varying levels of label abstraction. We propose integrating semantic hierarchical label knowledge during fine-tuning, ensuring the embedding features for different categories are distinctly separated across multiple levels of granularity.

Research Assistant In Machine Learning Theory

Sharif University of Technology

Supervised by *Dr. Abolfazl Motahari & Dr. Amir Najafi*

Jan. 2023 - Sep. 2023

- **Description:** Our work focuses on demonstrating the effectiveness of incorporating out-of-domain unlabeled samples. We proposed a polynomial-time algorithm that combines self-supervised learning (SSL) and Distributionally Robust Learning (DRL), with theoretically guaranteed improved generalization bounds over existing ERM methods.

Teaching Assistantship

(Grad. Course) Deep Generative Models

Sharif University of Technology

Lectured by *Dr. Beigy*

2024

(Grad. Course) Intelligent Analysis of Biomedical Images

Sharif University of Technology

Lectured by *Dr. Rohban*

2023

(Grad. Course) Deep Learning (×2)

Sharif University of Technology

Lectured by *Dr. Beigy & Dr. Soleymani Baghshah*

2024 & 2023

(Grad. Course) Machine Learning (×2)

Sharif University of Technology

Lectured by *Dr. Sharifi Zarchi & Dr. Motahari*

2022 & 2023

Artificial Intelligence

Sharif University of Technology

Lectured by *Dr. Soleymani Baghshah & Dr. Rohban*

2023

Advanced Information Retrieval

Sharif University of Technology

Lectured by *Dr. Beigy*

2023

Awards & Achievements

2019	Silver Medal , International Olympiad on Astronomy and Astrophysics (IOAA 2019)	Hungary
2018	Gold Medal (1st Rank) , Iran's National Olympiad on Astronomy and Astrophysics	Iran
2018 -	Elite Recognition , Iran's National Elites Foundation (INEF)	Iran

Work Experience

Tapsi

Tehran, Iran

Mid-Level Data Scientist / Data Science, Maps

Jan. 2022 – Mar. 2023

- Worked with cross-functional teams to centralize ETA modules across backend and data science into a unified repository, resolving discrepancies between ETA metrics in simulations and production, resulting in a 1% revenue increase.
- Architected a graph-based ETA prediction system by designing a data pipeline to construct a road segment graph and prototyping a forecast model using Graph Neural Networks.
- Designed and implemented a data preprocessing module optimized for the OSRM routing engine's Hidden Markov Model algorithms. This reduced location matching errors by nearly 80% and generated a 0.5% revenue increase.
- Developed an automated end-to-end pipeline for the ETA framework, enabling model retraining and deployment without manual intervention, thereby eliminating constant monitoring overhead.

Tapsi

Tehran, Iran

Mid-Level Software Engineer / Backend, Rides

Feb. 2021 – Jan. 2022

- Collaborated with the data science team to develop a flow-optimized driver-passenger matching algorithm, increasing revenue by nearly 2% and reducing average waiting time by 8%.
- Refactored three microservices by optimizing database queries, indexing, and caching strategies. Migrated inter-service communication to gRPC. Reduced average response times for domain events by ~15%.
- Developed monitoring dashboards for three microservices using Grafana and Metabase.

Open-Source Contributions

- **MedSegDiff**: Implementation of “*MedSegDiff: Medical Image Segmentation with Diffusion Probabilistic Model*,” using the LGG Segmentation Dataset for detecting tumor and cancer anomalies. [Code]
- **BYOL**: A PyTorch implementation of BYOL with a pre-trained ResNet backbone on the STL10 dataset. [Code]
- **Generative Models**: Experimentation with VAEs, GANs, and DDPMs on the Fashion MNIST dataset. [Code]
- **Object Detection**: Zero-shot object detection using CLIP and Faster R-CNN for region proposals. [Code]
- **Adversarial Robustness**: Evaluating robustness against adversarial attacks such as FGSM and PGD. [GitHub]
- **Full-stack Food Delivery Platform**: A food delivery application with a Python backend (FastAPI & Docker) and a Vue.js frontend, featuring an event-driven, distributed microservices architecture. [Website] [Code]
- **FastAPI JWT Authentication**: A Python middleware for distributed systems with Redis. [PyPI] [Website] [Code]

Technical Competencies

- **Deep Learning**: PyTorch, Hugging Face Transformers, RAPIDS, TensorFlow, Keras, PyTorch Geometric
- **Machine Learning**: Spark MLlib, Scikit-Learn, Catboost, XGBoost, PySpark, Pandas, Numpy, Scipy
- **Dashboarding & Visualization**: Metabase, Grafana, Tableau, Power BI, Dash, Plotly, Matplotlib, Seaborn
- **End-to-End Machine Learning Workflow**: MLflow, Metaflow, Prefect, Weights & Biases, Luigi
- **DBMS**: pgAdmin, RedisInsight, MongoDB Compass, PostgreSQL, MongoDB, Redis, Hazelcast, MySQL
- **Programming Languages**: Python, Django, Node.js, Java, Go, C++, C, R, L^AT_EX

Professional Certificates

Advanced Data Science with IBM Specialization

4 Courses - Grade: 99.0%

IBM
Badge & Certificate

ML and RL in Finance Specialization

4 Courses - Grade: 100.0%

New York University
Certificate

Deep Learning for Healthcare Specialization

3 Courses - Grade: 96.7%

University of Illinois
Certificate

Natural Language Processing Specialization

4 Courses - Grade: 100.0%

DeepLearning.AI
Certificate

Deep Learning Specialization

5 Courses - Grade: 96.2%

DeepLearning.AI
Certificate

AI for Medicine Specialization

3 Courses - Grade: 100.0%

DeepLearning.AI
Certificate

Self-Driving Cars Specialization

4 Courses - Grade: 99.4%

University of Toronto
Certificate

Skills & Activities

English: IELTS Academic (7.0/9.0), DET (140/160)

Piano: +8 years of experience

Observational Astronomy: Winner of two national competitions

Sports: Tennis, Swimming, Table Tennis