# Mohammad Taha **Fakharian**

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## Education

**School of Electric and Computer Engineering, University of Tehran** *Tehran, Iran*

B.Sc. in Computer Engineering(Software Engineering Major) *Sep. 2019 - present*

- **Cum. GPA: 19.43/20 (4/4)**, Faculty Average: 15.1/20
- Related Courses: Artificial Intelligence: 20/20(4/4), Data Mining(Master's course): 20/20 (4/4), Real Time Embedded Systems: 19/20 (4/4), Internet Engineering: 19.4/20 (4/4), Operating Systems: 19.6/20 (4/4), Engineering Probability and Statistics: 19.6/20 (4/4)

## Research Interests

- **Computational Neuroscience**
- **Brain-computer Interfaces**
- **AI in Medicine**
- **Bioinformatics**
- **AI in Finance**

## Research Experience

**Under the supervision of Prof. M. Abolghasemi** *University of Tehran*

Research Assistant *Aug. 2023 - present*

We are applying spiking neural networks to model the human auditory system and solve challenges like the McGurk and Cocktail Party effect. We are currently reading a number of papers related to this field.

**Under the supervision of Prof. N. Saeedi and Prof. M. Firouzifar** *Tehran University of Medical Sciences*

Research Assistant *Aug. 2023 - present*

We are working on voice disorder diagnosis using deep learning models. Additionally, the ability to diagnose inverted papilloma(IP) from inverted papilloma squamous cell(IP-SCC) tumors using AI is considered. Both studies are in the data preparation and exploring step.

**Under the supervision of Prof. A. Shakery** *University of Tehran*

Research Assistant *July. 2022 - Dec. 2022*

We are applying graph convolutional neural networks to hate speech detection tasks. We have tried different structures and methods and combined this concept with other state-of-art models like Bert. We have read a numerous number of papers on similar ideas. The research is finished.

**Under the supervision of Prof. B. Bahrak** *University of Tehran*

Research Assistant *Aug. 2021 - Nov. 2022*

We are working on an alternative consensus protocol based on Proof of Activity to combine the benefits of using both the PoS and PoA protocols. We have watched a series of courses and read an abundant number of papers on similar ideas. The research is finished.

## Publications

S. Kamali, S. Shabihi, MT. Fakharian, A. Arbabi, P. Tajmehrabi, M. Saadati, B. Bahrak (2022) **"RPoA: Redefined Proof of Activity"**. Submitted.

## Honors & Awards

2023 **Ranked 1st among bachelor students of the Computer Engineering**, University of Tehran *Tehran, Iran*

2019 **Ranked 96 (Top 0.1%) in Konkour**, National Organization of Educational Testing (NOET) *Tehran, Iran*

## Teaching Experience

### University of Tehran ACM Student Chapter

**Artificial Intelligence and Deep Learning Course Mentor** Summer of Code *Jul. 2022 - Sep. 2022*

### University of Tehran

**Head Teaching Assistant** Artificial Intelligence, Prof. Y. Yaghoobzadeh, H. Fadaei *Fall 2023*
**Teaching Assistant** Data Mining, Prof. A. Shakery *Spring 2023*
**Head Teaching Assistant** Advanced Programming, Prof. R. Khosravi *Fall 2022 - Spring 2023*
**Supervising Teaching Assistant** Engineering Probability and Statistics, Prof. B. Bahrak *Fall 2022*
**Teaching Assistant** Advanced Programming, Prof. R. Khosravi *Spring 2021 - Fall 2021 - Spring 2022*
**Teaching Assistant** Engineering Probability and Statistics, Prof. B. Bahrak *Fall 2021*
**Teaching Assistant** Discrete Mathematics, Prof. S. Mohammadi *Spring 2021 - Fall 2021 - Spring 2022*
**Teaching Assistant** Operating Systems, Prof. M. Kargahi *Fall 2022 - Spring 2023 - Fall 2023*
**Teaching Assistant** Artificial Intelligence, Prof. Y. Yaghoobzadeh, H. Fadaei *Fall 2022 - Spring 2023*
**Teaching Assistant** Formal Languages and Automata Theory, Prof. H. Hojjat *Fall 2021 - Spring 2022*

