

# SAMIRA HAJIZADEH

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## EDUCATION

### Columbia University

New York City, NY

#### Master of Science

May 2026

Electrical Engineering, Research Track Specialization (GPA 3.88/4)

*Recipient of the Mahsa Amini Fellowship*

*Approved for the Advanced Master's Research (AMR) Specialization on long-context reasoning in LLMs*

*Course Assistant for Signals and Systems (Fall 24, Fall 25)*

**Notable Courses:** Causal Inference, Deep Learning for NLP, Generative AI, Audio & Speech Processing, Deep Learning, Machine Learning, Algorithms for Data Science

### University of Tehran

Tehran, Iran

#### Bachelor of Science

Mar 2024

Electrical Engineering, Specialization in Control Engineering (GPA 3.82/4)

Teaching Assistant for Engineering Probability and Statistics (four semesters) and Electric Machines (two semesters)

**Notable Courses:** Artificial Intelligence, Neural Networks, Intelligent Systems, Advanced Programming

## PUBLICATIONS

### Sense and Sensitivity: Examining the Influence of Semantic Recall on Long Context Code Reasoning

Under review at ARR

### Ensemble Deep Learning for Diabetes Detection from Retinal Fundus Images: A Comparative Study

Under review at Array journal

## RESEARCH EXPERIENCE

### Columbia University

NYC, NY

#### Advanced Master's Research Fellow

Oct 2025 - Current

Working on improving code-generating LLMs via inference-time optimization, including agentic workflows, code mutation, and fuzzing-style test/input generation.

### Columbia University

NYC, NY

#### Researcher

Jan 2025 - Oct 2025

Co-authored a research paper introducing SemTrace, a framework to measure semantic recall in LLM code generation

Observed that LLMs struggle with reasoning when key information is located mid-context (lost-in-the-middle effect)

Analyzed the divergence between semantic and lexical recall in LLMs

### Columbia University

NYC, NY

#### Researcher

Jan 2025 - May 2025

Developed and fine-tuning Text-to-Speech (TTS) Diffusion Models to synthetically generate and analyze healthy and pathological heart sounds for diagnostic applications

Fine-tuned a conversational LLM-based diagnostic assistant to analyze and discuss heart sound anomalies, integrating speech processing and medical signal interpretation

### University of Tübingen

Tübingen, Germany

#### Research Assistant

Sep 2024 - May 2025

Reviewed current applications of Large Language Models as conversational agents for therapeutic purposes

Assessed the effectiveness and safety and ethical issues of fully-automated LLM-based psychotherapy

### Center of Convergent Technologies

Tehran, Iran

#### Research Assistant

Sep 2021 - Feb 2024

Achieved high accuracy in detecting anomalous Fundus images using Out-of-Distribution detection techniques

Diagnosed blood hypertension from retinal Fundus images

Created feature detection algorithms for blood vessel extraction and optic disc and macula detection

# Ludwig Maximilian University

## Data Analyst

Monitored visitor behavior of the Museum of Tomorrow based on gaze patterns

Generated heat maps showing areas of interest in museum exhibits

Conducted statistical analysis on gaze data to provide recommendations for improving museum layout and design

Munich, Germany

May 2023 - Jan 2024

## WORK EXPERIENCE

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### Rocket Lawyer

SF, CA

AI/ML Intern

Jun 2025 - Aug 2025

Conducted prompt engineering and tool orchestration for legal document analysis using multi-agent systems

Developed agent pipelines to assess LLM output quality, such as faithfulness in RAG settings and overall factual accuracy

Designed and implemented an AI Insights Agent to extract document-level insights

*PydanticAI - Prompt Engineering - Agentic Frameworks - LLM as a judge - Python*

## PROJECTS

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### Multi-Agent RAG for Financial Q&A and Stock Market Analysis

Fall 2024

Applied depth-pruning and LoRA to various LLM backbone models to fine-tune them for financial question answering

Implemented multi-agent retrieval-augmented generation for improving model accuracy

*Python - PyTorch - Naive and Agentic RAG - ChromaDB - Langchain - CrewAI*

### SimCLR paper code implementation and result reproduction

Fall 2024

Implemented the code for SimCLR which is a framework for Contrastive Learning of Visual Representations

*Python - Tensorflow - Google Cloud Platform - Self-supervised Learning*

## LANGUAGES AND SKILLS

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Python, C++, R

PyTorch, Tensorflow, Librosa, Scikit-learn, NumPy, Pandas, PydanticAI, CrewAI

LLMs, Text-to-Speech Diffusion Models, Computer Vision, Out-of-Distribution Detection, Agentic Frameworks

University of Tehran IEEE Student Branch Deep Reinforcement Learning Workshop