SEYED YAHYA SHIRAZI

Ph.D. Candidate in Mechanical Engineering

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EXPERIENCE (SELECTED)

Graduate Research Assistant

UCF BRaIN Lab

Jan. 2017 – Present Orlando, FL

- Study responses of young and older adults to mechanical perturbations during exercise on a robotic recumbent stepper. We collect & analyze EEG, EMG & biomechanical data. Analyses span from studying the biomechanical behavior to cortico-muscular connectivity analysis.
- Developed new 3D position recording methods to digitize EEG electrode locations, using a motion capture system or 3D scanners. For this project, we implemented several image-processing & clustering techniques including iterative closest point (ICP) & Gaussian mixture model (GMM).
- Constructed deep neural network models for online classification of EEG signals to find movement intention in a locomotor task prior to movement execution.

Graduate Research Assistant

Tehran Polytechnic

Sept. 2011 – Feb. 2014 Tehran, Iran

- Studied responses of transtibial amputees and healthy participants to different mechanical perturbations during standing.
- Designed and created a multi-directional perturbing mechanism that disturbs participants in the pitch and roll directions directions.
- Designed a pneumatic control system to create rapid movements for the perturbing mechanism using LabVIEW.

EDUCATION

Doctor of Philosophy

University of Central Florida | Mechanical Engineering

Jan. 2017 – April, 2021

- Dissertation : Corticomuscular adaptation to mechanical perturbations in a seated locomotor task

Master of Science

Tehran Polytechnic | Biomedical Engineering

Sep. 2011 – Feb. 2014

- Thesis : Dynamic Postural Stability Analysis on Standing Normal Subjects & Transtibial Amputees.

Bachelor of Science (with Honors)

Tehran Polytechnic | Biomedical Engineering

Sep. 2007 – Sep. 2011

- top 3rd in the department

SKILLS

- Biomedical signal acquisition
  - EEG, EMG, Motion Capture, Force
- Signal processing and machine learning
  - Matlab: EEGLAB, SP, NN, DL, Image processing
  - Simulink: IoT (Raspberry, Arduino), Control
  - Python: Numpy, Pandas, Scipy, Scikit Learn, MNE
  - GitHub, VSCode, Docker, Ray (futures), Dask
- Human 3D modeling
  - Mimics, XOR
- Product development
  - SolidWorks, Ansys (Structural, CFD, FSI), Visio

PROJECTS (ECA, SELECTED)

Perturbations on-the-go

- Developed a real-time controller to create resistive perturbations during stepping exercise.
- The controller is scalable to small to small exercise devices using an IoT kit.

Zombie ant biomechanics using ResNet

- Implemented DeepLabCut toolbox (a ResNet network for pose estimation and tracking) to track antennae and limb segments of Carpenter ants before and after infecting with Ophiocordyceps unilateralis (Zombie) fungus. link to the video: `pic.twitter.com/59Qk9fLJHU`

PUBLICATIONS (SELECTED)

Shirazi, S. Y. & Huang, H. J. *Differential theta-band signatures of the anterior cingulate and motor cortices during seated locomotor perturbations*, IEEE Transactions on Neural Systems and Rehabilitation Engineering, 2021. link to the article: `10.1109/tnsre.2021.3057054`

Shirazi, S. Y. & Huang, H. J. *More reliable EEG electrode digitizing methods can reduce source estimation uncertainty, but current methods already accurately identify Brodmann areas*, Frontiers in Neuroscience, 2019. link to the article: `10.3389/fnins.2019.01159`

PATENT

S.Y.Shirazi: *Centrifugal Micro-viscometer. A lab-on-a-chip device to assess viscosity of biological fluids*, Iran Patent #77944, June 2012.