

GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES ARTIFICIAL INTELLIGENCES ON HEALTHCARE CHATBOT SYSTEM

Kalyani.Priyanka*¹, R .Elizabeth Abishikta², V. Greesham Rao³, Mr C Kishore Kumar Reddy⁴ &
Dr. B V RamanaMurthy⁵

*1,2,3,4&5 Stanley College of Engineering and Technology for Women, Hyderabad

ABSTRACT

Though Chatbots one can communicate with text of voice interface and get reply through artificial intelligences. Artificial Intelligences chatbot is a technology that makes interaction between man and machine in their natural language. The main goal of the chatbot is to make the conversation between students and machine. The chatbot consists of core and interface. Typically, a chatbots will communicate with a real person. Chatbots can be programmed to respond the same way each time, to respond differently to messages containing certain keywords and even to use machine learning to adapt their responses to fit the situation. A developing number of hospitals, nursing homes, and even private centers, presently utilizes online chatbots for human services on their sites. The Healthcare chatbots system will help hospitals to provide healthcare support online 24X7, it answers deep as well as general questions. It also helps generate leads and automatically delivers the information of leads to sale. By asking questions in series it helps the patients by guiding what exactly he/she looking for it saves time and money. There are countless cases where a digital personal assistant where a chatbot could help physicians nurses, patients or they families. Better organization of patient's pathway, medication management, help in emergency situations or with first aid, offering a solution for similar medical issues: this are the possible issues for chatbot to step in and ease the burden on medical professionals. In somecases, healthcare chatbots are also able to connect patients with clinicians for diagnosis or treatments, but that is already one step further down the line. The general ideas is that in the future, this talking or texting smart algorithms might become the first contact point for primary care. Patients will not get in touch with physicians or nurses on any medical professions

Keywords: *Artificial Intelligence, chatbot, healthcare, human computer interaction, content, Question Answering.*

I. INTRODUCTION

Since 2016 the world became digital with new technology. One of the best example is chatbot .The chatbot matches the input statements from the users within the pattern that are already presented in the knowledge base(KB) .Each pattern is paired with the knowledge base of the chatbot whose primary source is AIML.

The data which has been modelled on the pattern of the conversations would be tested using a series of scenarios. The result from the chatbot would be cross checked with the basic pattern defined in AIML files. This is done to add some knowledge to the data because it hasn't been modelled before. So if the input the output sentences do not match in the knowledge based then it is remodelled.

Chatbot will give solutions for the users queries and problems. In this paper a chatbot is designed to answers both general questions and FAQ's. AIML is the artificial markup language. The AIML template is defined with almost all the general queries like "Hi, Hello, How are you?"etc.

It is used to deal with general questions and greetings. AIML simple language, which can give random poses for single query (or) scripts. Chat box can be built on any closed platform which may support PL ,that allows to make a web API.

The bot will ask about symptoms and engage the patients based on question approved by health professionals to identify the actual ailment probabilistically and the care required. The chatbot determines the severity of the

condition and proffer immediate recommendations to stabilize the patient (if critical), while booking an appointment immediately with a specialist. If not critical or severe, we will recommend the best treatment or care to apply.

Our bot will keep people informed about their medical conditions by providing answers to frequently asked questions. They may ask questions relating to normal blood pressure, blood sugar levels, diabetes grades and signs, best sleeping positions for babies, and others. And also ask the questions related to cardiology and nephrology. we will help people in locating doctors or specialists in their area and booking appointments with them.

The bot will remind patients about their appointments. It will also allow patients to setup reminders for their pills in terms of timing and dosage, so they don't forget when it is time to take the next dose – intelligent reminder. we will also be able to track and monitor patients' improvements or health status, but this feature is reserved for the future. AI can be used to analyse and identify patterns in large and complex datasets faster and more precisely than has previously been possible. It can also be used to search the scientific literature for relevant studies, and to combine different kinds of data; for example, to aid drug discovery.

The Institute of Cardiology research canSAR database combines genetic and clinical data from patients with information from scientific research, and uses AI to make predictions about new targets for cancer drugs. Researchers have developed an AI 'robot scientist' called Eve which is designed to make the process of drug discovery faster and more economical. AI systems used in healthcare could also be valuable for medical research by helping to match suitable patients to clinical studies.

