



Conversational Chatbot in Healthcare

Dr Vinod Kimbahune¹, Prof. Dhanashri Patil², Sakshi Nimbalkar³, Suyash Alekar⁴, Meghraj Yadav⁵, Snehal Desai⁶

Computer Engineering, Nutan Maharashtra Institute of Engineering and Technology Savitribai Phule Pune University, India.

ABSTRACT

It is critical to have good health in order to live a happy life. However, obtaining a doctor's consultation for any health issue is quite tough. The goal is to use Artificial Intelligence to construct a Health chatbot that can diagnose an illness and provide basic information about it before contacting a doctor. Through the use of a medical chatbot, this will help to minimise healthcare expenses and enhance access to medical knowledge. Chatbots are computer programmes that communicate with users using natural language. The data is saved by the chatbot in order to recognise the sentence keywords, make a query choice, and respond to the question. From the given input sentence, a score will be calculated for each sentence, and additional similar sentences will be found for the query. Natural language processing underpins the operation of medical chatbots, which allows users to submit health-related issues. The User can use the chat-Bot to ask any personal question about health care without having to go to the hospital. The query is forwarded to ChatBot, who responds with a relevant answer and displays

Keywords: *Chatbot, NLP, NLU, NLG, data-preprocessing, analysis, stopwords, corpus*

1. Introduction

These systems can self-learn and restore their knowledge with the help of humans or web resources. Because knowledge is saved in advance, this application is extremely important. To respond to user enquiries, the system application employs the question and answer protocol in the form of a chatbot. This system was created to help consumers save money and time on healthcare because it is not always possible for them to see doctors or specialists when they are in need. The answer to the inquiry will be based on the user's query as well as the knowledge base. The important keywords are extracted from the sentence and used to answer those sentences. If a match is found or a major difference is found, an answer will be supplied or comparable answers will be displayed. The main goal of this chatbot is to mimic a person's conversation. This enables patients to have a better understanding of their symptoms and receive the most precise diagnosis possible. The chatbot is also drawing on the ever-expanding range of medical questions to supplement its already vast medical knowledge

2. Literature Review

Hospitals are the most typical place for sick people to acquire health-related analysis, disease diagnosis, and drug prescriptions. This has practically become the standard for everyone on the planet. Hospitals are regarded as the most dependable and major source of diagnosis. The proposed idea is to make it easier for people to check on their health, as opposed to the traditional method of standing in line for hours to acquire their medication. This study intends to employ the RASA framework in order to create a chatbot. The chatbot can connect with people and take on the user's symptoms as if it were a real person. [1] Florence – A Health Care Chabot. Medical chatbots that are automated are conversationally constructed with technology in mind, with the potential to cut healthcare expenses and enhance access to medical services and knowledge. We came up with a diagnosis. A bot that engages patients in a conversation about their medical concerns and queries in order to deliver an individualised diagnosis based on their reported symptoms and profile. With a standard precision of 65 percent, our chatbot technology is qualified to diagnose symptoms from user inputs. Correct symptoms were discovered using

these extracted diagnosed symptoms and a recall of 65% and precision of 71% were achieved. Finally, the chatbot provided the anticipated diagnostic for additional procedures.[2]Automated Medical Chatbot(Medibot).In this research, we develop a chatbot as part of a stress management framework aimed at assisting health-care workers in managing their work-related stress. Our framework uses chatbots and robots to have conversations with people in order to determine their stress level using a Sense of Coherence (SOC) model and then provide help based on the SOC value. Our system may provide individuals with a variety of sorts of assistance; in this study, we discuss the care-receiving support type, which is based on helper theory. Experiments are conducted utilising a smartphone-based chatbot built on the LINE chatbot platform, which allows our chatbot to be used on both Android and Apple devices. [3]Chatbot for Peer Support Realization based on Mutual Care.It is critical to have good health in order to live a happy life.

