Parsa Mohammadi | Curriculum Vitae

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GitHub | LinkedIn | Google Scholar

EDUCATION

- **Amirkabir University of Technology (AUT)**, Tehran, Iran — Sep 2020 – Present
  - B.S. in Electrical Engineering
    - **GPA: 3.56 (17.42 out of 20)**, Last 2 years: **3.88 (18.1 out of 20).**
    - Ranked within the top 1% of the Iranian University Entrance exam.

RESEARCH INTERESTS

- Natural Language Processing (NLP)
- Large Language Models (LLM)
- Computer Vision
- AI for Healthcare

PUBLICATIONS

- **Mohammadi, P.**, Sharifian, S., *Med Mini-Gemini: Chest X-ray Images Diagnosis and Report Generation. (In Preparation).*
- **Mohammadi, P.**, Malakouti, M., Suratgar, A., Menhaj, M. *Eye Pupil Control Analysis*. Vision Research Journal (Under Review) (*https://doi.org/10.21203/rs.3.rs-4504934/v1*)

RESEARCH EXPERIENCES

Medical Images Report Generation - HPCRC Lab — Jan 2024
- Fine-tuned **COCA Vision-Language** Model achieving **80%** accuracy on the **MIMIC-CXR** dataset.
- Applied a fine-tuned **BERT** model, achieving an **81%** accuracy rate on the **MIMIC-III** dataset.
  - *Supervisor: Dr. Saeed Sharifian (Amirkabir University of Technology, Tehran, Iran)*

Tondguyan Petrochemical Company Maintenance System — Jul 2023 – Sep 2023
- Performed feature reduction on a dataset of mechanical properties of facilities.
- Implemented the K-means algorithm to identify anomalous data clusters.
  - *Supervisor: Dr. Somaye Mohammadi (Sharif University of Technology, Tehran, Iran)*

Eye Pupil Control Analysis – DIOR Lab — Oct 2022 – Mar 2023
- Linearized a complex, non-linear model of human eye pupil control to facilitate further analysis.
- Conducted linear control analysis on the linearized model.
  - *Supervisor: Dr. AmirAbolfazl Suratgar (Amirkabir University of Technology, Tehran, Iran)*

Data-driven Maintenance of Urban Infrastructure in Smart City — Dec 2021 – Jul 2022
- Utilized Random Forest, K-means algorithms and MLP to optimize the cost of maintenance and repair of power networks. Achieved **90% accuracy** for predicting power network failures.
- Developed a Decision Support web application for control centers using Django framework.

WORK EXPERIENCES

Machine Learning Intern - Asr Gooyesh Pardaz · Full-time, Tehran, Iran — Jul 2023 – Sep 2023
- Developed an end-to-end Automatic Speech Recognition (ASR) model using **E-Branchformer** architecture and **ESPNet framwork** on a Persian dataset.
- Achieved **2.0 WER** on Mozilla's Common Voice dataset (Persian).
- Implemented the trained model on **Hugging Face Space** with **Gradio**, providing an interactive user interface. Link to online demo.
  - *Supervisor: Dr. Hossien Sameti (Sharif University of Technology, Tehran, Iran)*

TEACHING EXPERIENCES

Sharif University of Technology (SUT), Tehran, Iran Sep 2023 – Present

- **Automatic Speech Recognition** – **For the past three semesters**
  - Conducted weekly quizzes and workshops on **ESPNet** framework.
  - *Supervisor: Dr. Hossien Sameti (Sharif University of Technology, Tehran, Iran)*

Amirkabir University of Technology (AUT), Tehran, Iran

- **Logical Circuits** Sep 2024 – Present
  - Taught VHDL programing with Vivado and ISE.
  - *Supervisor: Dr. Zahra Shariatmadar (Amirkabir University of Technology, Tehran, Iran)*
- **Computer Architecture & Microprocessors** Sep 2023 – Feb 2024
  - Created educational materials, including projects and weekly homework.
  - *Supervisor: Dr. Ahad Shabani (Amirkabir University of Technology, Tehran, Iran)*
- **Linear Control Systems - Electrical Engineering** Feb 2023 – Jul 2023
  - Taught MATLAB and Simulink basics to students.
  - *Supervisor: Dr. Amir A. Suratgar (Amirkabir University of Technology, Tehran, Iran)*

SKILLS

- Programming Skills

Python
- TensorFlow
- PyTorch
- NumPy
- Pandas
- Sklearn
- Gradio
- OpenCV
- Threading

