

Therapy Chatbot: A Relief From Mental Stress And Problems

Pranav Kapoor, Pratham Agrawal, Zeeshan Ahmad

Abstract— As the pandemic goes by, psychological state has become a vital side of our daily lives. Individuals still don't feel comfortable to speak to people regarding their psychological state and frequently tend to keep their issues to themselves, this typically results in the buildup of stress in their minds and thus leads to a hampered productivity in their work. As these cases tend to extend, we tend to conceive it by introducing a Therapy Chatbot, that may assist and check with the person regarding his mental state. The user gets to share his feelings while not having the concern of being judged. Thus, reducing the number of deaths because of depression.

Index Terms— Bot, Chatbot, Emotion, Mental Health, NLP (Natural Language Processing), Stress, Therapy, Tokenization

1 INTRODUCTION

According to the U.K. Surgeon Journal (1999), mental health is the successful performance of the mental function resulting in productive activities, fulfilling relationships with other people, and providing the ability to adapt to change and cope with adversity.

The term mental illness or disturbance refers to all identifiable mental disorders – health conditions characterized by alterations in thinking, mood, or behavior related to distress or impaired functioning.

Mental health has long been outlined because the absence of psychopathologies, like depression and anxiety. In today's world, depression will hit anyone, and is a serious concern.

Depression is an especially complicated illness. nobody is aware of specifically what causes it. The attainable reasons may well be loneliness, relationships, deadlines, genetics, abuse, conflicts, medications, major diseases etc.

Some individuals might experience depression and feel powerless with unhappiness and loneliness for no well-known reason. Individuals handling depression need to inform their state of mind to someone and that they are mostly afraid to talk to, such as their friends and relatives.

- *Pranav Kapoor is currently pursuing a bachelor's degree program in Computer science engineering in Vellore Institute of Technology, Vellore, India, PH-+91 9003493221. E-mail: pranavkapoor2k@gmail.com*
- *Pratham Agrawal is currently pursuing a bachelor's degree program in Computer science engineering in Vellore Institute of Technology, Vellore, India, PH- +91 9140084318 E-mail: prathamagraval76@gmail.com*
- *Zeeshan Ahmad is currently pursuing a bachelor's degree program in Computer science engineering in Vellore Institute of Technology, Vellore, India, PH-+91 7667300652. E-mail: Zeeshan22ahmad@gmail.com*

2 LITERATURE REVIEW

As indicated by United Nations agency, Bharat drawn nearly V-J Day of the worldwide mental health, issue. native space reviews gauge that the generality of sorrow and tension may well be up to thirty three percent for each one of people.

In India, the treatment percentage is 70-92%, contingent upon the state. It's assessed that just about thirty third of patients United Nations agency rummage around for facilitate from medical services don't seem to be nonetheless supplied with. Therefore, mental chatbot was a necessity to be introduced for the sake of improvement of individual's psychological state.

Naeun Lee et al. [2] [2017] projected the execution of division utilizing NLTK. tongue ToolKit (NLTK) could be a python package that obliges provide forms of help for human language technology. it's built-in tokenizers. shoppers got to import the package and utilize the required reasonably tokenizer that is gift as capacities.

The NLTK incorporates a good scope of tokenizers that area unit as per the subsequent norm, letter, word, exemplary, lowercase, N-gram, design, watchword, way, etc. the foremost ordinarily used tokenizer is that the word-punk tokenizer what divides the sentences at the clear areas. The exactitude, speed, and productivity of the NLTK tokenizers area unit commendable. Also, it does not want any rule execution because the package executes them at the backend.