II. LITEARTURE SURVEY

AgataPasikowska, A BolfazlZaraki, Nicole Lazzeri have proposed A dialogue with a virtual imaginary interlocutor as a form of a psychological support for well-being Computer, tablet and smartphone are tools that increasingly accompany us during everyday activities. Given the booming use of the virtual reality and the wide range of people who have access to it, people are increasingly presented with an online alternative to the support of professionals, therapeutic groups organized by healthcare institutions, or significant others (such as family, friends and colleagues). This can be used as a tool for personal development and to cope with stress. Our research program includes creating a virtual reality application to sustain well-being and improve quality of life. [1]

Nicole Radzinill and Morgan have proposed Evaluating Quality of Chatbots and Intelligent Conversational Agents Chatbots are one class of intelligent, conversational software agents activated by natural language input (which can be in the form of text, voice, or both). They provide conversational output in response, and if commanded, can sometimes also execute tasks. Although chatbot technologies have existed since the 1960s and have influenced user interface development in games since the early 1980s, chatbots are now easier to train and implement. This is due to plentiful open source code, widely available development platforms, and implementation options via Software as a Service (SaaS). [2]

Iulia Nica and Oliver A. Tazl and Franz Wotawa1Chatbot-based Tourist Recommendations Using Model-based Reasoning Chatbots have gained increasing importance for research and practice with a lot of applications available today including Amazon's Alexa or Apple's Siri. In this paper, we present the underlying methods and technologies behind a Chatbot for e-tourism that allows people textually communicate with the purpose of booking hotels, planning trips, and asking for interesting sights worth being visited [3]

ZojanMemon, AkthalHussanJalbani have proposed multiagents communication system with chatbot it has been found that communication is actually important in our lives; without it is difficult to accomplish something. It becomes possible with the support of the technology that is being used today; now it is easy to communicate as faster and much easier. A type of an agent called Chatbot is a conversational agent or a special kind of a program which had been specifically designed to replicate an intelligent chat with a single or multiple human users by using auditory or text based techniques. [4]

Mohsin Shaikh Rapi and Ahmed Ali have proposed multi agents communication system with chatbot, It has been found that communication is actually important in our lives; without it is difficult to accomplish something. It becomes possible with the support of the technology that is being used today; now it is easy to communicate as faster and much easier. A type of an agent called Chatbot is a conversational agent or a special kind of a program which had been specifically designed to replicate an intelligent chat with a single or multiple human users by using auditory or text based techniques. [5]

Michele L , MC Nepal and David Newyea have proposed chatbot in library, The most common questions coming to your library by IM or Chat, such as inquiries about location, hours, policies, or patron access to specific material, can all be answered by a chatbot, saving valuable staff time. A chatbot effectively creates a natural language processing interface to your catalog and databases, providing answers to library users by structuring language to a database's requirements.[6]

Rithika M Eassialukas Nessianhdas, Neet Gupta D EDangan DC S arkar have proposed AI – automation chatbot, It is no secret that customer's expectations have massively changed over that last few years. With digital transformation and the constantly evolving digital landscape, customers are hyper connected across mobiles, tablets, social, and even non-digital avenues. This is changing the way enterprises do business, and has created a need to create and offer products, services, and solutions that resonate with customers personally. The gravity of this situation is huge, and it is time for companies to meet and ultimately exceed the customer's heightened expectations.[7]

1Ameya Vichare, 2Ankur Gyani, 3Yashika Shrikhande, 4Nilesh Rathod have proposed

A chatbot system demonstrating Intelligent Behaviour using NLP

Chatbots are computer programs that interact with users using natural languages. Just as people use language for human communication, chatbots use natural language to communicate with human users. In this paper, we begin by introducing chatbots and emphasize their need in day-to-day activities. Then we go on to discuss existing chatbot systems, namely ELIZA, ALICE and Siri. We evaluate what we can take from each of the systems and use in our proposed system. Finally, we discuss the proposed system.[8]

