Project Title:

Human-Centered Data Science in Healthcare and Medical Research

Supervisor: Prof. Mark Chignell

Application: Please submit CV, unofficial transcript, and a single paragraph describing your interest in the project in one file in a single email to Prof. Mark Chignell at chignel@mie.utoronto.ca and Dr. Lu Wang at wanglu.wang@mail.utoronto.ca. We will decide the acceptance based on your interest and completion in doing a small real data work within our projects instead of your interview performance.

Project Description: Healthcare systems are changing in the era of big data. Advances of artificial intelligence (AI) in healthcare make it possible for healthcare providers to sift through tremendous amounts of information efficiently, which eventually help them take care of their patients better. There are various types of health information ranging from medical literature to pathology reports. Albeit the last few years have witnessed an explosive increase of healthcare data in terms of volume, variety and veracity, it is insufficient to build a robust prediction model in various scenarios due to time, geographical and domain inherent constraints. How to develop and apply Machine Learning (ML) methods that can efficiently utilize Electronic Health/Medical Records (EHRs/EMRs) is significant to facilitate decision making of physicians in their clinical practice.

In addition to ML methods, inspired by the motivation of human-in-the-loop, Human-Centered AI (HCAI) for Data Driven Decision Making (D3M) addressing healthcare/medicine problems attracts more attention to improve the situation awareness and the quality of decisions. More specifically, interactive Machine Learning (iML) improves the ML *prediction* by looping human experts in the learning process and integrating human expertise. From another perspective, eXplainable Artificial Intelligence (XAI) and trustworthy AI in healthcare systems not only improve the uptake of ML model but also increase physician *trust* in ML prediction for clinical decision making.

In this project, you will have opportunities working with the real healthcare and medical data including EHRs/EMRs for multiple cognitive disorders and chronic diseases collaborating with physicians, clinicians and psychiatrists, etc.

Start date: Summer/Fall 2023

Research area: Data science, machine learning, artificial intelligence, healthcare, medical research.