LinHua federal agency et al. [8] [2018] clarifies the standard lexicon methodology of word extractions. during this methodology, the framework info base keeps a dataset of equivalents for important watchwords around there. The sentence sent by the consumer is at that time planned on to it equivalent dataset. The catchphrases detected from the sentence area unit then checked around there set to examine for an equivalent expectation. All potential equivalents of that watchword area unit then paid special mind to a match within the primary info base. The sentence that is nearest to the consumer sentence is removed. This methodology is tedious and needs ad-

ditional capability and complexity. The hidden feeling lexicon is that the Emotional Dictionaries of SentiWS. The SentiWS could be a freely accessible German jargon for emotional analysis. It covers simply the 5 feelings listed antecedently. It stays to what is to return to foster feeling term lists for the emotions blame and disgrace to hide each applicable feeling. To manage grammatical mistakes and composing blunders, a downlike coordinative strategy is employed for distinctive feeling terms. during this manner, words are often perceived in spite of whether or not they do not coordinate 100 percent with words within the word reference. Limit esteem was characterized for the downlike coordinative.

Sachin S. Gavankar et al. [10] [2017] projected the crazy call tree rule for expectation. this type of call tree is that the make-shift version of the standard call tree. It creates this tree at runtime, supported queries, and keeps refreshing the tree on new user messages. take into account its operating for sickness expectation. during this rule, the symptoms recognized within the user inquiry square measure added as fry nodes to the foundation hub.

The nodes continue obtaining added for brand new symptoms recognized. additional for every symptom, the rule checks for the second symptom that has the best event with the previous symptom and asks the user for that symptom. forward he says affirmative, the system traces that thanks to check for the sickness gift at the foundation hub. this may keep action for all users and also the tree keeps obtaining reinvigorated for brand new entries or traces the approach accessible.

A projected a technique for ending the reliance tree. It initially finds out the dependencies among the words within the sentence. every word is checked for its relationship or reliance with the opposite word. The word with the best reliance is chosen to be the foundation. the opposite words with a reference to the foundation hub square measure appended thereto because the child nodes. This keeps on continuing till each one of the words is place within the tree. The tree style of the sentence is termed the reliance program tree. The dependencies among the words square measure discovered by mistreatment the POS tags.

Zhenghua Li [7] [2014] gave a model of the reliance program. within the standard strategy documented over the program creates a parsed tree for the desired sentence. within the chart-based reliance program, the tree created is modified over to a chart wherever the words within the sentences square measure the vertices and also the reliance between the words is described by the perimeters. This info structure shows a superior illustration of the parsed sentence. Parsing is often to be performed by the standard technique. However, chart based mostly program improves the visibility, coherence, and comprehensibility of the program.

A projected a technique for ending the reliance tree. It initially finds out the dependencies among the words within the sentence. every word is checked for its relationship or reliance with the opposite word. The word with the best reliance is chosen to be the foundation. the opposite words with a refer-

ence to the foundation hub square measure appended thereto because the child nodes. This keeps on continuing till each one of the words is place within the tree. The tree style of the sentence is termed the reliance program tree. The dependencies among the words square measure discovered by mistreatment the POS tags.

The impact of mistreatment chatbots on subjective psychological prosperity was analyzed by three studies. Those studies were directed in Scandinavian nation, Turkey, and Japan, severally. Of the three studies, two studies were quasi-experiments, and also the leftover study was AN RCT. The Flourishing Scale was wont to live subjective psychological prosperity in two studies, whereas the WHO-5 Well-Being Index was employed by the third study. as long as the high risk related to quasi-experiments and accessibility of only 1 RCT, the results of the three studies were synthesized narratively.

The impact of utilizing chatbots on mental hassle was inspected by two examinations, light-emitting diode in Japan and Australia. The pain was calculable utilizing the Kessler Psychological Distress Scale. whereas one examination was a one-bunch quasi-experiment, the opposite investigation was a two-bunch quasi-experiment. Consequently, AN accounting approach was utilized to look at their outcomes.

As indicated by Suganuma et al, there was a genuinely Brobdingnagian distinction between preferring chatbot use over no intercession on hassle levels when treatment. Further, there was a genuinely Brobdingnagian improvement in hassle level among the chatbot bunch when treatment contrasted and before treatment.

