CURRICULUM VITAE
EHSAN TAHVILIAN

MECHANICAL ENGINEER • BIOMECHATRONICS MASTER'S STUDENT

Isfahan, Iran

+98 (913) 009 – 7421

ehsantahvilian.ac@gmail.com

http://mech.sharif.ir/~ehsan.tahvilian/

https://www.linkedin.com/in/ehsan-tahvilian/

SUMMARY

- Two years of experience in the research center of intelligent neuro-rehabilitation technologies resulting in the development of a telerehabilitation wearable system of IMUs for Parkinson's patients' movement therapy
- Collecting a colossal dataset of functional and LSVT-BIG activities containing both simple and complex labels to enhance the learning accuracy of Complex Human Activity Recognition (CHAR) by different classifiers, especially deep learning-based ones
- One year of experience in robotics and acoustics laboratory resulting in the construction of a low-cost Active Noise Control (ANC) system and a publication on narrowband ANC using the FxLMS control method
- An international and cross-functional collaborator having two months of participation as an international Italian intern resulting in a publication on composite structures
- An enthusiastic instructor with seven years of experience in teaching university and school courses, mainly related to robotics, dynamics, and artificial intelligence, resulting in holding applied courses in collaboration with the college students' scientific association of the Isfahan University of Technology, Isfahan, Iran

EDUCATION

Present – 09/2020

M.Sc. Mechanical Engineering: Applied Design

SHARIF UNIVERSITY OF TECHNOLOGY — Tehran, Iran

My elected modules involve the study of Bio-Mechatronics, especially the application of wearable sensors for Parkinson's patients.

- GPA : 4.00/4.00 **OR** 18.53/20.00
- Thesis Title : "**Complex Activity Recognition for PD patients by Means of an IMU-Based Wearable System**"

09/2020 – 09/2016

B.Sc. Mechanical Engineering

ISFAHAN UNIVERSITY OF TECHNOLOGY — Isfahan, Iran

A general mechanical engineering program focused on Mechatronics

- GPA : 4.00/4.00 **OR** 19.07/20.00
- Thesis Title : " **Design and Construction of Active Narrowband Noise Control System Based on AVR Microcontroller** "

RESEARCH & WORK EXPERIENCES

Present – 09/2020

Graduate Research Assistant

DJAVAD MOWAFAGHIAN RESEARCH CENTER FOR INTELLIGENT NEURO-REHABILITATION TECHNOLOGIES — Tehran, Iran

- Working on Complex Human Activity Recognition (CHAR) algorithm development for the online application of an IMU-based wearable system for Parkinson's patients' therapy
- Practical acquaintance with different medical constructions and concepts, including Inertial Measurement Unit sensor, Kinect sensor, Marketing Techniques, Gait Analysis, PD and CP Patients Treatments, etc.
- Supervisor of interns during the 2022 summer internship

09/2019
06/2019

International Research Intern

M&MOCS Research Center

Frosinone, Italy

- Working on computational algorithms of composite materials under the supervision of Prof.Erden Yildizdag from the Faculty of Naval Architecture and Ocean Engineering, Istanbul Technical University, Istanbul, Turkey.
- Publishing a paper on composite materials, with the title of "**3-D multi-patch isogeometric analysis of composite laminates with a discontinuous Galerkin approach**" in the journal of ENGINEERING FOR THE MARITIME ENVIRONMENT

Present
09/2018

University Teaching Assistant

Sharif University Of Technology

Tehran, Iran

Isfahan University Of Technology

Isfahan, Iran

My experiences as a Teaching Assistant for university B.Sc. and M.Sc. courses over the past semesters include:

- Advanced Dynamics (Spring 2022)
- Robotics (Fall 2021 and Spring 2022)
- Statics (Spring 2021)
- Applied Electrical and Electronics (Spring 2019 and Spring 2020)
- Dynamics of Machinery (Fall 2019)
- Technical Drawing 1 (Spring 2018 and Fall 2018)

Moreover, my responsibilities as a Teaching Assistant mainly include:

- Holding practice-solving classes and presenting related materials as the extra lectures
- Designing a series of homework
- Giving a series of quizzes
- Teaching software and programming languages, such as Simscape Multibody, MATLAB, and Arduino

Present
09/2014

University and High School Course Instructor

- Instructor of Robotics-based courses in cooperation with the **university students' scientific association of Isfahan University of Technology, Isfahan, Iran**
  - The mentioned courses include robot simulation using MATLAB Simscape Multibody and implementation along with the programming of different robotics concepts such as kinematics, dynamics, computational motion planning, etc.
- Instructor of different university and high school courses as a private teacher for Iranian students in **Isfahan, Iran** and **Cologne, Germany**
  - The mentioned courses mainly include Strength of Material 1 & 2 (German equivalent: Technische Mechanik 1 & 2), Python Programming, CAD using SolidWorks, Robotics, Dynamics, Applied Electrical and Electronics, Calculus, etc.

