A Novel Approach for Medical Assistance Using Trained Chatbot

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Abstract—**There are lot of treatments that are available for various diseases. No human can possibly know about all the medicines and the diseases. So, the problem is that there isn't any place where anyone can have the details of the diseases or the medicines. What if there is a place where you can find your health problem just by entering symptoms or just scanning an ECG or you can check whether the prescribed medicine is supposed to be used the way you are told to. Then it will help us to deduce the problem and to verify the solution.**

The proposed idea is to create a system with artificial intelligence that can meet the requirements. The AI can predict the diseases based on the symptoms and give the list of available treatments. The System can also give the composition of the medicines and their prescribed uses. It helps them to take the correct treatment. Hence the people can have an idea about their health and can have the right protection.

Keywords—*Chatbot; Artificilal Intelligence; AI; Prediction; Disease; Medicine.*

I. Introduction

Artificial Intelligence [3] gives the supreme power to mimic the human way of thinking and behaving to a computer. Chatbot's are such kind of computer programs that interact with users using natural languages. This technology started in the 1960's the aim was to see if Chatbot systems could fool users that they were real humans. However, Chatbot systems are not only built to mimic human conversation, and entertain users. Chatbot's work basically on Artificial intelligence, so using this capability we have decided to add some contribution to the Health Informatics [9].

A Chatbot system [2] is a software program that interacts with users using natural language. Different terms have been used for a Chatbot such as: machine conversation system, virtual agent, dialogue system, and Chatterbot. The purpose of a Chatbot system is to simulate a human conversation; the Chatbot architecture integrates a language model and computational algorithms [7] to emulate informal chat communication between a human user and a Computer using natural language. In addition to that we have added some

Medical details to the system so that Chatbot's delivers it to the user whenever they needed it.

II. Features

A. Build a simple and interactive real time chat system [6].
B. Age based Medicine dosage details.
C. Dedicated system which is able to solve all the queries regarding a medicine.
D. Designed in such a way that it should work in cross platform devices.
E. Effective Symptom based disease prediction.
F. Can be easily integrated and upgradable.

A. Build a simple and interactive real time chat system.

Nowadays mobile conversations are becoming the trend in communication. The speciality of such conversations are, they are really simple and time saving mode of communication. So Chatbot can be really successful if it follows all the simplicity of an instant messaging application. Chatbot's are usually text-driven, with images and unified widgets, which makes it easy to start interacting with a bot. Just think of the messenger app you're using – it's as simple as it can possibly be, and that's exactly why we like these things so much. Content is king, so don't distract your user with fancy but redundant features. Also, simplicity is what helped the most successful brands win our hearts. These things are the core of a Chatbot concept that's why they are doomed for success.

Basically, there are 2 types of Chatbot's – unintelligent ones that act using predefined conversation flows written by people and intelligent AI Chatbot's [8] that use machine learning. You may read about these two in more detail in some of our other blog posts. No matter which kind of bot you build, it will be anyway more personal and human than your usual app. You can fill it with your personality, your brand's identity, make it speak to your users like you would, change its message depending on the input from the user.

What's more, we are likely to ascribe human [4] features to inanimate things; personification of complex notions is most natural function of our mind. So, when we interact with a Chatbot, we are tricked into thinking that we communicate

with a person [5]. Just imagine what kind of possibilities open to us here – no more business jibber jabber focused on selling to everybody, to some unified abstract person and not a unique individual. There's one difference between a real person and an AI, though. A Chatbot is selfless and dedicated to you, it is always there for you and it always has time for you. And that's even more incredible about this technology.
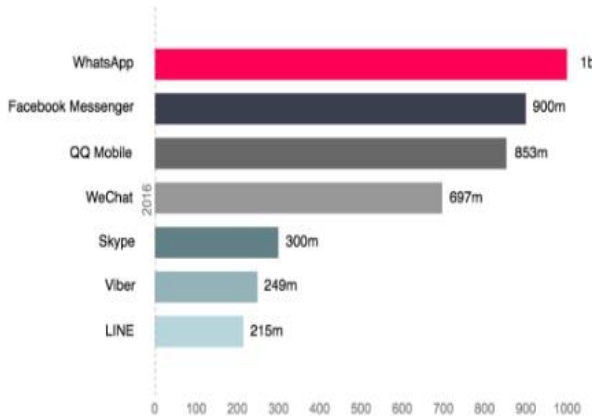

Fig.1. User density of various message applications.

