PERSONAL ASSISTANT FOR PRENATAL CARE

Mr. Narendra Ilaya Pallavan P*,Adam Jayahar.B[1], Hariharan.D[2], Maheshwaren.S[3],

*Assistant Professor,[1,2,3]Student, Department of Electronics and Instrumentation Engineering
Bannari Amman Institute of Technology
Sathyamangalam, Erode, Tamilnadu, India

Abstract

The world has seen an amazing rise in technology in various fields, among them the health sector has seen an amazing boom with the arrival of artificial intelligence and machine learning. Due to westernization of culture and nuclear families there isn't much attention for people in need of care especially pregnant women as being taken care by elderly people with experience because of cosmopolitan lifestyle, work and society. In cases of emergency due to over population and traffic, immediate medical attention is a major hindrance in cosmopolitan societies. By incorporating machine learning, neural network and natural language processing, the system proposed is a "personal assistant" which eliminates the need for any experienced personal to care for or look after pregnant women. This personal assistant is an advanced and specific chat-bot with the data set containing common complication women face during prenatal period also improving their lifestyle and nutrition. The personal assistant then gives solutions and remedies based on the symptoms and complication when they are alone. In severe cases, the personal assistant even contacts hospitals and family members to provide necessary care.

Keywords: Personal Assistant, Neural Network, Natural Language Processing.

****Corresponding AuthorE-mail:*** **adamjayahar.ei16@bitsathy.ac.in**

I. INTRODUCTION

A parental feel is probably the best thing that could ever happen to a person. The joy of becoming a parent cannot be expressed in words. The joy they experience is beyond imagination and to make this happen we have built a personal bot to assist woman during prenatal period.We might all ruminate on how is it ever possible. How can a bot be trusted in assisting women during prenatal period?What if there occurs an error? To eradicate all the questions artificial intelligence comes into play.We have entered an era where bots have overtaken humans and this edge that the bots have over humans is because of the processing time,the agility, the reliability, the accuracy and the precision that they possess[1]. Artificial intelligence is emerging as one of the most cutting-edge technology in all fields and sectors from healthcare to manufacturing to testing and processing[2]. Further with the help of machine learning, deep learning, neural networks, natural language processing, the chat-bots are given additional and ultimate features that makes them far better than human intervention[3]. Our proposed system works on speech to speech conversation, just like conversing with a human, eliminating the need of keyboard to type the query and wait for the response[4]. Whenever a woman comes up with any queries regarding her state of heath during prenatal period, she can get rid of all her fears be it physical, emotional, or psychological as these are commonly experienced by women during their pregnancy period [5].

II. DESIGN AND IMPLEMENTATION

The Personal Assistant is destined to help pregnant women in times of struggle and offer them support. The main advantage to the personal assistant is i) to help women clarify any doubts during their pregnancy period relating to physical or emotional disturbances where any experienced people are not near ii) eliminating the need for keyboard i.e. the personal assistant recognises speech and returns the answer to the query in the form of speech[6].

iii) in cases of severe emergencies, the personal assistant also contacts our family members or loved ones and also intimates to the nearby hospitals in times of need. Though there are a lot of chatbots, this is specially developed to help women during their prenatal period[7]. Pregnant women experience a variety of trauma

physically, mentally and emotionally. Therefore, they are in need of utmost care and proper diagnosis and treatment for the well-being of both the foetus and the mother. The accuracy and response period of this personal assistant is also relatively high and better when compared to other chatbot and personal assistants. A large number of queries and different ways of contexts in which the questions or queries can be asked are also provided so that the assistant can identify the problem the earliest and offer solutions with precise care. The more the varieties of contexts and variation of queries the greater the speed of detection and accuracy. Also, the information relating to the diagnosis and problem identification and solution offered are from reputed verified websites[8],[9]. The data provided to the personal assistant is proven to be clear and true.

