Project Proposal - Digital Counselling

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1 Introduction and Problem Statement

In recent years, the use of digital technology has transformed the field of mental health care. One area in which this technology has been particularly useful is in the development of digital counselling chatbots. These chatbots are designed to provide support and guidance to people experiencing mental health issues by engaging in conversation with them. As the world becomes increasingly digital, it is important to explore how technology can be used to help those in need of mental health support. Mental health issues are a growing concern worldwide, and the demand for mental health services is increasing. However, many people are hesitant to seek help due to stigma, lack of access to services, or concerns about the cost of care. In addition, mental health professionals may not always be available when people need support.

Digital counselling chatbots have the potential to address some of these challenges by providing accessible and affordable mental health support to a wide range of people. This project aims to develop a digital counselling chatbot that is designed to offer support and guidance to people experiencing mental health issues. The chatbot will be designed to provide a safe and confidential space for users to discuss their concerns and receive practical advice and information.

2 Background

Mental health issues are a major concern worldwide. These disorders can have a significant impact on a person's quality of life and can also affect their ability to work, socialize, and carry out daily activities. While mental health services are available in many countries, there are still significant barriers to accessing these services, including stigma, lack of availability, and high costs.

The use of digital technology in mental health care has been shown to have a positive impact on outcomes, and there is a growing body of evidence to support the use of digital interventions in mental health care. Chatbots are computer programs that are designed to simulate conversation with human users, and they can be programmed to provide support and guidance to people experiencing mental health issues. In particular, digital counselling chatbots have been shown to be effective in providing support and guidance to people experiencing mental health issues. They offer a potential solution to these challenges by providing accessible and affordable mental health support. These chatbots are available 24/7 and can be accessed from anywhere with an internet connection, making them a convenient and accessible option for people in need of support.

3 Related Works

[1]The promise of machine learning in predicting treatment outcomes in psychiatry: They reviewed key studies using machine learning to predict treatment outcomes in psychiatry, ranging from medications and psychotherapies to digital interventions and neurobiological treatments.

[2]Towards a chatbot for digital counselling: This paper proposes the design of a chatbot for mental health counseling. A demo chatbot has been developed to facilitate an interactive user journey when accessing a self-help library, using emojis to convey emotions and moods on existing platforms like Messenger.

[3]A Chatbot for Psychiatric Counseling in Mental Healthcare Service Based on Emotional Dialogue Analysis and Sentence Generation: This paper discusses using AI-based emotion recognition and natural language processing methods to provide personalized counseling services through a chatbot which uses multi-modal methods, including text, voice, and visual expression, and collects additional user information like facial expression, age, sex, and bio-signals to improve the accuracy of emotional recognition. The chatbot also uses methods for analyzing spatial-temporal context and user inputs for appropriate responses while tracking persistent emotional changes.

[4]Assessing the Usability of a Chatbot for Mental Health Care: The paper assesses the usability of a chatbot designed to provide mental health support and counseling based on a conversational model. The study involved 20 participants who used the chatbot for a 30-minute session, with generally positive feedback but some identified usability issues. The paper concludes that chatbots can improve mental health care but highlights the need to design them to be user-friendly and responsive to user needs, and for

further research to address the usability issues identified.

[5]A Mental Health Chatbot for Regulating Emotions(SERMO) - Concept and Usability Test The paper talks about SERMO, a chatbot with integrated CBT interventions in German enabling unrestricted natural language user input. It differs from the available systems by integrating natural language processing (NLP) and emotion analysis methods in order to automatically determine emotions from the user input.

4 Objectives and Goals

Our idea is to develop a digital counseling chatbot that utilizes a combination of NLP algorithms, Machine Learning (ML) techniques, and personalized counseling sessions. The chatbot will use NLP algorithms to understand the user's queries and sentiments, and ML techniques to develop a personalized counseling session for the user. Additionally, the chatbot will be able to provide immediate support to individuals in crisis by guiding them towards appropriate resources. Our problem consists of two main tasks: classification of user input into emotion labels and generating a response according to classification. We aim to analyze different techniques for both tasks and to provide a solution with the best accuracy and best outcome. Also, we aim to target the teenage group.

5 Techniques/Algorithms

We will use NLP algorithms such as sentiment analysis, intent recognition, and entity recognition, and ML techniques such as decision trees, neural networks, and support vector machines. These algorithms will help us un- derstand the user's query and sentiments and provide personalized counseling sessions. Additionally, we will develop a recommendation system that sug- gests appropriate resources to individuals in crisis.

6 Evaluation and Metrics

We have two tasks to do: Classification: classify the mood of the user into various different emotion classes like anger, joy, sadness, disgust, surprise, etc. To evaluate this part we plan to use intrinsic evaluation metrics like accuracy, precision, recall, F1 score, etc. Generation: generating the replies to the user chatting with our chatbot. To evaluate this we plan to carry out surveys with the users who will be asked certain questions like whether the chatbot helped them? will they use the chatbot again? etc.

7 Citations and Bibliographies

[1] https://onlinelibrary.wiley.com/doi/full/10.1002/wps.20882

[2] https://www.scienceopen.com/hosted-document?doi=10.14236/ewic/HCI2017.24

[3] https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7962482

[4] https://link.springer.com/chapter/10.1007/978-3-030-17705-8_11

[5] https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9000924

8 Potential Contributions

Dux Pal Singh, Anishka: Data collection, preprocessing of data, identification of different models to be tested, final evaluation
Manav Saini, Navidha Jain: Implementation of different models for classification task and choosing the best one, Improving baseline scores
Ashwin Tomar, Tanishqa Shital Singh: Implementation of different models for response generation and choosing the best one, Improving baseline scores
Report writing: All members