

GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES A PSYBOT-AN INTERACTIVE COUNSELOR

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ABSTRACT

Health professionals have limited resources and are not able to personally monitor and support patients in their daily life. And the rate of depression is growing like alarming rate. A study found that people more likely to open to talking to a computer than a human. So, in this paper, we introduce an application of counselling chatbot, which provides the conversational service for mental health care based on some emotional recognition methods like Natural Language processing (NLP) and chat assistant platform. This can provide the service per head to head. The reasons for depression are many like continues difficulties, failures, disguised unemployment, loneliness this causes to the stress in the life. This paper talks about a Chatbot which can release your stress and helps to come out from your depression state. This chatbot acts as a virtual friend who listens, understands, make them comfortable, encourage, guide and helps to pour out their bad feelings, loneliness and thus releasing the stress.

Keywords: *Conversational service, Psychiatric, counselling, Mental health care, Chatbot, IBM Watson Cloud.*

I. INTRODUCTION

This chatbot deals with the Psychological problems of a human, which designate to be an object and standardization measure of a sample behavior. The term Psychology is derived from the Greek word Psyche means Soul and Logos means knowledge. The better definition for Psychology is “Psychological tests are written, visual, or verbal evaluations administrated to assess the cognitive and emotional functioning of children and adults”. The purpose of this test is to assess a variety of mental abilities and attributes including achievement ability, personality, and neurological functioning. Now a days there are many psychological tests are there for example Intelligence Test, Personality Test, Attitude Test, Achievement Test, Aptitude Test, Neuropsychological test, Vocational Test and many more.

Psychological problems (also called as Mental disorder or Mental illness) means “A wide range of conditions that effect the mood, thinking and behavior”. The most common types are Clinical depression, anxiety disorder, Bipolar disorder, Dementia, Attention-deficit/hyperactivity disorder, Schizophrenia, Obsessive compulsive disorder, Autism and Post traumatic stress disorder.

Technology based self service channels and digital health intervention have the potential to support patients in their everyday life and health professional likewise. Although there are scalable self service channels in the form digital voice assistants and chatbots offered by Apple (Siri), Amazon (Alexa), Google (Assistant), Microsoft (Cortana) or Samsung (Bixby), they cannot be (yet) be applied in health care. However this services just applies the NLP, they Do not apply the emotion recognition. Intodays world, many people undergo psychotherapy due to change in awareness of psychiatric treatment. So it is not easy to aware of mental illness of one selves is not generally easy. And there is lack of experts compared to demand, the cost of consultations are expensive with the experts: psychiatrics, mental clinical counsellor, and mental psychologist. Therefore, an unfair problem of treatment opportunity arise. In order to solve the problem, such as unfair treatment opportunity, self diagnosis and simple consultation services need to encourage treatments by specialized medical institutions. Using the conversational service, anyone can easily accessible and receive practical treatments for mental counseling services.

The conversational service can provide personalized counseling service to individual head-to-head. It is important to resolve the mental dis-order such as depression and lethargy. One-to-one conversation can resolve this problem effectively. The conversational service for a psychiatric counseling has many benefits one of them are:

Critique In the early study [7], they have developed simple chat bot that provide interventions about subsequent behavior change for young adults' alcohol risk. They give interventions based on three item questionnaires about drinking habit via alcohol consumption level and frequency of drinking by internationally well-known as AUDIT-C the 17 participants are satisfied and perceived usefulness. However the chatbot can not adapt to long term mental disease, because there is no continuous observation. Ethical contemplation about interventions of chatbot considered it as well.

II. LITERATURE SURVEY

A chatbot is a conversational character which seems to look like a human. It's a computer program conducting the conversion through different method, it usually acts as a virtual assistant and can have its own virtualization. All of these activities including the conversational methods is simulated through artificial intelligence. Nowadays chat oriented dialogue system has gained popularity as they had attempted to get into daily life and achieve some work. For the chatbots to behave like a human, it has to go through and pass the Turing Test.

AIML stands for (Artificial Intelligence Markup Language) is XML specifications, it makes it possible to create human interfaces while keeping the implementation simple to program, easy to understand and is maintainable.

