Saba Charmi Motlagh

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Summary of Qualifications

I am a detail-oriented professional who brings a solid foundation in machine learning and statistics. With over 4 years of hands-on experience in Python programming, I've honed my skills in data manipulation, exploration, and maintenance of enterprise data models. I am highly skilled in all aspects of data analysis, including data pre-processing, data manipulation, feature extraction, statistical analysis, and data visualization techniques. I am a dedicated and adaptable professional with excellent communication skills, adept at fitting into various workplaces and collaborating effectively within teams.

Professional Experience

Western University **Feb 2024 – Present**
Research Assistant *London, Canada*

- Engaging in collaborative research efforts within the framework of a large-scale project (*OMMABA*), taking place at McGill and Western Universities
- Utilizing various data collection methodologies, including the acquisition of behavioral, EEG, and fMRI data, from cohorts of healthy volunteers
- Demonstrating proficiency in data pre-processing, cleaning, and analysis, ensuring the reliability of collected datasets

Vector Institute for AI **Sep 2023 – Jan 2024**
Machine Learning Research Intern (Github Repo) *Toronto, Canada*

- Extracted RGB and Optical flow from videos generated using THINGS database
- Assessed the performance of action recognition models (two-stream I3D ConvNet, R(2+1)D ConvNet, and ConvLSTM) under rapid target presentation
- Formed Representational Dissimilarity Matrices (RDMs) and conducted Representational Similarity Analysis (RSA) to compare model performance and and brain response patterns
- Highlighted CNN limitations in mimicking brain processing in rapid visual tasks and proposed RNNs as a better approximation

Western University **Sep 2021 – Aug 2023**
Graduate Research Assistant (Github Repo) *London, Canada*

- Proposed a novel hypothesis about object recognition, suggesting the crucial role of recurrent processing in visual system
- Conducted an independent experiment and collected EEG data from human volunteers to investigate the neural dynamics of image processing
- Performed pre-processing, cleaning, and manipulation on 100 GB collected EEG data
- Leveraged machine learning techniques such as Multivariate Analysis and bootstrapping to analyze pre-processed data
- Utilized inferential statistical analysis to confirm the proposed hypothesis

Western University **Sep 2021 – Apr 2023**
Graduate Teaching Assistant *London, Canada*

- Held Python tutorials for Computer Science Fundamentals and managed over 40 students during these tutorial sessions
- Collaborated closely with course instructors to prepare the course material

Sharif University of Technology **Sep 2019 – Aug 2020**
Machine Learning Research Assistant (Github Repo) *Tehran, Iran*

- Proposed a novel hypothesis about the impact of weighted data fusion on emotion recognition, boosting accuracy by 10% compared to literature
- Utilized different machine learning models such as SVM and MLP to classify and predict the emotional state of human subjects
- Compared the results of different classifiers for different fusion methods – feature-level, decision-level, and ensemble

IPM Institute for Research in Fundamental Sciences **Jul 2019 – Sep 2019**
Summer Intern *Tehran, Iran*

- Engaged in collaborative research with a team to record, pre-process, and classify olfactory signals related to odor perception using machine learning techniques

Skills

Programming Languages: Python, MATLAB, C/C++
Machine Learning Libraries & Frameworks: Pandas, Numpy, Scikit-learn, OpenCV, PyTorch, Tensorflow, Keras, SciPy
Data Analysis & Visualization Tools: Matplotlib, Seaborn, MySQL, Tableau, Microsoft Power BI
Other Software & Tools: Microsoft Office, LaTeX, Git, AWS
Soft Skills: Project Management, Communication, Problem-solving, Teamwork

Education

Western University, London, Canada **Sep 2021 – Aug 2023**
M.Sc. in Computational Neuroscience, ***GPA: 4/4***
Selected Courses: Brain-Inspired AI, Advanced Artificial Intelligence

Sharif University of Technology, Tehran, Iran **Sep 2016 – Feb 2021**
B.Sc. in Electrical Engineering, ***GPA: 3.8/4***
Selected Courses: Computational Intelligence, EEG Signal Processing, Machine Learning, Linear Algebra, Statistics

Selected Projects

Supervised and unsupervised learning in predicting human attention (*Report*) **Western University**
- Utilized deep neural networks (AlexNet and RotNet) to forecast human behavior in object recognition
- Conducted comparison between supervised and unsupervised learning techniques in predicting human attention patterns
- Collaborated with a team to provide insights into the application of deep learning algorithms in understanding human attention dynamics

The *Algonauts Project 2021* Challenge: How the Human Brain Makes Sense of a World in Motion **Western University**
- Collaborated effectively with a team to actively participate in the Algonauts challenge
- Utilized a pre-trained two-stream I3D Convnet to predict motion from provided video sets with over 1000 samples
- Compared the model activation patterns with brain activations extracted from fMRI data

EEG Signal Analysis for Imagined Motor Movements **Sharif University of Technology**
- Extracted required features from EEG data recorded during imagined motor movements
- Classified imagery motor movements using neural networks and evolutionary algorithms
- Assessed the classification models using different evaluation metrics to determine the most effective model

Publications

Motlagh, S. C., Joanisse, M., Wang, B., & Mohsenzadeh, Y. (2024). Unveiling the neural dynamics of conscious perception in rapid object recognition, *NeuroImage*, 120668. Advance online publication.

Honors & Awards

One of Five Recipients of the BrainsCAN Scholarship at Western University, C$50,000 **Sep 2021 – Aug 2023**
Recipient of Western Graduate Research Scholarship, C$23,000 **Sep 2021 – Aug 2023**
Recipient of Vector Research Grant, C$4,000 **May 2023**
Member of Iran's National Elites Foundation **Sep 2016 – Feb 2021**
Ranked 16th among 200,000 participants in the Iranian National University Entrance Exam **Sep 2016**

Volunteer Activities

Western Brainhack 2023 **Sep 2022 – Nov 2023**
- Assisted with the Western Brainhack 2022 and 2023 Competitions, a dynamic initiative that brought together researchers and trainees of all backgrounds to collaborate on open science projects in neuroimaging and neuroscience

Member of the Brain and Mind Coffee Talk Committee at Western Institute for Neuroscience (WIN) **May 2023 – Aug 2023**
- Organized and hosted lectures by researchers from all over the world for graduate students

Member of the RESANA Student Organization during the Sharif Neuroscience Symposium (SNS 2019) **Jan 2019 – Mar 2019**
- Collaborated closely with the organizers of the Sharif Neuroscience Symposium, a convergence of diverse disciplines in systems neuroscience, machine learning, and neuro-engineering
- Managed the social media for the SNS 2019 and promoted the symposium's reputation as a premier neuroscience research platform