However, obtaining a doctor's consultation for any health issue is quite tough. The goal is to use Artificial Intelligence to construct a medical chatbot that can diagnose an illness and provide basic information about it before contacting a doctor. Through the use of a medical chatbot, this will help to minimise healthcare expenses and enhance access to medical knowledge. Chatbots are computer programmes that communicate with users using natural language. The data is stored in the database so that the chatbot can recognise the sentence keywords, make a query choice, and respond to the question. The n-gram, TFIDF, and cosine similarity are used to rank and calculate sentence similarity.[4]Chatbot for Healthcare System Using Artificial Intelligence. In the field of health care, clever algorithm-powered chatbots are gaining traction. Chatbots are computer programmes that engage in conversation with people and provide assistance via text messages, applications, or instant chatting. Instead of conversing with a human, the user converses with a bot that is guided by simple rules or artificial intelligence. Chatbots are already widely utilised in other industries, such as retail, to support, accelerate, and enhance procedures, and the technology is also gaining popularity in health care, where it is assisting patients and doctors with a variety of activities.[5]Health Care Chatbots Are Here To Help. Survey on Medical Self-Diagnosis Chatbot for Accurate Analysis Using Artificial Intelligence[11]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.A medical chatbot provides personalized diagnoses based on symptoms 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.But A medical chatbot provides personalized diagnoses based on symptoms 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

3. Conversational Chatbot :

A chatbot is a software application used to conduct an on-line chat conversation via text or voice. A chatbot is a type of software that can automate conversations and interact with people through messaging platforms.

3.1. NLP (Natural Language Processing)

NLP allows computers and algorithms to understand human interactions via various languages. In order to process a large amount of natural language data, an AI will definitely need NLP or Natural Language Processing. Currently, we have a number of NLP research ongoing in order to improve the AI chatbots and help them understand the complicated nuances and undertones of human conversations. Chatbots are nothing but applications that are used by businesses or other entities to conduct an automatic conversation between a human and an AI. These conversations may be via text or speech. Chatbots are required to understand and mimic human conversation while interacting with humans from all over the world.Natural language processing deciphers free-form text and/or voice into intents and parameters using the NLP module. It can also break down a statement into a series of intentions that can be programmed to do a specific action. The intent of the dialogue (input) is determined by NLP, and developers must add replies to this intent.

3.2. SVM (Support Vector Machine)

Support Vector Machine or SVM is one of the most popular Supervised Learning algorithms, which is used for Classification as well as Regression problems. However, primarily, it is used for Classification problems in Machine Learning.The goal of the SVM algorithm is to create the best line or decision boundary that can segregate n-dimensional space into classes so that we can easily put the new data point in the correct category in the future. This best decision boundary is called a hyperplane.SVM chooses the extreme points/vectors that help in creating the hyperplane. These extreme cases are called as support vectors, and hence algorithm is termed as Support Vector Machine. Consider the below diagram in which there are two different categories that are classified using a decision boundary or hyperplane:

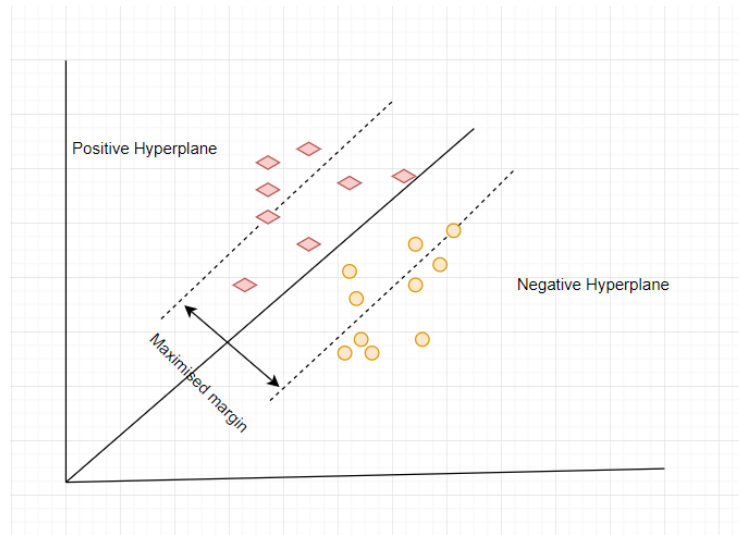


Fig.1SVM

3.3. KNN (K-Nearest Neighbor)

K-Nearest Neighbour is one of the simplest Machine Learning algorithms based on Supervised Learning technique. K-NN algorithm assumes the similarity between the new case/data and available cases and put the new case into the category that is most similar to the available categories. K-NN algorithm stores all the available data and classifies a new data point based on the similarity. This means when new data appears then it can be easily classified into a well suite category by using K- NN algorithm. K-NN algorithm can be used for Regression as well as for Classification but mostly it is used for the Classification problems. K-NN is a non-parametrical algorithm, which means it does not make any assumption on underlying data. It is also called a lazy learner algorithm because it does not learn from the training set immediately instead it stores the dataset and at the time of classification, it performs an action on the dataset. KNN algorithm at the training phase just stores the dataset and when it gets new data, then it classifies that data into a category that is much similar to the new data.

