Mohammad Taha **Fakharian**

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Education

School of Electrical 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 Dr. T. Masquelier *CNRS*

Research Assistant *Oct. 2023 - present*

We're working on delay learning in spiking neural networks using back-propagation, which can solve complex tasks with fewer number of parameters. We are currently reading related papers.

Under the supervision of Dr. M. Abolghasemi *Centre For Convergent Technologies Research, University of Tehran*

Research Assistant *Aug. 2023 - present*

We are working on biological-plausible improvements such as learning rules on existing spiking neural networks, which can be used to model the human auditory system and solve challenges like the McGurk and Cocktail Party effect. We are currently reading several papers related to this field and developing a new library for high-performance SNN training, named Spyker.

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

Programming	High Intermediate: C++, Python Intermediate: C, Java 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

Persian	Native
English	Professional working proficiency **Academic IELTS: 7.5/9 [R:8.5, L:8.5, S:6.5, W:6.5] (Oct. 2023)**