B. Age based Medicine dosage details.

Not everyone can intake the same amount of medicine, basically the intake dosage is categorized based on the age and weight of the person who intake the medicine. So, the Chatbot is designed in a way that it gives the medicine description including the dosage of medicine [12] based on the age of the user.

Json format for the Chatbot is given below:

```
{
 "medicine": {
        "med001": {
                "name": "Amoxicillin",
                "dosage": "Adult - 500 mg every 12 hours
or 250 mg every    8 hours
                Child - 40 mg per kilogram (kg) of weight
per day in divided doses every 8 hours",
                "side effect": "Upset stomach, Diarrhoea,
Vomiting, Yeast infection",
                "checom":  "4-thia-1-azabicyclo  [3.2.0]-
heptane-2-carboxylic acid, 3,3 -dimethyl-7-oxo-6-[(phenoxy
acetyl)amino]-, monopotassium salt, [2S-(2a,5a,6b)]",
                "uses":  "Amoxicillin  is  used  to  treat
different  types  of  infection  caused  by  bacteria,  such  as
tonsillitis, bronchitis, pneumonia, gonorrhoea, and infections
of the ear, nose, throat, skin, or urinary tract."
                }
         }
}
```

C. Dedicated system which is able to solve all the queries regarding a medicine.

Current medicine description sites are really pathetic and weird in interaction and detailing of medicine. As the no. of kind of diseases are very high, so is the no. of medicines. There are various companies that are manufacturing them. The manufacturers have their own signature in the medicine. Hence each of them are different are one way or another. So, there is no way to check the composition or use of each medicine.

The system can describe the medicine given the name and manufacturing company. It will give the chemical composition, the dosage for each age group, prescribed uses, side effects etc. The users can ask almost any query regarding the medicine. Then the users can verify the doctor's opinion and be sure of the treatment suggested.
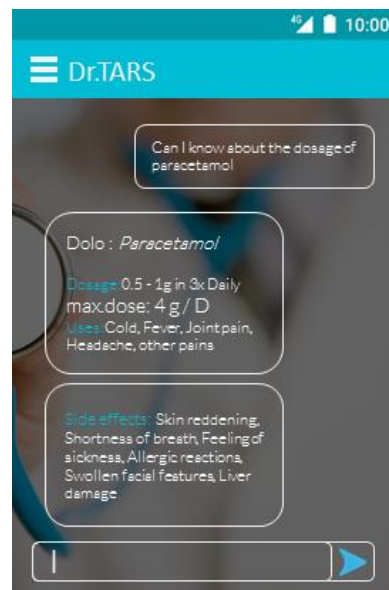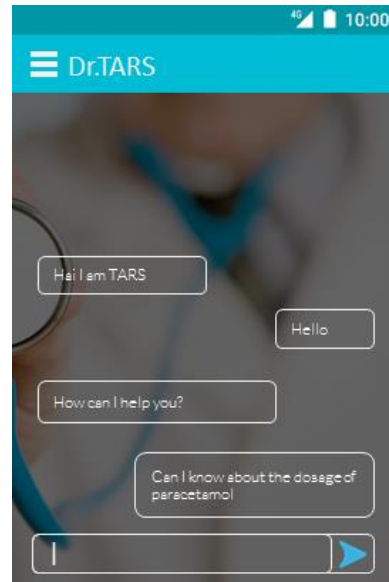

Fig.2. Chatbot user interface.

