



Leveraging ChatGPT for Mental Health Support: Case Study using Text Analytics

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ABSTRACT

ChatGPT is a tool that has become exceedingly popular in various fields ever since the general public could access the platform in 2022. It is a chatbot powered by Artificial Intelligence and has been a disruptive innovation in the world of technology. As this technology tries to emulate human intelligence, there has been improvement in how much emotional intelligence ChatGPT displays. Thus, there is potential for ChatGPT to provide a supportive and interactive experience in mental health communities, ultimately contributing to suicide prevention efforts. ChatGPT's responses to online posts identified as a cry for help are analysed using Qualitative Analysis and Text Analytics. This novel approach suggests leveraging ChatGPT as a tool to enhance mental health and cultivate positive interactions with those seeking assistance online to enhance their mental health.

Keywords: mental health, emotional intelligence, ChatGPT, Qualitative Analysis, Text Analytics.

Introduction:

People seek support for their mental health on online platforms (Grohol et al., 2014). There is comprehensive information regarding mental health issues like depression, bipolar disorders, schizophrenia, eating disorders, anxiety, substance abuse, and others available on many online websites. The internet has become a dominant source of information that is easily accessible and is used for self-directed therapy that is received online. (Eysenbach et al., 2002) And often, information regarding health is written in a way that is readable to all. It was found that not a single website had content that was readable at a 6th-grade reading level. Common sources that were chosen for mental health information, like Wikipedia, had a significantly poor readability score. (McInnes & Haglund, 2011)

Mental health problems may affect many in a population. Seeking help is the first step in improving mental health and seeking mental well-being (Rickwood et al., 2005). Despite investing heavily in mental wellness and health reforms, many people who need therapy cannot access face-to-face sessions with a therapist. (Christensen & Hickie, 2010). Face-to-face communication with a therapist is expensive (Andrews et al., 2000). Furthermore, there is a negative perception attached to requesting assistance from a qualified expert (Barney et al., 2009). The Internet is a service that is widely used. Mental health platforms online can be anonymous and private. Thus, using the internet reduces the stigma associated with seeking help. (Stephens-Reicher et al., 2011)

ChatGPT, an AI, is gaining popularity as it performs natural language processing tasks like a human. ChatGPT is a language model that generates human-like responses to text inputs. Thus, people can communicate with ChatGPT and it'll give relevant responses. It is plausible that users seeking help will approach ChatGPT. When individuals interact with the AI platform seeking guidance or intervention, ChatGPT can possibly provide appropriate assistance.

The objective of this research is to analyze if ChatGPT is capable of recognizing emotions in posts regarding mental discomfort. And evaluating the effectiveness of its ChatGPT's responses to these texts as well.

Literature Review:

Health, including mental health, plays a role in the development of a country. The World Health Organization (WHO) defines mental health as the state of mental well-being in which an individual realizes their abilities, cope with life's stresses, work productively, and contribute to their community (WHO, 2021). Being mentally healthy is important for individuals to perform well personally and professionally. Additionally, they make positive contributions to society (Patel et al., 2018). Since societal health is important to a country, governments must prioritize mental health care for national development.

An article in the Indian newspaper, *The Economic Times*, stated that close to 60 to 70 million people in India suffer from mental disorders (2023). The report also specified that India is the world's suicide capital. There were over 2.6 lakh cases of suicide reported in a year. It also stated that the average suicide rate in India is 10.9 for every lakh people. Hence, there is a need to address the growing mental health crisis in the country. Additionally, it was reported that there are only 0.3 psychiatrists, 0.07 psychologists, and 0.07 social workers per 100,000 people in India. In comparison, developed countries have a ratio of 6.6 psychiatrists per 100,000 people. Thus, there is a shortage of mental health professionals. This poses a serious challenge in addressing mental health issues effectively.

There has been research done on Artificial Intelligence's (AI's) contribution to the field of mental health. Researchers are exploring how AI, such as chatbots, and machine learning (ML), can be used to improve mental healthcare. One application is assistance in diagnostics (Bzdok & Meyer-Lindenberg, 2018). By analysing data and behaviour, ML can help professionals make better and faster diagnoses of mental health disorders. Another use of AI in mental health is assistance in administrative tasks (Topol, n.d.). AI can help in clerical tasks such as scheduling appointments, keeping records, and billing. This will allow medical professionals focus on providing better care to their clients. Studies have also shown that AI-based gaming can enhance mental health by boosting social motivation and attention performance (Vajawat et al., 2021).

