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Hassan Al-Hayawi

ON, Canada

519-982-7062 Links: LinkedIn | My Portfolio Website! | GitHub | Medium page

SKILLS

- **Neuroimaging Data (*Collect, Format, Preprocess, & Advanced Analysis*):** MRI, fMRI, fNIRS, & EEG
- **Programming/Coding:** Linux, Python, PySpark, SQL, SPSS, R, MATLAB, BASH, HTML & CSS, VSCode
- **Machine Learning:** TensorFlow, Keras, Scikit-learn, PyTorch, supervised/unsupervised learning, convolutional neural networks, feature engineering, model optimization, Google Cloud Platform (GCP), and MLOps with Azure
- **Research Methodology:** quantitative & qualitative statistical analysis, experimental design, project planning and execution, problem-solving and troubleshooting, data interpretation and visualization; pandas, seaborn, matplotlib

EDUCATION

University of Western Ontario **Sept. 2022 – Dec. 2024**
Master of Science (M.Sc.) - Cognitive, Developmental and Brain Sciences London, ON, Canada

- Thesis title: "*Machine Learning for Prognosis of Acute Brain-Injured Patients in the ICU Using EEG Complexity Analysis and Naturalistic Narrative Stimuli*"
- Supervisors: Dr. Adrian Owen & Dr. Derek Debicki

King's University College **Sept. 2018 – Apr. 2022**
Bachelor of Arts (B.A.) - Honours Specialization in Psychology London, ON, Canada

- Thesis title: "*Cortical Function of Super Refractory Status Epilepticus: An fMRI Case Study*"
- Supervisor: Dr. Loretta Norton

PROJECTS

MRI Image Segmentation of Mouse Bladders | Link | *TensorFlow, Pytorch, Keras* **Dec. 2023 – Jan. 2024**

- Automated MRI image segmentation for bladder volume analysis in mouse cancer models. Achieved high accuracy and dramatic improvements to efficiency, reducing manual processing time from months to minutes.
- Developed a custom U-Net convolutional neural network model; coded a multi-step encoder-decoder architecture and applied image augmentation to improve model robustness.
- Model used to assess cancer progression in preclinical studies reliably.

EEG Complexity for Prognosis of ICU Patients | Link | *Python, sklearn, feature engineering* **Oct. 2022 – Aug. 2024**

- Predicted future clinical outcomes of brain-injured coma patients with 80% accuracy (AUC = 0.80–0.83). Trained classification models using features extracted from patient EEG brain signals by optimal complexity algorithms.

HRF of ICU Patients with Simultaneous EEG-fNIRS | Link | *TensorFlow, Optimization* **Sep. 2022 – Oct. 2022**

- Awarded a Provincial Scholarship for this project, which proposes the simultaneous integration of fNIRS and EEG to enhance the sensitivity of detecting brain activity in ICU patients. This method considers crucial underlying physiological mechanisms by estimating a patient's hemodynamic response function (HRF, with the calculation involving a gradient descent-based search algorithm that maximizes the correlation of fNIRS-EEG).

ADDITIONAL EXPERIENCE

Clinical Researcher – LHSC/Center for Brain & Mind, London, ON, Canada **Sept. 2022 – Dec. 2024**

- Collected EEG, fNIRS, and fMRI data from ICU patients to investigate neural activity in critical care settings.
- Implemented end-end machine learning pipeline on neuroimaging data to improve prognostic capabilities.

Teaching Assistant – University of Western Ontario, London, ON, Canada **Sept. 2022 – May. 2024**

- Independently led tutorials for courses such as Research Methods 2801, where I instructed students to work with data, conduct and test hypotheses, and visualize and interpret data effectively.

Data Analyst – The Owen Lab, London, ON, Canada **Oct. 2021 – Aug. 2022**

- Preprocessed and analyzed large datasets, applying advanced techniques for noise reduction, artifact removal, signal enhancement, statistical testing, data visualization, feature extraction, dimensionality reduction, etc.

Advanced Repair Agent – Best Buy, London, ON, Canada **Oct. 2020 – Dec. 2021**

- Document, troubleshoot, diagnose, problem-solve, and fix issues with client computers. Maintained detailed records of procedures and transactions. Trained users in the proper use of hardware and/or software.

Team Lead – Kognitive Sales Solutions, Windsor, ON, Canada **Mar. 2018 – Jan. 2020**

- Led a high-performing sales team during promotional events, driving product visibility and customer engagement.
- Initially hired as a Field Marketing Representative, exceeded sales targets, and was promoted to Team Lead.