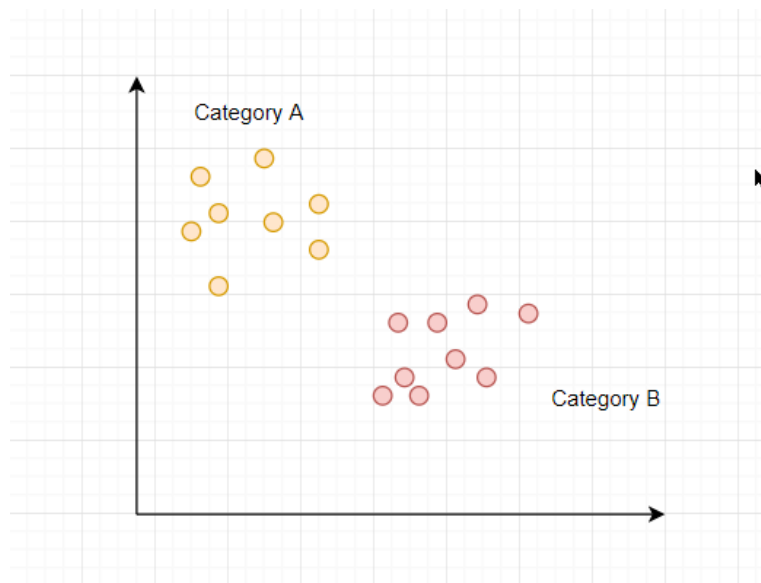


Fig.2 KNN

4. Proposed system

A doctor chatbot is a conversational technology that can diagnose and prevent diseases. The system acts as a consultant, asking inquiries about health concerns and attempting to give relevant remedies. This saves the doctor a lot of time because the consultation is done ahead of time. Depending on the situation, the system also assists the patient in scheduling appointments with doctors. A ML-based Support Vector Machine Algorithm using a cardiac dataset developed in Python is used to predict diseases. Ngrok is used to construct a localhost on your PC, which uses your PC's port 5000 to generate a public link that is necessary to communicate with the Dialogflow Chatbot. The Appointment Scheduler module is merely a test module.