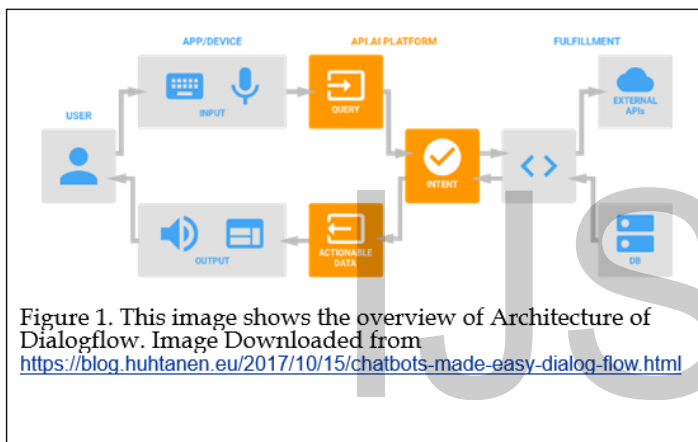
Naganna Chetty et al. [11] [2015] set forth a fuzzy methodology for forecasts. during this calculation, the framework follows the bunching element. It implies that the calculation separates that info from the data base that is that the nearest to the shopper question. At the purpose once the shopper fires AN inquiry, the calculation appearance for the most effective matches within the info base and offers one thing the same as the shopper. within the following stress, once the shopper provides the following question, the most effective matches square measure additional probe for significance. every question of the shopper channels the matches on every cycle. This continues continuing till one best match is found which match is given to the shopper because the aftereffect of expectation. viewing the 2 calculations we have a tendency to return to understand that expectation utilizing downy explanation (grouping) isn't troublesome to hold out and includes less complexness. Then again, energetic alternative tree calculation includes additional complexness and needs additional chance for execution. Yet, the truth given by anxious alternative trees is additional as contrasted with the downy methodology.

Sijun Qin [9] [2015] projected an element determination technique for word extraction. during this strategy, among each one of the items of discourse labels, words having the labels as an issue, action words, and modifiers square measure set apart as positive labels and also the others as negative labels. The

extremity for every part (word) is at that time done by utilizing the POS labels. If the final part extremity is positive, at that time it all right could also be distinguished utterly. All the positive highlights square measure then assembled and also the equivalent's location for the gathering of highlights is typically solid, as a full condition is checked for its synonymic that means. The word sets that square measure separated for that condition of highlights square measure at that time determined for information acquisition. The one with the foremost noteworthy information acquire is that the most grounded equivalent separated.

3. METHODOLOGY

A basic Sequence to Sequence architecture is used for building conversational Therapy chatbot using DialogFlow framework.



Different entities are created inside an intent where different entities are focused on reacting for different situations.

Our therapy chatbot takes four entities:

- Personal loss
- Relationship problems
- Career / Job problems
- Academics / Education related problems.

Initial comments and its responses are arranged in a nested way so as to preserve sequence of "conversations" among the people.

This chatbot is used in the form of an app, where supervised learning is used to generate responses based on a person text, in which the bot detects the keywords and reacts according to it.

After training the data, the dialogFlow intent is connected with the flutter app and the app uses this intent to create a chatbot.

3.1 Software requirements

3.1.1 Android Studio

Android Studio provides a unified environment where a developer can build apps for Android phones, tablets, Android Wear, Android TV, and Android Auto. Structured code modules allow you to divide your project into units of functionality that you can independently build, test, and debug.

3.1.2 Flutter / Dart

Flutter is a free and open-source Google mobile UI framework that provides a fast and expressive way for developers to build native apps on both IOS and Android.

Flutter builds from a single codebase, compile directly to the native arm code, Use the GPU and access the platform APIs and services.

3.1.3 DialogFlow

Dialogflow is a natural language processing (NLP) platform that can be used to build conversational applications and experiences for a company's customers in various languages and on multiple platforms.

Dialogflow can be used for a variety of applications, including:

- Customer service artificial intelligence (AI) agents-- Interfaces can be programmed to answer questions, access orders, make appointments and take requests.
- Conversational commerce- Bots can help customers make self-service purchases or schedule deliveries.
- Internet of things (IoT)- Dialogflow can be applied to IoT devices to make them better at understanding context and responding with precision.

