

# SENTIMENTAL ANALYSIS FOR CHATBOTS TO MAKE THEM EMOTIONALLY REACTIVE

Aishwarya B R<sup>1</sup>, Deepthi P<sup>2</sup>, Greeshma B G<sup>4</sup>, Madhumitha Raj C<sup>3</sup>, Jahnavi S<sup>5</sup>

<sup>1</sup> Student, Computer Science and Engineering, DSATM, Karnataka, India

<sup>2</sup> Student, Computer Science and Engineering, DSATM, Karnataka, India

<sup>3</sup> Student, Computer Science and Engineering, DSATM, Karnataka, India

<sup>4</sup> Student, Computer Science and Engineering, DSATM, Karnataka, India

<sup>5</sup> Assistant Professor, Computer Science and Engineering, DSATM, Karnataka, India

## ABSTRACT

Many surveys shows the increase in the mental disorders in many countries all over the world. But, the number of human experts for giving mental healthcare guidelines or services are not increasing. So, a application integrated with chatbot is developed. Where, CBT that is the Cognitive Behaviour Therapy method is used which helps mentally unstable people to deal with their emotions and feelings. The emotions of the user is automatically determined using NLP that is natural language processing and lexicon based sentiment analysis methods from the natural language inputs.

**Keyword :** - Cognitive Behaviour Therapy(CBT), Natural Language Processing (NLP), Sentimental lexicon based algorithms.

## 1. INTRODUCTION

Mental disorders is one of the major problems, which if not taken care at the right time causes a severe problem. There have been many surveys which shows that over last few years there is a increase in the number of mental disorder cases but the human resources for the services is not increasing. For this purpose, a application integrate d with chatbot, is developed.

Chatbots are software that is a conversational interface. Emotional feeling is a peculiar characteristics of humans that differentiates from the machines. Hence to make chatbots more humanized, a emotional chatbot to analyse the user's sentiment is developed.

The Cognitive Behaviour Therapy method is used to encourage people in dealing their feelings and emotions. The emotion of the person is automatically determined from the NLP that is the Natural Language Processing method and by the sentimental lexicon analysis. In which the rule based lexicon approach is used. Text sentimental recognition recognizes the person's sentiment or his/her state of emotions and responds with the appropriate and the best response using the multi-turn dialogue method.

Here, we are combining the multi-turn dialogue method and the sentimental analysis method for developing a chatbot, which categorizes the sentences entered in terms of state of emotions and a suitable response is selected.

## 2. PRIOR WORK

The paper, A mental healthcare system using method of SAT counselling provides a digital course to support mentally disorder people by converting the structured association technique into the digital content. By

using the Convolution Neural Network, Light image processing, Virtual reality methods. The limitations here is that the test was conducted only once and there was no continuity to verify whether the course was useful.

A character-level method for text classification paper gives information on classifying the text to support selecting a suitable response for the text, using the convolution neural network, Recurrent neural network algorithms. The classifier's accuracy is improved and it is a light weighted solution. Multi-turn Dialogue model used in Emotional chatbot paper gives information about implementing emotional chatbot using the model of multi-turn dialogue. The advantage in this paper is using generative model chatbot which responds to user based on their conversation in daily base. It has disadvantage of misconception, due to dataset generated by internet or other sources which express more emotion than real life.

A text classifier using KNN Algorithm based on K-medoids and rough set this paper provides knowledge about classification of text using the k-nearest neighbours (KNN). They used naïve bias algorithm and neural networks. Main advantage is, that it has good accuracy and scalability. And disadvantage is that it is computationally expensive and consumes lot of server resource.

Emotion Lines: An Emotion Corpus of Multi-party Conversation this paper's main objective is to extend the dataset for textual emotion detection. They used LSTM algorithm for text analysis and CNN and bidirectional CNN algorithm for accuracy. In this model we have tried to tackle with most of these problem by collecting textual dialogues from various internet sources to establish emotional connection to provide human-like response. But it has limitation that it lacks minor emotion categories like fear and tragedies for sadness utterances.

Multi-Turn Response Selection for Chatbots with Deep Attention Matching Network paper uses multi-turn scenario for response selection. This paper uses Deep attention matching network. The advantage is that we consider every word or the conservation for response selection so it has more accuracy. The limitation is that there can be some logical errors.

Deep learning model used in text classification, the objective of this paper is to track friends location and send SOS alert using android application. They used Natural language processing tool, provides the function of sentence tokenization, heatmap, visualization. They are computationally effective and no need of any third-party libraries. But text classification accuracy is a major concern here.

Research of Text Classification Based on improved TF-IDF algorithm this papers objective is text classification to select the suitable response. They used improved TF-IDF algorithm. The main advantage is simple for computation and highly scalable. But the limitation is accuracy of text classification.

### 3. RELATED WORK

A. SeqGAN is nothing but combination of seq2seq model and GAN(generative adversarial network).Where seq2seq model acts as a generator and uses discriminator to classify an image as fake or original. The main aim of this is to allow discrimination of the rank that the generator generates the sentence.

B. Multi-turn dialogue model The main lead for commercialization of chatbot are natural language understanding and intent recognition of multiturn dialogue. The Multiturn dialogue model works based on users the users previous conversation. By using this will be humanized communication between user and computer rather than doing some specific task.