D. Designed in such a way that it should work in cross platform devices

The services [11] of the system should be available to as much as possible people. So, it must be able to work across multiple platforms both in PCs as well as mobile platforms. The system should be designed in such a way that it is capable of working among any platform such as iOS, Windows and Android. As the support increases so does the amount of people we can help.
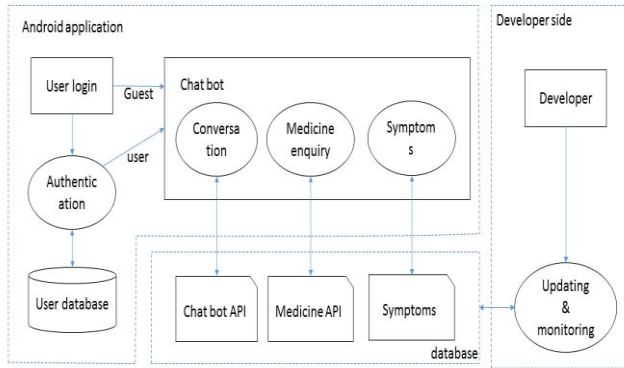

Fig.3. Block Diagram (Chatbot Working)

Pseudocode: med_disc (keywords)

{
Read the message.
Identify type of message.
If medicine name, then
Search for json object.
If found, then
Print values.
Else
Search online for result and load it to json.
Print values.
Else
Print suggestions.
}

Pseudocode: chat_bot (keywords)

{
Read message.
Identify keywords.
Search for matching conversations in previous chats.
If found, then
Print reply.
Else
Search for matching keywords.
Call function choose_chat (keywords)
}

Pseudocode: choose_chat (keywords)

{
Categorize keywords.
Choose clusters based on categorize.
Search for keywords in chat using keyword category.
Flag chats if categorize and matching keyword.
Choose highest flagged chat
If multiple choose most used
Return result.
}

Pseudocode: symptoms (keywords)

{
Read symptoms.
Search database for matching symptoms.
Create cluster.
Repeats till end of the symptoms
Choose clusters with probability > threshold in database.
Print results.
}

E. Effective Symptom based disease prediction.

Each disease has a signature. They start as small problems and grow into something dangerous and life threatening. The diseases start as symptoms like headache or back pain, which would seem normal. But actually, they will be beginning of something like cancer. So, each disease has a pattern of growing.

The most common diseases can be easily identified by analyzing the symptoms. The symptoms can be anything like headache, itching etc... So, by reading the symptoms and analyzing them, any possible health problem can be predicted [5], if any. If a person's body is analyzed periodically, it is possible to predict [10] any possible problem even before they start to cause any damage to the body.

F. Can be easily integrated and upgradable.

The system should be integrated [10]. That is, it must be built of multiple modules. Each module is capable of performing a task. The modules must be able to be accessed and upgraded independently. The system offers many services. Most of them are very complex. So as time passes each module can be optimized. So, the system must design in such a way that each module must be upgradable independently. The system must be able to improve the performance by module. Hence the system can be improved easily.

As the system improves, the capabilities of the system also increase. It will be able to predict more and more diseases, as well as can describe more medicines. One such proposed capabilities of the system is describing the health status of a

human by analysing pulse or an ECG (Electrocardiogram). Thus, it can give timely update on our health. Thus, giving us predictions on possible diseases even before they start to grow

III. CONCLUSION

The implementation of Personalized Medical assistant heavily relies on AI algorithms as well as the training data as discussed in this paper. However, it is still in its early stage and levels and faces some challenges; some of which have a direct link to AI were discussed. While other problems such as research and implementation costs, and government regulations are also challenges which are critical to the successful implementation of personalized medicine, but not addressed by the algorithms discussed in this paper. However, Personalized chatbot [1] does not only faces challenges; it does pose some challenges, as the accuracy of result and practice to the extent that some futurist think algorithms and machines could replace most of the jobs doctors do today. Finally, a successful implementation of personalized medicine would save many lives and perfect the medical profession.

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