

A Chatbot System For Mental Health Care

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Abstract

An artificial intelligence (AI) enabled feature which behaves similar as a human conversational partner, a Chatbot is a programme that uses natural language processing (NLP) and Machine learning (ML) techniques to analyse and understand the user's query and provide with intelligent responses that are human-like. Conversational agents that act as an intermediate between the user and the computer. The chatbot therapist is designed to provide relief to people suffering from mental illness (anxiety, depression or stress) with daily conversations and motivating them for better mental health using the cognitive behavioural therapy (CBT) method. CBT works by changing the thinking pattern and behaviour of people by working on their imagination, belief and attitude. These therapies are mostly free of cost and available anytime. People open up more in an online chat rather than a face to face conversation. Some of the conversational agents like Flow, Wysa, Woebot, joy and Talkspace are made available for the public sector. There is a need for the mechanism of using chatbots to make people understand about the options the technology is providing with and to maintain user motivation regularly.

Keywords: Chatbot ; CBT ; Human-computer interaction ; Mental health ; therapy ;

1. Introduction

In recent researches, according to the World Health Organization, there are around 264 million people who suffer from depression and in the worst-case scenario, it tends to suicide. Many cases of stress and anxiety are among the people aged between 15 - 29 years and the source of depression can be diverse among these age groups. The number of people suffering from mental illness is immense but the issue is, many of them consider to be a phase and continue to be stressed without knowing how it affects their brain cells. Stress release is something that should be practiced by every individual. Another issue is about 76-85% of people in the low-middle income countries don't have proper resources or lack trained health care providers. The national health services struggle to keep up with the growing need of resources. While developed countries have 9 mental health providers out of 100,000 people and low-income countries have as little as 0.1 for every

100,000 people. Chatbots could be a real-time saviour for such people and the only requirement is network connectivity and you have your bot therapist ready. One of the greatest advantages of the internet is that it shares all its information and provides services to all users. Likewise, chatbot could address short comings of mental health professional in any area.

Even when people have access to health assistance but may delay using the service for many reasons such as thinking that their feelings are not enough to visit a psychiatrist or afraid of the judgment of people around them. Chatbots are always available which will benefit humans as they will not have to wait for an appointment. These tools are not for replacing human health practitioners, but they are helping them to do their jobs better. Chatbots are user friendly and have an interactive platform. There are even non-depressed people who genuinely have a bad

day and require motivation to boost their energy. Such individuals can also make use of the chatbot therapist and have a clear idea about their thoughts. Students in need of mental help face a lot of trouble regarding money, location, availability, etc. Studies have proven that the chatbot therapist is a more efficient and cost-effective method of treating depression.

Therefore, we have these self-mental healthcare techniques using chatbot for stress reduction and user motivation. The therapist chatbot is the advanced method for therapy. It contains different modules that perform together to make a chatbot functional. The inputs are provided to the chatbot based on which it identifies the level of stress according to which it gives a response to the user by providing constructive thoughts and offers self-help techniques. Using NLP (Natural language processing), the program detects how the user is feeling and then the system shows the content based on his current mood. In this study we have conducted an analysis about the conversational agents (chatbot) that are available and the cognitive behavioural method used in chatbot.

2. Related Study

Many articles and papers have been made that suggest using a chatbot for efficient therapy. The different conversational agents currently available in the field of psychiatry and their role in treating, analysing and diagnosis of mental illness. According to a study by the World Health Organization, 29% of the 15,000 mental health apps focus on mental health. Chatbots are viable as well as an effective method of getting mental help via your device or some may call it “reducing barriers to therapy”. The most obvious thing about these bots a convenience, you can reach out to these clever bots and get help at any point in time. According to G Cameron mental health contribute to 28% of the total disease in the world compared to the other diseases. He says the gap between the number of people suffering from mental illness and the number of resources the National health services (NHS) can provide is likely to widen in the coming years so providers are looking for effective ways to deliver mental healthcare. So, digital interventions are created to help with these

issues. Chatbots have the most interactive user interface that uses emojis and GIFs to increase user experience when they search for self-help. It is predicted that chatbot would provide initial counselling by giving them the right direction and correct information.