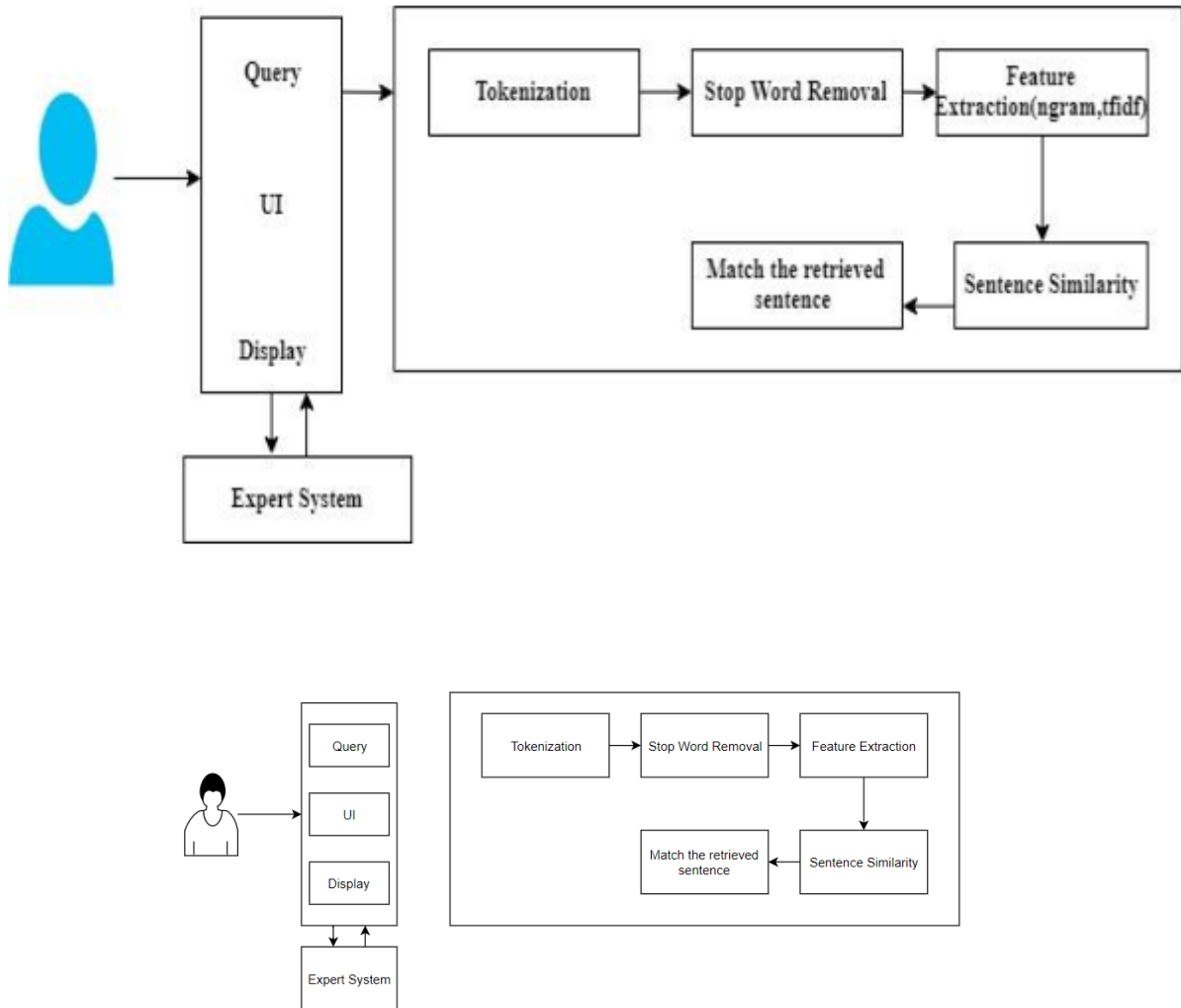


Fig.4. System Architecture for Fall Detection

5. Result and Test cases

Extract user's information by asking simple questions. Chatbots then use this information and give the appropriate answer to the questions asked by user