AM Rahman Addulaha C Mamum Aar Is Have proposed Programming challenges of chatbot: Current and future prospective In the modern Era of technology, Chatbots is the next big thing in the era of conversational services. Chatbots is a virtual person who can effectively talk to any human being using interactive textual skills. Currently, there are many cloud base Chatbots services which are available for the development and improvement of the chatbot sector such as IBM Watson, Microsoft bot, AWS Lambda, Heroku and many others. A virtual person is based on machine learning and Artificial Intelligence (AI) [9]

Amit Patil, K Marimuthu1*, Nagaraja Rao A1 and R Niranchana1 have proposed comparative study of cloud platforms to develop a Chatbot before chatbotsthere were simply bots: The invention of a chatbot brought us to the new era of technology, the era of conversation service. A chatbot is a virtual person that can effectively talk to any human being with the help of interactive conversion textual skill. Now a days there are many cloud-based platforms available for developing and deploying the chatbot such as Microsoft bot framework, IBM Watson,Kore,.[10]

-OSarthak V. Doshi1, Suprabha B. Pawar2, Akshay G. Shelar3, Shraddha S. Kulkarni have proposed Artificial Intelligence Chatbot in Android System using Open Source Program A chatbot is a conversational agent where a computer program is designed to simulate an intelligent conversation. It can take user input in many formats like text, voice, sentiments, etc. For this purpose, many open source platforms are available. Artificial Intelligence Markup Language (AIML) is derived from Extensible Markup Language (XML) which is used to build up a conversational agent (chatbot) artificially. In this paper, we use „program-o“ which is an AIML interpreter for the generation of the responses of users input. We have used this method for developing an android application chatbot which will interact with user using text and voice responses.[11]

Vos.T , Barber, R. M, Bell. B Bertozi – Villa, A Biryukov, S. Bolliger, I. Charlson, F. Davis, DickerD Have proposed **Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries** Although substantial progress has been made toward reducing mortality and extending life expectancy throughout the world over the past few decades, the epidemiological transition is manifest in the growing importance of non-fatal diseases, outcomes, and injuries which pose, partly as a consequence of decreasing death rates, a rising challenge to the ability of the world's population to live in full health. Complementing information on deaths by age, sex, cause, geography, and time with equally detailed information on disease incidence, prevalence, and severity is key to a balanced debate in health policy. [12]

[Ferrari AJ¹](#), [Charlson FJ](#), [Norman RE](#), [Patten SB](#), [Freedman G](#), [Murray CJ](#), [Vos T](#), [Whiteford HA](#) **Author information** **Burden of depressive disorders by country, sex, age, and year: findings from the global burden of disease study 2010.** Depressive disorders were a leading cause of burden in the Global Burden of Disease (GBD) 1990 and 2000 studies. Here, we analyze the burden of depressive disorders in GBD 2010 and present severity proportions, burden by country, region, age, sex, and year, as well as burden of depressive disorders as a risk factor for suicide and ischemic heart disease.[13]

McManus S Meltzer, BurghaT, Bebbington P, Jenkins R ,have proposed **Adult Psychiatric Morbidity Survey: Survey of Mental Health and Wellbeing, England** The Adult Psychiatric Morbidity Survey (APMS) series provides data on the prevalence of both treated and untreated psychiatric disorder in the English adult population (aged 16 and over). This survey is the fourth in a series and was conducted by NatCen Social Research, in collaboration with the University of Leicester, for NHS Digital. [14]

III. PROPOSED METHODOLOGY

Architecture of AI chatbot Figure 1

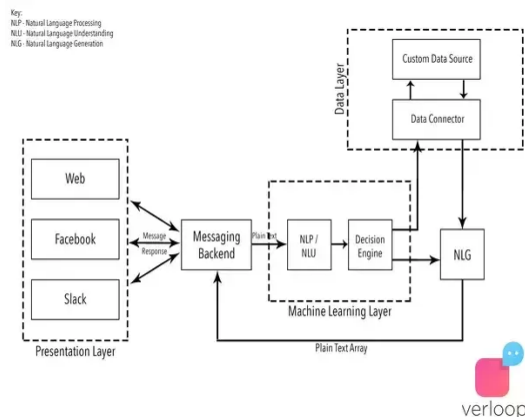


Figure 1: AI chatbot

This is the Architecture of Chatbot which consists of three main layers:

1. Presentation Layer
2. Machine Learning Layer
3. Data Layer

Here the information is taken in the form of message and comes out in the form of response.

