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AFFILIATIONS

- 2023 – Now** **Researcher**, Neuroimage Signal and Image Analysis Group, School of Cognitive Sciences (SCS), Institute for Research in Fundamental Science (IPM), Tehran, Iran.
- 2020 – Now** **Research Assistant**, Control and Intelligent Processing Center of Excellence (CIPCE), School of Electrical and Computer Engineering, University of Tehran, Tehran, Iran.

EDUCATION

- 2022 – Now** **Ph.D.** in Biomedical Engineering – Bioelectric, University of Tehran, Tehran, Iran.
Overall GPA: 19.30 / 20 (4.0 / 4.0) (Ranked 1st in class) ([Transcript](#))
Thesis: Explainable Localization of Epileptic Foci from Resting-State fMRI Data Using Graph Neural Network.
Supervisor: Professor Hamid Soltanian-Zadeh
- 2018 – 2021** **M.Sc.** in Biomedical Engineering – Bioelectric, University of Tehran, Tehran, Iran.
Overall GPA: 18.16 / 20 (4.0 / 4.0) (Ranked 1st in class) ([Transcript](#))
Thesis: Epileptic Seizure Focus Localization: Comparison of State-of-the-art Approaches on an EEG-fMRI Dataset and Presenting a Novel fMRI-based Method. (Grade: Excellent)
Supervisor: Professor Hamid Soltanian-Zadeh
- 2014 – 2018** **B.Sc.** in Biomedical Engineering – Bioelectric, Sadjad University of Technology, Mashhad, Iran.
Overall GPA: 19.68 / 20 (4.0 / 4.0) (Ranked 1st in class) ([Transcript](#))
Thesis: Short-term and Long-term Effects of Jammer High-frequency Electromagnetic Fields (EMF) on Human Brain using EEG signals. (Grade: Excellent)
Supervisor: Professor Morteza Kafaei

COURSE HIGHLIGHTS

- Digital Signal Processing, Advanced Digital Signal Processing, Biological Signal Processing
- Digital Image Processing, Medical Imaging Systems, Functional Brain Imaging Systems
- Cognitive Neuroscience, Biological Systems Modeling, Dynamic Systems in Neuroscience
- Statistical Inference, Machine Learning, Computer Vision, Neural Networks, Deep Learning
- Presentation of Technical Documents in English

RESEARCH INTERESTS

- Clinical Neuroscience, Applied Neuroimaging, Brain Stimulation, Brain Disorders and Cancer, Epilepsy
- Brain Source Localization, Brain Connectivity, Multimodal Brain Mapping, Cortical Folding Patterns
- Machine Learning, Deep Learning, Interactive Learning, Graph Neural Networks, Explainable AI

CURRENT RESEARCH

- Applied neuroimaging in pre-surgical evaluation of epilepsy
- Cognitive impacts of invasive epilepsy treatments
- Epileptic network graphs

LINGUISTIC PROFICIENCY

- **English:** Fluent (IELTS score: 7.0)
- **Persian:** Native

TECHNICAL SKILLS

Programming	Python, MATLAB, R, C
Toolboxes	FSL, SPM, Brainstorm, CONN, EEGLAB, PsychToolbox, XPPAUT
Frameworks	HLS4ML, PyTorch, TensorFlow, OpenCV, Scikit-learn, Seaborn, SciPy, Pandas, NumPy, Matplotlib, etc.
Typesetting	LaTeX
Version Control	Git

DATA ACQUISITION

2024 – Now	Multimodal Neuroimaging from candidates for epilepsy surgery
2020 – 2021	Simultaneous EEG-fMRI Recording from 20 Patients with Epilepsy Using 64-channel BrainAmp MR Plus EEG and 3-Tesla Siemens Prisma MRI Scanner.
2017 – 2018	EEG Recording from 15 Healthy Adults Using 32-channel MitsarEEG-202 Device.

TEACHING EXPERIENCES

Fall 2023	Graduate Teaching Assistant , Advanced Digital Signal Processing, Prof. H. Soltanian-Zadeh.
Fall 2023	Graduate Teaching Assistant , Digital Image Processing, Prof. R. A. Zoroofi.
Fall 2022	Graduate Teaching Assistant , Fundamentals of Medical Imaging, Prof. H. Soltanian-Zadeh.
Fall 2020	Graduate Teaching Assistant , Digital Image Processing, Prof. H. Soltanian-Zadeh.
2017 – 2018	Undergraduate Course Instructor , Electronic Circuits, Sadjad University of Technology, Mashhad, Iran.
2016 – 2018	Undergraduate Teaching Assistant , Electronic Circuits (4 semesters), Prof. Kh. Mafinezhad.
2015 – 2016	Undergraduate Teaching Assistant , Electrical Circuits (2 semesters), Prof. A. M. Aminian-Modarres.

