Mansooreh Pakravan

Curriculum Vitae

Tarbiat Modares University
City, Tehran
℡ *02182884972*
✉ *mpakravan@modares.ac.ir*

Education

2021–present **Assistant Professor in Biomedical engineering**, *Electrical and Computer Engineering Department, Tarbiat Modares University*, Tehran, Iran.

2020–2021 **Postdoc in Computational neuroscience**, *School of Cognitive Science in IPM*, Tehran, Iran.

2012–2019 **Ph.D. in Biomedical engineering**, *Electrical Engineering Department, Sharif University of Technology*, Tehran, Iran, *GPA − 19.23*.

2013–2014 **Visiting Ph.D. Graduate Student**, *Supervised by Prof. Sylvain Baillet*, neuroSPEED: Neural Dynamics of Brain Systems laboratory, McConnell Brain Imaging Centre, McGill University, Montreal, Canada.

2010–2012 **M.Sc. in Biomedical engineering**, *Electrical Engineering Department, Sharif University of Technology*, Tehran, Iran, *GPA − 18.46*.
First Class Honours

2005–2010 **B.Sc. in Communication Systems**, *Electrical Engineering Department, Sharif University of Technology*, Tehran, Iran.

Ph.D. Thesis

Title *Joint analysis of fMRI multi-subject data to extract common spatial and temporal sources*

Supervisor Professor Mohammad Bagher Shamsollahi

Description Joint analysis of multi-subject brain imaging datasets has wide applications in biomedical engineering. In these datasets, some sources belong to all subjects (joint), a subset of subjects (partially-joint), or a single subject (individual). In this thesis, we have presented a deflation-based algorithm utilizing higher order cumulants to analyse the Joint/partially-Joint/Individual Multi-Dataset Unidimensional (JpJI-MDU) source models. Our results in analyzing three real datasets reveal that the analyzed datasets follow the JpJI-MDU source model.

M.Sc. Thesis

Title *Biomedical Signal Analysis and Multiclass Discrimination of Laryngeal Disorder Using Voice Database*

Supervisor Dr. Mehran Jahed

Description   This thesis is aimed to analyze and classify diseases of the larynx with the aid of signal processing which tends to be faster and easier to implement and quite economical. This study utilizes the vowel sound /a/ and a well-referenced database, namely MEEI. In this work, using existing signal modeling and processing methods, the appropriate glottal waveform was obtained for each voice. Significance tests are also applied on classifier's results to justify and evalute them.

B.Sc. Thesis

Title   *Finger Flexion Prediction and Classification, Using ECoG Biomedical Signal Processing for Rehabilitation Purposes*

Supervisor   Professor Mohammad Bagher Shamsollahi

Description   Brain Computer Interface (BCI) is one of the clinical applications that might restore communication to people with severe motor disabilities. In this thesis, signal processing and classification were validated to extract relevant features for five-class finger flexion. The signal is provided by ECoG dataset from BCI competition IV.

Experience

Research

1. **Supervisor: Prof. Sylvain Baillet**.
   Designing an experiment aimed to investigate the behavior of visual regions of the brain. In the experiment, subjects watched 2D and 3D natural movies and the recorded database has been used to discriminate the brain behaviors in watching 2D and 3D movies (at McConnell Brain Imaging Centre - McGill University).

2. **Supervisor: Dr. Reza Farivar-Mohseni**.
   Recording fMRI data of 34 subjects and denoising the recorded fMRI data using AFNI software (at department of Ophthalmology, Faculty of Medicine - McGill University).

3. **Supervisor: Prof. Sylvain Baillet**.
   Recording MEG data of 34 subjects and denoising the recorded MEG data using Brainstorm software (at McConnell Brain Imaging Centre - McGill University).

4. **Supervisor: Prof. Mohammad bagher Shamsollahi**.
   Decoding neural spike train using point process filter algorithms to classify human brain activities (at Sharif University of Technology).

5. **Supervisor: Dr. Ali ghazizadeh**.
   Decoding of monkey's fMRI data to extract information-map using mutli-voxel pattern analysis in the context of value-based memory (at School of cognitive science, IPM).