## Industrial Experience

**Tapsi** *Tehran, Iran*
Data Scientist *Mar. 2023 - present*
Dealing with real-world challenges for an online ride-hailing system, I've improved my ability to think efficiently about problems and find the best breakdown for them. The data science team is directed by Mr. Ali Elahi and managed by Mrs. Zeinab Taghavi. The atmosphere of the team helped me improve my ability, both in problem-solving and learning new methods. Currently, I'm a member of both the Automation and Map team, working on a variety of products, from Generative AI to recommender systems.

## Licenses

**Game Theory** Standford University, The University of British Columbia *Aug. 2023*
**Machine Learning Engineering for Production (MLOps) Specialization** DeepLearning.AI *Aug. 2022*
**Natural Language Processing Specialization** DeepLearning.AI *Jul. 2022*
**AI for Medicine Specialization** DeepLearning.AI *May. 2022*
**Generative Adversarial Networks (GANs) Specialization** DeepLearning.AI *May. 2022*
**Deep Learning Specialization** DeepLearning.AI *Feb. 2022*
**Machine Learning** Stanford University *Feb. 2022*
**Reinforcement Learning Specialization** University of Alberta *Feb. 2022*

## Notable Academic Projects

**Spiral** *Computational Neuroscience*
A python package for spiking neural network simulation using PyTorch on CUDA or CPU
Contributed some efficient and interesting features to this package during my personal research.

**Crystaline** *Cryptocurrency*
A cryptocurrency powered by a redefined PoA protocol
Developed as a proof of concept on pure Python, this cryptocurrency incorporates a newly defined Proof of Activity as its primary consensus protocol. It was designed and researched by me and several other students of the University of Tehran.

**Earthquake Damage Prediction model** *Data Mining*
The final project of Data Mining course
This project includes data preprocessing, feature selection and model selection with feature generation as a bonus part on Gorkha's buildings' dataset. Each step has its own analysis.

**Oak** *Internet Engineering*
The main project of Internet Engineering course
A complete implementation of a website from scratch by me and my teammate. This project was developed using Java and Spring for the back-end, and React for its front-end. We have used tools like CI/CD pipelines, JDBC, JUnit, Github Oauth apps, etc. The project is a marketplace for merchants and customers. Merchants can register their products and customers can buy, rate, and comment on the commodities.

**Smart Pot** *Real Time Embedded Systems*
The First project of Real Time Embedded Systems course
The project was about designing and implementing a smart pot that automatically waters the plant based on the soil moisture level and temperature. The project was implemented using Arduino and C++. The pot was equipped with a temperature sensor, a humidity sensor, and a water pump. Different modules communicated via Bluetooth and the master chip could adjust the water pump irrigation based on the sensor readings.

**XV6 Kernel** *Operating Systems Lab*

XV6 KERNEL WITH IMPROVEMENTS

Adding some new features such as new system calls, three new custom task schedulers, and a process synchronization (using semaphore) to xv6 kernel.

**CMM Compiler** *Compiler Design*

A COMPILER FOR A PROGRAMMING LANGUAGE

A compiler for new functional Language called CMM. The project had four phases: Grammar specification, Type Analysis, Name Analysis and ByteCode Generation.

**Socket Server** *Computer Networks*

FULLY FUNCTIONING SOCKET SERVERS

Three fully functioning socket servers, consist of a ftp server, a web server and a chat server, with many capabilities implemented in C++ that uses socket programming to communicate with clients at a low level.

## Skills

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|---|---|
| **Programming** | High Intermediate: C++, Python<br>Intermediate: C, Java<br>Beginner: Lua, Bash, LaTeX |
| **Technologies** | Git, Docker, K8, Makefile |
| **Data Science** | Pandas, NumPy, PySpark, Pytorch, Keras, Tensorflow, Trax and Scikit-learn |
| **Operating Systems** | Linux (Debian-based and Arch-based), Windows |

## Languages

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|---|---|
| **Persian** | Native |
| **English** | Fluent |