Gültekin and Şahin's research shows that AI can be used in various ways for therapy. (2024). One of the key roles identified is the "expert assistant" role, where AI applications support therapy and facilitate the work of mental health professionals. Participants in the study conducted said that AI can be used as a support for therapy, instead of being used alone. AI can also be objective in analyses of data, without the influence of emotional considerations, which can be valuable in treatment. Additionally, AI can offer extensive services, making mental health services available to diverse groups through easily accessible and inexpensive means. These findings suggest that AI has the potential to significantly enhance therapy by providing expert assistance, improving diagnostic accuracy, and increasing the accessibility of mental health services. Emotion analysis has proven to be an effective tool in facilitating interactions between humans and robots, as shown in Szabóová et al.'s research (2020). There is potential in utilization of automatic emotion detection in text received in human-robot interactions. Research has shown that AI platform, ChatGPT; exhibits emotional intelligence even while interacting with users. In a study conducted by Elyoseph et al. (2023), the Levels of Emotional Awareness Scale (LEAS) was used to determine whether ChatGPT possessed emotional awareness. This study also aimed to estimate the average emotional intelligence of human beings. The results of the study indicate that ChatGPT scored higher on the LEAS scale than French men and women after two evaluations.

Additionally, AI-powered platforms offer scalable and accessible mental health interventions, bridging the gap in mental health care access and providing support to a larger population. As the field continues to evolve, further research and development are needed to fully realize AI's potential in transforming mental health care.

Methodology:

In this study, web scraping was used to collect anonymous posts from Reddit's r/SuicideWatch subreddit, where individuals discuss mental health challenges, particularly thoughts of suicide. Reddit is a social media platform with numerous communities (subreddits) where users can share content and engage in discussions on a wide range of topics. The web scraping was done using R Software. By extracting geotagged posts specifically from the Indian region, our research aimed to investigate responses generated by ChatGPT when presented with content indicative of mental distress within this specific cultural context. This approach enabled a deeper understanding of how if individuals interacted and looked for support using ChatGPT concerning mental health within the Indian Online Community.

The data is further analyzed in R using qualitative analysis and text analytics.

Analysis:

Data Description:

175 posts, all authored by Indian users, have been collected from the r/SuicideWatch subreddit using web scraping techniques. The rationale behind selecting posts geotagged in India is to ensure cultural consistency and eliminate the effects of external factors. After removing irrelevant texts that were completely unrelated, the dataset was left with 169 posts by individuals.

Below is a sample of 10 texts posted by 10 different people collected from the subreddit. The rest of the text is not shown due to its sensitive nature.

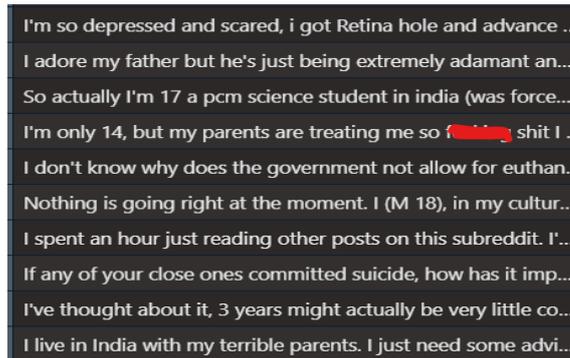


Figure 1. Sample of texts that were posted on Reddit by users

Upon viewing the initial portions of a sample of 10 posts on the platform, it is evident that a significant number of individuals are using this platform to vent their emotions and express their grievances. The rest of the posts have been masked due to the sensitive nature of the content. The discussion forum contained posts with details of ill-treatment, physical and mental health issues, financial struggles, sexual assault, abuse, depression, and other sensitive subjects that require privacy and anonymity for the users. Since people are openly discussing intimate details of their life on the platform, Reddit seems to provide a safe space for people to share their experiences and seek support from a community who may understand their struggles.

