A Review of 'Moodshift: An App for Depression'

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Abstract: Chatbots were introduced to mimic human behavior. This concept can be applied to mental healthcare apps wherein the users anticipate they are talking to a mental health professional. Voice-based chatbot makes it casual, intuitive, and direct. Interaction with the chatbot happens through natural language whereas its evaluation happens through natural language processing and natural language generation. A machine learning algorithm for depression detection is implemented to give accurate results and classify them into ranges according to the severity

Index Terms— Chatbot, depression detection, machine learning algorithm, mental healthcare, natural language generation, natural language processing, voice-based chatbot

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1 INTRODUCTION

According to the international Journal of Psychiatry, 13.5% of children between 0-14 years suffer from some sort of clinical depression. The idea is to propose a system that will provide constant companionship and make people feel cared about. Since professional therapy may not be accessible or affordable, the goal is to provide an alternative. Chatbot is often described as a conversational agent by interacting between users and machines. The purpose of a chatbot is simple, to intake the input from the user, interpret and send a response appropriately. Another means of being a bridge between humans and machine is a speech-to-speech system. It provides a humanly touch by analysing sentiments based on the conversation. To predict the severity of depression, the questionnaire helps by analysing the answers and gives a suitable output. Additionally, the system also provides calming methods to deal with anxiety.

2 MOTIVATION

The main objective of this application is to provide an accessible and free help to those who have doubts regarding their mental health. To help people lighten their mood it provides comfort, companionship and jokes. It also suggests professional help to the user based on the severity if necessary.

3 SCOPE

The scope is to maintain a personalized diary to track how you felt a particular day and maintaining history which will keep track of user's progress. Professional help is also made available 24x7. Training depression detection model over a large dataset, we will have to use an unsupervised learning algorithm. We can add voice modulation analysis and combine the results from sentiment analysis which will result in higher accuracy. Emotional intelligence can be achieved by continuously training the model.

4 LITERATURE SURVEY

[1] puts forward an application integrated with chatbot which responds to the user in understandable and conversational language. It detects emotions and recognizes them. Author also talks about an application Woebot after which the students, after using, show the symptoms of depression overtime. Author also proposes a system for developing a CBT bot not only for depression but for anxiety, panic disorders, bipolar disorders. In this paper, author states, "How can detected emotions be used to support a user in regulating his or her emotions."

[2] focuses on finding sentiment diffusion pattern from different sentiment polarities rather than just analysing the text which gives an improvement of about 5.06% to 8.38%. In this method all tweets and retweets were assigned a polarity value like for a positive tweet, the value was a positive integer whereas for a negative tweet the value was a negative integer. For a neutral tweet, the value was zero. This was further used to analyse what kind of statements lead to a sentiment reversal.

[5] talks about a system, that provides a questionnaire and also gathers data from a social networking site and converts the textual data into input data which is analysed using machine learning SVM approach. Deep Neural Netword is used for feature extraction and a deep integrated support vector machine (DISVM) classifies the input data and realizes the recognition of depression which makes the system better by making the algorithm more stable and also increases accuracy.

[6] proposes a system that is about developing and understanding virtual therapy. Building an application for which every user will have its own personal therapist. It attempts to offer extreme privacy between the bot and the user. The bot would also be able to detect the depression level which is divided into five levels ranging from 0-4. Depending upon these levels, therapy level is suggested. It talks about features of the chatbot for it to become more human-like, displaying jokes, searching the web, storing data and carrying data analysis, suggesting appropriate solution to patients.

[7] says that this system converts textual data into input data which was analyzed using convolutional neural network (CNN). Apart from this, it also analyzes other features like community in social network based on what pages you follow, the posts you like, etc.

5 ADVANTAGES

The application can be used as per the user's convience. It can

be accessed from remote areas and comes handy when there are no means of professional help. It maintains user application privileges by keeping information anonymous. It prompts the user to seek professional help when it cannot interpret the results. The application is free of cost and does not burden the finances of the user.

6 LIMITATIONS

Limited professional engagement may not provide beneficial and accurate results. Insufficient experimental suggestions can be a drawback of this application. It might not be able to give the feel of a real-life experience.

7 HARDWARE AND SOFTWARE REQUIREMENTS

Software requirements:
1. Android studio 4.0
2. TensorFlow 2.0
3. Windows 10
4. Python 3.8

Hardware requirements:
1. 8th gen Intel Core i7 processor

8 SYSTEM ARCHITECTURE

Register and Login: To maintain user's data and keep a log of everything. The user can log in using their valid email id and password.

Chatbot: It communicates with the user by providing a humanly interaction. A voice-based chatbot is also provided to interact with the bot back and forth. It analyses the chat and depending accordingly predicts sentiments.

Depression Detection: Depending upon the results obtained from the questionnaire, the model predicts the probability of depression.

Calming methods:

To calm a person down, meditation techniques are introduced.
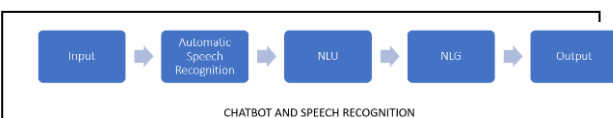
9 SYSTEM ARCHITECTURE

Fig. 1. Chatbot and speech recognition.

The input is given to the chatbot using text or speech. Automatic speech recognition converts speech to text. The NLP components Natural Language Understanding which helps the machine to understand and analyze human language through keywords, emotions transforms the speech, and Natural Language Generation (NLG) that acts as a translator and converts the computerized data into natural language representation. The output can be given through speech or text based on users' preference.
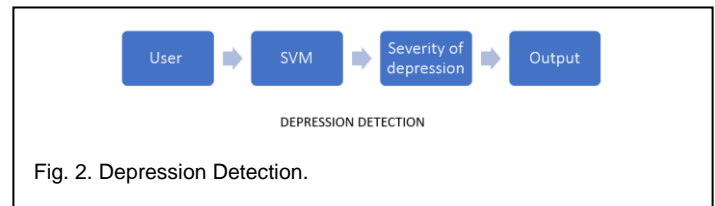

Fig. 2. Depression Detection.

The input is taken from the user when they answer the questionnaire. This is given to the Support Vector Machine or SVM which is primarily used for Classification of data. The goal of the SVM algorithm is to create the decision boundary that can segregate n-dimensional space into classes so that we can easily put the new data point in the correct category and according to these categories, the severity of depression is predicted.

10 SYSTEM ARCHITECTURE

In an age of growing competition, many college students suffering with depression is also progressing. The idea behind developing this system was to combine different aspects and features which can help someone suffering not only from depression, but also other mental health conditions like anxiety, panic disorders etc. Further more the system has been enhanced by including various features from different applications into one unit. The positive outcome expected is to make people aware of the effect of help for their mental fitness, as well as make them open to idea of approaching professional help with ease.

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