International Journal of Trend in Research and Development, Volume 5(2), ISSN: 2394-9333
www.ijtrd.com

Survey on Medical Self-Diagnosis Chatbot for Accurate Analysis Using Artificial Intelligence

[1]Divya S, [2]Indumathi V, [3]Ishwarya S, [4]Priyasankari M and [5]Kalpana Devi S,
[1,2,3,4]UG students, [5]Assistant Professor,
[1,2]Department of Computer Science and Engineering, Easwari Engineering College, Chennai--600089, India

Abstract: Healthcare is essential for a good life. Unfortunately, consultation with a doctor can be difficult to obtain, especially if we need advice on non-life threatening problems. The proposed idea is to create a system with Artificial Intelligence that can meet the requirements. Medical chatbot is built with medical applications having the potential to reduce healthcare cost and improves accessibility to medical knowledge. Some chatbots are compact medical reference books, which are useful for patients and for those who want to learn more about health. The real benefit of the chatbot is to provide advice and information for an healthy life. A text-to-text diagnosis bot engages patients in conversation about their medical issues and provides a personalized diagnosis based on their symptoms. Hence, people will have an idea about their health and have the right protection.

Keywords: *Chatbot, Artificial Intelligence, Text-to-text diagnosis.*

I. INTRODUCTION

Artificial Intelligence 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 language. Chatbot works basically on Artificial Intelligence. Using this capability we have decided to add some contribution to the Health Informatics.

Our project builds a text-to-text conversational agent that diagnosis patients explaining their condition using natural language. The bot asks for relevant information, e.g., age and sex, and requests a list of symptoms. The system remembers past responses and asks progressively more specific questions in order to obtain a good diagnosis. The three primary components of our system are (1) identification and extraction of symptoms from the conversation with the user, (2) accurate mapping of extracted symptoms to documented symptoms and (3)Specifying the disease and referring to an appropriate specialist if necessary. In its current form, our bot's best application would be as a preliminary diagnosis tool that patients could use to assess their symptoms before going to the doctor, perhaps using the bot's specialist referral feature to choose the right care provider.

II. LITERATURE SURVEY

The chatbot study reviews medical self-diagnosis chat bot for accurate analysis using Artificial Intelligence.

In paper[1] it reviews the current evidence for the feasibility and effectiveness of online one-on-one mental health interventions that use text-based synchronous chat. Synchronous written conversations (or "chats") are becoming increasingly popular as Web-based mental health interventions. This review provides an evaluation of individual synchronous Web-based chat technologies as a mode of psychological intervention and support. Based on the current evidence of the application of this technology in this area of mental health research, we see tentative support for this mode of intervention. Interventions utilizing text-based synchronous communication showed better outcomes compared with Waitlist conditions and overall equivalent outcomes compared with Treatment As usual , and were at least as good as the comparison interventions. However, the issue of whether these technologies are cost effective in clinical practice remains a consideration for future research studies.

In paper [2] the chatbot will act as a virtual doctor and makes possible for the patient to interact with virtual doctor. Natural language processing and pattern matching algorithm for the development of this chatbot.. It is developed using the python Language.. Based on the survey given it is found that the no of correct answer given by the chatbot is 80% and incorrect/ambiguous answer given is 20%.From this survey of chatbot and analysis of result suggested that this software can be used for teaching and as a virtual doctor for awareness and primary care.

Paper[3] proposed an idea in which the AI can predict the diseases based on the symptoms and give the list of available treatments If a person's body is analyzed periodically, it is possible to predict any possible problem even before they start to cause any damage to the body. It has some 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.

Paper [4] describes the development of a chatbot for medical students, that is based on the open source AIML based Chatterbean.. The AIML based chatbot is customized to convert natural language queries into relevant SQL queries. A total of 97 question samples were collected and then those questions were divided into categories depending on the type of question. The resultant categories were ranked according to the number of questions in each category. The majority of questions were based on what is query, comprising 47% of the posed questions. The remaining categories comprised less than 7% each of the total questions. The system has not been specially designed for the task of supporting natural dialog in chatbots or, providing responses to student queries

Paper[5] proposed an idea to offer predictions about patients infected with hepatitis virus. A tool made to suggest a decision is able to extract information from other solved cases so it can obtain experience and can also take into consideration the results of the last researches, but won't be able to replace the most important factor in decision making: human judgment. Therefore, the final decision has to be made by a human expert. These systems are created only to suggest a solution.