4. ARCHITECTURE / BLOCK DIAGRAM

The customer inputs the inquiry in the UI as the content. The UI gets the client question and after that send it to the chatbot application.

In the chatbot application, the abstract encounters pre-

handling steps consolidate tokenization where the words are tokenized, by then the stop words are taken out and highlight.

The inquiry answers are put away in the information data set to recuperate the recover the answer.

4.1 Tokenization

The words or sentences isolated word by word for expanded handling. It isolates text into words at whatever point it encounters one of the summaries of shown character. Every one of the words is isolated from sentences and the accentuation is discarded. This suggests the subsequent stages.

4.2 Stop words expulsion.

The not required words are eliminated from the sentences to extricate significant catchphrase.

It is primarily utilized to eliminate pointless things like words happening too oftentimes in sentences.

It is likewise used to erase words that are not significant or the words with no particular implications like an, a, or the. This progression is applied to decrease preparing time or computational intricacy.

4.3 Recover the coordinated with the sentence.

The responses for the question which are acquired from the above interaction are recovered and shown in the UI.

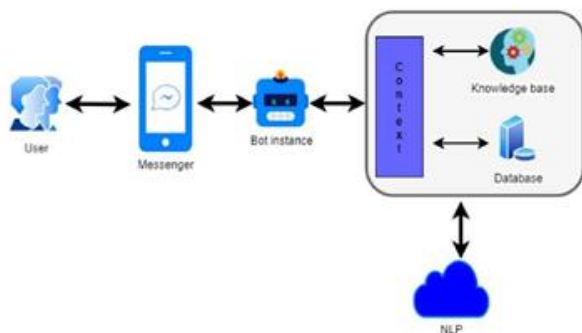


Figure 2. The designed framework of AI chatbot functionality. Image Downloaded from <https://www.mdpi.com/2227-9032/8/2/154/html>

5. FLOW CHART

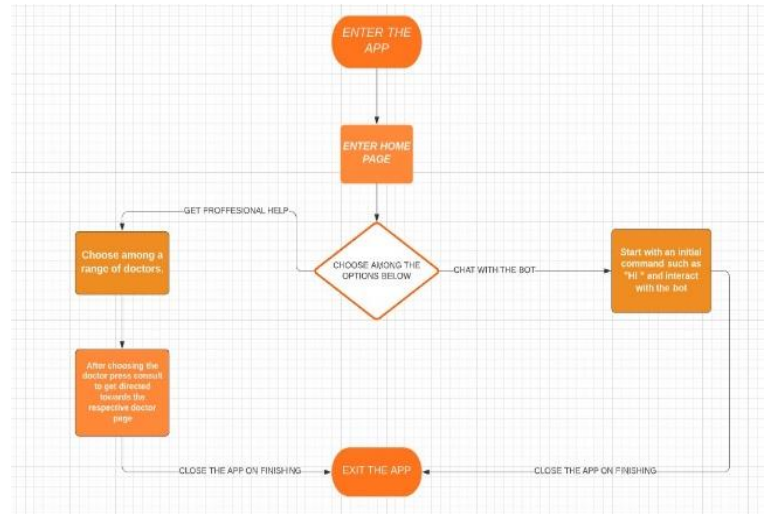


Figure 3. The Flow diagram of App flow

1. The user first enters the app and create an account or directly login's inside the app.
2. After login, the user enters the homepage and gets to choose among the 2-option available – a. Chat with the bot and b. Get professional Assistance.
3. After selecting the chat with bot option, the user can chat with the bot and discuss upon his problems and the bot on the basis of tokenization method detects keywords and acts accordingly.
4. The bot asks the user a series of questions and suggest some ways to cope up better.
5. I the user is not satisfied and needs additional help; the bot suggests user to visit the professional help section of the app.
6. On visiting the professional help section, the user is suggested some of the best therapists with their brief background and with subsequent links to visit the doctor's page and make an appointment.

