halhaya@uwo.ca
519-982-7062

Hassan Al-Hayawi

Ontario, Canada
Links: Portfolio Website | LinkedIn | GitHub | Medium page

SKILLS

- **Neuroimaging Expertise:** MRI, fMRI, fNIRS, & EEG
- **Programming:** Python, SQL, R, Matlab, HTML & CSS
- **Machine learning**: TensorFlow, Keras, Scikit-learn, PyTorch, CNN, ANN, LLM, (un)supervised classification, Google Cloud Platform (GCP), & MLOps Azure
- **Research methodology**: Quantitative and qualitative statistics, experimental design, data manipulation, interpretation, and visualization (pandas, numpy, seaborn, matplotlib)

EDUCATION

University of Western Ontario **Sept. 2022 – Aug 2024**
Master of Science (M.Sc.) - Cognitive, Developmental and Brain Sciences (cGPA: 4.0) London, ON, Canada

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

EXPERIENCE

Research Technical Assistant – M31 AI, Toronto, ON, Canada **Sept. 2025 – Present**

- Designed and executed large-scale GPU-accelerated experiments on HPC infrastructure.
- Development of medical imaging ML workflows and deep learning architectures for 3D MRI analysis.
- Predicting AVM recurrence in pediatric patients as part of a collaboration with the SickKids Hospital.

Machine Learning Research Assistant – The Haeryfar Lab, London, ON, Canada **May 2025 – Sept. 2025**

- Enabled faster, more reliable assessment of cancer growth in preclinical studies by automating histopathological evaluation of liver tissue. Replaced labor-intensive manual scoring with a deep learning computer vision model.
- Leveraged pretrained models and enhanced training protocols for robust automated patch-based classification.

Research Analyst – LHSC / London Health Sciences Centre, London, ON, Canada **Sept. 2022 – Dec. 2024**

- Collected, organized, & analyzed complex neuroimaging datasets to create predictive models from acquired data.
- Developed and implemented end-to-end ML pipelines, optimized to improve data-driven insights in the ICU.

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

- Preprocessed & analyzed large high-dimensional datasets with advanced techniques for noise reduction, artifact removal, signal enhancement, statistical testing, optimization algorithms, feature extraction, & data visualization.
- Utilized PCA for dimensionality reduction & ICA to eliminate artifacts & isolate meaningful patterns in the data.

PROJECTS

CNN for Binary Image Classification (Computer Vision) | Link | *PyTorch, Transfer Learning* **Dec. 2024 – Mar. 2025**

- Model: Developed a model to automatically classify X-rays images of pneumonia-affected lungs, distinguishing them from normal lungs. Achieved 81% accuracy and an F1 score of 83.8%.
- Workflow: Fine-tuned a pre-trained CNN in PyTorch through data manipulation and transfer learning techniques for better classification while minimizing computational resource usag.

Automated Image Segmentation (Computer Vision) | Link | *TensorFlow*, *Keras* **Dec. 2023 – Jan. 2024**

- Built a custom U-Net convolutional neural network with a multi-step encoder-decoder architecture.

Machine Learning to Predict Coma Patient Outcomes | Link | *sklearn, feature engineering* **Oct. 2022 – Aug. 2024**

- Prognostic Modelling: Complexity algorithms were used to extract features from EEG brain signal data. Features subsequently used to train classification models that predict clinical outcomes of coma patients with 80% accuracy.

Improving Analysis & Interpretation of Neuroimaging Data | Link | *TensorFlow, Optimization* **Sep. 2022 – Oct. 2023**

- 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.