Presentation Layer: This layer is the interface between the user and machine. In this layer the message is sent in the form of input either through web, Facebook, stacks etc. This information goes through the message backend block and enters the machine learning layer.

Machine Learning Layer: This layer consists of two blocks one of NLP/NLU and decision engine. Here the send information is converted from the user understandable code to the machine understandable code. After this conversion the decision engine takes the decision whether to send to the NLG Block or through the data layer.

Data Layer: In this layer the machine checks whether the send information is converted to the machine understandable code or not through the custom data service. After checking it will send the information through the NLG block and then sends it through the ‘Plain Text Array’ to the messaging backend block. And send’s it to the presentation layer in the form of user understandable code.

NLP: National Language Processing.

NLU: National Language Understanding.

NLG: National Language Generator

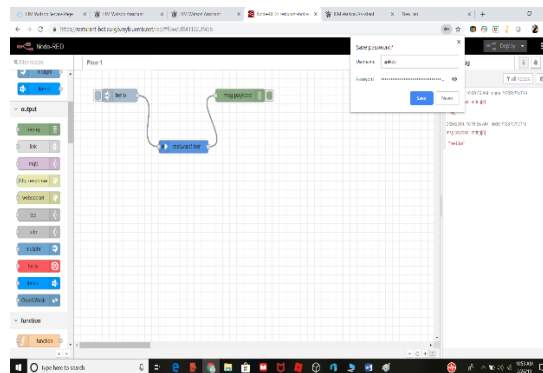


Figure 2: Node-red flow—1.

- Now drag the function called output parsing and connect it to output of the assistant an dinput of the msg.payload. Now, go to deploy and that go to manage palette.
- After completing the above process go to user settings nodes and select the palette. Now install the node-red dash-board and click on install.
- In the node properties give group as home size as auto and example as text and click on done. Now ,drag the form from search filters and click the assistant input to form output. Create a new function and connect the new function to form output to input of assistant. Now, again select the msg.payload=msg.payload. text; from the functions.
- Now, the two text blocks onto the screen and connect the text blocks with the name you to the output of output parsing and otherone with the name bot to the output of output parsing.

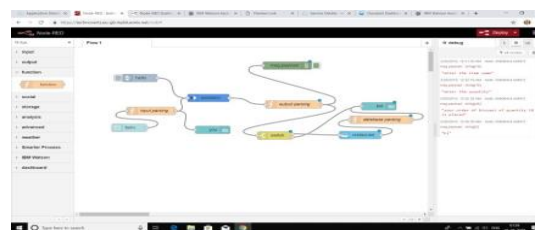


Figure 3:Node-red flow—2.

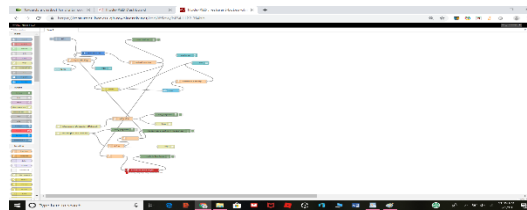
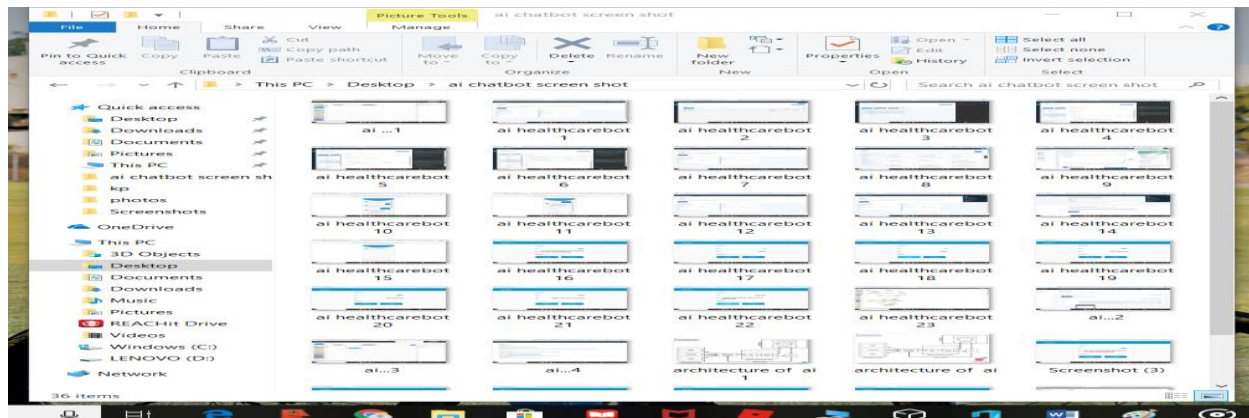