III. METHODOLOGY

Natural language processing constitutes major part of artificial intelligence. The main pretension of natural language processing is to make the machine understand human language[10]. There are many ways to make machine understand human language, but currently natural language processing constitutes the major part of it though a lot of technologies and methods are still in development. This personal assistant is based on the concept called neural networks, which is actually the state of art technology for natural language processing. Neural networks are data hungry models, the more data we provide higher will be the performance of model[11]. Our model consists of a new dataset in .json format which consist of more than 15 intents and each intent is specific to certain problem or complication that most women commonly face during their prenatal period. Initially, the system records the query of user through the device microphone. Then, using Python open source library for speech to text conversion, the queries placed forth by the user are converted from speech to text. Text data is an unstructured data, so it needs to be pre-processed before the next stage of the process using NLTK library. NLTK consist of many pre-processing methods such as sentence segmentation, word

tokenization, stemming, lemmatization, removal of stop words, parts of speech identification, named entity recognition (NER) and so on. Using these methods, the model will pre-process the users query and identifies the main subject of the user query. After pre-processing, the unique words are converted into word vectors using bag of words approach. Word vectors are just numbers which indicate the frequency of corresponding words in a specific order so that an MLP (Multilayer perceptron) classifier can classify this word vector to its most relevant intent. The MLP constitutes of one input layer with number of nodes equal to the length of unique word vector that has been previously created and Relu activation function is used for input layer, one hidden layer with Relu activation function and finally output layer with SoftMax activation function. This output layer will classify the word to one of the intents. After classifying to intent, the intent is passed to a data structure which extracts the response to be given to the user from the "response" tag of that intent. The response is then given to text to speech converter which will output an audio in human language user can understand [12].

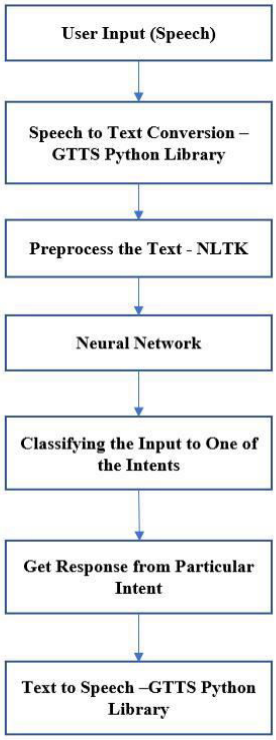

Fig 1 Block diagram of the Prenatal Care Process

THE PERSONAL ASSISTANT IN REAL LIFE:

The personal assistant diagnoses and gives remedy to a wide range of common complications that women undergo commonly during their pregnancy period [13]. It diagnoses the complication based on the symptoms given by the user and gives the remedy and also gives notes on nutrition and lifestyle. the setup is the common app which is in the form of .apk file, which can be installed in any android phone [14]. Upon installing this application and

opening it, it first greets us which is not conventional text to text type chatbot rather, it is a voice operated personal assistant [15]. The personal assistant inquires the person if they are experiencing any intricacies. The user on the other end converses with the chatbot regarding their complication. the personal assistant then tries to find the complication and remedy by analysing through a dataset that contains relevant and accurate information. Once the symptom is clear and the complication is found, the personal assistant then responds with the set of remedies from its dataset [16]. For instance,let's say the person is a smoker and she have a doubt whether she can smoke during her prenatal period. So now when she asks this question whether she can smoke , Our bot replies her with "No and don't try to quit narcotics on your own ,consult your nearby gynecologist" .One more added advantage that our bot possess is that it also lets the user know the nearbygynecologist clinics and hospitals using google maps API. If anything, other than relevant information is asked or conversed, the personal assistant displays a default message that promotes the proper usage of the application[17]. This is only to help pregnant women in times of complications and not to
perform any irrelevant unnecessary conversation. Thereby making it more accurate and relevant to use the personal assistant.

IV. RESULT AND DISCUSSION

The Speech to Text Conversion Process is done and the output is shown in the console window.

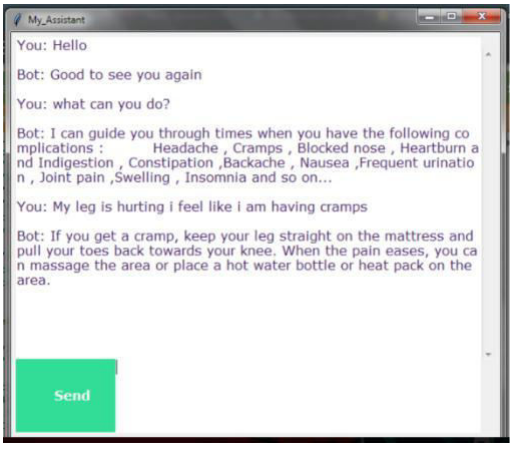

Fig 2 Console Window

Fig 2 shows the console windows where the user input(in form of speech) is displayed in the input window in the form of text , the ouput also appears in the form of text and this is notified by the chatbot to the user in the form of speech.

