

AI-Powered Conversations: The Diagnostic Potential of Chatbots in Mental Health Care

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Abstract

In this study, the diagnostic potential of AI-powered chatbots in mental health care, assessing their ability to detect symptoms of mental health disorders and provide appropriate interventions or referrals was examined. The study employed Breezy, an AI-powered chatbot developed to engage users in social conversations while addressing depressive symptoms. Breezy is not designed for clinical diagnoses but aims to provide social support to users experiencing depressive feelings. It will be available as a premium service across Nigeria, offering a new way to address mental health issues

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through accessible AI technology. Results of the study reveal that the primary distribution of the intent of the chatbot was "sleep", "about", "sad", "depressed", "learn more", "help", "something else", "scared", "user-meditation", "thanks". These keywords are depressive (containing depression- or sadness-related keywords), happy (containing happiness- or excitement-related keywords), and general (indicating all utterances in the same period). The findings show that chatbots may share valuable information about depressive states, particularly in users who cannot describe their feelings to others. Overall, the study provides valuable knowledge about how the usage of such technology can transform the diagnostic approach and try to improve global access to mental health services.

Keyword: AI Powered, Conversation, Diagnostic potential, Chatbots, Mental, Health care.

Introduction

Digital mental health aims to reach the youth demographic with technology in evaluating, supporting, preventing, and treating mental health [1]. Over the past few years, one of the most promising trends is the integration of AI chatbots into mental health care assistance [2]. These are the chatbots, which implement natural language processing to conduct conversations like humans and are opening new possibilities to increase access to mental health care, especially diagnostic ones [3-5]. Despite the limitations to implementing AI-regulated chatbots, their applicability in the field of mental health screening is evident because of factors like accessibility, early interventional approach, and cost-effective care solutions [6-9].

Chung & Park in [7] revealed that AI chatbots are conversational agents or generative AI using large language models. Also revealed that there are situations where an AI chatbot can give a much more profound answer than human therapist [10]. However, the need to have the feel of one-on-one interaction where clients can be attended to with the required level of understanding [11-13]. It introduced the notion of human-artificial intelligence, the synergetic cooperation between humans and AI to achieve a shared purpose often faster, safer, more sustainable, and more fun than otherwise [14].

Breezy is an AI model specifically developed to engage in social conversation and ensure the user has fun. Its inputs are anything that a user types into the chatbot or anything that the chatbot might say. It also has an explaining feature where the application also shows users how to answer a given question, which is called Breezy [15-17]. The specifics provided by the user within this function are stored in the overall central database maintained for the activity. The service subsequently queries this database to produce the optimum response for subsequent user inputs [18-21].

Breezy is unique and serves as the only mental health chatbot in Nigeria. It is the only one that could be described as an open-domain machine chat service, meaning it can talk about anything at all [7].

This makes Breezy more realistic as a tool for analyzing how humans participate in the social support-seeking process.

The name Breezy was given since it is fun, casual and quirky, which is essential for a chatbot designed to help ease the mind and minimize stress. Breezy chatbots show a high potential for enhancing changes in the better delivery of mental health care services, but they have specific ethical and technical considerations. Some of these include failure to provide harmful or even toxic support, using loopholes to target the vulnerable in society and, arising from the fact that most algorithms are developed with bias, the AI may give out prejudicial advice. However, it is more challenging for users to realize the type of interaction they have with chatbots consciously [11].

There has been a remarkable increase in the use of AI in clinical systems in regard to mental health in the last couple of years. The AI-integrated chatbot software and application provide excellent health care that efficient and professional doctors previously offered [15,19,21]. There remains a significant chasm between AI in mental health advancement and its actual usage by practitioners in their workplaces [7].

The Breezy dataset constitutes an extensive pool of discussions on mental health. It comprises general conversations, frequently asked questions and answers about the human mind, classically therapeutic conversations, and general advice given to someone experiencing anxiety and depression [7]. The primary purpose of this dataset is to build a training data set for a chatbot that mimics that of a therapist in nature in order to console emotionally distressed people [2].

The consumption of such datasets will help researchers and developers create better chatbot models designed to handle individuals struggling with anxiety or depression. It is to design an AI assistant that can engage in a conversation with the client and restore them with hope and encouragement to make an effective therapeutic intervention [12]. To this end, this study posits to examine, the diagnostic potential of AI-powered chatbots in mental health care while assessing their ability to detect symptoms of mental health disorders and providing appropriate interventions measures.

