Problem Statement and Goals

Team 13
Software Architecture for Natural Language Processing/AI applied to Mental Health

Michael Breau,
Matthew Curtis,
Benjamin Chinnery,
Jessica Dawson,
Yaruo Tian

March 27, 2024

Table 1: Revision History

Date	Developer(s)	Change
September 24, 2023	Benjamin Chinnery, Yaruo Tian	Initial Release
March 27, 2024	Jessica Dawson	Initial rework for Rev 1

1 Problem Statement

1.1 Problem

As society grows to become more conscious of the ever-growing issues surrounding mental health, the demand for support services only increases, especially in a post pandemic world, where more and more people are no longer satisfied with just having a higher visibility on their own mental health issues, they wish to actively work on themselves using support services. Unfortunately, many Canadians find themselves in remote communities where they are unable to receive the support they require. Many of these people turn to the internet as a way to express their struggles and find support.

This online activity represents an untapped body of information that could be used to assist in diagnosing and identifying mental health conditions quicker, helping mental health professionals work more efficiently and assist more people. Natural language processing (NLP), a branch of machine learning, can be used

to analyze this online activity and make predictions relating to a mental health diagnosis. However research and development of tools in this area is lacking and more work is required. This capstone project will focus on developing tools and furthering research in this area to assist psychologists.

1.2 Inputs and Outputs

The system built in this capstone project will take the posts written by a person in online forums and provide predictions relating to various mental health diagnoses the person may have. These predictions will be of a form that can assist mental health professionals in reaching an accurate diagnosis quickly.

1.3 Stakeholders

The primary stakeholders for this project are psychiatrists and other researchers in this space. The tools we build have the potentially to directly benefit psychiatrists who will be able to work more efficiently. The techniques and approaches we try also directly impacts researchers in this space who may build upon or reference our work in the future.

Secondary stakeholders are people searching for a mental health diagnosis. More efficient and effective mental health professionals means more patients seen and less time bouncing around diagnoses trying to find the correct one.

Tertiary stakeholders include government and professional organizations dedicated to privacy concerns and patient confidentiality. A system in this space has to conform to various regulations and rules to not breach the privacy of patients.

1.4 Environment

1.4.1 Hardware

- The systems will be supported on desktops and laptops with connections to the servers that CLEF eRisk 2023 provides to us.

1.4.2 Software

- The system will be supported on Windows and macOS.

2 Goals

2.1 Ease of Setup

The system should not be difficult to set up and get running.

2.2 Accuracy

The system should outperform prior research and/or certain baselines in at least one area. The exact details of these areas, prior research, baselines, and what it means to outperform will depend on the specific diagnosis task the system is performing and will be expanded on more in the project's SRS (Breau et al., 2023).

2.3 Safety of Data

The product should never leak personal data of any user being analyzed.

3 Stretch Goals

3.1 Improved Accuracy

The system should outperform prior research and/or certain baselines in more than one area. Again see the SRS (Breau et al., 2023) for more details.

3.2 Support for public usage

The product could have an user interface that allows general public could enter their own inputs and able to generate an accurate result.

References

Michael Breau, Matthew Curtis, Benjamin Chinnery, Jessica Dawson, and Yaruo Tian. Cognitive care crew system requirements specification, 2023. URL https://github.com/MichaelBreau/nlp-mentalhealth/blob/main/docs/SRS-Meyer/index.pdf.