

# Parsa Mohammadi | Curriculum Vitae

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## 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.**, 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.
  - Supervisor: Dr. AmirAbolfazl Suratgar (Amirkabir University of Technology, Tehran, Iran)

## 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 **ESPN** framework 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

<a href="#">Programming Skills</a>	<a href="#">Machine Learning Skills</a>	<a href="#">Tools</a>
VHDL	NLP	ISE Design Suite
Verilog	- NER	Vivado Design Suite
HSPICE	- Semantic Analysis	- IP Core
Python	- Vision-Language	- HLS
C/C++	- LLM	- Vitis
HTML/CSS	- NLTK	- Micro Blaze
JavaScript	Speech Processing	Proteus 8
Matlab	- ASR	PCB Design (Altium Designer)
- Electrical Libraries	- ESPNet	STM32 Microcontroller
- Simulink	Computer Vision	Cadence (VLSI Designer)
Assembly	- Segmentation	Microwind
	- Object detection	Arduino
	Classical AI Algorithms	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.

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### 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

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

➤ **Online Certificated Courses:**

- |   |  |
|---|--|
| • <b>Machine Learning</b><br>- <i>Dr. Andrew Ng</i>                                   | • <b>Deep Learning Specialization</b><br>▪ Convolutional Neural Networks<br>▪ Sequence Models (Transformers)<br>- <i>Dr. Andrew Ng</i> |
| • <b>Django for Everybody</b><br>- <i>Dr. Charles Severance</i>                       | • <b>Finetuning Large Language Models</b><br>- <i>Deeplearning.ai</i>  |
| • <b>Analysis of Intelligent Biomedical Images</b><br>- <i>Dr. Mohammad H, Rohban</i> | • <b>Prompt Engineering with Llama 2 &amp; 3</b><br>- <i>Deeplearning.ai</i>   |

## VOLUNTEERING EXPERIENCES

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- **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

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- 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

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|-----------------------------------|--------------------|--------------------|
| • English (Exam date: 10/31/2024) | • Persian (Native) | • Kurdish (Native) |
|-----------------------------------|--------------------|--------------------|