ABBAS JAFARPOUR MAHALLEH

Prospective Ph.D. student

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Summary

- Highly motivated researcher with three years of experience in the vibration, optimization and rehabilitation field; resulting in publication of a Journal and a Conference paper, both peer-reviewed.
- Proficient in coding languages such as Python, MATLAB, and C#. Familiar with simulation apps. such as MSC Adams, Abaqus, and SIMULINK.
- Experienced in machine learning deployment for reinforced learning and object detection purposes.

Education

M.Sc. in mechanical engineering (18.15/20, **GPA 4**, Ranked 9 in the national entrance exam) *Tehran, Iran*
University of Tehran *Oct. 2021-Oct. 223*

❖ **Thesis title:** Optimization of a passive vibration absorber for hand tremors using Shape Memory Alloys
Tutor: Mohammadreza, Zakerzadeh

B.Sc. in mechanical engineering (17.71/20, **GPA 3.86**, Member of exemplary students) *Tabriz, Iran*
University of Tabriz *Oct. 2016-Oct. 2021*

❖ **Thesis title:** Predicting Commodity Prices Using Neural Networks
Tutor: Jafar, Keygobadi

Research Interests

◈ Rehabilitation ◈ Biomechanical Engineering ◈ Biomechatronics ◈ ML for rehabilitation
◈ Reinforcement Learning

Publications

Journals

[1] **A. Jafarpour Mahalleh and** M. Zakerzadeh, "A Nonlinear Energy Sink For Tremor Suppression Using Shape Memory Alloys," *Journal of Vibration and Control (JVC), (Accepted; Awaiting publication)*, 2024.
[2] **A. Jafarpour Mahalleh and** M. Zakerzadeh, "Mechanical Solutions For Parkinson's Disease: A Review," *(In preperation).*

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. -. [Link]

Skills

Programming Languages

◈ Python (Proficient) ◈ MATLAB (Proficient) ◈ C# Windows Form (Intermediate) ◈ C (Beginner)

Applications

◈ SIMULINK (Proficient) ◈ MSC Adams (Intermediate) ◈ Abaqus (Beginner)

Experiences

Teaching

- Teaching assistance in “Advanced vibrations” for Dr. Arash Bahrami *(Graduate students)* *2021*
- Teaching assistance in “C Programming Language” for Dr. Mohamamd Ali Hamed *2018*

Academic Projects

- Development of object detection convolutional neural networks *2023*

  As a side project, I developed and documented comprehensive guides to developing CNNs on my personal blog [Link]. specifically, YOLO-vN networks. The implementations were purely derived from the original papers. Because there are no guides online for constructing these CNNs from scratch, this guide can help novices have a better grasp of how benchmark CNNs work [link].

- Development of agents for playing basic games using reinforcement learning *2023*

  Created advanced agents capable of excelling in basic games like lunar lander and cart pole through the use of reinforcement learning. A comprehensive guide and step-by-step documentation have been added to my GitHub repository and personal blog.

- Design and numerical optimization of a hand tremor absorber using Sape Memor Alloys *2022*

  As my Master’s thesis, I developed a hand tremor absorbers for patients suffering from Parkinson’s disease. The constitutive model for SMA string was developed [Link]. Next, the viability of the absorber was determined by SIMULINK. For the optimization, the project was developed in both Python and MATLAB. MATLAB was chosen for optimizing the absorber using numerical methods (GA). MATLAB’s ODE15s solver was customized to solve the stiff ODEs .The Code base of the entire project can be seen in my GitHub repository [Link].

- Design and development of a 3DOF robotic arm *2018*

  Simulated and constructed a 3DOF robotic arm as a side project. The simulation was done using MSC ADAMS. The robot itself was powered by 3 stepper motors. A simple Arduino was used as the control unit which was programmed in C.

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*

Language

- English (C1 level, IELTS 8.0)
- Persian (Mother language)
- Turkish (Fluent)

References

- **DR. M.R. Zakerzadeh** (My Master’s thesis instructor)
  Professor (Associate) at University of Tehran
  Email: zakerzadeh@at.ac.ir
  Phone: +98 (21) 611 5262
- **DR A. Bahrami** (My thesis advisor)
  Professor (Assistant) at University of Tehran
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