Amin Zeinali

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Education

University of Tehran — **Iran, Tehran**
Bachelor of Science, Computer Science — *2019–Present*
GPA: 3.82/4

Research Interests

- Spiking Neural Networks
- Computer Vision
- Deep Learning
- Machine Learning
- Reinforcement Learning

Research Experience

CNRL — **Iran, Tehran**
Research Assistant — *February 2023– Present*

Member of the Computational Neuroscience Research Laboratory (CNRL) team developing a framework for efficient simulation of cortical columns on GPUs. My contributions involve implementing and testing inhibitory learning rules that help the simulated neural networks resist runaway excitation. This makes the networks more robust and facilitates parameter tuning.

Hoosh Pardaz — **Iran, Tehran**
Research Assistant — *April 2022– July 2022*

As a research assistant, I worked on developing a machine-learning model to predict phone number prices. This involved scraping websites for data, engineering meaningful features, and considering economic factors to ensure future generalizability. Responsibilities included extensive data collection, advanced feature engineering, model development, and analysis of economic indicators for robust predictions. This experience enhanced my skills in machine learning, data analysis, and real-world factor consideration.

Teaching Experience

University of Tehran — **Iran, Tehran**
Teaching Assistant — *February 2022–June 2022*

- Course: Advanced Programming
- Instructor: Dr. Abbas Nowzari-Dalini
- Created exercises to supplement course material and reinforce student learning
- Graded assignments and exams to evaluate student progress

Work Experience

Hermes Capital — **Iran, Tehran**
Data Scientist — *July 2022–October 2022*

- Collaborated with teammates to solve customer business problems using data analytics and machine learning.
- Designed training problems and exercises for the company's machine learning bootcamp program.

Projects

- **Computational Neuroscience**
  - Developed and analyzed LIF, ELIF, and AELIF neuron models and neural populations.
  - Studied and Implemented neural encoding (time-to-first-spike), synaptic plasticity, and learning rules STDP and Reward-modulated STDP

  Supervisor: Dr. Mohammad Ganjtabesh
- **Inhibitory Synaptic Plasticity**
  - Modeled inhibitory synaptic plasticity using PymoNNtorch.
  - Implemented inhibitory STDP (iSTDP) learning rule to modify inhibitory synapses based on spike timing.
  - Analyzed iSTDP in balanced and feedforward inhibition networks, observing reduced excitation.
  - combined iSTDP with unsupervised and reinforcement learning for input pattern recognition, finding specialized neuron groups emerged.

  Supervisor: Dr. Mohammad Ganjtabesh
- **Predict Phone Number Price**
  - Built models to predict phone number prices using machine learning techniques.
  - Scraped and processed raw phone number data. Engineered features through exploratory data analysis
  - Developed Random Forest and Convolutional Neural Network regressors in Pytorch to predict prices.
- **Computer Vision**
  - Developed image classifiers using transfer learning and fine-tuning in TensorFlow.
  - Implemented ResNet50 architecture in Pytorch.
  - Created convolutional/pooling layers and DoG/Gabor filters for image filtering and feature extraction.
- **Machine Learning Algorithms**
  - Implemented machine learning algorithms from scratch in Python including KNN, Linear Regression (normal equation and gradient descent), Logistic Regression (NumPy and PyTorch), and Multi-Layer Perceptron.

  Supervisor: Dr. Bagher Babaali

Courses

Computational Neuroscience
Instructor: Dr. Mohammad Ganjtabesh
Grade: 16.25/20

Deep Learning
Instructor: Dr. Bagher Babaali
Grade: 20/20

Advanced Programming
Instructor: Dr. Abbas Nowzari-Dalini
Grade: 19/20

Nonlinear Programming
Instructor: Dr. Majid Soleimani-damaneh
Grade: 17/20

Data Mining
Instructor: Dr. Samaneh Eftekhari
Grade: 19.1/20

Database
Instructor: Dr. Alireza Khalilian
Grade: 19.75/20

Online Courses

Deep Learning Specialization
Coursera

- Neural Networks and Deep Learning
- Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization
- Structuring Machine Learning Projects
- Convolutional Neural Networks

Machine Learning Specialization
Coursera

- Advanced Learning Algorithms
- Unsupervised Learning, Recommenders, Reinforcement Learning

Computer Skills

- **Programming Languages:** Python, JavaScript, C/C++, MySql, Assembly
- **Tools:** VSCode, PyCharm, CLion, Jupyter Notebook, Sublime Text
- **Other:** PyTorch, Tensorflow, Numpy, Pandas, Scikit-Learn, Plotly, Matplotlib, LaTeX, Microsoft Office

Honors

- **Governmental Full Tuition Waiving Fellowship – University of Tehran** **Iran, Tehran**
  Ranked in the top 1% among more than 160,000 participants in the Konkoor, *2019–Present*
- **CodeCup 6** **Iran, Tehran**
  Placed 8th out of over 1000 participants in this annual programming competition, *December 2021*

Language Skills

- Turkish: Native
- Persian: Native
- English: Fluent