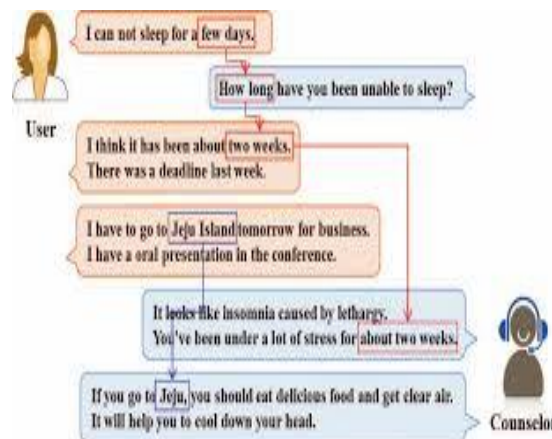
2.1. Understanding natural language processing for chatbots

Communication with natural language be it a text or a speech act, both merely depends upon our knowledge and expectations within the reach of the course. Understanding it not just the exchange of words: it also requires interface about the speakers goals, knowledge and assumptions as well as the context of the interaction. Implementation of a natural language requires that understandingly represent knowledge and expectations of the domain and reason effectively about them.

The goal of natural language processing is to build computational models of natural language for its analysis and generation. First, there is a technological motivation of building computer systems such as machine translation systems, natural language interfaces to databases, man-machine interfaces to computers in general, speech understanding systems, etc. Computers have been widely used to store and manage large of amounts of data. The data might pertain to railway registration, library, banking, management, information, and so on. Normally, to use these systems, specialized computer knowledge is necessary.

The goal of natural language interfaces is to remove this barrier. It is necessary to understand the sentences in dialogues. Understanding the users inputs provide a basis to deliver an appropriate response. Each user will have different expression to use for conversation depending on their ability and vocabulary skills. In the chatbot, method for paraphrasing by various representing expressions which applies to understand by the machine using analysis of sentence based on word embedded models. The word embedded models include the usage of semantic information of words and represent the word as a vector. Using the word vector, we can collect synonym knowledge of lexical units. The lexical units here having similar semantics have similar word vectors from synonym knowledge. In spatial-temporal context analysis means that analyze explicit and implicit expressions about spatial and temporal context in natural language sentences. The analysis converts an unstructured expressions to a structured data about the spatial-temporal information. The data is useful to response that matches the spatial-temporal context with the chatbot.

Figure:1

*An example of spatial-temporal context analysis*

2.2.ELIZA

Eliza, the first chatbot created by Professor Joseph Weizenbaum from Massachusetts institute of technology is described as a program making the use of Natural Language conversion possibly with a computer the problems with ELIZA are mainly with the identification of the keywords, the discovery of the minimal content, the choice of the appropriate transformation, generation of responses in the absence of keywords and the prevision of the editing capability for ELIZA scripts later on the problems on ELIZA are preoccupied. A.L.I.C.E is the new ELIZA, the concluded distinctive between those two can be described as: ELIZA- keyword spotting and pattern matching with 200 stimulus response pair.

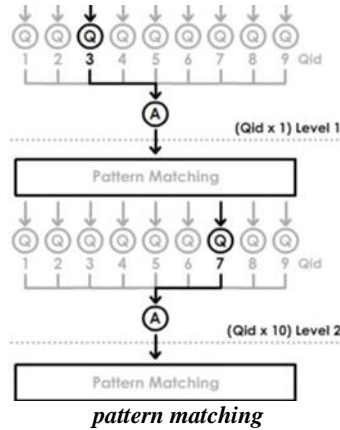
A.L.I.C.E-case based reasoning (CBS) for extraction of a correct context of ambiguous words, random sentence generator, and knowledge based spell checker and 4500 stimulus respond pairs. It's andaward winning natural language for the chatbot and its intelligence, it uses AIML for the response of the queries. Here, the ELIZA is based on natural language and matching of the pattern. Firstly, it has to pass through the Turing test, this gives the appropriate or short conversation between the user-interface. The chatbots mainly consists of parts, the chatbot engine and the language model, it helps in implementing the bot in an advanced knowledge. Here, the primary feature helps in minimalizing the robot designing languages as it is the simplest. It consist of input and output questions, these questions are termed as pattern and the answer to that specific question is termed as a template.

2.3.CHATBOT for diabetics

In today's world diabetes is the most common disease that many people are suffering from and we also know that there is no permanent solution for this. We need to manage one diet in order to keep it regulated. There are 3 major components that monitors proper diet that has to be given to the patient or the affected ones by motivating them by showing them ways on how to manage it. Here, the process is that the patient will be having a regular chatting conversation using natural language along with the chatbot will be the one who will question and answer as input by patient session. The session will go on till the patient is successfully diagnosed and will be given with the most suitable advice for their diabetes condition. In order to make the diagnosis crystal clear, chatbot will be asking several questions in sequence and then those questions will be selected based on the diabetic giving their answers to them. This clearly signifies that the chatbot should know the complete conversation and the information flow.

