Sadra Zargarzadeh

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Education

University of Alberta **2022 – 2024**
Master of Science in Electrical and Computer Engineering *Edmonton, Canada*
Supervisor: Prof. Mahdi Tavakoli – GPA: 4/4

Sharif University of Technology **2018 – 2022**
Bachelor of Science in Mechanical Engineering *Tehran, Iran*
Supervisor: Prof. Navid Arjmand – GPA: 3.97/4

Research Interests

- Robotics
- Machine Learning
- Autonomous Systems
- Computer Vision
- Control Systems
- Reinforcement Learning

Publications

1. Y. Ou, **S. Zargarzadeh**, M. Tavakoli, *Robot Learning Incorporating Human Interventions in the Real World for Autonomous Surgical Endoscopic Camera Control*, Journal of Medical Robotics Research, 2023
2. **S. Zargarzadeh**, A. Sieben, E. Wiebe, L. Peiris, M. Tavakoli, *Augmented Reality-Based Tumor Localization and Visualization for Robot-Assisted Breast Surgery*, (Submitted to IEEE International Conference on Human-Machine Systems 2024)
3. J. Bern, W. May*, A. Osborn*, F. Stella*, **S. Zargarzadeh***, J. Hughes, *A Soft Robot Inverse Kinematics for Virtual Reality*, International Conference on Robotics and Automation (Submitted to International Conference on Robotics and Automation (ICRA) 2024)
4. M. Mohseni, **S. Zargarzadeh**, N. Arjmand, *Human Whole Body Static 3D Posture Prediction in One- and Two-Handed Lifting Tasks from Different Load Positions Using Machine Learning*, (Submitted to Journal of Biomechanics)
5. **S. Zargarzadeh**, M. Bahramian, M. Mohseni, N. Arjmand, *Comparison of Ten Qualitative Biomechanical Tools in Evaluating the Risk of Work-Related Injury*, (Submitted to Scientia Iranica)
6. **S. Zargarzadeh**, M. Mohseni, N. Arjmand, *An Artificial Neural Network to Predict 3D Human Posture During One- and Two-Handed Load-Handling Tasks*, Virtual Physiological Human Conference, Portugal, 2022

Research Experience

Telerobotics and Biorobotics Systems Group **Sep 2022 – Present**
Research Assistant *Edmonton, Canada*
- Autonomous Surgical Endoscopic Camera Control Incorporating Human Interventions Using Reinforcement Learning
- Developed an Augmented Reality-Based Tumor Visualization System for Robot-Assisted Breast Cancer Surgeries

École Polytechnique Fédérale de Lausanne (EPFL) **June 2023 – Sep 2023**
E3 Fellow and Research Intern *Lausanne, Switzerland*
- Soft Robot Inverse Kinematics and Control through Virtual Reality
- Design, Manufacturing, and Control of "Large" Soft Robots
- Investigated Potentials of Collaboration Between Robots and Plants

Spine Biomechanics Lab, Sharif University of Technology **Sep 2021 – Aug 2022**
Undergraduate Research Assistant *Tehran, Iran*
- Trained and Validated an Artificial Neural Network to Predict 3D Human Postures During Lifting Activities
- Used Qualitative and Quantitative Biomechanical Tools to Reduce Work-Related Musculoskeletal Disorders (WMSDs) in the Industry

DJavad Mowafaghian Research Center **May 2021 – Aug 2021**
Research Intern *Tehran, Iran*
- Motion and Gait Analysis of Cerebral Palsy Children Using Vicon Nexus
- Assembled and Debugged Telerehabilitation Devices Used for Parkinson's Patients

Honors and Awards

- Awarded the E3@EPFL Fellowship, EPFL, Switzerland, 2023 (3% Acceptance Rate)
- Accepted to EPFL Doctoral Program in Robotics, Control, and Intelligent Systems, 2022 (Directly from B.Sc.)
- Top Undergraduate Researcher Award, Mechanical Engineering Department, Sharif University, 2022
- Merit Scholarship for a Direct M.Sc. at Sharif University of Technology, 2021
- Ranked in the Top 0.2% Among 200,000 University Entrance Exam Participants, 2018

Teaching/Work Experience

Teaching Assistant, University of Alberta **Jan 2023 – Present**
Engineering Mechanics, Calculus I and II *Edmonton, Canada*

Teaching Assistant, Sharif University of Technology **Jan 2019 – Aug 2022**
Robotics, Dynamics of Machinery, Machine Elements Design I and II, Engineering Graphics *Tehran, Iran*

Industry Intern, Mehraveh Machinery Company **May 2020 – Aug 2020**
Designed and Manufactured Shafts and Bearings *Esfahan, Iran*

Technical Skills

Programming: Matlab, Python, C++/C#
Software: Unity, Solidworks, Abaqus (FEM), Simulink, Vicon Nexus
Languages: Farsi (Native), English (Fluent, IELTS 8/9), French (Limited)

Projects

Rigid-Soft Elephant Leg Design and Control | *EPFL Internship* **August 2023**
- Explored Various Geometries and Material, and Proposed a Design Using Fiberglass
- Implemented a Tendon-Based Actuating Mechanism Using Dynamixels for Gait Movement

Kuka KR-16 Modeling and Control | *Course: Advanced Robotics* **April 2023**
- Kinematics, Dynamics, and Control of the Kuka 6DOF Robotic Manipulator

Anomaly Detection and Adversarial Attacks | *Course: Deep Learning in Computer Vision* **March 2023**
- Investigating Anomaly Detection for Identifying Adversarial Attacks on Deep Neural Networks
- Utilized a ResNet-18 Backbone Trained on the CIFAR-10 and CIFAR-100 Datasets for Experiments

Garbage Classification | *Course: Deep Learning in Computer Vision* **February 2023**
- Analyzed the MobileNetV2 Architecture and Used it as the Backbone
- Trained on the Atlas 800 Medium and Converted to Atlas 200 DK for Inference

Design of a Complete Manual Gearbox| *Course: Machine Elements Design II* **November 2020**
- Designed Shafts, Bearings, and Gears for an Industrial Machine Gearbox

Leadership/Extracurricular

Math and Physics Teacher **2021 – 2023**
Online Instructor *Mahdavi Academy School*
- Tutored High School Students in Math and Physics (200+ Hours)

Academic Support Initiative **2019 – 2021**
President *Sharif University of Technology*
- Lead a Team of 20+ Sophmore Students to Support Freshman in Physics, Calculus, and Programming

References

- **Prof. Mahdi Tavakoli**
  University of Alberta, mahdi.tavakoli@ualberta.ca
- **Prof. Josie Hughes**
  EPFL, josie.hughes@epfl.ch
- **Prof. Navid Arjmand**
  Sharif University of Technology, arjmand@sharif.edu