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Hassan Al-Hayawi

ON, Canada

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

SKILLS

- **Neuroimaging Data (*Collection, Formatting, Preprocessing, & Advanced Analysis*):** MRI, fMRI, fNIRS, & EEG
- **Programming/Coding:** Linux, Python, PySpark, SQL, SPSS, R, MATLAB, HTML & CSS, BASH, & VSCode
- **Machine Learning:** TensorFlow, Keras, Scikit-learn, PyTorch, supervised/unsupervised learning, convolutional neural networks, feature engineering, model optimization, Google Cloud Platform (GCP), & MLOps with Azure
- **Research Methodology:** quantitative & qualitative statistical analysis, project planning and execution, problem-solving and troubleshooting, & data manipulation, 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 (cGPA: 4.0) 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 (cGPA: 3.7) London, ON, Canada

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

PROJECTS

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

- Automated Segmentation: Developed a highly efficient pipeline for measuring mouse bladder and kidney volume from MRI images, cutting manual processing time from months to minutes while maintaining high accuracy.
- Deep Learning Model Development: Built a custom U-Net convolutional neural network with a multi-step encoder-decoder architecture, and applied image augmentation to enhance model robustness.
- Cancer Research Impact: Enabled faster, more reliable assessment of cancer growth in preclinical studies.

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

- Prognostic Modelling: Used features extracted from EEG brain signals and complexity algorithms to train classification models that predicted clinical outcomes of ICU coma patients with 80% accuracy.

Simultaneous fNIRS-EEG for Estimating Patient HRF | Link | *TensorFlow, Optimization* **Sep. 2022 – Oct. 2022**

- Innovative Brain Signal Detection: Awarded a Provincial Scholarship for proposing a method that simultaneously integrates EEG and fNIRS data to improve sensitivity in detecting brain activity in ICU patients. This approach considers crucial underlying physiological mechanisms by estimating a patient's hemodynamic response function (HRF) using a gradient descent-based search algorithm that optimizes the correlation between fNIRS and EEG data.

ADDITIONAL EXPERIENCE

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

- Collected, organized, and analyzed EEG, fNIRS, and fMRI data to study neural activity in critical care settings.
- Developed and implemented an end-to-end ML pipeline for neuroimaging data to improve prognostic accuracy.

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

- Independently led tutorials for courses such as Research Methods 2801, instructing 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, and dimensionality reduction.

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

- Diagnosed and resolved client computer issues, maintained detailed records, and trained customers on hardware/software usage.

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

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