This session of chatting goes in flow as the user enters as an input and the chatbot will response. This logic can be said as search system where the user input searches the parameter and the search engine will return the result regarding the parameter. It is more of like a single flow process where previous input could not be relevant to the present or the future input. Perhaps, in chatbot technology, there is one such way where the chatbot can remember the previous conversation that is the input. By using the "Wildcard" in AIML in chatbots having the ability to remember things from the past. Thus, by using this wildcards, chatbot will have the ability to copy some words that user input and paste it as a response and eventually it will be given back to the user .

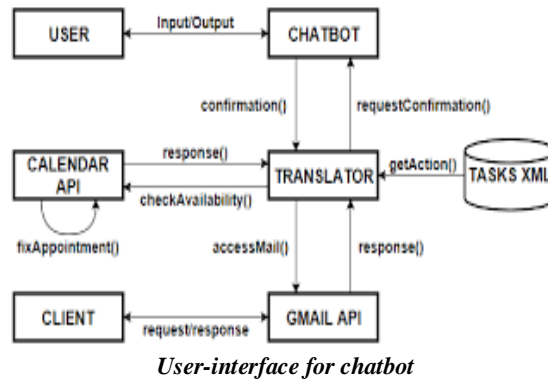
Figure:2



2.4.Chappie

A Semi Automatic Intelligent Chatbot Chappie was born as a requirement from the business side and desire for efficiency and automobile automation. Many people in Asia and in other continents are not very computer friendly and well prepare the chat to get the order fulfilled if implements the semi automotive intelligent chatbot called chappie. The entire paper focuses on a single bot and the bot and human interactions. They can also be claimed as safebot as the information given as the input will be safe and secured till you need a response from the bot.

Figure:3



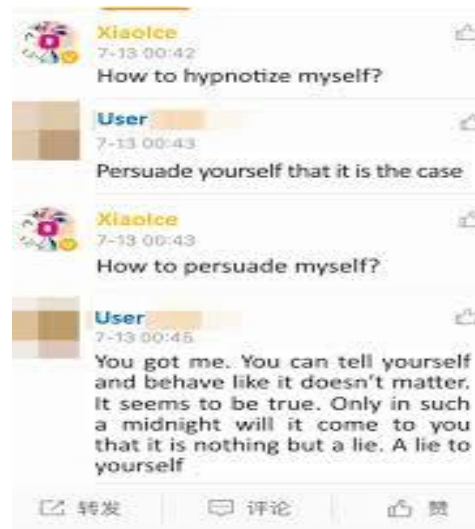
Chappie is trying to redefine chat expression in an automated manner. It will be the superior in bots with the supervisor in bots called the Jamie. As a personal assistant, a human makes it a little difficult for getting the work done that is booking tickets or be it ordering food online or getting down into the beauty services and so on. As soon as the chatbot understands the content then the interaction between the human and the chatbot becomes super efficient and easy for it understands. There is also a semi automatic chatbot which can change into manual mode that is it can do work on its own if only if it understands each every content learnt for the user and from the user.

The chappie here is recorded very wisely thereby encouraging people for its evolution from a human being. Here, the semi intelligent chatbot is termed as chappie.

2.5. Social chatbots

The current social media has accelerated with a very high speed, replacing many other technologies and leading to the advancement of broadband and wireless networking theory. And with this technology most of the people are connected digitally. There is nothing to be surprised that the social chatbots have been created or developed we can say a little more precisely, for like an alternate for the indulgement. Earlier, the chatbot were designed for chitchat purposes and social chatbots are now created o the help of user interface. All the social chatbots has the capability of performing various tasks for the users for the context basically. For this to happen the social chatbots should be developed in such a way that they acquire all the skills accommodating all the user's requests. Unlike other chatbots, they are designed efficiently without any hurry; it ends up the conversation super soon and computer friendly. The time required conversing with the users also satisfies the condition. One such widely used social chatbot invented was Xiaolce: it was widely developed all over the internet which was released by the microsoft company in may and year 2014.

