Hamzeh Alzweri

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Research Profile

I'm a third-year PhD student in Computer Science and Engineering at Michigan State University. My current research focuses on EEG and MEG analysis for epilepsy in collaboration with Henry Ford Health. I also have experience developing EEG signal-processing pipelines and evaluating machine learning models. I am a Fulbright award grantee for the 2020-2021 cycle. I am interested in the intersection of AI and Healthcare.

Research Experience

Epilepsy research using EEG and MEG: Contribute to an MSU–Henry Ford Health project on automated detection of interictal epileptiform discharges (IEDs).

- Preprocessed, segmented, and analyzed EEG and MEG recordings to prepare inputs for model training and evaluation.
- Trained models from prior studies on the project dataset and compared their detection performance.

P300 analysis in a visual attention task: Built a Python pipeline using MNE to align visual stimuli with eight-channel EEG recordings, reduce ocular artifacts, and measure P300 amplitude and latency. Generated diagnostic plots for each session to assess signal quality and verify peak selection.

Deepfake detection with pretrained vision models: Developed and evaluated classifiers to distinguish real from manipulated face images using features extracted from pretrained vision models. A two-layer neural network using InternVL3-78B features achieved **89.9% accuracy** on a balanced test set of 2,000 images.

Publications

- L-FAME: Longitudinal Focused Attention Meditation EEG Dataset and Benchmark. Accepted at NeurIPS 2026 (Evaluations & Datasets Track).
- Benchmarking Foundation Models for Zero-Shot Biometric Tasks. arXiv:2505.24214 (2025).

Education

PhD in Computer Science and Engineering — Fall 2024 – present
Michigan State University — GPA: 3.83

Master of Science in Computer Science and Engineering — Fall 2021 – Spring 2023
Michigan State University, specialization in Machine Learning — GPA: 3.83

Bachelor's degree in Computer Information Systems — Fall 2015 – Spring 2019
University of Jordan — GPA: 3.53

AI for Medicine Specialization — DeepLearning.AI, Coursera (data preprocessing, risk models, model evaluation).

Work Experience

Software Developer (.NET C#, Python) **Nov/2019 - Jun/2021**
Australian Post Global eCommerce Solutions **London, UK**

- Built and tested production data integrations in C# using Azure Functions to process and exchange data with customers and shipping carriers via APIs, webhooks, and SFTP.
- Built Python/Selenium tools that collected data from 21 websites and automated reporting, saving the team 2–3 hours per day.

Technical Skills

- **Programming and tools** — Python, MNE-Python, NumPy, pandas, PyTorch, scikit-learn, C#

- **EEG signal processing** — Filtering, event alignment, epoching, ocular artifact correction, and event-related potential (ERP) analysis, including P300 amplitude and latency measurement.

- **Deep learning and generative modeling** — Designing, training, and fine-tuning vision-language models (VLMs), including adapting their architectures to specific tasks. Developing neural networks for classification and regression and evaluating models under white-box adversarial attacks.

- **Computer vision** — 3D semantic segmentation of brain images, image classification, object detection and segmentation, content-based image retrieval, and image captioning. Experience with convolutional neural networks (CNNs) and image synthesis using GANs and vision transformers.

- **Natural language processing** — Part-of-speech tagging, named entity recognition, and document-level sentiment analysis. Experience with recurrent neural networks, transformers, attention mechanisms, and embeddings.

- **Evolutionary computing** — Multi-objective optimization, genetic algorithms (including NSGA-II), and evolutionary programming.