Matin Mirzababaei

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Education

Sharif University of Technology (SUT)   *Tehran, Iran*
B.Sc. Electrical Engineering   *Sep. 2021 - Present*

- With Total **GPA: 19.33** out of 20
- Among the top 5%

Kamal High School   *Tehran, Iran*
Mathematics and Physics   *Sep. 2014 - Aug. 2021*

- With Total **GPA: 19.99** out of 20

Research Experience

Integrated Neurotechnologies Laboratory (INL) at EPFL   *Geneva, Switzerland*
Research Intern   *Jul. 2025 - Sep. 2025*

- Model Quantization and Compression Research - Under supervision of **Dr. Mahsa Shoaran**.
- Initiated during **E3 summer research internship program** at EPFL, developing a novel LoRa-based post-training rotation-aware quantization framework for transformer progressive compression.
- Currently extending the work and benchmarking against the **state-of-the-art** LRA-QViT (ICML 2025), aiming to deploy the resulting model across ongoing **SoC-based projects** in the lab.

Software-Defined Communications Networks Lab (STNL) at SUT   *Tehran, Iran*
Research Assistant   *Apr. 2024 – Present*

- Research project under the supervision of **Prof. Babak Khalaj**.
- Developing an **Autonomous Robotic Agent** capable of 3D mapping, exploration, and open-vocabulary object retrieval through natural-language commands.
- Performed both **simulation experiments** in Webots and **real-world implementation** on a 4-wheeled robot with a stereo camera for 3D environment reconstruction and object retrieval
- Contributed to a first-author publication *"CORE-3D: Context-Aware Open-Vocabulary Retrieval by Embeddings in 3D"*, submitted and under review at **ICLR 2026**.

Publications

CORE-3D: Context-Aware Open-Vocabulary Retrieval by Embeddings in 3D (Link: arXiv:2509.24528)
First Author (equal contribution)
Under review at the International Conference on Learning Representations (ICLR 2026) (2025). 2025

Technical Skills

Programming	Matlab, C/C++, Python, Java, SQL, Verilog, MIPS Assembly
Professional Softwares	Simulink, ModelSim, Xilinx ISE, Pspice, LTspice, COMSOL, EEGLAB(Some plugins), PowerWorld
Drawing & Typesetting	Photoshop, Office, LaTeX
Languages	Persian(Native), English(Professional), Arabic(Preliminary)

Work Experience

Kavoshcom Company   *Tehran, Iran*
Smart Machines   *Jul. 2024 - Oct. 2024*

- Participating in an industrial summer internship at Kavoshcom Company. I worked on my bachelor project under supervision of Dr. Khalaj and collaboration of Dr. Fotowat.
- **Technical Skills:** Python, C++, Robotics, MySQL, Git, ESP32.
- **Soft Skills:** Teamwork, Time Management, Communication, Code Review.

Teaching Experience

Engineering Mathematics / Signals and Systems   *Dr. Hamid Aghajan*
Head Teaching Assistant   *Jun. 2024 – Present*

- Coordinated all course logistics.
- Assisted in the **design and preparation of midterm and final exams**.
- Conducted **review and problem-solving sessions** prior to exams to help students with challenging topics.
- Developed and maintained the **detailed course schedule**, including assignment timelines, deadlines, and examination dates.

Foundations of Blockchain (University of Minnesota) *Dr. Mohammad Ali Maddah-Ali*
Remote Teaching Assistant *Jul. 2023 - Jan. 2024*
I provided the main lecture note of the course and designed Theoretical problem sets of the course. (Available here)

Artificial Intelligence *Dr. Mohammad Hossein Rohban*
Teaching Assistant *Feb. 2024 - Jan. 2025*
I designed Theoretical problem sets on Bayesian Networks and Machine Learning topics. (Available here)(For two Semesters in a row)

Engineering Probability and Statistics / Machine Learning *Dr. Mohammad Hossein Yassaee*
Teaching Assistant *Aug. 2023 - Jul. 2024*
I designed Theoretical problem sets of the course under supervision of Mohammadreza Rahmani (Dr. MohammadHossein Yassaee's Doctoral Assistant). (For two Semesters in a row)

Object-Oriented Programming (OOP) *Dr. Bijan Vosoughi Vahdat*
Dr. Matin Hashemi
Teaching Assistant *Feb. 2023 - Jul. 2023*
I designed programming homework. To be more specific, the aim was to design a Java GUI application(Scientific Calculator) using the OOP skills by software development platforms like JavaFx or GUI toolkits like Swing. Also, I graded them here.

Convex Optimization / Circuit Theory *Dr. Rouhollah Amiri*
Teaching Assistant *Aug. 2024 - Jul. 2025*
I designed Theoretical problem sets for the Circuit Theory course and Practical problem sets for Convex Optimization course.

Notable Courses

- **Deep Reinforcement Learning (Graduate Course)**, Dr. Mohammad Hosein Rohban — *20.0*
- **Deep Generative Models (Graduate Course)**, Dr. Sajad Amini — *17.8*
- **Data Science**, Dr. Babak Khalaj — *20.0*
- **Principles of Economics**, Dr. Seyed Ali Madani zadeh — *20.0*
- **Machine Learning and Vision Lab**, Dr. Hoda Mohammadzade — *19.3*
- **Foundations of Blockchain (Graduate Course)**, Dr. Maddah-Ali — *Audited*
- **Artificial Intellignece**, Dr. Mahdieh Soleymani - Dr. Mohammad Hossein Rohban — *20.0*
- **Machine learning**, Dr. Rouhollah Amiri — *19.0*
- **Cryptography and Network Security**, Dr. Siavash Ahmadi — *20.0*
- **Linear Algebra**, Dr. Rouhollah Amiri — *20.0*
- **Signals and Systems**, Dr. Hamid Aghajan — *20.0*
- **Engineering Mathematics**, Dr. Hamid Aghajan — *20.0*
- **Engineering Probability and Statistics**, Dr. Mohammad Karbasi — *20.0*
- **Computer Architecture and Microprocessor and Lab**, Dr. MohammadReza Movahedin — *19.9*
- **Circuit Theory**, Dr. Mohammad Sharifkhani — *20.0*