Figure:4



social chatbot conversation

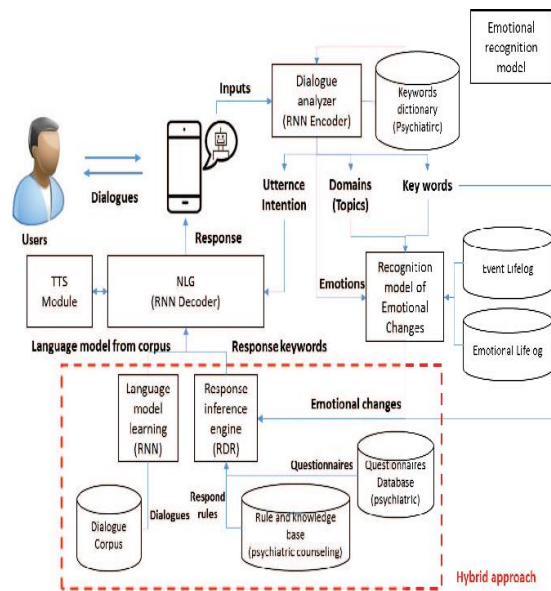
2.6. Role of emotions in a chatbot

The recognition of emotions plays a very important role in recent days to improve both the openness and effectiveness of human-computer interaction. Factors like interpretations, perceptions and response of feelings related to the experience one has encountered falls under the category of emotions. The recognition of emotions the recognition of the emotional state of a person as anger, sad, happy, neutral, etc. the recognition of emotions are classified into different approaches such as the word, the text, the face and all. The applications are monitoring, law, entertainment, e-learning, medicine. A state associated with a wide variety of feelings, thoughts and emotions are subjective experiences or experiences from an individual point of view. Emotions are often associated with mood, temperament, personality and disposition. In proposed system, the chatbot is built in such a way using an artificial intelligence algorithm. The bots speaks to us like a real person, with funny answers that makes the user to feel that it is no talking to a bot. if the user feels sad, the bot sends a joke present in the database and reaches the user in the window terminal. The system can conduct the conversation through the chat applications. Emotions detection is itself considered very important in the area of research in the field of computing emotionally. Interactions with the human computer, the face recognition of emulations plays a very important role whilst the detection of the emotions of the text receives less attention. The proposed system introduces chatbot which is nothing but a computer program and the conversation takes place through auditory or textual methods conducted by this computer program which is nothing but a chatbot, it makes a person not to understand that it is conversing with a bot. here will be an automatic interface of jokes or funny quotes to put up a person's mood instantly.

The conversational service is a type of counseling so we should understand dialogues between user and chatbot based on various natural language understanding methods.

The chatbot that provides conversational service for psychiatric counseling collect and summarizes the dialogues of text , voice and video information to recognize users emotions. Based on the information. The purpose of the service is to develop a personalized dialog system that communicates emotionally, with the user through text , voice, and speech and visual expression. It is the distribution of three parts: understanding conversation, emotional recognition and expression for communication.

Figure:5



The counseling chatbot architecture

2.7. Sentence generation for psychiatric counseling

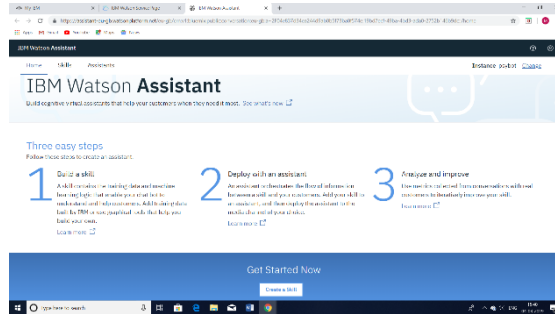
It is very important to have a natural conversation in the context of the conversation. If you do not feel that you are talking to someone else in the counseling, the effectiveness of the counseling will diminish. To solve the problem, we apply a technique to generate natural sentences based on an RNN-based decoder; it generates considering the context qualities of the conversation.

III. PROPOSED METHODOLOGY:

IBM cloud computing is a set a of cloud computing services for business offered by the information technology company IBM(International Business Machines).IBM cloud includes Infrastructure as a Service(IaaS), Software as a Service(SaaS)and Platform as a Service(PaaS) offered through public, private and hybrid cloud delivery models, in addition to the components that make up those clouds. The cloud is a storage place where data is accessible for everyone.

To create a chatbot in ibm Watson create an account in ibm. then go to Dashboard IBM WATSON assistant click on create now as shown in figure.

