THE CHATBOT - "EMOTION INTELLIGENCE"

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Abstract:

Conversational chatbots are Artificial Intelligence (AI)-powered applications that help users with different tasks by responding in natural language and are widely used in a variety of industries. Many chatbots we experience on websites and voice assistants like Google assistant, Alexa and Siri do not express empathy to the user, and their ability to empathise stays underdeveloped. A lack of empathy for the user is not required for a transactional or interactive chatbot, but bots designed to support mental healthcare patients must understand the user's emotional state and customise the conversations accordingly.

Keywords: Chatbot, Artificial Intelligence, Emotions, NLP

1. **Introduction**:

People with mental illness find it difficult to get professional help because of social disgrace and hesitancy. Because of this situation, it is not easy to support individualized patients with mental disorders. To overcome these problems, mental health professionals are using artificial intelligence-based chatbots, among others, as a first line of defence to meet the needs of individuals affected by mental health issues. When dealing with patients with mental illness, it is important to understand their emotional state and respond with simple micro-interventions such as breathing exercises and suggestions for friendly conversation. It helps to improve the patient's positive mood. The main advantage of these bots is that they provide actionable, evidence-based and compelling digital solutions that can quickly fill professional gaps. Although the development of artificial intelligence has paved the way for many chatbots, three Therapeutic Mental Health chatbots stand out and are widely used. A chatbot programmed to understand emotions can be similarly proactive, holding stories containing patient likes and dislikes, as well as topics that make patients laugh. Chatbots can optionally communicate patient likes and dislikes. Additionally, the adoption of therapeutic chatbots is growing rapidly due to the following benefits:

Manage the patient's mental state and be able to contact a physician in the event of an adverse event.

1. Chat support for all time

2. Smart with reactive actions such as answering questions instantly and giving patients tips on disease prevention and care.

3. Easy to initiate, construct and maintain, compatible with various operating systems such as Android, iOS and Linux.

4. Able to handle sensitive issues

5. Individual's data security is improved by a variety of authentication technologies, including facial recognition, biometrics, and passcode logins.

6. Cost-effective for some psychiatric disorders such as Stress relief

7. Provide reminders. For example, taking medication, exercising, and when to jog.

2. The birth of Chatbot and its gradual development:

It was in 1950 the early development chatbot was initiated inspired by Turing Test. Eliza chatbot built using simple hand-crafted scripts and Parry were the first widely known. Like Eliza, Parry uses a rules-based approach, but with a deeper understanding, including mental models that can inspire emotions. Similarly is ALICE (Artificial Linguistic Internet Computer Entity), a customizable chatbot that uses AIML (Artificial Intelligence Markup Language). So ALICE continues to use a rule-based approach, running pattern matchers recursively to get the answer. In May 2014, Microsoft introduced XiaoIce , a social empathetic chatbot that can recognize the emotional needs of its users. Most chatbot technologies today are developed using a neural approach. Emotional Chatting Machine (ECM) is the first work to build a large-scale emotion-aware conversational bot using a deep learning approach. Several studies have since been proposed to address this research area by introducing emotion embedding representations or modelling as a reinforcement learning problem. Most of these studies used encoder/decoder architectures, especially sequence-to-sequence learning (seq2seq). Some studies have introduced new datasets to try to have a better standard and improve system performance.

A basic sequence 2 sequence architecture consisting of two recurrent neural networks (RNNs). One is the encoder that processes the input and the other is the decoder that produces the response. Long Short Term Memory (LSTM) or Gated Recurrent Unit (GRU) were the most dominant variants of RNN used to train speech recordings in these models. Some studies have also modeled this task as a reinforcement learning task to obtain more generic responses and have chatbots successfully engage in long-term conversations. The report also introduced an alerting mechanism6. This mechanism allows the decoder to focus only on the important parts of the input at each decoding step. Another important part of building an EAC is a sentiment classifier to detect emotions in text and get more meaningful responses. Emotion recognition is a well-established task in the research field of natural language processing. This task was recently promoted in his two series, SemEval-2018 (Task 1) and SemEval-2019 (Task 3). Some tasks focused on classifying utterances into multiple emotional categories. But there are also tasks that try to predict the intensity of emotion contained in text. In the early development of sentiment classifiers, most studies suggested using traditional machine learning approaches. However, neural approaches can perform better, and more and more scientists are using them to accomplish this task. In chatbots, the system generates multiple responses based on multiple emotional categories. The system then responds with the most appropriate emotion based on the emotion recognized by the emotion classifier for the posted utterance.