Paper [6] proposed an idea to develop a chatbot that will function as virtual diabetes physician to do a basic diagnosis on diabetic patients. There was an effective usage of a chatbot in medical field proven by the success of VPbot. VPbot

simulates patients that medical students can "interview" through a web-based interface. A pattern-matching process will be done in order for chatbot to detect keywords from patient's input sentence. It will Create an array of possible input to be match (sentence, phrase and words) by using Sequence Words Deleted (SWD) techniqueHere the conversation to be controlled by chatbot rather than by user (likes any other chatbot program) by making the user remain to the conversation topic and not to enter any irrelevant input, and if they do, chatbot will response that the input was not understandable and keep repeating the previous question until the keywords is detected.

Paper[7]suggest that Bot Assistants can be an efficient and low-cost solution to Patient Care.A new Conditional Entropy Retrieval Based model is proposed and also an Attitude Modeling based on Popitz Powers.. Natural language processing is a field of computer science, artificial intelligence, and computational linguistics concerned with the interactions between computers and human, natural, languages.. The latest trend applies Deep Learning on Natural Language Processing, with DeepMind one of the most widely known, currently belonging to Google Deep Mind and Microsoft's Zo Chatbot. The algorithm successfully retrieves the suitable answer with a high success rate in the patient-Bot Assistant dialogue interaction. The results show that even in small training datasets, this method outperforms up to date methods for automated communication. The issue here is, it requires a compact Adjacency Matrix based on the dialogues.

III. TABLE ON LITERATURE SURVEY

S.NO	PROJECT	TECHNIQUES	RESULT	ISSUES
1	Application of synonous text-based dialogue system in mental health interventions	Web-based chat technologies are compared.	The review provides an evaluation of individual synchronous Web-based chat technologies as a mode of psychological intervention and support.	The issue of whether these technologies are cost effective in clinical practice remains a consideration for future research studies.
2	Dr.Vdoc: A medical chatbot that acts as a virtual doctor	Natural language processing and pattern matching algorithm.	80% of accuracy.	The full consultation is given at a free of cost, which is not a good practice.
3	A Novel approach for medical assistant using trained chatbot	Natural language processing and pattern matching algorithm.	It is possible to predict any possible problem even before they start to cause any damage to the body.	Provides the prescription and composition of medicine without consultation of a doctor.
4	Medchatbot: An UMLS based chatbot for medical students	AIML pattern technique for Pattern matching.	47% of accuracy.	The system has not been specially designed for the task of supporting natural dialog in chatbots.
5	Medical predictions system	Natural language processing.	These systems are created only to suggest a solution.	Won't be able to replace the most important factor in decision making.
6	Designing a Chatbot for diabetics patients	Sequence Words Deleted (SWD) technique. Pattern matching algorithm.	The conversation is to be controlled by chatbot rather than by user.	Keep repeating the previous question until the keywords is detected.
7	Conditional entropy based Retrivel model in Patient-Carer Conersational cases	Natural Language Processing.	The results show that even in small training datasets, this method outperforms up to date methods for automated communication.	The issue here is,it requires a compact Adjacency Matrix based on the dialogues.
8	Pharmabot: A pediatric generic Medicine consultant Chatbot	Left and Right Parsing Algorithm.	The result, which is 2.1923, is less than the table value of 2.447 with 0.05 level of significance for two-tailed test and 6 as degrees of freedom	It can be developed into a web-based application so that everyone can access and use it.
9	Towards a chatbot for digital counselling	Natural language processing and pattern matching algorithm.	60% of accuracy	The issue here is to maintain the ethical considerations.

Paper [8]introduces a Pharmabot,which is a conversational chatbot that is designed to prescribe, suggest and give information on generic medicines for children. Human machine as a technology integrates different areas, and the computational. The researchers used descriptive method in the study. The researchers use Left and Right Parsing Algorithm.Using T-test for uncorrelated data, the result, which is 2.1923, is less than the table value of 2.447 with 0.05 level of significance for two-tailed test and 6 as degrees of freedom. Calculated t-value is less than the critical t-value, therefore the

decision is to accept the null hypothesis because there is no significant difference between the two respondents regarding their assessment to the developed system. It can be developed into a web-based application so that everyone can access and use it.