Research Method

The datasets were obtained from kaggle datasets for Breezy Chatbot. This dataset contained interactions between individuals and chatbots about depressive symptoms. The data include sentences that contained specific words corresponding to the depressive mood. The following were identified as depression keywords, namely, depressed, distressed, dejected, gloomy, cheerless, sad,

feeling low, hate me, ashamed of myself. Breezy is concerned with depression among people and not persons clinically diagnosed with the disease.

Results and Discussion

Chat Distributions of Intents

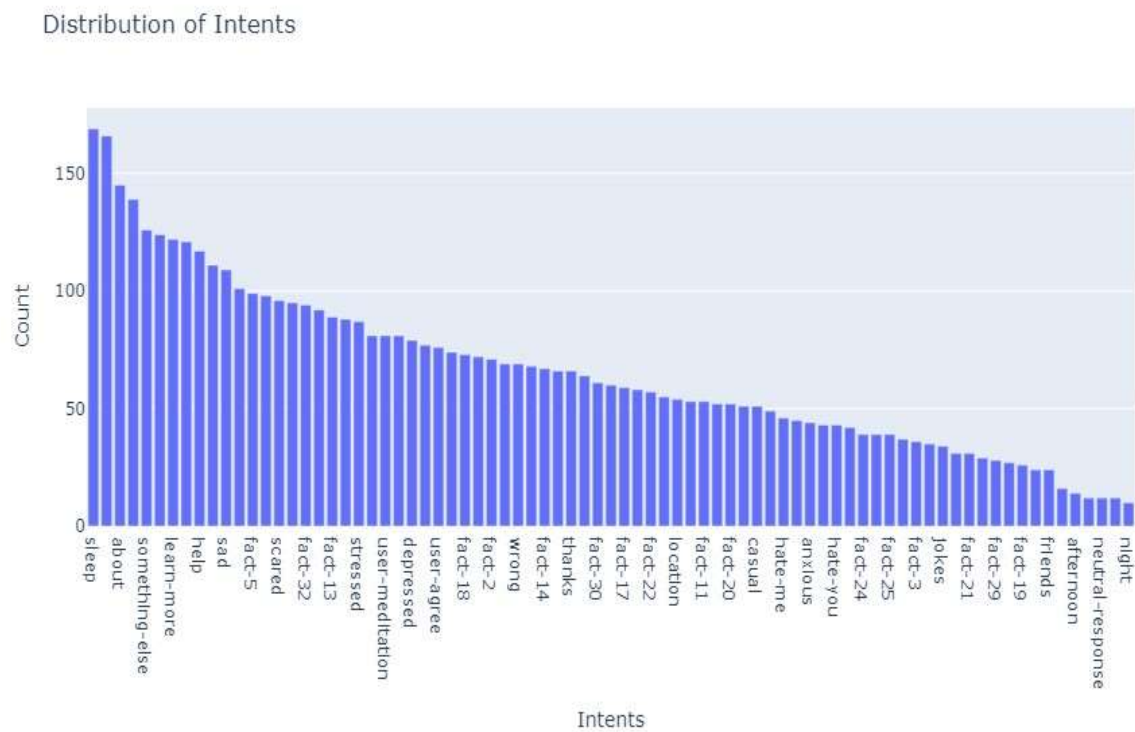
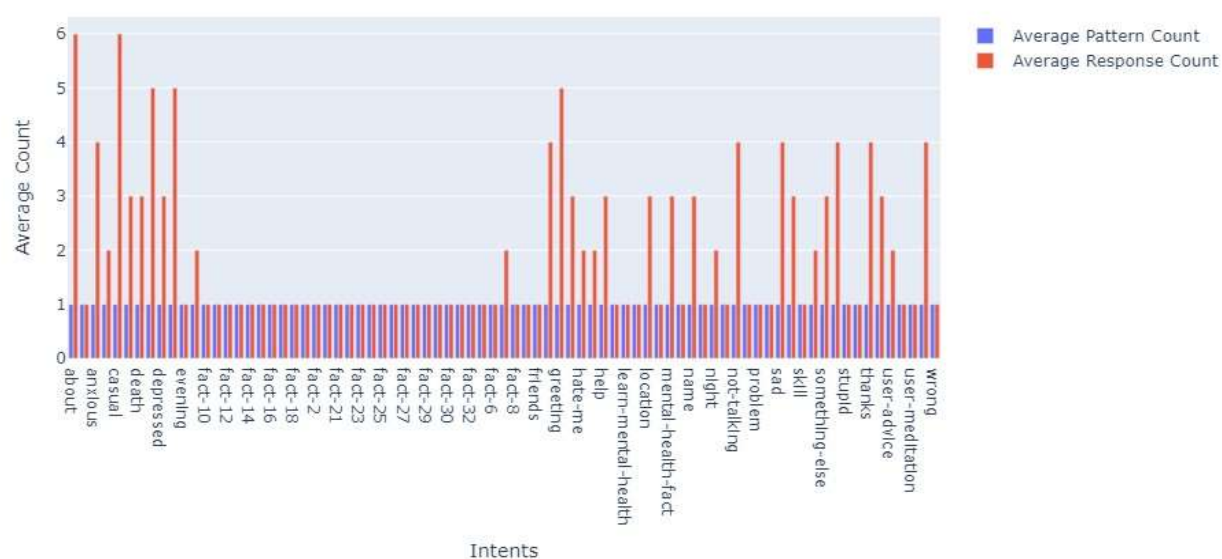


