

KIARASH VAZIRI GOODARZI

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RESEARCH INTERESTS

Multimodal deep learning, time-series modeling, mathematical modeling of brain dynamics, Brain-Machine Interfaces

EDUCATION

University of Southern California 2023 - Present

Doctor of Philosophy, **Electrical and Computer Engineering**

Viterbi School of Engineering

Advisor: Maryam Shanechi

Sharif University of Technology 2019 - 2023

Bachelor of Science, **Electrical Engineering**

RESEARCH EXPERIENCES

Graduate Research Assistant @ University of Southern California August 2023 - Present

- I have been working on self-supervised representation learning of intracranial EEG to track mood variations, predict cross-region neural activity, and other downstream tasks.

Research Intern @ University of British Columbia March - October 2022

- We explored multi-modal non-invasive neuromodulation as a possible treatment for Parkinson's disease. I worked as a data analyst and implemented system identification and signal processing approaches to investigate the effects of neuromodulation on Parkinson's disease patients.

Research Intern @ Biosen Group May - August 2021

- We worked on the design and development of an ECG patch that aimed at measuring heart electrocardiography and diagnosis of AF through feature-engineered ML classifiers.

B.Sc. Thesis @ Sharif University of Technology 2023

- My project accomplished implementing Transfer Learning algorithms in combination with graph kernels for between-subject classification of EEG data.

PUBLICATIONS

- Baraeinejad B., Shayan M.F., Vazife A.R., Rashidi D., Hamedani M.S., Tavolinejad H., Razmara P., Gourji P., **Vaziri K.**, Vashae D., Fakharzadeh M., "Design and Implementation of an Ultralow-Power ECG Patch and Smart Cloud-Based Platform," *IEEE Transactions on Instrumentation and Measurement*, Apr. 2022.

TECHNICAL SKILLS

Programming Python, Matlab, C/C++, Java.

ML Frameworks PyTorch, TensorFlow, Keras, scikit-learn

PROJECTS

Multimodal Sentimental Analysis, Deep Learning 2023

We built a sentimental analysis framework based on modalities of images and text. We used Weakly Supervised and Transfer Learning techniques to further improve the accuracy.

Image Denoising, Linear Algebra 2022

I denoised images via sparse representations over learned dictionaries. I used MP and OMP algorithms for sparse approximation and KSVD and MOD for dictionary learning in Python.

Dual SVM Problem Solving, Convex Optimization 2022

We implemented the barrier method and solved the dual soft SVM problem. We used an equality-constrained Newton method with backtracking line search.

EEG Mental Task Classification, AI & Computational Intelligence 2022

Our objective was to classify mental tasks based on EEG signals of 30 channels. I found top correlated features using genetic algorithm and built MLP and RBF neural networks in TensorFlow with a test accuracy of 80

SPICE-based Circuit Solver, Object-Oriented Programming 2020

Our project was a SPICE-inspired software written in Java. The program takes a text file describing circuit specifications and is able to run transient analysis on circuits including linear and nonlinear elements. Also, the program visualizes a diagram of the described circuit.

AWARDS

- **Annenberg Fellowship**, Ming Hsieh Department of Electrical and Computer Engineering, University of Southern California, 2023.
- Undergraduate High Honour Student, Sharif University of Technology
- **Ranked in the top 0.1% among 160,000 students** taking part in National University Entrance Exam in Mathematics branch, Iran 2019.

RELEVANT COURSEWORK

University of Southern California: Deep Learning and Its Application, Inference and Estimation: Theory and Algorithm, Random Processes, Data Analysis and Control Techniques for Neurotechnology, Probability in Electrical and Computer Engineering

Sharif University of Technology: Deep Learning, Convex Optimization, Introduction to Machine Learning, Linear Algebra, Computational Intelligence, Digital Signal Processing, Algorithm & Data Structures, Probability and Statistics in Engineering, Object Oriented Programming