6. RESULTS AND OUTPUT

Surveys And Social Media Marketing for Collection of Data

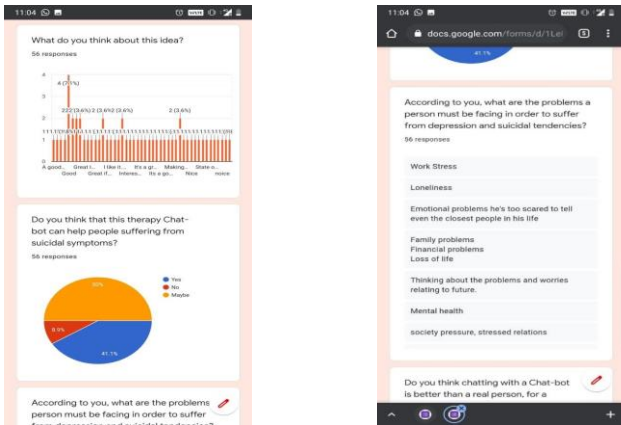


Figure 4. Survey of Mental health views of people which are used for the collection of data to train the Bot.

The bot has been trained on 4 user cases and needs to be constantly updated to keep up with the emerging problems.

Thus, after extensive training of the data, our bot will be very effective and be more open to a wider range of situations.

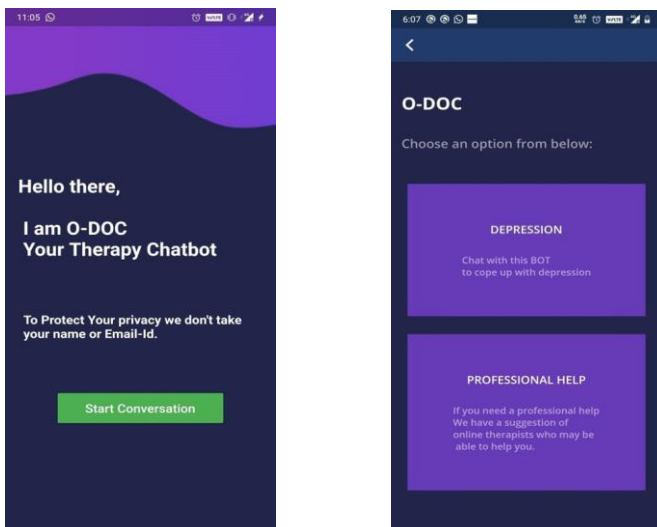


Figure 5. Image showing UI/UX of the app Menu

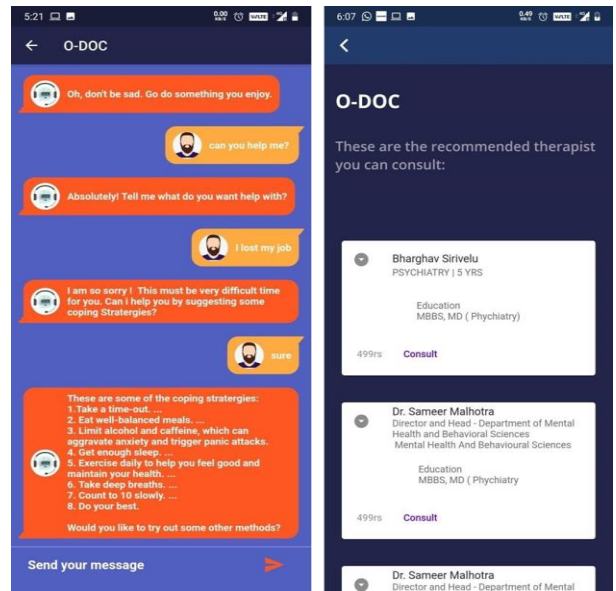


Figure 6. Image showing UI/UX of the chatbot page and professional help section

The bot is successful in detecting a user's problem and in responding with some ways on which how the user can feel better and get out of depression. The bot is able to detect all the 4 use cases taken into account which are:

- Personal loss
- Relationship problems
- Career / Job problems
- Academics / Education related problems.