Research Interests

Robotics/Computer Vision	Manipulation, 3D Mapping, Object Retrieval, Image Segmentation, RL
Machine learning	LLMs, Compression and Quantization, Generative Models
Neuroscience	Computational Neuroscience, SoC Architectures, Machine Learning Hardware

Projects

Rotation-Aware Model Quantization and Compression for Efficient Transformers *Geneva, Switzerland*
EPFL - INL *Jul. 2024 – Present*
- Developing a novel hybrid **rotation-based quantization** and **progressive compression** framework for large transformer models while preserving accuracy.
- Project initiated during a **summer research internship at EPFL** and currently being extended at Sharif University.
- The resulting model is planned for integration into several ongoing **System-on-Chip (SoC)** research projects in the lab.
- **Skills:** Python (PyTorch, NumPy, bitsandbytes, torch.quantization), Deep Learning, Model Compression, Research Writing, LaTeX

Efficient Trajectory Prediction Models

Tehran, Iran

Sharif University of Technology - EPFL VITA

Oct. 2024

- Under supervision of Mohammad-Hossein Bahari (EPFL, VITA).
- Built a **benchmarking framework** for trajectory prediction that evaluates both **accuracy** (ADE/FDE, miss/collision rates) and **computational efficiency** (**latency**, **GPU memory**, **scalability vs. batch size**, **energy**).
- Ran controlled experiments on **NVIDIA Quadro RTX 5000** (workstation) and **NVIDIA Jetson Nano 4GB** (edge), logging **power** via `INA3221` to study energy/latency trade-offs.
- **Skills:** PyTorch, NumPy, CUDA profiling, power/latency instrumentation (Jetson Nano + INA3221), Matplotlib, LaTeX.

Neural Decoding of Long-term recordings of motor cortical spiking activity during reaching in monkeys

Tehran, Iran

EPFL - INL

Jan. 2025

- Collaboration with Arshia Afzal at INL
- This project implements a Transformer-based model to predict the cursor velocity of a monkey based on its neural spike activity of Long-term recordings of motor and premotor cortical spiking activity during reaching in monkeys.
- Available on this GitHub repository

Analysis of PLV during Olfactory Stimulation as a Biomarker for Alzheimer's Disease in EEG Signals

Tehran, Iran

Sharif University of Technology

Jun. 2023

- I conducted this project under supervision of *Dr. Hamid Aghajan*.
- It consisted of two main aspects: 1. Pre-Proscessing (mostly using EEGLAB and Matlab) 2. Processing (using PLV and other PAC metrics)
- Available on this GitHub repository
- **Skills:** Matlab, EEGLAB, LaTeX

Comsol/ADS Simulation of Wave Interference and Matching (Double Stub Matching)

Tehran, Iran

Sharif University of Technology

Jan. 2023 - Feb. 2023

- Fields and Waves Course Project
- Available on this GitHub repository
- **Skills:** Comsol Multiphysics, ADS , Fields and Waves

Private Training and Machine Unlearning

Tehran, Iran

Sharif University of Technology

Jun. 2024 - Jul. 2024

- We implemented SISA Algorithm and tested its performance. We trained a classification model using a standard approach, then train it with privacy enhancements, and compare the Membership Inference Attack (MIA) accuracy of both models.
- Available on this GitHub repository
- **Skills:** Python (Pytorch), Machine Learning ,LaTeX

Head Football (Minigame)

Tehran, Iran

Sharif University of Technology

Dec. 2021 - Jan. 2021

- I conducted this project under supervision of Dr. Abdollah Arasteh (Basic Programming Course)
- An implementation of the game *HeadSoccer* using C++
- The code is available on this GitHub repository
- **Skills:** C++, SQL, LaTeX

MIPS Datapath Implementation

Tehran, Iran

Sharif University of Technology

Mar. 2023

- I conducted this project under supervision of Dr. MohammadReza Movahedin (Computer Architecture and Microprocessor)
- I implemented and tested Single-Cycle and MultiCycle Mips datapath using ModelSim. This processor would support the most important instructions of the MIPS instructions set(Branches,Jumps and main R-type and I-type instructions)
- Available on this GitHub repository
- **Skills:** Verilog

Awards and Honors

Jul. 2025	**E3 Summer Research Program at EPFL,** I was accepted in a very competitive fully-funded research program at EPFL, and successfully completed my internship	*Geneva, Switzerland*
Nov. 2023	**Ranked in the top 5% of Electrical Engineering Department,** Sharif University of Technology	*Tehran, Iran*
Feb. 2023	**"Brilliant Students of Iran" Granted by Ministry of Education ,** Honorary Title	*Mashhad, Iran*
Aug. 2021	**Ranked in the top 0.1% among nearly 150,000 students,** National University Entrance Exam in Math/Physics Branch	*Tehran, Iran*

References

Prof. Hamid Aghajan

Ph.D, Professor, Sharif University of Technology, Director of Stanford's Ambient Intelligence Research (AIR) Lab, and Wireless Sensor Networks Lab

- Email: *hamid.aghajan@UGent.be*
- *Google Scholar*

Dr. Mahsa Shoaran

Ph.D, Associate Professor, EPFL

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- *Google Scholar*

Dr. Rouhollah Amiri

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