Academic

1. Teacher assistant of EEG signal processing.
2. Teacher assistant of Fundamentals of Electrical Circuits course.
3. Teacher assistant of Circuit Theory (I) course.
4. Teacher assistant of Circuit Theory (II) course.
5. Teacher assistant of Digital Signal Processing course.
6. Teacher assistant of Time Frequency Signal Processing course.
7. Teacher assistant of Biomedical Signal Processing course.

Awards

2014	Member of Iran National Elite Foundation
2012	**Ranked 2nd** in the Nationwide University Entrance Exam for Ph.D. studies in Electrical Engineering, Iran
2012	**Ranked 1st** among the biomedical engineering students of class (M.Sc.)
2010	**Ranked 9th** in the Nationwide University Entrance Exam for M.Sc. studies in Electrical Engineering, Iran
2005	**Ranked 221th (8th in the region three)** in the Nationwide University Entrance Exam for B.Sc studies in Electrical Engineering, Iran

Computer skills

PYTHON LaTeX, MATLAB, AFNI, SPM, Brainstorm, C++, Linux, Microsoft Windows.

Course skills

Fundamental of biomedical engineering (score: 19/20)

Medical image systems (score: 19/20)

Blind source separation and sparse signal processing (score: 19.5/20)

Medical Image Analysis and Processing (score: 20/20)

Fuzzy Systems (score: 20/20)

Time-Frequency signal processing (score: 17.5/20)

Biomedical signal processing part 1(score: 19.5/20)

Biomedical signal processing part 2 (score: 19/20)

Speech processing (score: 17.5/20)

Neural modeling (score: 18.5/20)

Reviewer of

IEEE Journal of Biomedical and Health Informatics

AUT Journal of Electrical Engineering

Research Interests

Biomedical Signal Processing especially fMRI and BOLD signal processing
Topics:
- Causal inference
- Brain Connectivity Measures
- Graph Neural Networks
- Deep Learning
- Brain decoding and encoding
- Multi-Variate (Multi-Voxel) Patten analysis
- Joint Blind Source Separation

Neuroscience and Cognitive Science
Topics:
- Visual system
- Brain mapping
- Social brain
- Alzheimer disease
- Parkinson disease

Publications

Journal Papers

- **Pakravan, M**., Jahed, M., Significant Pathological Voice Discrimination by Computing Posterior Distribution of Balanced Accuracy, *Biomedical Signal Processing and Control*, 2022 Mar 1;73:103410.
- **Pakravan, M**., Abbaszadeh M., Ghazizadeh, A., Coordinated multivoxel coding beyond univariate effects is not likely to be observable in fMRI data, *NeuroImage*, 2021 Dec 21:118825.
- **Pakravan, M.**, Shamsollahi, M. B. (2018). Extraction and Automatic Grouping of Joint and Individual Sources in Multisubject fMRI Data Using Higher Order Cumulants. *IEEE Journal of Biomedical and Health Informatics*, 23(2), 744-757.
- **Pakravan, M.**, Shamsollahi, M. B. (2020). Joint, Partially-joint, and Individual Independent Component Analysis in Multi-Subject fMRI Data. *IEEE Transactions on Biomedical Engineering, vol. 67, no. 7, pp. 1969-1981.*
- **Pakravan, M.**, Shamsollahi, M. B. (2020). Spatial and temporal joint, partially-joint and individual sources in independent component analysis: Application to social brain fMRI dataset. *Journal of neuroscience methods*, 329, 108453.

Talks

2020 **Multivariate pattern analysis in brain decoding** at School of cognitive science, IPM, Tehran, Iran

2021 **Is there any real and observable second order multivariate coding available in fMRI data?** at Sharif Neuroscience Symposium, Sharif University of Technology, Tehran, Iran

Courses that I can Offer

- Functional Brain Imaging Systems
- Pattern Recognition
- Machine Learning
- Causal Inference
- Time-Frequency Signal Processing and Wavelet
- Modeling of Biological Systems

References

1. **Prof. M. B. Shamsolahi**, *Electrical Engineering Department at Sharif University of Technology*.
   mbshams@sharif.edu

2. **Dr. M. Jahed**, *Electrical Engineering Department at Sharif University of Technology.*
   jahed@sharif.edu

3. **Prof. Sylvain Baillet**, *McConnell Brain Imaging Centre, McGill University.*
   Sylvain.Baillet@mcgill.ca

4. **Dr. Ali Ghazizadeh**, *School of cognitive science, IPM.*
   alighazizadeh@ipm.ir