Abbas Jafarpour Mahalleh

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Education

University of Tehran — Tehran, Iran
M.Sc. in Mechanical Engineering (18.15/20, GPA: 4.0) — *Sep. 2020 – Sep. 2023*
Thesis: "Optimization of a passive vibration absorber for hand tremors"

University of Tabriz — Tabriz, Iran
B.Sc. in Mechanical Engineering (17.71/20, GPA: 3.86, Member of examplary students) — *Sep. 2016 – Sep. 2020*
Thesis: "Predicting Timeseries Using Neural Networks"

Experience (Academic)

Research Assistant — 2023 – Present
University of Tabriz — *Tabriz, Iran*

- . Developed an open source development suit for reinforcement learning projects. Various RL algorithms are deployed in it and it is coded in a way to be able to be used in projects.
- Built a Python-based human forearm simulator grounded in Hill's model, providing a realistic environment for training reinforcement learning agents on neuromuscular control tasks.
- Designed and implemented from scratch multiple reinforcement learning algorithms (PPO, DQN, DDQN, DDPG) in PyTorch; deployed and trained agents entirely with original code without relying on third-party RL libraries.
- Publication of a conference paper regarding training of an RL agent for moving a human arm using Hill's model.
- Successfully employed Spiking Neural Networks (SNNs) for reinforcement learning tasks that have discrete action space using snnTorch and PyTorch.
- Deployed distributed training for increasing training speed of RL agents utilizing SNNs.
- Development of a stack to facilitation distributed training of neural networks in HPCs.

Graduate Research Assistant — 2020 – 2023
University of Tehran — *Tehran, Iran*

- Created a validated biomechanical model of the human hand that accurately captures passive joint stiffness and damping, enabling reliable planar dynamic simulations; coded in Python and MATLAB.
- Developed a multi-core parallel simulation framework for HPC environments, built around a MATLAB compute core, Python-driven workflows, and Linux shell–based execution control
- Developed a hand-tremor-reduction device as part of my M.Sc. thesis. Modeled the nonlinear behavior of SMA alloys in Python and MATLAB, formulated and solved the associated nonlinear ODE system, and fully vectorized the simulation pipeline for parallel CPU execution, significantly accelerating numerical optimization.
- Publication of a journal paper and a conference paper based on the Master's thesis

Undergraduate Research Assistant — 2016 – 2020
University of Tabriz — *Tabriz, Iran*

- Developed a shallow neural network for predicting timeseries data in the close future. The stack was developed on Tensorflow and was coded with Python.
- Simulated a 3-DOF robotic arm with MSC ADAMS and successfully constructed the robotic arm. The robot was programmed in C and was controlled by an Arduino board.
- Modeled, constructed and optimized the design parameters for an elevator using C-sharp and C.

Experience (Non-Academic)

Junior AI Advisor — 2022 – 2023
NOA Trader — *Tehran, Iran*

- Designed and implemented feed-forward neural networks (FFNNs) models to accurately predict outcomes for deterministic processes using Tensorflow 2.0 .
- Implemented and trained LSTM-based neural networks for time-series forecasting, improving predictive accuracy through careful data pre-processing and model tuning using Tensorflow 2.0 .
- Developed benchmarks for analyzing various trading strategies using classic feed forward networks.
- Performed data analysis and generated actionable insights using Python (pandas, NumPy, Matplotlib/Seaborn), processing large datasets to support business decision-making and reporting.
- Developed and maintained Python scripts to ingest, transform, and automate real-time data extraction from multiple online APIs and web feeds (e.g., RESTful services, JSON/XML endpoints).

Experience (Teaching)

University Of Tehran 2022
Master's students *Tehran, Iran*

- Teaching assistance in "Advanced vibrations" for Dr. Arash Bahrami

University Of Tabriz 2016 – 2020
Bachelor's students *Tabriz, Iran*

- Teaching assistance in "C Programming Language" for Dr. Hamed
- Teaching assistance in "Dynamics Of Systems 1" for Dr. Hasannejad
- Teaching assistance in "Dynamics Of Systems 2" for Dr. Hasannejad
- Teaching assistance in "Introduction To FEM" for Mrs. Fazel

Projects

RL Suite | *Python* | *link* June 2024 – Present

A GitHub repository containing various RL algorithm deployments to be used by everyone.

- Deployed custom implementations of DQN, DDQN, PPO and DDPG.
- Git LFS and Hugging-face integration for loading/uploading the training from/to cloud.
- Supports Hyperparameter Optimization for each algorithm.
- Support for 3rd generation neural networks (Spiking Neural Networks).
- Real-time and fully customizable visualization of the training process.
- Support for multi-agent training for Parallelizable algorithms.

DistTrainer — Currently private | *Javascript, Python, Node.js, Lightning SDK* Sep 2025 – Present

A library that designed for facilitating distributed training of networks.

- Syncs training runs on multiple HPC serves in real time.
- Supports simultaneous hyperparameter tuning for an algorithm/environment in multiple HPC servers.
- Telegram integration to keep the user up-to-date with the training process.

Publications

Journals

1. **A. Jafarpour Mahalleh** and M. Zakerzadeh, "A Nonlinear Energy Sink For Tremor Suppression Using Shape Memory Alloys," *in Journal of Vibration and Control (JVC), 21 Jun 2024.*

Conferences

1. **A. Jafarpour Mahalleh**, M. Zakerzadeh, "A Vibration Absorber For Absorbing Tremors *In Wrist" in Proc. of the 13th international conference on acoustics and vibration, Tehran, Iran, 2023, pp. -.*
2. M. R. Sayyed Noorani, **A. Jafarpour Mahalleh**, K. Khojand, "DDQN-Learning of Hill-Type Musculoskeletal Arm Model for Elbow Motor Control", *in Proc. Iranian Conference of Biomedical Engineering, Tabriz, Iran, 2025*

Certificates

IELTS 8.0 (Listening 8.5, Reading 8.5, Writing 7.5, Speaking 8.0) *Taken on 28 May. 2024*
Deep Learning Specialization from Coursera [Link] *Oct. 2023*
Machine Learning Specialization from Coursera [Link] *May. 2023*

Technical Skills

Languages: Python, C/C-Sharp, SQL (Postgres), JavaScript, MATLAB
Frameworks: Node.js, Express.js, Django
Developer Tools: Git, Docker, VS Code, Visual Studio
Applications: SIMULINK, MSC ADAMS, ABAQUS, OpensSim

References

DR. M.R. Zakerzadeh (Master's instructor)
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DR. A. Bahrami (Master's referee)
Professor (Assistant) at University of Tehran
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