Project Title: Explainable AI for Health Risk Prediction

Project Description: This project applies machine learning models designed for structured/tabular data to identify and interpret risk factors for mental health using nationally-representative health datasets. We will use models such as XGBoost, Explainable Boosting Machines (EBMs), and Neural Additive Models (NAMs) to balance predictive accuracy and interpretability, with a focus on understanding the complex relationships between demographic, social, and behavioral variables and key health outcomes, including chronic disease (e.g., mental health, obesity, diabetes, cancer, Alzheimer's) and infectious disease (e.g., influenza, dengue, COVID-19, malaria, TB). The goal is to produce interpretable models that can inform evidence-based policy and personalized interventions.

The ideal candidate is a student with experience in Python, strong understanding of supervised learning for tabular data, and familiarity with explainable AI (e.g., SHAP, LIME, global surrogate models). Interest in health equity and social determinants of health is a plus, but is not required.

Supervisor: Prof. Ethan Fosse

Application: Please submit your CV, unofficial transcript, and a single paragraph describing your interest in the project in an email to Prof. Ethan Fosse (ethan.fosse@utoronto.ca) and Prof. Nicholas Spence (nicholas.spence@utoronto.ca).

Start Date: Fall 2025

Research Area: Data Science, Machine Learning, Artificial Intelligence, Health, Human Factors