In an article by Cara Curtis mentions that a bot that helps people with depression could be the future of therapy. Multiple studies prove that technology is dedicated to people’s mental wellbeing. Technology is surely taking keen interest to help people struggling with mental health. One such project is the “flow” app developed by the Flow Neuroscience. The chatbot helps those struggling with their mental health as they wait for their turn to be seen by a psychiatrist. The app was created by the team of clinical psychologists and some machine learning experts and it's based on the latest neuroscience techniques and psychology. The app is free and is currently available on iOS and soon will be launched in android. The digital therapist directs the users through 18 sessions on how and why sleep, exercise and nutrition are the three main pillars in recovery from mental illness like depression, stress and anxiety while tracking the mood data and offering personalized therapy based on behavior. It engages users with daily chat to present them self-help techniques, mood tracking, meditation-videos and exercises. The Co-Founder of Flow Daniel Mansson said in a press release said people feel anxious to talk about their condition to other people but flow there is no fear of being judged by anybody. While there are many apps out to help you to understand mindfulness. However, according to flow’s findings, 24 percent of its users have completely overcome their depression while 41 percent felt their conditions have improved after 6 weeks of brain stimulation treatments.

One of the main challenges is to design a domain-specific conversational interface experience. The chatbot user interface is a bit complicated because with conversation comes expectation and to meet these expectations the design patterns need to be personalized to fit in different domains. To achieve customer satisfaction, it is important to look into the design aspects of the product. The Stanford study

reveals that chatbots do relieve depression and anxiety in students to level up their moods. Bots mimic the basic therapy technique and chatting with them surely elevates the mood of individuals. Woebot, the invention of Alison Darcy is an instructor at the Stanford school of medicine, uses cognitive behavioral therapy CBT techniques to help the people identify the symptoms of anxiety and depression and to manage it. The changing patterns of distorted negative thinking give an idea about the thoughts of individuals. The bot is not a replacement for a skilled human therapist – even Woebot makes that clear. But a chatbot can be an alternative tool that is available 24/7 for chats, from wherever the client is or whosoever is the person, with the guarantee of confidentiality from its makers. There are no queues and appointments required. Self-talk is a human tendency. The kind of thoughts that we have replicates to our behavior. The advantage of being a non-human people will not be afraid of burdening the Woebot any time, they know there is nobody really behind it and they feel ok to share becoming a bit more candid and open.

3. CBT Method

Cognitive behavioral therapy helps to replace all the negative and unhelpful thoughts, behavior and feelings with positivity. Certain similar facts have been recognized in various philosophical traditions particularly in stoicism the stoic philosopher Epictetus believed that logic could be used to identify and discard false beliefs that lead to destructive emotions. This contributed to the way modern CBT techniques identify cognitive distortions that contribute to depression and anxiety. CBT was introduced by Aaron Beck in cognitive therapy which was later developed into CBT and Albert Ellis who invented rational emotive behavior therapy (EBT) and came up with the ABC method. He says people assume that it's the situation, surrounding or person that makes us feel a certain way. For example - if we are upset, angry or sad we tend to blame others for making us feel this way. However, the fact is – no one will be able to make you feel inferior, without your permission. To illustrate this, ABC model was developed. A (antecedent) means the situation that leads to the response, B (beliefs) means our interpretation of the situation and C (consequences) is

the way we react or behave. Cognitive behavioral therapy includes the ABC model. So, the goal of CBT is to help people respond appropriately and not to replace any emotions or feelings. Now thinking of what exactly occurs in CBT, the therapist would basically work on your thoughts, feelings and behavior and the different ways they intersect. It would look at how your thoughts would be contributing to difficult emotions and so are your thoughts helping to sustain a level of anger or sadness or fears or are their ways that maybe you can think about situations or people or yourself from a different perspective in order to feel better.

CBT is strongly encouraged counselling therapy because it's an effective and evidence-based way of dealing with a variety of problems and issues. If you are working with a CBT therapist you will realize that the work is very collaborative and it's really a team approach to examining the issues you struggle with. The other thing that people may have a little bit of trouble accepting or getting used to it with CBT therapy is you will get homework. It's just like back in school but a good CBT therapist will be assigning you some kind of homework assignment or action item to complete between sessions. The reason for this is to really help you practice the skills and strategies that you are learning in a session out of session and you will find that you progress faster in your therapy process if you do your homework assignments. CBT is a mixture of behavioral and cognitive psychology. The diagram shown below depicts how feelings, thoughts and behavior all influence each other.

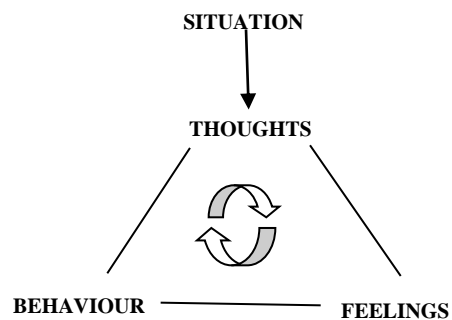


Figure 1: cognitive behavioral therapy mechanism

A few more things to know about cognitive behavioral therapy is that it's a more structured approach than other types of therapies and it involves

recognizing goals that you and the counsellor agree to work on together. The other key point is that in CBT the counsellor really welcomes and solicits feedback on how things are going so this goes back to the idea that it's a very collaborative approach and it's not the idea that the counsellor is having more knowledge than you but just that the counsellor has expertise in different areas that they can bring to bear and maybe give different ways of thinking about the problems.