Figure 4:Node-red flow—3



Figure 5: Facebook integration

Implementation
Figure 2:



Firstly open your IBM cloud go to dashboard and then to catalog and type Watson Assistant give some service name and then create it. click on Launch Tool go to Skills create the new skill. Click on add intent give some intent name and then create the intent, give some user examples like (Hi, Hello, Good Morning, Good evening etc) then try it once by clicking on try it box. Go to dialog create one welcome node and then try it again. Click on welcome node add node below open that node and give some name. then click respond with Text enter: I and then try it. click on intent, add intent then give intent name as #enquiry click on create intent. give some user examples like: (what are the symptoms? Or would you like us suggest you the top most doctors?) click on add example. Then go to entities and create once entity with the name @entity give some name to the value and add the synonyms if needed. Then again go to dialog add one node below the greetings node name it as enquiry on multiple responses if needed. We can also give the image to our input by clicking on respond with Image instead of respond with Text. And then try it out once again. Create slots if needed. Continue the process accordingly. Go to skills click on assistant and then add assistant give some as name in this we gave it as Medication Chatbot click on create. Add dialog skill go to add existing skill and then click on the bot which it shows below (which is named as Medication Chatbot) click on preview link and then open the link which it

shows below. Finally we can see our output screen there. To create a Node-Red click on settings go to manage palette install node-red dashboard. Now open it from dashboard nodes drag Form node on to the flow, click on the node to modify it. Then take a function node place it in between Form node and assistant node, click on it give name as input parsing. Edit function as `msg.payload=msg.payload.text` and the click on done. Take two text nodes click on it give label name as you and for another node give it as bot click on done. Connect you input to the input parsing output and bot input to the output parsing output. Click on deploy. And then we can perform our operation successfully by continuing it accordingly.

