Abtin Badie

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Education

Iran University of Science and Technology (IUST) 2021 – Present
B.Sc. Computer Engineering *Expected Graduation: Fall 2025*

- GPA: 18.87/20 — (3.99/4)

Research Interest

- Deep Learning
- Machine Learning
- Computer Vision
- NLP (Natural Language Processing)
- LLM (Large Language Models)

Honors and Awards

- Top 10% Undergraduate Student, Iran University of Science and Technology (Present).
- Ranked 2nd among first-year cohorts at Iran University of Science and Technology (2022).
- Ranked 1st for academic achievement at Tohid High School (2019, 2021) and Ehsan School (2018).

Experience

Undergraduate Research Assistant June 2024 – Present
IUST Natural Language Processing Lab *Tehran, Iran*

- Conducting thesis research on Medical Image Captioning to generate automated medical reports from images.
- Investigating methods to enhance LLM performance in specialized domains under Dr. Sauleh Etemadi's supervision.
- Designed and built an autonomous agent system using LLMs for complex task execution.

Teaching Assistant
Iran University of Science and Technology *Tehran, Iran*

- Served as **Head TA** for *Theory of Languages and Automata*, supporting 100+ students by leading recitations, grading, and holding office hours.
- Also assisted with courses including: *Artificial Intelligence*, *Advanced Programming*, *Fundamentals of Programming*, *Digital Systems Design*, *Logic Circuits*, and *Discrete Mathematics*.

Software Engineer Intern Feb 2025 – Jun 2025
TAPSI *Tehran, Iran*

- Developed the Minimum Viable Product (MVP) for TAPSI-Service, a new platform for on-demand home repair and utility services.
- Built a scalable back-end architecture as a member of the system design team using **Python**, **FastAPI**, and **PostgreSQL**.

Projects

Medical Image Captioning with BLIP & Flan-T5 | *Image Captioning, PyTorch, Hugging Face, BLIP, Flan-T5*

- Engineered a two-stage captioning pipeline using BLIP for initial generation and Flan-T5 for refinement, enhancing caption descriptiveness for radiology images.
- Fine-tuned the BLIP model on the ROCOv2 dataset to adapt its vision-language understanding to the specialized medical imaging domain.
- Developed an automated evaluation framework using BERTScore and ROUGE-L to rigorously measure the semantic similarity and accuracy of generated captions.

Persian Video Understanding: Fine-Tuning CLIP & CLIP4Clip | *Multimodal Learning, PyTorch, Video-Text Retrieval*

- Adapted CLIP and CLIP4Clip models for Persian by fine-tuning on the MSR-VTT dataset with 10,000 translated captions, enabling bilingual video-text retrieval.

- Implemented multilingual text encoders with custom tokenization and efficient training on an NVIDIA V100 GPU using weighted contrastive loss and dynamic frame sampling for temporal awareness.
- Achieved 84.1% R@1 accuracy in Persian text-to-video retrieval, outperforming zero-shot baselines, and developed a reusable GitHub framework for multimodal research.

Deep Learning Course Workshops | *PyTorch, Generative Models, PEFT, CNNs, Transformers*
- Established a comprehensive workshop series covering fundamentals like NumPy, Pandas, and PyTorch, emphasizing GPU-accelerated tensor operations.
- Built a diverse range of models from scratch, including CNNs for image classification, RNNs for NLP, LSTMs for time-series forecasting, and generative models like VAEs and Conditional GANs.
- Implemented advanced, parameter-efficient fine-tuning (PEFT) techniques, including building a Transformer from the ground up and using LoRA to adapt a Stable Diffusion model for medical imaging.

Artificial Intelligence Course Projects | *Python, TensorFlow, Keras, Reinforcement Learning*
- Implemented classical ML algorithms from scratch, including Decision Trees for fraud detection, SVMs for text classification, and a Genetic Algorithm for clustering.
- Built and trained MLP neural networks using TensorFlow and Keras for function approximation and CIFAR-10 image classification, including full hyperparameter tuning.
- Engineered deep reinforcement learning agents for pendulum balancing (95% success rate) and Othello (82% win rate) using trial-and-error and self-play techniques.

Selected Courses

- Artificial Intelligence (20/20)
- Computational Intelligence (18.75/20)
- Fundamentals of Programming (20/20)
- Advanced Programming (20/20)
- Theory of Languages & Automata (20/20)
- Data Structures (18.37/20)
- Analysis & Design of Algorithms (18.5/20)
- Operating Systems (18.3/20)

Test scores

- Scheduled to take the TOEFL exam on September 27, 2025.

Skills

AI & Machine Learning

- **Frameworks/Libraries**: **TensorFlow**, **PyTorch**, **Keras**, **LangChain**, Scikit-learn, NumPy, Pandas
  Core Concepts: **Deep Learning (CNNs, RNNs, Transformers)**, **LLMs**, **Natural Language Processing (NLP)**, **Computer Vision**

Web Development & Programming

- **Languages**: Python, JavaScript, TypeScript, Go, SQL, C/C++, MATLAB
  Backend: FastAPI, Django, Fiber (Go), GORM
  Frontend: React, HTML5, CSS3
  Databases: PostgreSQL, MySQL

DevOps, Tools & Professional

- **Tools & Platforms**: Git, Docker, Linux, Bash, CI/CD
  Mobile Development: Android, Kotlin
  Professional Skills: Teamwork, Team Leadership

Certificates

- **Algorithmic Toolbox**: Coursera
  Data Structures: Coursera
  Advanced Algorithms & Data Structures: Quera
  Machine Learning with Python: Quera
  Backend Development with Django: Quera
  Frontend Development with React: Quera
  Software Engineering with Golang: Quera

References

Dr. Sauleh Etemadi — Assistant Professor at Iran University of Science & Technology
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Dr. Nasser Mozayani — Associate Professor at Iran University of Science & Technology
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Dr. Reza Entezari Maleki — Assistant Professor at Iran University of Science & Technology
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Dr. Farzaneh Ghayour Baghbani — Assistant Professor at Iran University of Science & Technology
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