Mahdi Zaferanchi

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Education

Shahid Beheshti University — Tehran, Iran
Bachelor of Science in Electrical Engineering (Electronics branch) — *Sep 2015–Jul 2019*

- GPA: **3.81** (17.89/20)
- B.Sc. Thesis Title: Communication of Two Circuits in Close Proximity Using Induction Between Two Coils (similar to RFID and NFC)
- B.Sc. Thesis Supervisor: Dr. Masoud Meghdadi

Amirkabir University of Technology — Tehran, Iran
Master of Science in Electrical Engineering, Digital Electronic Systems branch — *Sep 2019–Jun 2022*

- GPA: **3.65** (17.21/20)
- M.Sc. Thesis Title: Accelerating Convolutional Neural Networks on Graphics Processing Units
- M.Sc. Advisor: Dr. Seyyed Ahmad Motamedi
- Notable Courses: Machine Learning (4/4), Parallel Processing (4/4), Neural Networks (3/4), Big Data (3/4)

Experience

Hoosh Xarf Sharif — Tehran, Iran
ML Engineer, Front-end Web Developer — *Apr 2021–Mar 2023*

- Hoosh Xarf Sharif is a start-up active in the area of algorithmic trading using AI and Machine Learning.
- During my tenure at this company, I fulfilled two distinct roles:
  - As an **ML Engineer**, I helped create the algorithms used to asses market conditions and determine subsequent trading actions. To achieve this, our team trained neural networks on historical market data.
  - As the (only) **Front-end Web Developer**, I created a website that lets users see their account information such as recent transactions, balance, profit and loss, etc. and control their trading bot. I additionally developed an introductory website to effectively present the company's services.

Notable Projects

Accelerating Convolutional Neural Networks on Graphics Processing Units
M.Sc. Thesis
Coming from an Electrical Engineering background, I have always been curious about the low-level implementation of Machine Learning algorithms. Therefore, as my Master's thesis, I explored GPU programming with CUDA. Specifically, my project involved two sections:

- **Writing CUDA and C++ code from scratch that could train a CNN or MLP for MNIST digit classification.** View on GitHub
- **Optimizing Winograd convolution kernels to speed up CNN inference on GPUs.** This was done in a special case by fusing the pooling operation (which frequently comes after convolution) into an existing highly-optimized convolution kernel. View on GitHub

Metric-based Few-shot classification and Self-supervised Learning
Deep Learning
My position as an ML Engineer naturally exposed me to the limitations of conventional supervised learning. This eventually sparked my interest in metric-based methods. I explored new ideas in

metric-based few-shot image classification and later discovered the closely related field of contrastive self-supervised learning. I have recently organized my learnings in this field as a review paper. View PDF

Multi-layer Perceptron (MLP) for MNIST digit classification using only NumPy
Deep Learning
This project helped me better my understanding of essential concepts like backpropagation, SGD, etc.

Communication of Two Circuits in Close proximity Using Induction Between Two Coils
Bachelor's Thesis
Induction between nearby coils is used to transfer data in RFID and NFC. Replicating this technique of digital communication as my bachelor's final project helped me develop a deeper understanding of the relevant electronics and telecommunications concepts.

Implementation of a Decision Tree in Python
Machine Learning
This project was done as part of the Machine Learning course I took for my Master's degree. Implementing the algorithm from scratch required deep understating of the involved concepts.

Raspberry Pie Telegram Bot
Electronic Systems
A Telegram bot that lets the user control a Raspberry Pie device that acts as a NodeJS server for the bot.

Telegram Bot for Online Shopping
Web Development
Which I developed made for a small online business.

Front-end Only Web Apps
Front-end Web Development
I've done various other small projects and "practice projects" to improve my coding skills in front-end web development. Such as: a landing page for a small business (View on GitHub), a typing practice app, a time management and tracking app (View on GitHub), etc.

Honors and Awards

- Ranked **8th** out of 851 participants in the Electronics major of Iran's 2023 national PhD entrance exam, scoring in the **top 1%**. *2023*
- Ranked **2nd** out of (roughly) 120 students in the 2015 cohort of Shahid Beheshti University's Electrical Engineering program, based on performance at the conclusion of the 6th semester, which is a period characterized by shared classes and before specialization-specific courses commence. *2015 –2018*

Skills

- **Programming:** Python, C, C++, GPU Programming with CUDA, JavaScript, HTML and CSS, Familiar with Scala
- **Machine Learning and AI:** Pytorch, NumPy, Pandas, scikit-learn, TensorFlow and Keras, Familiar with Apache Spark
- **Electronic Systems:** AVR and ARM Microcontrollers, Raspberry Pi
- **Web Front-end:** ReactJS, Data Visualization
- **Other:** Git, MongoDB, LaTeX

Languages

- **English:** Fluent
  - **IELTS Academic: 8.5** (Listening: **9**, Reading: **9**, Speaking: **8**, Writing: **7.5**)
- **Persian:** Native
- **Turkish:** Familiar
- **Arabic:** Familiar

References

- Available upon request