After entering each post into ChatGPT, the AI generated a response, which was recorded. The responses of ChatGPT to those 10 posts are displayed below:

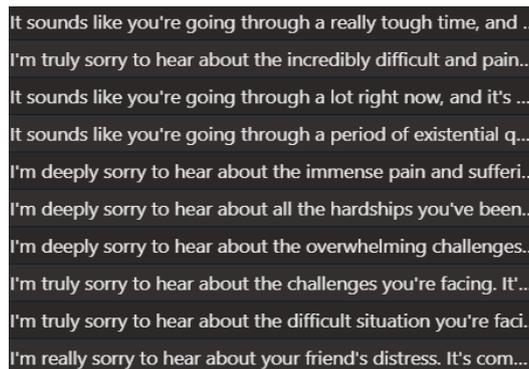


Figure 2. Sample of ChatGPT responses to the posts.

In all the responses, it is observed that ChatGPT has understood the theme of the conversation and responded to it. The process of analyzing the text data involved several steps. Firstly, the data was tokenized, which means it was divided into individual words or phrases. Then, further cleaning was done to refine the data. This includes removing stop words, which are words like “the” or “and”; that do not carry much meaning. Additionally, all text was changed to lowercase to avoid any discrepancies due to capitalization. Thus, the text data was effectively prepared for analysis.

Sr. No.	tokens	n	Sr. No.	tokens	n
1	just	444	16	people	195
2	like	426	17	going	180
3	life	327	18	go	179
4	get	301	19	dad	173
5	even	290	20	can	172
6	now	265	21	good	163
7	time	255	22	really	161
8	know	254	23	back	158
9	one	242	24	never	158
10	india	228	25	think	157
11	want	228	26	years	157
12	parents	220	27	day	156
13	will	211	28	family	155
14	feel	206	29	job	155
15	got	201	30	friends	148

Figure 3. Commonly used words in Reddit Posts

Based on the analysis conducted, it has been observed that 169 users have frequently used certain words in their posts. For instance, the word "parents" has been used 220 times, "family" has been mentioned 155 times, "dad" has been utilized 173 times, "people" has been referred to 195 times, and "friends" has been cited 148 times. The posts revolve around a common theme: the users' support system. The discussions indicate that the people around them may be a contributing factor to the deterioration of their mental health, or the consequences of their actions may affect those around them.

Sr.No.	tokens	n	Sr.No.	tokens	n
16	want	217	1	support	728
17	please	215	2	can	681
18	like	204	3	help	596
19	alone	199	4	time	361
20	family	199	5	care	312
21	feel	191	6	people	266
22	take	183	7	reach	262
23	professional	172	8	difficult	247
24	feeling	167	9	health	239
25	feelings	161	10	mental	236
26	hear	151	11	important	232
27	going	149	12	consider	228
28	life	145	13	provide	222
29	resources	143	14	remember	219
30	also	136	15	may	218

Figure 4: Commonly used words in ChatGPTs responses:

In the 169 responses provided by ChatGPT, the word "support" appeared 728 times, "help" appeared 596 times, "care" appeared 312 times, "health" appeared 239 times, "mental" appeared 236 times, "professional" was mentioned 172 times, and "resources" was mentioned 143 times. This indicates that ChatGPT's responses to queries related to mental health are centered around encouraging individuals to seek help, care, and support from professionals.

Sr. No.	tokens	n	Sr. No.	tokens	n
1	hear	138	16	immense	17
2	sorry	130	17	situation	17
3	going	85	18	way	16
4	truly	58	19	xperiencin	12
5	time	53	20	challenging	11
6	really	48	21	incredibly	11
7	difficult	41	22	struggles	9
8	deeply	37	23	concerned	6
9	pain	31	24	suffering	6
10	facing	25	25	health	5
11	feeling	23	26	now	5
12	like	23	27	struggle	5
13	sounds	21	28	life	4
14	tough	18	29	right	4
15	challenges	17	30	want	4

Figure 5. Commonly used words in the First Sentence of ChatGPT Responses

The first sentence of a conversation sets the tone for the entire interaction. It is important to choose words carefully when someone is going through a difficult time. ChatGPT understands the struggles people face and aims to provide empathetic support.

Sr. No.	tokens	n	Sr. No.	tokens	n
1	help	172	16	hope	52
2	support	168	17	hesitate	50
3	please	110	18	life	45
4	care	109	19	need	38
5	people	109	20	know	35
6	remember	105	21	ask	34
7	time	105	22	future	34
8	alone	98	23	things	34
9	want	89	24	better	33
10	reach	88	25	brighter	29
11	difficult	69	26	feel	29
12	deserve	61	27	resources	27
13	take	57	28	health	25
14	can	54	29	mental	25
15	okay	54	30	available	24

Figure 6. Commonly used words in the Last Paragraph of ChatGPT Responses:

The final paragraph serves as a conclusion for the conversation. Based on the frequency of certain words throughout the conversation, it is evident that seeking support and focusing on a brighter future were recurring themes. To achieve this, individuals are encouraged to seek help from available resources and people in their surroundings.