Selected Projects

08/2022
05/2022

Simple and Complex Human Activity Recognition using a CNN-LSTM-based multi-task deep neural network

- Implementation of a CNN-LSTM Deep Neural Network Using TensorFlow and Keras Libraries in Python3

08/2022
12/2021

Collecting a dataset of Functional (daily routines) and LSVT-BIG (Lee Silverman Voice Treatments with big body movements) activities for Parkinson's Disease therapy from 43 normal male and female subjects, containing both simple and complex activities labels

- Designing 14 Complex activities containing 51 Simple activities, Using four Inertial Measurement Unit sensors (two on wrists and two on thighs) with a self-design Android Application to capture the data

01/2022
11/2021

Musculoskeletal injury risk assessment and intervention in a car manufacturer using various quantitative and qualitative tools

- Evaluating the musculoskeletal injury risk of sequential lifting, carrying, and lowering of the cylinder blocks using quantitative (e.g., biomechanical models such as 3DSSPP, CATIA, and Jack) and qualitative (e.g., Washington State tables, WISHA, NIOSH, MAC, Renault V3, and RULA) assessment tools

04/2021
01/2021

Algorithm development for estimation of the Step Length in the Gait cycle using a wearable system, consisting of IMU sensors attached to the ankles

- Using integration from Inertial Measurement Unit sensors signal along with preventing accumulative error and evaluating through the Vicon system of markers

09/2020
03/2020

Design and construction of an Active narrowband Noise Control system based on an AVR microcontroller

- Construction of the physical system, Designing of the related boards using Altium Designer, Implementation of FxLMS algorithm

10/2020
06/2020

Design and construction of an educational board using microcontroller STM32F103C8T6

- Electronic Circuit Design using Altium Designer, Assembly of electric and electronic elements, Connecting the board to the computer and Programming In Keil uVision

06/2020
05/2020

Kinematic Modelling and Control Simulation of Franka Emika Panda which is a 7-DoF robot manipulator

- Simulation using online data transfer from MATLAB Simulink to CoppelaSim, Implementation of DLS control method over different spatial trajectory and motion plannings

Research Interests

- Machine Learning, especially Deep Learning and AI
- Intelligent Control using Reinforcement Learning
- Mechanism Design
- Robotics, especially Medical and Soft Robotics
- Neuro Science and Telerehabilitation
- Programming and Algorithm Design

Honors and Awards

- Ranked **1st** among all 127 bachelor students in each semester
- Accepted for taking part in the **2019 summer internship** in the International research center M&MOCS, Frosinone, Italy
- **Merit-based admission** for master's program from Sharif University of Technology, Tehran, Iran
- Ranked in the **top 1%** among nearly 163,000 university entrance exam participants

Publications

- **Tahvilian E**, Iranpour M, Loghmani A. Narrowband active noise control in a duct using FxLMS method based on the AVR microcontroller. Modares Mechanical Engineering. 2022 Sep 10;22(9):625-35. (Status: Published | Link to paper | **0 citations** till Oct. 2022)

- Obohat MA, **Tahvilian E**, Yildizdag ME, Ergin A. Three-dimensional multi-patch isogeometric analysis of composite laminates with a discontinuous Galerkin approach. Proceedings of the Institution of Mechanical Engineers, Part M: Journal of Engineering for the Maritime Environment. 2021 Nov;235(4):820-33. (Status: Published | Link to paper | **4 citations** till Oct. 2022)

- **Tahvilian E**, Partovi E, Ejtehadi M, Bakhshayesh PR, Behzadipour S. Accuracy improvement in simple and complex Human Activity Recognition using a CNN-BiLSTM multi-task deep neural network. In2022 8th International Conference on Signal Processing and Intelligent Systems (ICSPIS). (Status: Accepted)

- Azarbeik MM, **Tahvilian E**, Kousha E, Karimi O, Arjmand N. Musculoskeletal injury risk assessment and intervention in a car manufacturer using various quantitative and qualitative tools. (Status: In Preparation)

Languages

Persian	Native Language
English	**TOEFL iBT®** • **Test Date:** November 20th, 2022 • **Score:** ○ **Reading:** 22 | **Listening:** 21 | **Speaking:** 22 | **Writing:** 20 | **Overall:** 85

Software Skills

Programming Languages	Python, MATLAB, Arduino, C/C++, HTML/CSS
Simulation	MATLAB Simulink, MATLAB Simscape Multibody, CoppeliaSim
Computer-Aided Design	CATIA, SolidWorks, Inventor
PCB Design	Altium Designer
Utilities	Microsoft Word, Microsoft Powerpoint, Adobe Photoshop

Personal Traits

- Responsibility
- Teamwork
- Commitment
- Leadership Abilities
- Critical Thinking
- Problem-Solving

Hobbies

- **Art:** Pencil Drawing, Oil Painting
- **Sports:** Swimming, Ping-pong
- **Leisure Time:** Traveling, Hiking, Reading Books, Listening to Music