Figure 1. Distribution of Intents.

The major distribution of the intent of the chatbot was “sleep”, “about”, “sad”, “depressed”, “learn-more”, “help”, “something-else”, “scared”, “user-meditation”, “thanks”.

Pattern and Response Analysis

Pattern and Response Analysis

**Figure 2.** Pattern and Response Analysis.

These key words depressive (containing depression- or sadness-related keywords), happy (containing happiness- or excitement-related keywords), and general (indicating all utterances in the same period). The plot demonstrates that depressive emotions varied throughout the day. The chat emotions differed among individuals. This aligns with Chin et al. [6] who employed the global open-domain social chatbot SimSimi to sample 152,783 conversation utterances that had the terms "depress" and "sad" in three Western countries: Canada, the United Kingdom, and the United States and five Eastern countries: Indonesia, India, Malaysia, Philippines, and Thailand. Although participants did not report their mood overtly on the questionnaire, further analysis of self-reported words using Linguistic Inquiry and Word Count and n-gram revealed cultural differences in the treatment of depression and sadness with chatbots. Results further reveal that AI-based chatbots can also enhance consumer access to cost and quality mental healthcare services as they can perform the work of clinicians³. These chatbots exist with a financial cost and are easily accessed through a person's phone, making help easily accessible at any time and place [5].

The study reveals that in order to aid the model training process, the data set introduced the concept of an "intent". Every intent corresponds to the motivation that exists behind each user's message. For instance, if a user posts that we are sad, then the intent that can be derived from that signal is sorry as observed by [12]. Thus, each intent came with a set of patterns; these are example messages that

fall under the particular intent of the chatbot and the corresponding responses that the chatbot should formulate to correspond to the identified intent [17,19,21]. Additionally, to perform the user intent identification as well as respond with meaningful and sympathetic answers, multiple intents are defined, together with their patterns and responses [5]. Nonetheless, there are a few limitations related to the current research. However, firstly, it is not easy to generalize the results obtained since the young adult dominate the participants of the chatbots studied. Secondly, the present study is limited to only English-speaking conversations because of the challenges that come with analyzing multilingual content, so the conclusions that are made may only be valid for some of the users who engage the chatbots in the analyzed countries. As such, future works could consider doing multilingual sentiment and topic analysis.

Conclusion

The data readily confirm that users expose a small-talk, open-domain chatbot to depressive moods or negative self-images. This is even more so in the developed nations, but it has never been the case in Nigeria. This paper has provided evidence that individuals can speak to a chatbot in a certain way and, in return, expect certain behaviors from the chatbot, such as responding with small talk and offering them social support. These results suggest that the next generation of conversational agents will also need to be developed to serve these social functions. There are possibilities for peer chatbot-supported mental health helping, calling for further technical and policy-wise work to enhance the functioning of chatbots for those in search of emotional support. The dataset showed that chatbots may be able to offer helpful information related to depressive moods where there is an inability to convey such to other people.

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