Sr. No.	bigram	n	Sr. No.	bigram	n
1	there are	363	16	to help	170
2	reach out	255	17	not alone	164
3	help you	252	18	can provide	163
4	out to	234	19	to a	162
5	mental health	216	20	you and	155
6	want to	213	21	you through	154
7	and there	210	22	about you	152
8	are people	210	23	to hear	150
9	important to	208	24	care about	149
10	people who	204	25	going through	146
11	that you're	202	26	remember that	145
12	support and	190	27	who care	143
13	through this	187	28	difficult time	136
14	you can	180	29	who can	135
15	it's important	172	30	out for	134

Figure 7. Commonly used Bigrams in ChatGPT Responses:

A bigram is a phrase of two words. Bigrams are commonly used in language modeling to analyze the frequency of co-occurring pairs of words. During the ChatGPT conversation, several commonly used phrases or bigrams were noticed. These included "reach out", "help you", "mental health", "to help", "not alone", and "who care". The conversation with ChatGPT saw attempts to convert the negative tone of a difficult conversation into a more optimistic one. The underlying theme was to encourage people to seek help for their mental health concerns and let them know that they are not alone. The conversation also emphasized the importance of having people in one's life who care and are willing to provide support.

Sentiment Analysis:

A lexicon based approach was used to conduct sentiment analysis and for detection of emotion from the text data. In natural language processing, a lexicon is a collection of words or terms that are used to identify specific features or characteristics of a given text(Machová et al., 2023). These collections of words are often organized according to their semantic meaning, with each word being assigned a numerical value or annotation that reflects its association with certain emotions or sentiments. Lexicons are commonly used in text analysis to determine the probability of certain emotions or sentiments being expressed in a given text. By searching for specific words or terms from a pre-defined lexicon, it's possible to identify patterns or trends that can help researchers better understand the underlying meaning of a text . The BING Lexicon and AFINN Lexicon were used in this study.

Sentiment Analysis using Bing Lexicon:

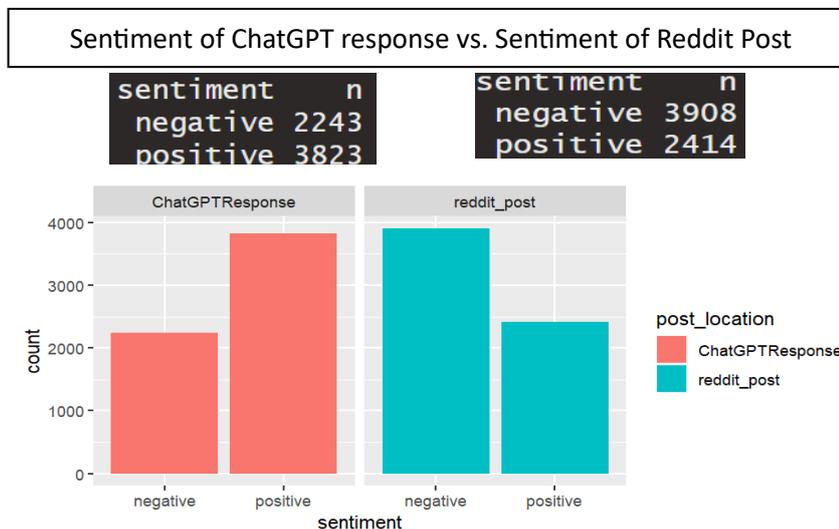


Figure 9. The number of words with negative sentiment and number of words with positive sentiment for ChatGPT Responses vs. Reddit Posts using BING Lexicon

Sentiment Analysis using AFINN Lexicon:

