

Therapy Bot using Machine Learning for Psychotherapy

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Abstract: Due to recent technological advances, there has been an increase in targeted digital interventions either to add or instead to deal with the mind health services that include mental health chatbots, who claim to provide care using a therapeutic Approach. These are new methods operated by Natural Language Processing (NLP). Chatbot can be described as a computer program that is capable of providing intelligent responses to user input with understanding natural language using one or more NLP strategies.

Keywords: Chatbot, NLP, face-to-face psychotherapy, sequence-to-sequence model, counselling, depression.

1. Introduction

Therapy Chatbot is a bot that intends to help people remove stress and anxiety by having interviews with the patient and ask them questions about the mind and emotions you should allow them to share their thoughts and feelings. It also offers suggestions for immediate practitioners and psychologists. Research is being done on this chatbot for analysis of Chatbot's effectiveness in dealing with the problems of individuals. In this study, we discuss the use of NLP in psychotherapy and general analysis of the existing systems are made by comparing answers given by the chatbot against a set of predefined user inputs regarding queries related to welfare and mental health. Normal method involved in the construction of such chatbots including basic NLP techniques such as word embedding, emotional analysis, Models similar to Sequence-to-order model and attention way. We also suggest Therapy Bot, an application that uses NLP techniques to provide not only for chat service but also a useful toolbox for keeping mental health in place. By combining mental health assessment tools in chatbot interface, as well as general treatment. It also helps patients to deal with their mental issues and overcome certain mental blocks. It also has other applications and uses that can achieve certain goals in mental health, as a waiting list and location issues prevent face-to-face counseling appointments.

2. Methodology

The following Natural language processing operations are involved in the construction of a chatbot capable of initiating comforting conversations to alleviate mental health problems.

A. Word Embeddings

It is possible to translate embedded words as a vector representation of words. This embedding can also be learnt by models which are unsupervised. They can identify and capture the similarity and/or resemblance of words and are therefore necessary. In some NLP applications, such as POS tagging, they are very helpful in representing words. There are several words embedding families, including Bag of Word Based, RNN Family Based, Focus words based: This method is a very common feature extracting procedure for sentences and documents, the histogram of words in a text is looked upon in this approach, it considers each word count as a feature.

B. Seq to Seq Model

The objective of a sequence-to-sequence model is to map a fixed-length input with a similar length output where the input and output size can vary (Kostadinov, 2019). The model consists of three sections: encoder, vector intermediate (encoder), and decoder: Encoder A Multiplication stack unit (LSTM or GRU cells for better performance) when each of them received one portion of input sequence, gather and distribute knowledge of that feature. Input sequence is in the form of problem answering questions which will list all of the mentioned words from the user question.

C. Challenges Identified

Even though there are lots of benefits of using AI in mental health chatbots, there are also challenges of different types that need to be considered. In the following section, we distinguish between technical challenges, ethical challenges, challenges of practical implementation, and accountability implications.

D. Technical Limitations of Mental Health Chatbots

Even though AI can realize and help to create chatbots that can pass the Turing test, there are still technical limitations. Existing systems are unable to remember what has been said in earlier conversations, which can lead to inappropriate responses. Knowledge regarding the user's mental state has to be collected and stored for future conversations with the bottom address the problem. A chatbot reply might be frustrating or insufficient for a user due to a misunderstanding or missing emotional intelligence. The skills of existing mental health chatbots are generic, often repetitive and the user interaction is

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quite similar to a self-help book. Altogether, this might cause annoyance and limits user functionality to such applications. Existing mental health chatbots are often authored systems, guiding through a predefined conversation flow.



Fig. 1. Flowchart for the working of chatbot

3. Conclusion

It can be concluded that the realm of mental health assistants and chatbots in psychology and Psychotherapy applications are rapidly growing. The application of cutting-edge Natural language technologies in combination with psychotherapy can lead to tools which can to a great extent fill the holes in the delivery of mental care. However, they need to be tested and tried on a large scale and viable outcomes should be

documented before approving any clinical use.

The various natural language technologies were discussed at length. Current applications of natural language processing in mental care delivery were examined and it was established.

References

- [1] Abu Shawar, B. A. Atwell, E. S, "Chatbots: are they really useful?" J. Lang. Technol. Comput. Linguist, volume 22, p. 29-49.
- [2] E. Adamopoulou, L. Moussiades, "An Overview of Chatbot Technology," Artificial Intelligence Applications and Innovations: 16th IFIP WG 12.5 International Conference, volume 2020, pp. 373 - 383
- [3] Alaa A Abd-Alrazaq, Mohannad Alajlani, Ali Abdallah Alalwan, Bridgette M Bewick, Peter Gardner Mowafa Househ, "An overview of the features of chatbots in mental health: A scoping review," International Journal of Medical Informatics, volume 132.
- [4] Susel Alonso, Gongora," Analyzing Mental Health Diseases in a Spanish Region Using Software Based on Graph Theory", International Conference on Innovative Computing and Communications, pp. 701 - 709
- [5] E Bendig, B Erb, L Schulze-Thuesing, H Baumeister, "The Next Generation: Chatbots in Clinical Psychology and Psychotherapy to Foster Mental Health -A Scoping Review."
- [6] N Birla, "Mental health may hurt India to tune of \$1.03 trillion; here's a dose for cos. The Economic Times".
- [7] A. Blom, S Thorsen "A sentiment-based chat bot".
- [8] D. Browne, "Do Mental Health Chatbots Work? Healthline".
- [9] G. Cameron, "Towards a chatbot for digital counseling".
- [10] S. Cohen, T. Kamarck, R. Mermelstein, "Perceived stress scale Measuring Stress: A Guide for Health and Social Scientists".