3. Types of Emotion Intelligence chatbots:

Mental health patients may express their emotions using text, emoji or emotions, speech, recorded or live audio/visuals. The main goal of therapeutic chatbots is to understand the corresponding emotions from a user's conversation and suggest appropriate treatments. The empathy expressed by mental health patients is cognitive, emotional, and compassionate. The purpose of all these categories is to understand the user's emotions context and relate them to corresponding emotions such as happiness, sadness, angriness, and fearfulness. User emotions can be processed with Learning Technology using Artificial Intelligence And Natural Language Processing (NLP). NLP describes how chatbots translate and understand patient speech. NLP allows chatbots to understand spoken or written language and perform tasks such as keyword extraction, translation, and topic classification. NLP uses techniques such as sentiment analysis, facial recognition, and speech recognition to process content expressed in natural human language. A chatbot with NLP capabilities can understand patterns in the context of a patient's conversation and use contextual cues from voice, video, or text input to analyze the sentiment behind messages.

i. Analysis of Sentiments:

Sentiment detection is a subfield of sentiment analysis that deals with analyzing and extracting emotions. Emotion recognition helps mental health professionals provide personalized treatment. Mood analysis detects how people with mental disorders feel about something. Identifies patient messages and emoji/emotions as positive, negative, or neutral based on the context of the conversation with the patient. The extracted opinions are used by therapeutic chatbots to suggest appropriate treatments or refer them to a psychologist in an emergency. The use of emojis/emotions in electronic messages is rapidly increasing, allowing people with mental illness to easily express their emotions using smileys and ideograms. Emotions show deeper meaning in the context of the patient's conversation. Patient responses and emoji/emotions are converted to the Unicode character set to train the model. The training data collected to train the model depends on the clinical tools used to collect the data. B. Collect data from clinical records, surveys, and patient blogs The categories of sentiment analysis are defined as follows: B. Aspect-based sentiment analysis is used to analyze text-based messages from patient responses, and emotion-based analysis is used to analyze emotions.

ii. Video-based emotion analysis by facial recognition:

In the process of video-based interactions between patients and treatment chatbots, it is important to recognize, process and analyze patient emotions and insight in order to adjust treatment strategies. The aim of facial recognition is to collect data and analyze the patient's emotions to provide an appropriate response. Data is collected from various physical characteristics such as body movements, facial expressions, eye contact and other physical and biological signals. These physical emotions fall into different categories such as sadness, joy, surprise, fear, and anger. Using image processing and computer vision techniques, her two-pronged approach of geometry and appearance is used to extract the facial features of mental health patients. A geometry-based approach presents the facial geometry of mental health patients by extracting the nodal points, shapes, and positions of facial components such as eyebrows, eyes, mouth, cheeks, and nose, and calculating total distances . Create one Enter feature vector between

face components. The main challenge of this approach is achieving high accuracy in real-time face component detection. Appearance-based approaches display the facial texture of mental health patients by extracting variations in skin texture and facial appearance. This approach uses Local Binary Patterns (LBP), Local Directional Patterns (LDP), and Directional Ternary Patterns (DTP) to encode textures as training data. Empathy chatbots detect emotions from facial expressions using an appearance-based approach. This is because shape-based approaches require reliable and accurate facial component detection to achieve maximum accuracy scores, which is very difficult in real-time scenarios.

iii. Speech-based emotion identification

A speech-based emotion recognition system is a pattern recognition system that consists of three main parts: speech signal processing, feature computation, and speech classification. The main purposes of signal processing include audio signal digitization, audio signal filtering, and speech-to-text segmentation of spoken dialogue. The purpose of feature computation is to find properties of preprocessed and digitized acoustic signals that represent emotions and convert them into encoded vectors. Finally, a machine learning (ML) classification algorithm is applied to the feature selection vector. These classification algorithms depend on the data set they were trained on.

4. Limitations

One of the biggest challenges is situational awareness during patient interviews.

- Lack of contextual data for training, change in patient behavior with emojis, short descriptions/short text during conversations.

- Few medical professionals would argue that AI should complement rather than replace medical professionals, and finding the right role for AI will be a major challenge in the future.

- Many medical experts in the US point out that bots do not effectively understand patient needs and do not take responsibility for making a complete diagnosis. Some believe that using chatbots in healthcare risks self-diagnosis and may not understand the diagnosis

- Other challenges include patient confidentiality and privacy. Because patient conversations involve personal matters, it is imperative to encrypt patient conversations or anonymize patient data in databases.

CONCLUSION

Psychological research shows that happiness and meaningful conversations often go hand in hand. Therefore, it is not surprising that social chatbots have become an important alternative for interaction as more and more people become digitally connected in the age of social media. Unlike early chatbots, which were designed for chatting, today's social chatbots are designed to meet users' needs for communication, affection, and social belongingness which are equipped with empathy, personality, and skills and which integrates and optimizes both EQ and IQ.

Empathy chatbots can provide a forum for psychiatric patients to discuss issues, provide access to support guides, improve mental health literacy, and track moods, but empathy chatbots can provide a forum for psychiatrists and It is not a replacement for psychotherapists.With few limitations, empathic chatbots are proving to be a new technology with great future potential. Empathy added to chatbots has filled a clear

and important gap that has already been proven to transform patients' lives increase. Therefore, empathic chatbots in mental health are not only making waves in the healthcare, they are also paving the way for more innovative and beneficial uses of chatbot technology in all areas. This study describes different methods of AI techniques used to classify conversational intentions into emotions, and looked at some prominent apps in the field.

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