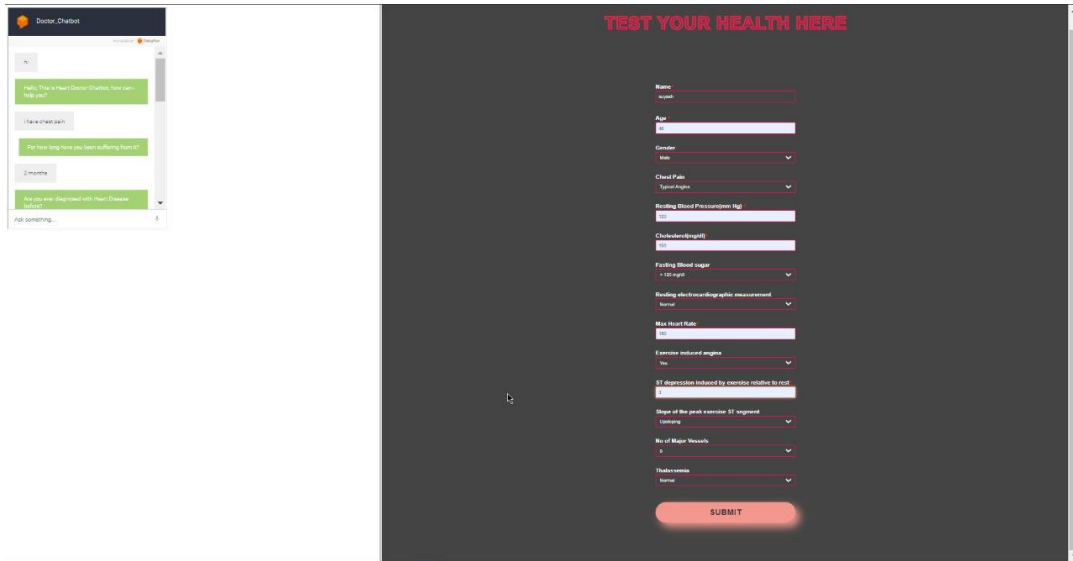


Fig.5. chatbot interface

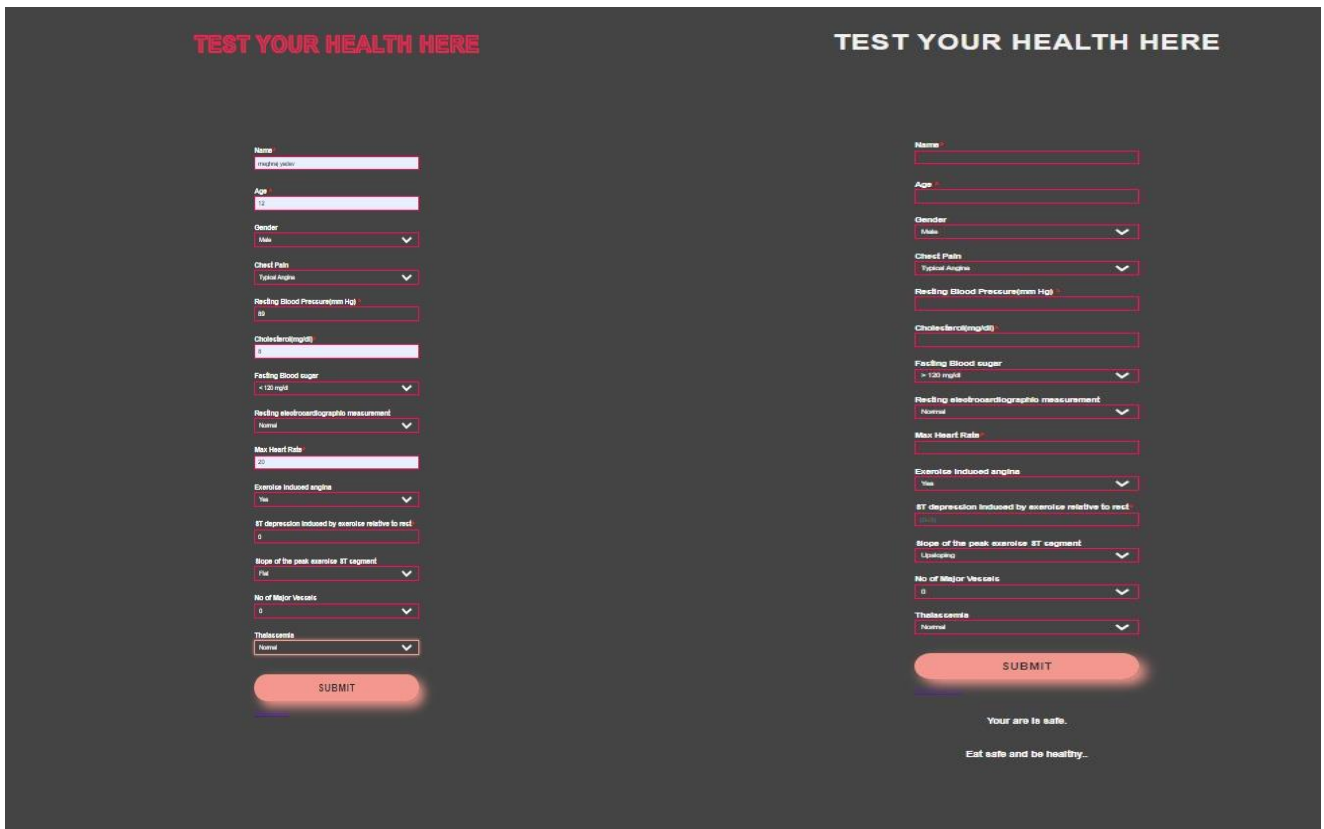


Fig.6. Output

6. Conclusion and Future Scope

From the review of different journals, it is concluded that, the usage of Chatbot is user friendly and can be used by anyone 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 much improved by adding support for more medical features, for instance location, duration, and intensity of symptoms, and more detailed symptom description. The implementation of customized Medical assistant heavily relies on AI algorithms as well as the training data. At the end, the implementation of customized medicine would successfully save many lives and create a medical awareness among people. As mentioned before, the future era is the era of messaging app because people going to spend more time in messaging app than any other apps. Therefore, medical chatbot has huge and large future scope. No matter how far they are, people can have this medical conversation. The only requirement they would need is a simple desktop or smartphone with internet connection. The efficiency of the chatbot can be improved by adding more combination of words and increasing the use of database so that of the medical chatbot. could handle all type of diseases. Even voice conversation can be added in the system to make it easier to use.