Paper[9] proposed an idea to design a chatbot to be used within mental health counselling. The demo chatbot has been created to provide a more interactive way of leading the user into the PDF worksheets, and asking them which areas they would like to receive information on. The method implemented here is the use of Emoji's. By incorporating mental health screening tools into a chatbot interface, the user can have a more interactive and user-friendly experience. It produce 60% of accuracy. The issue here is to maintain the ethical considerations.

CONCLUSION AND FUTURE WORK

The review concludes that the usage of Chatbot is user friendly and can be used by any person who knows how to type in their own language in mobile app or desktop version. A medical chatbot provides personalized diagnoses based on symptoms. In the future, the bot's symptom recognition and diagnosis performance could be greatly improved by adding support for more medical features, such as location, duration, and intensity of symptoms, and more detailed symptom description.

Future scope of this chatbot is very vast as researchers already mentioned that future era is messaging app, it means people are going to spent more time on the messaging app than other. So by using Chatbot it does not matter how far a person is, the only thing that is required are a simple desktop, tablet and smart mobile etc. The smartness and intelligence of the chatbot can be increased by conducting more study and increasing the database so that Chabot could answer all type of question about every type of disease. Audio system can also be included in this system to make this Chabot more interactive.

References

[1] Simon Hoermann, Kathryn L McCabe, David N Milne, Rafael A Calvo1," **Application of Synchronous Text-Based Dialogue Systems in Mental Health Interventions: Systematic Review**", *Journal of Medical Internet Research ,volume: 19 , issue 8 , August 2017.*

[2] Saurav Kumar Mishra, Dhirendra Bharti, Nidhi Mishra," **Dr. Vdoc: A Medical Chatbot that Acts as a Virtual Doctor**", *Journal of Medical Science and Technology, Volume: 6, Issue 3,2017.*

[3] Divya Madhu,Neeraj Jain C. J, Elmy Sebastain, Shinoy Shaji, Anandhu Ajayakumar**," A Novel Approach for Medical Assistance Using Trained Chatbot**", *International Conference on Inventive Communication and Computational Technologies(ICICCT 2017).*

[4] Hameedullah Kazi,B.S. Chowdhry,Zeesha Memon, "**MedChatBot: An UMLS based Chatbot for Medical Students**", *International Journal of Computer Applications (0975 – 8887)Volume 55– No.17, October 2016.*

[5] Doina Drăgulescu,Adriana Albu,"**Medical Predictions System**", *International Journal of Engineering Research and Applications , ISSN: 2248-9622 ,Vol. 2, Issue 3 , pp.1988-1996, May-Jun 2015.*

[6] Abbas Saliimi Lokman, Jasni Mohamad Zain,Fakulti Sistem Komputer, Kejuruteraan Perisian," **Designing a Chatbot for Diabetic Patients**", *ACM Transactions on Management Information Systems (TMIS), Volume 4, Issue 2, August 2015 .*

[7] Pavlidou Meropi,Antonis S. Billis,Nicolas D. Hasanagas, Charalambos Bratsas,Ioannis Antoniou, Panagiotis D. Bamidis," **Conditional Entropy Based Retrieval Model in Patient-Carer Conversational Cases**",*2017 IEEE 30th International conference on Computer-Based Medical System.*

[8] Benilda Eleonor V. Comendador, Bien Michael B. Francisco, Jefferson S. Medenilla, Sharleen Mae T. Nacion, and Timothy Bryle E. Serac**,** "**Pharmabot: A Pediatric Generic Medicine Consultant Chatbot** ",*Journal of Automation and Control Engineering Vol. 3, No. 2, April 2015.*

[9] Gillian Cameron, David Cameron, Gavin Megaw, Raymond Bond,Maurice Mulvenna ,Siobhan O'Neill, Cherie Armour, Michael McTear, "**Towards a chatbot for digital counselling**", *Journal of Medical Internet Research, 4(1), pp. e3.*