Mohammad Hasan Mokhtarabadi

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Education

M.Sc. Mechanical Engineering - Applied Mechanics *Oct. 2020 - Apr. 2023 (Expected)*
University of Tehran (UT), Tehran, Iran, (ranked 1st in Best Universities in Iran)
GPA: 17.89 / 20
Thesis Title: Design and Fabrication of a Fitness Machine Prototype with Visual Pose Estimation Using ANN for Adjusting Cable Tension Force
Supervisor: Dr. Farzad A.Shirazi, Dr. Mohsen Saadat

B.Sc. Mechanical Engineering *Sept. 2016 - Oct. 2020*
University of Isfahan (UI), Isfahan, Iran, (ranked 33rd in Best Universities in Iran)
GPA: 17.94 / 20
Thesis Title: Design and Fabrication of a Handheld Force-Feedback Device That Applies Forces with Two Jet-Propellers
Supervisor: Dr. Hossein Karimpour, Dr. Kourosh Hasanpour

Research Interests

- Mechatronics Systems
- Haptic Interfaces and Devices
- Machine Learning and Deep Learning
- System Identification and Adapive Control Systems

Publications

M. Mokhtarabadi, A. Zaheri, M. Saadat, F. Shirazi. 2022. Power Transmission Gearbox-Clutch with One Input and Multiple Selectable Outputs. U.S. Patent 63398326, filed Aug. 16, 2022. Provisional Patent.

A. Zaheri, M. Mokhtarabadi, M. Saadat, F. Shirazi. 2022. Fully Active Closed-Loop Cable-Driven Multi-Degree-of-Freedom Mechanical Arm System. U.S. Patent 63401421, filed Aug. 26, 2022. Provisional Patent.

Awards & Honors

- Ranked 50th among more than 7,000 participants in Iranian University Entrance Exam for Master's degree in Mechanical Engineering
- Ranked 36th in national Mechanics Olympiad, Iran, 2019
- Ranked 2nd GPA among undergraduate class of 2016 in the Bachelor program at University of Isfahan
- Ranked within the top 3% among more than 160,000 participants in Iranian University Entrance Exam for Bachelor's degree
- Received national graduate and undergraduate full scholarship

Academic Projects

Design and Fabrication of a Fitness Machine Prototype (Master's Thesis)
Supervisor: Dr. Farzad A.Shirazi, Dr. Mohsen Saadat *Oct. 2021 - Present*

- Implementation of Field Oriented Control (FOC) algorithm on STM32 microprocessor for feed-forward torque control of brushless DC motor
- Implementation of 3D pose-estamtion for adjusting cable torques according to participant's skeleton situation on Jetson Nano Developer Kit
- Design and implementation of front-end layer (Python) to interact with user, and back-end layer (C++) to communicate with hardware (STM32)
- Design and Fabrication of mechanical structure of machine containing two brushless motors, and driver circuits, magnetic rotary encoders, touch screen, camera, microphone, and etc.

Design and Fabrication of a Handheld Haptic Device (Bachelor's Thesis)
Supervisor: Dr. Hossein Karimpour, Dr. Kourosh Hasanpour *Mar. 2020 - Sept. 2020*

- Implementation of real-world dynamic equations on Arduino Nano board to adjust forces according to hand situation
- Design and Implementation of Virtual-Reality (VR) environment in SIMULINK, and wireless communication with hardware
- Design and Fabrication of mechanical structure of device containing Two jet-propellers, 3D printed parts, IMU sensor, servo motor, and etc.
- more details: https://www.youtube.com/watch?v=slAUNDxSRoE

Course Projects

- Design a Fuzzy Sliding mode controller for bodybuilding applications *Jan. 2022*
- Simulation of an article related to System Identification course, "Recursive Least Square Algorithm for Estimating Parameters of an Induction Motor" *Jan. 2022*
- Simulation of an Article related to Adaptive Control Systems course, "Design of direct MRAC augmented with 2 DoF PIDD controller: An application to speed control of a servo plant" *Jun. 2021*
- Simulation of an Article related to Advanced Control systems course, "RISE-based adaptive control for EICoSI exoskeleton to assist knee joint mobility" *Jun. 2021*
- Design a Robert mechanism that converts rotational motion in a specific range to linear motion in a specific length with this consideration that the linear motion becomes as straight as possible *Jan. 2021*

Experience

Research Assistant
- Mechatronics Lab, University of Tehran *Oct. 2021 - Present*

Teaching Assistant
- Advanced Control Systems *Oct. 2021 - Jan. 2022*
  Dr. Farzad A.Shirazi
- Measurement Systems and Laboratory *Feb. 2021 - Jun. 2021*
  Dr. Farzad A.Shirazi

Work Experience
- Internship in **Esfahan's Mobarakeh Steel Company** *Jul. 2019 - Sep. 2019*

Skills

Programming Languages: C++, Python, MATLAB, LaTeX
Applications: SolidWorks, MATLAB & SIMULINK, Microsoft Office
Operating Systems: Windows, Linux (Ubuntu)
Hardware: STM32 Microprocessors, Arduino Boards, NVIDIA Jetson Nano Developer Kit, Raspberry PI

Languages

Persian: Native
English: High-Intermediate
- TOEFL iBT Score: 100 (Reading: 28, Listening: 28, Speaking: 20, Writing: 24)

References

1. Dr. Farzad A.Shirazi: fshirazi@ut.ac.ir
2. Dr. Mohsen Saadat: saad0021@umn.edu
3. Dr. Hossein Karimpour: h.karimpour@eng.ui.ac.ir