References

- [1] Raij, A.B., Johnsen, K., Dickerson, R.F., Lok, B.C., Cohen, M.S., Duerson, M., Pauly, R.R., Stevens, A.O., Wagner, P. and Lind, D.S., 2007. Comparing interpersonal interactions with a virtual human to those with a real human. *IEEE transactions on visualization and computer graphics*, 13(3), pp.443-457.
- [2] Fadhil, A., 2018. "Beyond patient monitoring: Conversational agents role in telemedicine healthcare support for home-living elderly individuals". arXiv preprint arXiv:1803.06000.
- [3] Amato, F., Marrone, S., Moscato, V., Piantadosi, G., Picariello, A. and Sansone, C., 2017. Chatbots Meet eHealth: Automating Healthcare. In *WIAIH@ AI* IA* (pp. 40-49).
- [4] Comendador, BenildaEleonor V., et al. "Pharmabot: a pediatric generic medicine consultant chatbot." *Journal of Automation and Control Engineering* Vol 3.2 (2015).
- [5] KadekTeguhWirawan, I Made Sukarsa, I Putu Agung Bayupati, "Balinese Historian Chatbot using Full-Text Search and Artificial Intelligence Markup Language Method", *International Journal of Intelligent Systems and Applications(IJISA)*, Vol.11, No.8, pp.21-34, 2019. DOI: 10.5815/ijisa.2019.08.03
- [6] . S. Divya, Indumathi, S. Ishwarya, M. Priyasankari, S. Kalpanadevi | A Self-Diagnosis Medical Chatbot Using Artificial Intelligence | *Institute of Electrical and Electronics Engineers* June 2019
- [7] . Rohit Binu Mathew, Sandra Varghese, Sera Elsa Joy, Swanthana Susan Alex | Published 2019 | *Computer Science - 3rd International Conference on Trends in Electronics and Informatics (ICOEI)*
- [8] . D. Madhu, C. Jain, Elmy Sebastain, Shinoy Shaji, A. Ajayakumar | Published 2017- *Medicine International Conference on Inventive Communication and Computational Technologies (ICICCT)*;
- [9] . H. Anandakumar and K. Umamaheswari, "A bio-inspired swarm intelligence technique for social aware cognitive radio handovers," *Computers & Electrical Engineering*, vol. 71, pp. 925-937, Oct. 2018. doi:10.1016/j.compeleceng.2017.09.016
- [10] . S. Anil Kumar, C. Vamsi Krishna, P. Nikhila Reddy, B. Rohith Kumar Reddy, I. Jeena Jacob. (2020) | *Self-Diagnosing Health Care Chatbot using Machine Learning | International Journal of Advanced Science and Technology*, 29(05), 9323-9330.
- [11] . Shifa Ghare, Sabreen Shaikh, Tasmia Bano Shaikh and Habib Fahih Awab | *Self-Diagnosis Medical Chat-Bot Using Artificial Intelligence || EasyChair Preprint no. 2736*
- [12] . Nicholas A. I. Omogbe, Israel O. Ndaman, Sanjay Misra, Olusola O. Abayomi-Alli, Robertas Damasevicius, "Text Messaging-Based Medical Diagnosis Using Natural Language Processing and Fuzzy Logic", *Journal of Healthcare Engineering*, vol. 2020, Article ID 8839524, 14 pages, 2020
- [13] Prof. Amar Palwankar, Ms. Priyadarshani A. Satpute, Mr. Riddhi Dighe, and Ms. Rutuja Bhopale, "ARTIFICIAL INTELLIGENCE BASED HEALTHCARE CHATBOT SYSTEM", *IEJRD - International Multidisciplinary Journal*, vol. 5, no. 5, p. 6, Jun. 2020.
- [14] . Dinesh Kallal, Vatsalya Samiuddin | *IOSR Journal of Computer Engineering (IOSR-JCE)*
- [15] . e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 22, Issue 1, Ser. III (Jan - Feb 2020), PP 50-56
- [16] . Rida Sara Khan, Asad A li Zardar, Zeeshan Bhatti | *Journal of Information & Communication Technology - JICT* Vol. 11 Issue. 2
- [17] . Muse Mohamud Mohamed , Professor Wang Zhuopeng, *International Journal of Advanced Research in Computer and Communication Engineering* Vol. 9, Issue 2, February 2020
- [18] Kurian, Ciji Pearl, and George, V I and Bhat, Jayadev and Aithal, Radhakrishna S (2006) ANFIS Model for the Time Series Prediction of Interior Daylight Illuminance. *International Journal on Artificial Intelligence and Machine Learning*, 6 (3). pp. 35-40. ISSN 1687- 4854.
- [19] https://www.researchgate.net/publication/326469944_Automated_Medical_Chatbot <https://developer.infermedica.com/>
- [20] <https://www.ijctjournal.org/2018/Volume60/number-1/IJCTTV60P106.pdf>