Parsa Mohammadi | Curriculum Vitae

📞 (+98) 9182265891   🌐 Personal Website   ✉ parsamohammadi@aut.ac.ir

🐙 GitHub   💼 LinkedIn   Google Scholar

EDUCATION

- **Amirkabir University of Technology (AUT)**, Tehran, Iran   Sep 2020 – Present
  - B.S. in Electrical Engineering - Electronics
    - **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

- Machine Learning
- Computer Vision
- FPGA
- Microprocessor

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)*

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.
  - *Supervisor: Dr. Alireza Fereidunian (K. N. Toosi 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.

WORK EXPERIENCES

Machine Learning Intern - Asr Gooyesh Pardaz · Full-time, Tehran, Iran   Jul 2023 – Sep 2023
- Trained 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

Amirkabir University of Technology (AUT), Tehran, Iran

- **Microprocessor Systems & Interfaces**   Sep 2024 – Present
    - Taught embedded C, assembly and microprocessor basics.
    - *Supervisor: Dr. Amir A. Suratgar (Amirkabir University of Technology, Tehran, Iran)*
- **Logical Circuits**   Sep 2024 – Present
    - Taught MATLAB and Simulink basics to students.
    - *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 VHDL programing with Vivado and ISE.
    - *Supervisor: Dr. Amir A. Suratgar (Amirkabir University of Technology, Tehran, Iran)*

Sharif University of Technology (SUT), Tehran, Iran

- **Automatic Speech Recognition** – **For the past three semesters**   Sep 2023 – Present
    - Conducted weekly quizzes and workshops on **ESPNet** framework.
    - *Supervisor: Dr. Hossien Sameti (Sharif University of Technology, Tehran, Iran)*

SKILLS

- **Programming Skills**

VHDL
Verilog
HSPICE
Python
C/C++
HTML/CSS
JavaScript
Matlab
- Electrical Libraries
- Simulink

Assembly

- **Machine Learning Skills**

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

Speech Processing
- ASR
- ESPNet

Computer Vision
- Segmentation
- Object detection

Classical AI Algorithms

- **Tools**

ISE Design Suite
Vivado Design Suite
- IP Core
- HLS
- Vitis
- Micro Blaze

Proteus 8
PCB Design (Altium Designer)
STM32 Microcontroller
Cadence (VLSI Designer)
Microwind
Arduino
Linux
Git
Docker
Jupyter Notebook
LaTeX

SELECTED PROJECTS

Multi-Layer Perceptron (MLP) Implementation on FPGA

- Developed and trained an **MLP** for speech recognition, implemented on a **Virtex-E 2000 FPGA**.
- **Quantized** the model for **8-bit** calculations, achieving **83.4%** accuracy on the test set.

Heart Rate Calculation Using FPGA

- Implemented a **MicroBlaze** microprocessor on an FPGA with 8 **GPIO** ports using Vivado and Vitis.
- Programmed MicroBlaze using **Vivado HLS** for efficient heart rate calculations.

Trigonometric Functions Implementation on FPGA

- Implemented arctan and exponential functions using the **CORDIC IP** core in Xilinx ISE 14.6. Link.

General-Purpose Board Design with FPGA and Microcontroller

- Designed and developed a buffer board with complete schematic and **PCB** layout using Altium Designer.

Binary multiplication in FPGA

- Developed and simulated three binary multiplier designs (Array, Carry-Save, and Standard) using Vivado. [Link.](#)

CPU simulation on FPGA

- Designed and simulated a CPU with MIPS architecture in a 4-stage pipeline.
- Implemented RAM, ROM, ALU, and I/O interfaces.

Bachelor thesis: Chest X-ray Images Diagnosis and Report Generation

- Fine-tuned Mini-Gemini (a pre-trained VLM) on a large dataset of radiology images for a Visual Question Answering (VQA) task.
- Created a new dataset of paired images and reports, achieving significant performance improvements on the test set.

- *Supervisor: Dr. Saeed Sharifian (Amirkabir University of Technology, Tehran, Iran)*

Gender Classifier Model Development

- Trained a MobileNet architecture model using **Keras** and **TensorFlow** on a merged dataset from five large image datasets with gender labels.
- Achieved **92.7%** accuracy on the test set and deployed the model on a personal website using Django. Link to [project](#).

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*

- **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*

VOLUNTEERING EXPERIENCES

- **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.
- **Member of Amirkabir Astronomy Club**   Apr 2023
    - Designed and implemented astronomical events, engaging students and the public in astronomy-related activities.
- **Participated in a charity market**   Feb 2024
    - Created and sold handmade goods to raise funds supporting underprivileged students.

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)