On detecting each use case the bot responds accordingly and assess the user using simple series of questions to get information on the user's state of mind.

After a user press the consult button on a doctor's card, the user is directed to the specific doctor consultation page.

7. CONCLUSION

Our Therapy chatbot functions well and is able to work effectively.

Further for the future scope, due to the current pandemic , a new use case for dealing with coronavirus and lockdown stress can be added where the user or user's family suffering from Covid-19 can get help using this App to get rid of their mental stress and depression and to be able to cope up well to fight with this pandemic.

8. ACKNOWLEDGMENT

The authors wish to thank their mentor Dr. Swarnalatha P for her immense support throughout the research and for providing valuable guidance.

9. REFERENCES

1. Thara R, Padmavati R, Aynkran JR, John S. Community mental health in India: A rethink. *Int J Ment Health Syst.* 2008 Jul 14;2(1):11. doi: 10.1186/17524458-2-11. PMID: 18625047; PMCID: PMC2499987.
2. Gillian Cameron, David Cameron, Gavin Megaw, Raymond Bond, Maurice Mulvenna, Siobhan O'Neill, Cherie Armour, and Michael McTear. 2017. Towards a chatbot for digital counselling. In *Proceedings of the 31st British Computer Society Human Computer Interaction Conference* (*HCI'17*). BCS Learning & Development Ltd., Swindon, GBR, Article 24, 1-7. DOI: <https://doi.org/10.14236/ewic/HCI2017.24>
3. K. K. Fitzpatrick A. Darcy and M. Vierhile "Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent (woebot): a randomized controlled trial" *JMIR mental health* vol. 4 no. 2 pp. e19 2017.
4. 13. K. Chung and R. C. Park "Chatbot-based healthcare service with a knowledge base for cloud computing" *Cluster Computing* pp. 1-13 2018.
5. F. Patel, R. Thakore, I. Nandwani and S. K. Bharti, "Combating Depression in Students using an Intelligent ChatBot: A Cognitive Behavioral Therapy," 2019 IEEE 16th India Council International Conference (INDICON), Rajkot, India, 2019, pp. 1-4, doi: 10.1109/INDICON47234.2019.9030346.
6. Kyo-Joong Oh, Dongkun Lee, Byungsoo Ko and Ho-Jin Choi. A Chatbot for Psychiatric Counseling in Mental Healthcare Service Based on Emotional Dialogue Analysis and Sentence Generation. In: *Mobile Data Management (MDM), 2017 18th IEEE International Conference*. DOI:10.1109/MDM.2017.64 [7]. Mrs Rashmi Dharwadkar and Neeta A. Deshpande "A Medical ChatBot" *International Journal of Computer Trends and Technology (IJCTT)* – vol. 60 no. 1 June 2018.
7. 1. K. Oh D. Lee B. Ko and H. Choi "A Chatbot for Psychiatric Counseling in Mental Healthcare Service Based on Emotional Dialogue Analysis and Sentence Generation" 2017 18th IEEE International Conference on Mobile Data Management (MDM) pp. 371-375 2017.
8. Menal. Dahiya "A Tool of Conversation: Chatbot" *INTERNATIONAL JOURNAL OF COMPUTER SCIENCES AND ENGINEERING* vol. 5 pp. 158-161 2017.
9. L. Athota, V. K. Shukla, N. Pandey and A. Rana, "Chatbot for Healthcare System Using Artificial Intelligence," 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), Noida, India, 2020, pp. 619-622, doi: 10.1109/ICRITO48877.2020.9197833.
10. 6. I. J. Ribeiro R. Pereira I. V. Freire B. G. de Oliveira C. A. Casotti and E. N. Boery "Stress and quality of life among university students: A systematic literature review" *Health Professions Education* vol. 4 no. 2 pp. 70-77 2018.
11. K. Denecke, S. Vaaheesan and A. Arulnathan, "A Mental Health Chatbot for Regulating Emotions (SERMO) - Concept and Usability Test," in *IEEE Transactions on Emerging Topics in Computing*, doi:10.1109/TETC.2020.2974478.