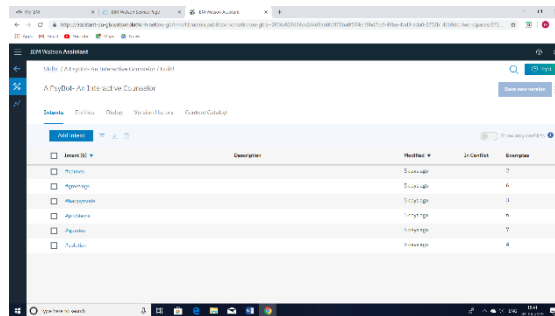
Figure:1



watsonassistant create page

- Then lunch the tool there you can see the create skill page click on it name your skill.
- There you can see the three things as shown in the below diagram 3.2 .Intent ,Entity and Dialog.
- Intent is a collection of inputs entered by user and the dialog is response to that intent. Entities is the grouping of similar type of inputs.
- We named our chatbot as “A PsyBot-An Interactive Counsellor”.

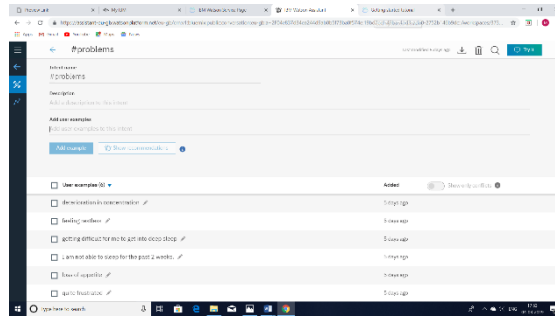
Figure:2



intent,entity and dialog

- To create an intent click on add intent,there you can see “add intent example” give your intent name and click on create intent.
- The intent is denoted by the symbol ‘#’.
- When you create an intent you have to give the user example also. click on user example give an example like “hi” click on add example. This is for the greeting intent. likewise you can give more examples for greeting intent like “hello”, good morning” as many you want.
- In our chatbot we have created six intents as shown in figure.they are :greeting intent, queries, problems ,causes , solutions and happy mode. As we know that it is a psybot for psychological problems so it will have the causes and problems intent.
- In the problem intent we gave some problems that a user is suffering from like: Sleep deprived, frequent headaches and so on.as shown in figure

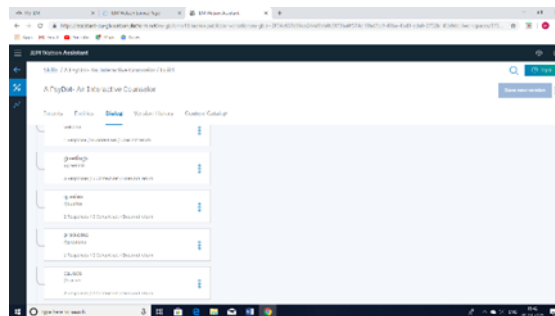
Figure:3



Creating the Intents

- And we have created the examples for other intents.
- The next is creating the dialog. A dialog defines the flow of a conversation in the form of a logic tree. It matches the intent(What user says) to the response (what bot says back).each node of tree has a condition that triggers it based on the user input.
- Now in Watson assistant tool click on dialog , click create. There you can see two nodes ‘welcome node’ and ‘anything else’ node .we have to add our node between these two nodes.
- Click on more icon(:) on the **welcome** node, and **add node below** .
- Type #greeting in the **enter condition** of this field. and select **#greetings** option. and hear you can response to your intents like ‘hi’, ‘hello’ and as many you want .For adding the multiple response go to the settings there on the **Multiple Responses** option.
- Now create the dialogs for all the intents that you have created in intent tab. The dialog node looks like figure shown below.

Figure:4



Dialog creation

- We have created the six dialog nodes like greeting node, causes node , problem node ,queries node ,solution node.
- Entities are the grouping of similar types user inputs, for example if the user entered an intent like “I am sad”, for this intent we create the entity of synonyms of the **sad** word. for creating an entity click on **entity** tab ,click on **my entity**, create entities .
- Click on **Tryit** icon to open “try it out”pane.at the bottom of the page write ‘hi’ and press enter. the output indicates that # hi intent recognized and the appropriate response ‘hi’ appears.