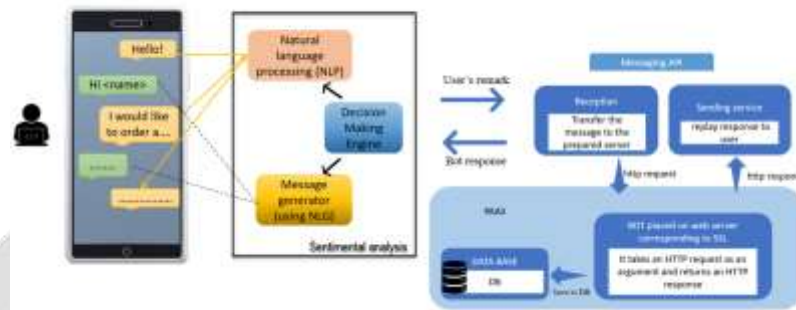
C. Light method process and face image process. The SAT methods are light image method and representation face image method. By using face image method, the pressure of the clients are reduced by making them in visualizing a light image covered in the worm colour through a structured questions. face image process helps the client to reduce pressure by utilizing the memories of the substitute presented by face representatives.

D. VR application in medical services The use of the VR in medical care is VERT(Virtual Reality Exposure Therapy).that is they produces or creates an fearful environment to which the patients have phobias. And helps them to get used to it. But some times it may raise fear instead.

E. Attention Module Attention is a very effective in Natural Language Processing (NLP) and other Research areas. Attention mechanism shows remarkable ability of attention to grab semantic dependencies, that helps us to improve multiturn response selection with the help of attention mechanism.

#### 4. BUILDING EMOTIONAL CHATBOT

We know that, emotion is a crucial aspect in building a humanized chatbot. To the present day, most of the emotional chatbots are developed based on the neural-based model. We use Python's chatterbot to implement this chat bot. This model is not language dependent so it can be trained to speak in more than one language. Machine learning is used to improve the knowledge of the bot while it interacts with humans. Python library is used to easily engage the bot in a conversation as shown in Fig 1.



**Fig -1:** Block diagram of Emotional Chatbot

The end users can access the portal by registering a new account. And then the users can login to their accounts using the registered email ID and password to access various other divisions in the portal. The user can also change the values in various fields of their profile and change their password to set a new password. The users can logout to end the session created during login and can also delete the account if they no longer wish to access the portal.

This bot is trained and tested using the available datasets to find its accuracy and the accuracy of it is improved if needed using optimization. A fitted model is used to foresee the expected responses. Certain APIs are developed in order to re-use the developed application in existing bots. An easily interactive front-end interface is set up so the user's session with the application can be simple and effective. This model will also be deployed on a cloud server to make it available world wide.

AI chatbots were a successful replacement for the human conversational agent as it is available 24\*7 and customers could get response immediately. But the existing system is incapable of considering human emotions while responding and responses only with the previously stored messages.

It is an ideal model for purposes like looking for restaurants, making queries about the weather conditions, answering the frequently asked questions and etc. But it does not qualify as an ideal system for human-computer interactions where a human's emotions are also to be considered while responding.

**Limitations:** All the research work as a standalone solution where the patient or the end user needs to either physically deploy the wearable devices or access the solution in their personal laptop or mobile application. None of these solutions have been made available over the cloud using as-a-service model thus extending the availability of the solution across the globe.

## 5. CONCLUSIONS

The model of multi-turn dialogue and the analysis of sentiment recognition is being combined in developing chatbots in this study. That is it will be developed to be used in the day to day conversations rather than the specific time. In future, this model is to be improved, so that learning for life long can be integrated and intent judgement can be served.

## 6. REFERENCES

- [1]. An emotional corpus of multi-party conversations Sheng- Yen Chen<sup>1\*</sup> , Chao-Chun Hsu<sup>1\*</sup> , Chuan-chun kuo<sup>1</sup>, Ting-Hao (Kenneth) Huang<sup>2</sup> , Lun-wei ku<sup>1</sup> 30 May 2018
- [2]. Virtual reality course based on the SAT Counseling Method for Self-guided Mental healthcare Tastuya ito Graduate School of Library, University of Tsukuba Tsukuba, Japan s1721654@s.tuskuba.ac.jp 2018 IEEE International Conference of Healthcare Informtics
- [3]. Model of Multi-turn Dialogue in Emotional Chatbot Chien-Hao Kao Institute of Medical Science and Technology National Sun Yat-sen University Kaohsiung, Taiwan kao910019@gmail.com 2018
- [4]. A Mental Health Chatbot for Regulating Emotions (SERMO) - Concept and Usability Test Kerstin Denecke, Sayan Vaaheesan, and Aaganya Arulnathan JOURNAL OF LATEX CLASS FILES, VOL. 14, NO. 8, AUGUST 2015
- [5]. I. Sutskever, O. Vinyals, and Q. V. Le, "Sequence to sequence learning with neural networks," in Advances in neural information processing systems, 2014, pp. 3104-3112.
- [6]. L. Yu, W. Zhang, J. Wang, and Y. Yu, "Seqgan: Sequence generative adversarial nets with policy gradient," in Thirty-First AAAI Conference on Artificial Intelligence, 2017.
- [7]. J. Li, W. Monroe, T. Shi, S. Jean, A. Ritter, and D. Jurafsky, "Adversarial learning for neural dialogue generation," arXiv preprint arXiv:1701.06547, 2017.