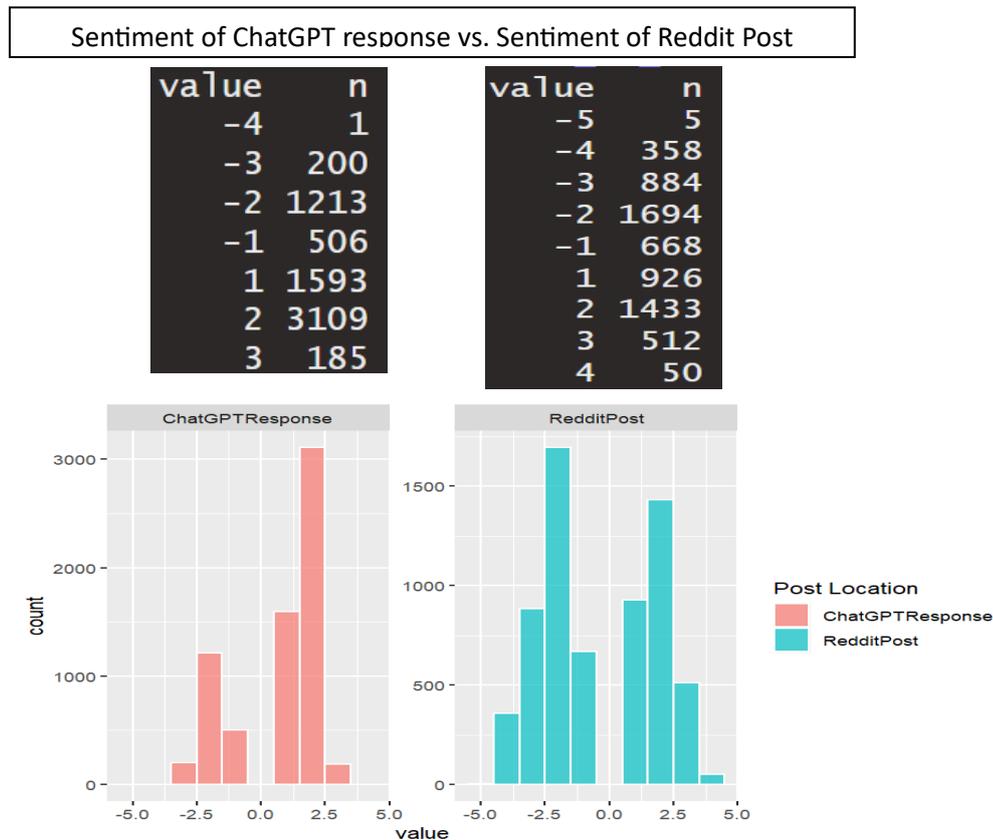


Figure 9. The number of words with negative sentiment and number of words with positive sentiment for ChatGPT Responses vs. Reddit Posts using AFINN Lexicon

In this research, the sentiment in Reddit posts and ChatGPT replies was analyzed using the Bing and Afinn lexicons. The analysis reveals interesting nuances in sentiment expression across the two platforms.

While Reddit posts exhibited a higher frequency of negative sentiment, they also displayed a wide range of emotional expression, including neutral and positive sentiments. In contrast, ChatGPT replies showed a trend towards positive sentiment, with relatively lesser instances of negative or neutral expressions compared to the Reddit posts.

ChatGPT replies are generated in response to supposed user queries or prompts, which bias the responses towards more positive and helpful content. Hence, ChatGPT is trying to give the reader insight with words that have a positive sentiment associated with it.

Limitations:

- i) ChatGPT is trained on human-annotated data. It is likely that this will be susceptible to bias. There may be bias due to patterns it has already studied in past data. Understanding new and unique scenarios may be a challenge for any machine learning based technology. Data points that are outliers may not get addressed with appropriate intervention.
- ii) Individuals' mental health is affected by socioeconomic status, educational and cultural factors, family dynamics, and many other influences. ChatGPT may not capture the nuances of this.
- iii) Without authentic and reliable sources of past data to refer to, ChatGPT may potentially harm individuals with psychiatric problems by providing inappropriate and incorrect advice.
- iv) Due to the sensitive nature of information shared, people may be reluctant to use any tech-based platform for their concerns.
- v) There could be concerns about privacy, confidentiality and stigma.

Conclusion:

The study has shown that ChatGPT is capable of detecting human emotions and accurately identifying the emotional state of a person who is experiencing mental distress. It analyzes the text and adjusts its communication accordingly. Due to a shortage of professionals available to handle those in need of mental

health guidance, chatbots powered by artificial intelligence can be appropriately trained to provide initial assistance to individuals in need. A collaboration between humans and AI can be employed to assist those seeking mental help. Initial interactions can be managed by AI, and further ones can be referred to human therapists.

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