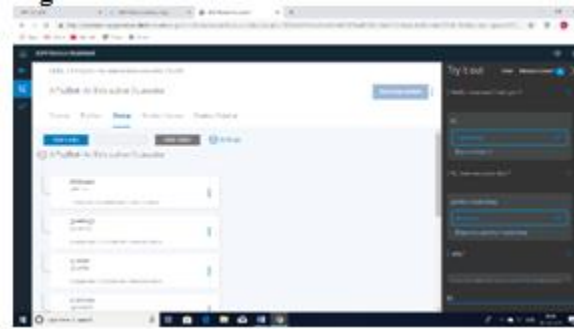
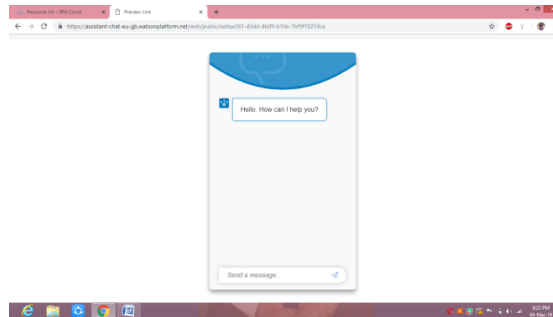


Figure:5 Try it pane

- Like wise we can try other things too .try it out pane is for checking weather the data is entering properly or not.Is the bot responding properly or nor.

IV. RESULTS AND DISCUSSION

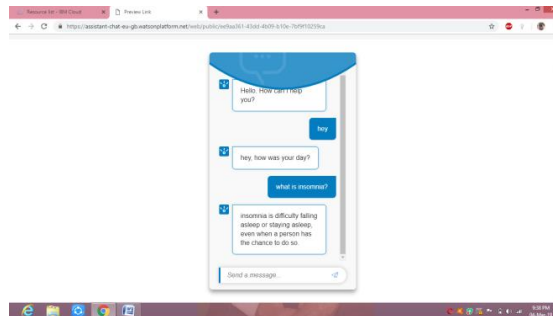
Figure:1



Testing the chatbot

In the IBM Watson assistant we can create our own kind of chatbot or assistant. The assistant responds in a following manner. Firstly, the greetings are given to the assistant bot when the preview link is opened and says “hey, how may I help you ?”. Then the input is given in response. It asks you how your day is going and wants you to response in a good way. It collects all the symptoms you give to the bot that is the psybot, and at the end tells you what you are going through that is the problem you are basically facing.

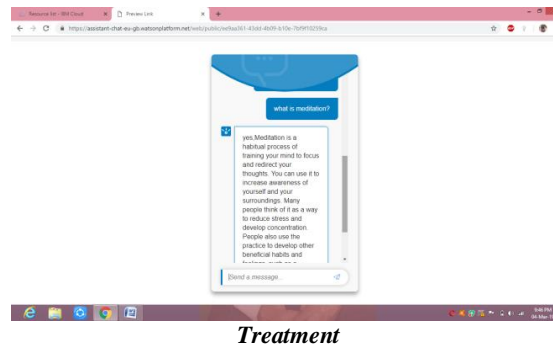
Figure:2



What is insomnia

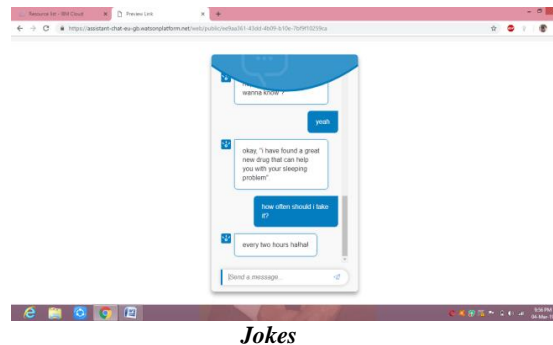
When the user is said that it is suffering from insomnia then the user asks what insomnia is then bot responds by saying what it means. When the user asks what are the solutions to the problem then the bot responds by saying that meditation can help a person put and when the user asks the bot what it means, then the bot responds. We need to tell each and everything what a user is facing so that bot responds to it. A user should feel free to ask as the conversation is only between the user and the bot.

Figure:3



When the bot finds that the user here is depressed, then the bot responds by giving jokes as an output, it would ask the user about the questions asked by the bot and the questions asked are quite funny, the user responds to it and thereby the bots achieves its moto of enlightening the users mood.

Figure:4



V. CONCLUSION

We designed and implemented a chatbot that provides personalized counselling service to head-to-head. The chatbot assist psychiatric counseling in dialogues. The service communicates with a user through dialogues and conducts psychiatric counselling using NLP, sentence generation technique and AIML. By using this chatbot anyone can know their mental health like are they suffering from depression or not. And it also provides the treatment for the problem. It is easy to communicate with a counseling chatbot rather than a human. We have created this chatbot with the easy methods.

In, future we will integrate this chatbot with the social networks like facebook and Instagram. and we will try to implement it to converse with the voice message and facial expression.

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