SELECTED COURSE PROJECTS

PyTorch	Remote Sensing Image Captioning Based on Structured Attention.
PyTorch	Speech Emotion Recognition with Natural Language Inference Using HuBERT Transformer.
PyTorch	Recognizing Textual Entailment with Natural Language Inference Using GLOVE Embedding and BERT Model.
PyTorch	LSTM-based Machine Translation Using GLOVE Embedding, Teacher Forcing, and Beam Search.
PyTorch	Self-Supervised Image Colorization Using CNN and L2 Regression Loss.
PyTorch	Image Classification Using CNN with Residual Blocks and Inception module.
TensorFlow	Unsupervised Image Generation Using DCGAN, ACGAN, and Wasserstein GAN.
TensorFlow	Self-Supervised Semantic Segmentation Using BEiT Vision Transformer (ViT).
TensorFlow	Liveness Detection in Biometrics Using AlexNet and LeNet-5.
TensorFlow	Credit Card Fraud Detection Using Autoencoder Neural Network.
TensorFlow	Fake News Detection Using a Hybrid CNN-RNN Approach.
TensorFlow	Air Pollution Prediction Using CNN-LSTM Model.
TensorFlow	Face Segmentation with Robustness to Occlusion Using PSPNet and DeepLab.
TensorFlow	Chess Pieces Segmentation Using Fine-tuned YOLOv6.
TensorFlow	Effects of Image Resolution in CNN-based Classification Performance.
Scikit-Learn	Colorful Image Compression Using K-Means Clustering and Principal Component Analysis (PCA).
Scikit-Learn	Handwritten Digits Classification Based on Bayes, KNN, KNC, RNC, and GNB Classifiers.
XPPAUT	Pathological Synchronization in a Model of Focal Epileptic Seizure.
R-Studio	Exploring Cardiovascular Risk Factors and Glycosylated Hemoglobin Levels.

- PsychToolbox** Spatial Heterogeneity in the Perception of Face and Form Attributes: Task Design, Reimplement, and Curve Fitting.
- MATLAB** Supporting Relation between Bidirectional Frontoparietal EEG Oscillations and Working Memory.
- MATLAB** Quantile-based Robust Power Spectral Estimation for EEG Data.
- MATLAB** Feature Based Panoramic Image Stitching Using Speeded-Up Robust Features (SURF).
- MATLAB** Melanoma Segmentation Using Morphological Connected Component Border Extraction.
- MATLAB** Modeling the Effects of Multiple Myeloma on Kidney Function.
- MATLAB** Automatic Detection of Electrocardiogram (ECG) Waves and Intervals.
- Review** Time-frequency Analysis for Detection and Prediction of Epileptic Activity.
- Review** Whole-Brain Imaging with Single-Cell Resolution Using Chemical Cocktails and Computational Analysis.

RESEARCH AND PUBLICATIONS

B.Sc. Thesis Effects of Jammer High-frequency Electromagnetic Fields (EMF) on the Human EEG

By Seyyed Mostafa Sadjadi

Supervisor Professor Morteza Kafae

Abstract In this study, we attempted to investigate the quantitative effects of Jammer waves on the human brain by creating a simulated Jammer protected place and recording EEG signal from 15 adults who are there respectively as a two-stage experiment. After processing the signals and running the statistical tests, results have shown that electromagnetic waves of the Jammer cause a significant increase in the alpha waves of the whole brain EEG. This study seeks to illustrate the biological changes in the brain workflow due to exposure to the electromagnetic radiation of Jammer.

M.Sc. Thesis Epileptic Seizure Focus Localization: Comparison of State-of-the-art Approaches on an EEG-fMRI Dataset and Presenting a Novel fMRI-based Method.

By Seyyed Mostafa Sadjadi

Supervisor Professor Hamid Soltanian-Zadeh

Abstract This thesis implemented the state-of-the-art interictal non-invasive methods for epileptic seizure focus localization using fMRI and simultaneous EEG-fMRI data on a dataset of 20 patients with focal epilepsy to see the clinical results and make an exhaustive comparison in terms of clinical accuracy, dependencies, the simplicity in data recording and artifact removal process, etc., and then suggested a novel combined method for the localization of epileptic focus using fMRI alone data that showed to be simple, independent from IED occurrence and foci depth, and sufficiently accurate. The implemented approaches were conventional EEG-fMRI analysis, component-based EEG-informed fMRI GLM analysis, fMRI seed-based functional connectivity based on epileptic EEG dipole coordinates, directional functional couplings modulated by EEG network variations, spatially independent and lateralized fMRI components as epileptogenic areas, and the novel method, spatio-temporal component-based functional connectivity (stCBFC).