4. Chatbot Applications

To have a look upon how chatbots measure up to in-person therapy here are some surveys on the different chatbot therapists developed by different institutions and labs.

4.1. Woebot

It's a fully automated therapist chatbot that is developed by the Woebot labs in San Francisco. It is a user-friendly device and it does a short survey to see what areas a person might want to focus on. It takes care of confidentiality and also reminds the user that it's not for replacing human support. A Woebot gives instructions on what to do if there is an emergency situation. It also has a sense of humor. Woebot uses cognitive behavioral therapy in which it identifies the mood of users with the support of emoji, identifies three thoughts related to that mood and makes users realise that these thoughts are distortions that can be replaced with helpful thoughts. Overtime it charts the emoji responses to make user visualize their responses. This makes the user understand why they should bother to check-in on a daily basis. The chat exchange is for 10 minutes, though you can stop chatting any time you wish.

4.2. Wysa

It's an AI and NLP based playful penguin that was launched in late October 2016, designed to track emotions and create awareness and make its client motivated. It operates on android and iPhone platforms. The chats are private and encrypted. If a user responds by saying that he has stress issues then based on his responses, Wysa would build a toolkit that contains a variety of exercises for better focus. These exercises are based on mindful meditation, which is an evidence-based approach to managing a

variety of psychological issues, especially stress and anxiety. It creates a weekly report of the performance of the individual over a week so that the person has a track of how he has been doing the entire week. Wysa can restructure thoughts as well as has CBT skills and it is user-friendly, attractive and easy to use. Also, if there is a suicidal thought then the bot would suggest having a talk with a psychiatrist.

4.3. Joyable

Joyable was developed by the powerhouse team of experts and scientists in the field of therapy. It is an online platform that supports users with a dedicated real-life coach and a two-month course in CBT. It has a seven-day free trial and then it would cost you \$99 per month. It performs a structured assessment of the eight-week program that helps users understand what to work on. The program contains mood tracking, 10 minutes of activities and one-on-one coaching. Each week a new themed course is unlocked, allowing a chance to tackle a new set of BT challenges. In addition to treating, the Joyable also provides a lot of information about why a person feels depressed or what happens to the brain when people get better (psychoeducation).

4.4. Talkspace

Provides online therapy with a licensed health practitioner at a significantly reduced rate. Once your case has been handed over, you are matched with a therapist in the form of photos and bios- a bit like a dating app, but for the therapist. It is similar to Joyable, it uses a variety of activity-based tools to improve a variety of areas like happiness, balance, compassion, productivity, and self-awareness. Users can also contact by leaving a text, video or audio message anytime. The tool is perfect for the people who are not comfortable speaking to a professional face to face. It is also convenient because you don't have to worry about making appointments with your therapist.

5. Discussion

Chatbots have had a great impact on various fields including the psychological sector. So, the idea is to help you recognize and monitor your mood using

natural language processing and expertise. It is clinically tested and has a positive success rate. Many of the cases with mild symptoms of depression noticed that the therapy was effective and it helped. Since the chatbot is not a replacement for mental health practitioners. For those who have severe mental issues, the chatbot can be taken as a warm-up session before the main sessions. The aim is to deploy it at a larger scale, the next step would probably be to incorporate advance computational and AI methods. This would play a crucial role in achieving a much efficient system that would enhance user engagement, a much-detailed content, providing a domain-specific therapy, etc. Applications that are involved in mental health disorders are new, but looking at the growing number of users and the rate of mental illness there is a need for using mental health apps. Overall, the potential of chatbot was reported to be high. Many of the studies proved that chatbot in field of psychiatry would be an effective and enjoyable tool in treatment.

6. Conclusion

We have seen now that bots like Woebot, Wysa, and Joy might have a great impact on providing help to people suffering from mental illness. Many people are still not educated about this technology of treating depression and how chatbots could be a real help. The chatbot is a great platform for anyone and is widely available anytime through an interface and internet access. The automated bot follows up the minimum standard it should meet- to respect user privacy, should be evidence-based and also ensure user's safety. Chatbots using CBT have certainly made things sorted by making their clients identify emotions, distinguishing between healthy and unhealthy feelings and how distorted thoughts contribute to painful feelings. The chatbot therapist is an amazing invention in the healthcare department. It will encourage users to discuss their problems and emotions with ease.

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