C/C++
HTML/CSS
JavaScript
Matlab

- Machine Learning Skills

NLP
- NER
- Semantic Analysis
- Vision-Language
- LLM
- NLTK

Speech Processing
- ASR
- ESPNet

Computer Vision
- Segmentation
- Object detection

Classical AI Algorithms

- Others

Linux
Git
Docker
Jupyter Notebook
VSCode
LaTeX

SELECTED PROJECTS

Bachelor thesis: Chest X-ray Images Diagnosis and Report Generation Mar 2024 – Present

- Tuned **Mini-Gemini** (Pre-trained VLM) on a large dataset of radiology images for **VQA** task.
- Created a **new dataset** of paired images and reports for training.
- Achieved significant performance improvements on the test set.
  - *Supervisor: Dr. Saeed Sharifian (Amirkabir University of Technology, Tehran, Iran)*

Radiology Image Diagnosis Feb 2024 – Mar 2024

- Trained **COCA Vision-Language Model** on the U-Xray dataset to diagnose TB and pneumonia from chest X-ray images, achieving **84.6%** accuracy.
- Implemented Low-Rank Adaptation (**LoRA**) to optimize memory usage during model training.
- Conducted comparative evaluation using **Gemini 1.5 Pro** API to verify results against ground truth data.
  - *Supervisor: Dr. Saeed Sharifian (Amirkabir University of Technology, Tehran, Iran)*

Cancer Detection with CT images Feb 2024 – Mar 2024

- Fine-tuned **YOLOv8** on the Lung-PET-CT-Dx dataset for cancer detection, achieving 79% accuracy on the test set.
  - *Supervisor: Dr. Saeed Sharifian (Amirkabir University of Technology, Tehran, Iran)*

Sentiment Analysis of Twitter Posts Sep 2023 – Feb 2024

- Preprocessed a large dataset of Twitter posts, including tokenization, stemming, and normalization, for sentiment analysis.
- Employed **TF-IDF** for feature extraction and fine-tuned a **BERT-based uncased** model, achieving 95% accuracy on the test set.

Clinical NER and Report Classification Sep 2023 – Feb 2024

- Fine-tuned **BioBERT** on MHN and CHM datasets for NER and classification of chest X-ray reports into 10 disease categories.
- Achieved **86**% accuracy in disease classification with precise recognition of clinical entities.

Fine-tuned DistilBERT for QA Task Sep 2023 – Feb 2024

- Fine-tuned **DistilBERT** on the **bAbI** dataset for extractive QA using PyTorch, addressing challenges in alig ning tokenized inputs with answer spans.
- Achieved an F1 score of ~**85**%, effectively extracting precise answers from text.

COURSES

- Artificial Intelligence [Fall 2021]
- Machine Learning [Fall 2023]
- Advanced Programming [Winter 2023]
- Computer Vision [Winter 2024]

➢ **Online Certificated Courses:**

- **Machine Learning**
  - *Dr. Andrew Ng*
- **Django for Everybody**
  - *Dr. Charles Severance*
- **Analysis of Intelligent Biomedical Images**
  - *Dr. Mohammad H, Rohban*
- **Building and Evaluating Advanced RAG Applications**
  - *Deeplearning.ai*
- **Deep Learning Specialization**
  - Convolutional Neural Networks
  - Sequence Models (Transformers)
  - *Dr. Andrew Ng*
- **Finetuning Large Language Models**
  - *Deeplearning.ai*
- **Prompt Engineering with Llama 2 & 3**
  - *Deeplearning.ai*
- **Prompt Engineering for Vision Models**
  - *Deeplearning.ai*

VOLUNTEERING EXPERIENCES

- **Participated in a Charity Market** Feb 2024
  - Created and sold handmade goods to raise funds supporting underprivileged students.
- **Member of Amirkabir Astronomy Club** Apr 2023
  - Designed and implemented astronomical events, engaging students and the public in astronomy-related activities.
- **Member of "Amirkabir 2021 International Summer School," Executive Team** Mar – Sep 2021
  - Invited Dr. Larry Cheng from Penn State University to participate in the summer school.
  - Assisted Dr. Larry Cheng during the summer school sessions.

Honors

- Won **1st** place prize in the IEEE Open Data Hackathon Competition. Certificate link Nov 2022
- Ranked among **top teams** in Irancell Labs AI Hackathon. Certificate link. Aug 2023

LANGUAGE PROFICIENCY

- English (IELTS: L:8, R:8, S:7, W:6.5, overall: **7.5**)
- Persian(Native)
- Kurdish (Native)