2021 Localization of Epileptic Foci Based on Simultaneous EEG-fMRI Data

S.M. Sadjadi, E. Ebrahimzadeh, M. Shams, M. Seraji, and H. Soltanian-Zadeh
Frontiers in Neurology ([Link](#))

2021 Localizing Epileptic Foci Using Simultaneous EEG-fMRI Recording: Template Component Cross-Correlation

E. Ebrahimzadeh, M. Shams, M. Seraji, **S.M. Sadjadi**, L. Rajabion, and H. Soltanian-Zadeh.
Frontiers in Neurology ([Link](#))

2021 Automatic Detection of Coronavirus (COVID-19) from Chest CT-scans Using VGG16-based Deep Learning

A. Karimiyan Abdar, **S.M. Sadjadi**, A. Bashirgonbadi, M. Naghibi, and H. Soltanian-Zadeh
27th National and 5th International Iranian Conference on Biomedical Engineering (ICBME) in IEEE ([Link](#))

2022 fMRI Functional Connectivity Analysis for Localizing Epileptic Focus

S.M. Sadjadi, E. Ebrahimzadeh, and H. Soltanian-Zadeh
30th International Conference on Electrical Engineering (ICEE) in IEEE ([Link](#))

- 2022 Extended VGG16 Deep Learning Detects COVID-19 from Chest CT**
A. Karimiyan Abdar, **S.M. Sadjadi**, A. Bashirgonbadi, M. Naghibi, and H. Soltanian-Zadeh
AUT Journal of Electrical Engineering ([Link](#))
- 2022 Simultaneous EEG-fMRI for Assessment of Human Brain Function**
E. Ebrahimzadeh, S. Saharkhiz, L. Rajabion, H. Baghaei Oskouei, M. Seraji, F. Fayaz, S. Saliminia, **S.M. Sadjadi**, and H. Soltanian-Zadeh
Frontiers in Systems Neuroscience ([Link](#))
- 2023 Effectiveness of Repetitive Transcranial Magnetic Stimulation (rTMS) on DLPFC for Enhancing Cognitive Function in Healthy Adults: A Review**
M. Asgarinejad, M. Saviz, **S.M. Sadjadi**, S. Saliminia, A. Kakaei, P. Esmacili, A. Hammoud, E. Ebrahimzadeh, and H. Soltanian-Zadeh
Available at SSRN 4524707 ([Link](#))
- 2024 Repetitive Transcranial Magnetic Stimulation (rTMS) as a Tool for Cognitive Enhancement in Healthy Adults**
M. Asgarinejad, M. Saviz, **S.M. Sadjadi**, S. Saliminia, A. Kakaei, P. Esmacili, A. Hammoud, E. Ebrahimzadeh, and H. Soltanian-Zadeh
Medical & Biological Engineering & Computing ([Link](#))
- 2024 High-Resolution Remote Sensing Image Captioning (RSIC) Based on Structured Attention and SAM Network**
Y. Riyazi, **S.M. Sadjadi**, A. Zohrevand, and Reshad Hosseini
32nd International Conference on Electrical Engineering (ICEE) in IEEE ([Link](#))
- 2024 Neuroenhancement by Repetitive Transcranial Magnetic Stimulation (rTMS) on DLPFC in Healthy Adults**
E. Ebrahimzadeh, **S.M. Sadjadi**, M. Asgarinejad, A. Dehghani, and H. Soltanian-Zadeh
Cognitive Neurodynamics (Accepted for Publication)
- 2024 Spatio-Temporal Component Classification for Localizing Seizure Onset Zone**
S.M. Sadjadi, E. Ebrahimzadeh, A. Fallahi, J. Mehvari Habibabadi, M.R. Nazem-Zadeh, and H. Soltanian-Zadeh
The Journal of Neuroscience (Under Review)

Preparing **Mathematical Biomarkers for Epileptogenic Interictal Activity in Functional Neuroimaging**

Preparing **Multimodal Analysis of Seizure Focus in Pre-Surgical Evaluation of Epilepsy**

Preparing **Explainable Localization of Epileptic Foci from Resting-State fMRI Data Using Graph Neural Network**

References

- **Prof. Hamid Soltanian-Zadeh** ([Google Scholar](#))
Professor, Biomedical Engineering Department, School of Electrical and Computer Engineering, College of Engineering, University of Tehran, Tehran, Iran.
Senior Scientist, Medical Image Analysis Laboratory, Departments of Radiology and Research Administration, Henry Ford Health System, Detroit, MI, United States.
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- **Dr. Elias Ebrahimzadeh** ([Google Scholar](#))
Postdoctoral Research Fellow, Centre for Research and Development in Learning (CRADLE), Nanyang Technological University, Singapore.
Research Fellow, Neuroimage Signal and Image Analysis Group, School of Cognitive Sciences (SCS), Institute for Research in Fundamental Sciences (IPM), Tehran, Iran.
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