IV. RESULT & DISCUSSION

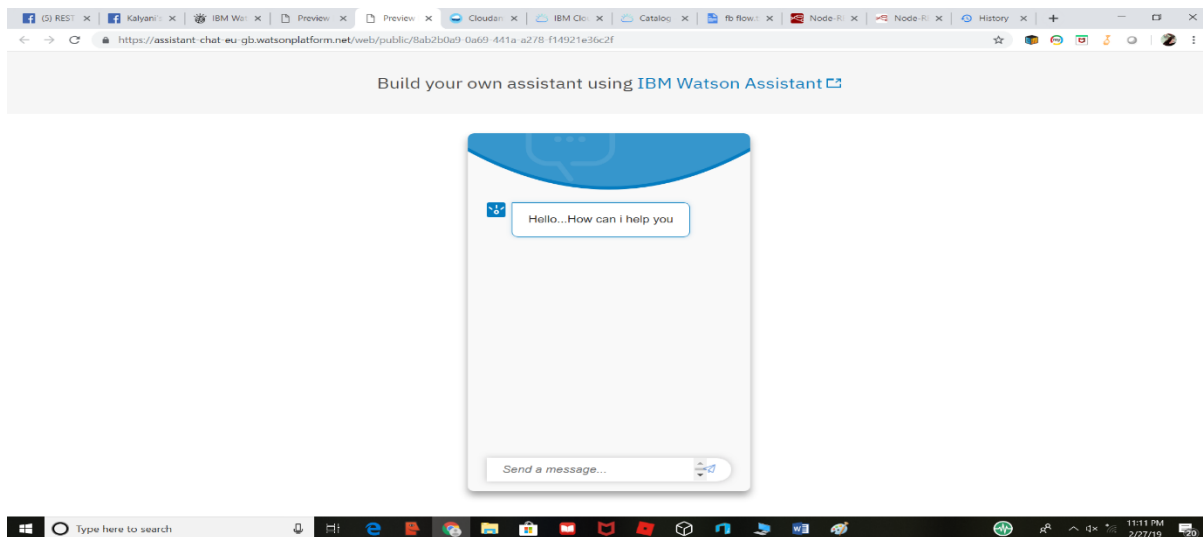


Figure3: Welcome Message In IBM Watson Assistant

In the IBM Watson assistant we can create our own assistant. The assistant responds in the following manner. Firstly the greetings are given to the assistant bot when we open the preview link it directly gives that Hey!! I'm ROBORTO. Iam here to help you out in finding skin diseases and general health issues. Then we need to give input as Hi it gives Hello, How are you? Then the user will give the reply as iam fine. Then the bot respond in the following way good! How can I help you? Then let us assume that user ihas spotted with whiteheads, then he will give input as I have spotted while heads on my face. Then the assistant bot recognize the exact skin disease from which user is suffering from. Bot will give response as the disease of the mentioned symptom is acne would you like us to suggest you a doctor? If user wants to suggest us a doctor then let us assume that he will give input as Yes please!! Then our bot will show the top-most Doctor's in Hyderabad and shows their Locations accordingly. If user dosen't want chatbot to suggest him the doctor's he will obviously No!! the our bot gives reply as It's ok!! Then, take care!! Finally when the user selects the option of the prescribed doctor of which he want to go to. Our chatbot thank him/her by saying Thankyou!!