V. CONCLUSION

The recent trends in technology paves way for the chatbots to reach an amazing development. They can be used in personal computers to mobile phones and are platform independent. This personal assistant particularly is designed specially to help women during their prenatal period. The families being westernized and nuclearized and humans being replaced by machines, the need of experienced people to take care of young women is lessened due to cosmopolitan work culture and society. This is where it comes to play. An advantage of this is the elimination of keyboard and implementing voice to voice conversation. Also, indicating the nearby hospitals and contacting our loved ones in cases of emergency. The information provided by the personal assistant are accurate as they are taken from reputed and verified medical documents. In certain cases, these mechanised doctors are proven to alter lifestyle and save lives better than humans. Also, eliminating massive expenditure on diagnosis and thing killing time making it a better alternative in times of emergency.

REFERENCE

[1] Bostrom, N., and Yudkowsky, E. 2014. "The Ethics of Artificial Intelligence," The Cambridge Handbook of Artificial Intelligence, pp. 316–334.

[2] McTear, M., Callejas, Z., and Griol, D. 2016. "The Conversational Interface," New York: Springer (10), pp. 978–3.

[3] A. Vales and K. S. Sukhanya, "Personal healthcare assistant/companion in virtual world," Department of Electrical Engineering and Computer Science, Los Angeles, California, 2009.

[4] Imran Ahmed and Shikha Singh, "AIML Based Voice Enabled ArtificialIntelligent Chatterbot", International Journal of u- and e- Service,Science and Technology (IJUNESST), Vol. 08, No. 02 , pp. 376-384,2015.

[5] C. A. Lovejoy, V. Buch, and M. Maruthappu, "Technology and mental health: The role of artificial intelligence," Euro. Psychiat., vol. 55, pp. 1–3, 2019, doi: 10.1016/j.eurpsy.2018.08.004.

[6] http://www.cyh.com/HealthTopics.

[7] https://www.open.edu/openlearncreate

[8] Unnati Dhavare, Umesh Kulkarni, "Natural Language Processing using Artificial Intelligence", *International Journal of Emerging Trends & Technology in Computer*

Science (IJETTCS), vol. 4, no. 2, pp. 203-205, April 2015.

[9] Balakrishnan, K., and Honavar, V. 2001. "Evolutionary and Neural Synthesis of Intelligent Agents," Advances in the Evolutionary Synthesis of Intelligent Agents, pp. 1–27.

[10] Cohen, M. H., Cohen, M. H., Giangola, J. P., and Balogh, J. 2004. Voice User Interface Design, Addison-Wesley Professional.

[11] Guzman, A. 2017. Making AI Safe for Humans: A Conversation with Siri, Routledge, pp. 85–101. (https://doi.org/10.4324/9781315637228-11).

[12] Shabina Sayed, Rushabh Jain, Burhanuddin Lokhandwala, Fakhruddin Barodawala, MurtuzaRajkotwala, "Android based Chat-Bot", International Journal of Computer Applications, vol. 137, no. 10, pp. 29-32, March 2016.

[13] P Antonius Angga ; W Edwin Fachri ; A Elevanita ; Suryadi ; R DewiAgushinta "Design of chatbot with 3D avatar, voice interface, and facial expression", 2015 International Conference on Science in Information Technology (ICSITech), 27-28 Oct. 2015.

[14] Abbas SaliimiLokman, JasniMohamadZain,FakultiSistemKomputer, KejuruteraanPerisian," Designing a Chatbot for Diabetic Patients",*ACM Transactions on Management Information Systems (TMIS), Volume 4, Issue 2, August 2015* .

[15] DivyaMadhu,Neeraj Jain C. J, ElmySebastain,ShinoyShaji, AnandhuAjayakumar," A Novel Approach for MedicalAssistanceUsingTrained Chatbot",*International Conference on Inventive Communication and Computational Technologies(ICICCT 2017).*