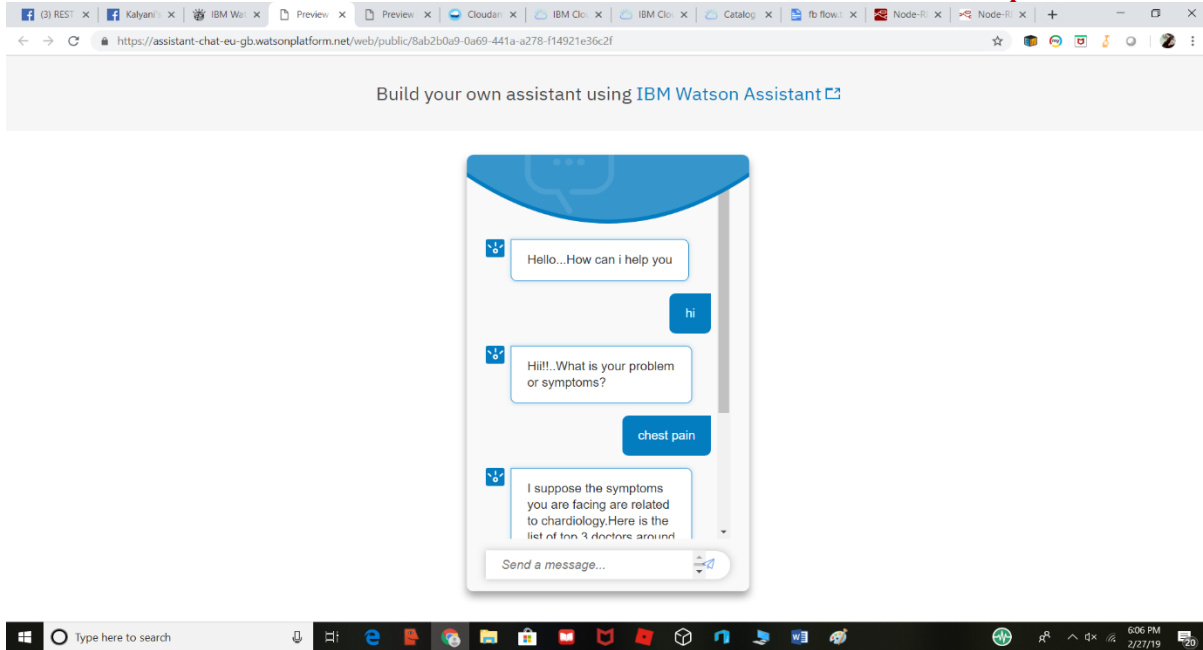


Figure 4: The output for the given symptom

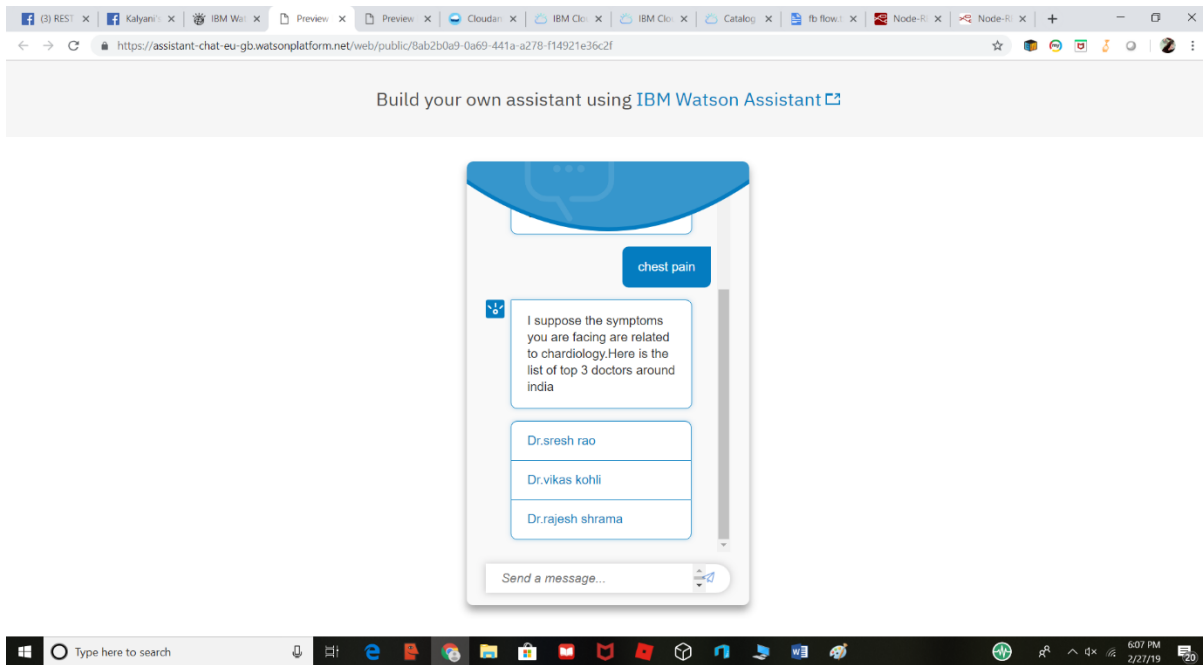


Figure 5: The output of bot suggesting the top 3 doctors in india

V. CONCLUSION

The healthcare industry is rapidly growing while promising to cost cuts, but science AI is still in its infancy, some fear that this approach is filled with risks and it is safer to let bots handle only non-vital tasks. Yet, for patients living in remote areas with limited access tech tools to healthcare facilities, these tech tools could make o notable differences in the quality of their lives.

Currently, the safest ways to use healthcare chatbot includes :scheduling doctors appointments based on the severity of the symptoms, monitoring the health status and notifying a human nurse immediately if the parameters are out of control, helping homecare assistants stay informed about patients evolution. This is in fact replacing the work of customers service representatives.

These intelligent assistants can also take care of billing inventory, and insurances claim man. Availability and ongoing health monitoring. All the healthcare chatbot providers are Always willing to help their patient and they understand how it is vital to be available. If there is urgent need of medical attention. Providing information fast when there is not a moment to lose. Emergences are normalFor healthcare which means prompts and correct diagnosis is vitally important. agement, as the healthcare software development company Itransition describes.

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