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Artificial Intelligence Based Healthcare Assistant and Consulting Android Application

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Abstract: Taking care of health is given high priority in a person's day to day life. People want to take good care of their health without spending a high amount of money on healthcare expenditure but at the same time wish for good health and a low-cost consulting facility. Research says, 60% of patients visit doctors for common health issues and that major issues can be cured by homemade remedies. But patient's lack of knowledge on the specific issue and proper medical assistant makes the patients visit the doctor. In the times of pandemic like covid - 19 outbreak it becomes very dangerous for the patients to visit doctors for common health issues. As we live in the times of Artificial Intelligence, Machine Learning and advanced technology. There is a need for Artificial Intelligence based healthcare assistants. Which can interact with patients to know about their medical conditions whether the threshold is low or mild or high. Based on which it can give a proper medical report and suggestions whether to have a homemade remedy or to consult a doctor or to visit the hospital. People can avoid unnecessary visits to clinics and hospitals when they can easily consult a doctor online. Consulting online can also be very helpful when there is a need for immediate medical assistance, especially in places where there is no proper healthcare facilities, it is becoming more difficult to consult a medical specialist when there is an emergency situation. Thus, an effectively designed and deployed AI healthcare assistant can help patients by providing preventive measures, herbal remedies and online consulting.

Keywords: Artificial Intelligence (AI), Herbal, Healthcare chatbot, Covid-19, Natural Language Processing (NLP), Pattern Matching, consulting.

I. INTRODUCTION

We are growing in the field of Artificial Intelligence (AI) and Machine Learning (ML) with remarkable achievements each year for decades. At the same time we are in a pandemic facing a deadly virus called Covid-19 or Coronavirus for more than a year now. This pandemic has affected many lives, businesses, economies of different countries and the global economy and more importantly healthcare infrastructure and availability of common healthcare facilities, resources and medical assistants among common people. Due to the outbreak of this virus people are facing a lack of medical assistance for common healthcare issues. People are visiting hospitals for health issues which can be cured with the help of homemade remedies at home itself and putting their and others lives at risk. Due to the lack of physical availability of doctors at clinics and hospitals leaving people left with no proper medical assistance. And there is no guarantee that this pandemic is going to end very soon. Maybe another pandemic will start after this one ends. Hence, there is a need for Artificial Intelligence (AI) based healthcare assistants which can help patients by providing preventive measures, home remedies and online consulting. And consulting a doctor online is also very helpful in preventing the spread of virus and for the need of immediate medical assistance from a professional like a doctor in areas with no proper healthcare facilities.

II. LITERATURE SURVEY

The current existing system which supports and provides medical assistants is not so accurate when coming to results. Because the majority of systems are designed in terms of business oriented. Not result oriented. The Artificial Intelligence models used in the systems or applications are not so well trained and trained with limited amounts of data. Which causes inaccurate results and which leads to inappropriate response from the system or application to the users or patients input.

Inaccuracy in the results in healthcare assistants is not acceptable at all by any user or patient. Current Artificial Intelligence based healthcare assistants or chatbots do not support consulting a doctor online. The current system is limited to providing inaccurate responses for users input and suggesting a list of doctors to consult physically. The other major problem with the current system or applications is the data security issues and data breaching. Many healthcare assistant applications fail to provide security to users or patients health data. Hence, there is a need for a well trained and result oriented system.

III. PROPOSED SYSTEM

The proposed system is an Artificial Intelligence (AI) based healthcare assistant and consulting application. In an attempt to provide smart healthcare and make it more accessible, this interactive application analyzes symptoms to diagnose, predict medical conditions, generates treatments and suggestions based on the inputs provided by the user. As the models of this application are well trained, it provides accurate results to the user. This application also provides an appropriate list of doctors to consult with for appropriate treatment. The user or patient can easily make an appointment or even immediate medical assistants and consult with a doctor. This application provides a safe way of communicating with doctors and does not store patient's health data by providing a live chat feature before consulting a doctor online on a video appointment or call.

Advantages:

- Online consulting
- Low-cost appointments
- Herbal Remedies
- Medical assistant at home
- Clarification on medical conditions
- Immediate consulting
- Secure system

IV. SYSTEM DESIGN

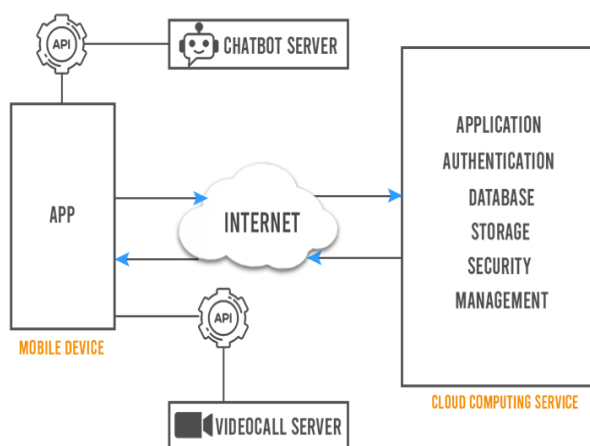


Figure 1: System Design

The system design is a cloud based android application which has three main parts: the chatbot server, video call

server and the application itself. Everything is deployed on cloud and to access functionality of chatbot and video call, the application needs to be connected to the internet. The application makes API calls to communicate between the servers and app with the help of the internet. The authentication, database, storage, security and management is achieved with the help of cloud computing server i.e Firebase backend as a service.

V. IMPLEMENTATION

A. Technology Stack:

The proposed application is mainly developed as an android application with the help of Android Studio and backend programming languages such as Java and Kotlin. The different functionality of this app is built using different technologies such as Python, Javascript and their relevant libraries. Below is the technology stack used to build this project.

- **Application Implementation:** Android Studio, Java, Kotlin.
- **Chatbot Implementation:** Python, Flask, Pycharm.
- **Video Call Implementation:** Javascript, PeerJS, Html and CSS.
- **Cloud Tools:** Firebase, Postman, Infermedica.

B. Modules:

The proposed project contains three modules: video call module, chatbot module, and the android app module. These three modules are responsible for handling different functionality of the application and implemented using different technologies.

1. Healthcare Chatbot module: The Healthcare Chatbot module is responsible for providing assistance to the user or the patient to any healthcare related queries. The chatbot is first trained with the dataset, after we check if the sentence or keywords given by the user are present in the dataset or not with the help of pattern matching. Then the appropriate response is given by the chatbot to the user. Steps to create chatbot are Import and load the data file, Preprocess data, Create training and testing data, Build the model, Predict the response.

Algorithm:

Input: Natural Language Query from user

Output: Requested data from intents.json file tags based on input in the form of Natural Language.

Pseudocode:

1. While user has a question.
2. User enters the query.
3. detected and extracted words.
4. for each keyword k in query.
5. Lookup k in intents.json data fields.
6. Lookup k in AIML.

7. return the intents.json data value v.
8. end for.
9. concatenate v with predefined reply sting.
10. end while.

2. Video Call module:

Video call module is responsible for handling video communication between users. This module is developed using Javascript as backend language and HTML and CSS as frontend. And PeerJS library for peer-to-peer connection. This module consists of four files

Call.html: The call.html is responsible for structuring the video call frontend. It consists of two Video elements. The first is primary-video and second is secondary-video. The primary video element displays the video form the doctor's end and secondary video element displays the user's end.

Style.css: The styles.css is responsible for styling the html document

Call.js: The Call.js file is responsible for handling all the functionality of the video call module. It is used as a backend language for this module. It consists of multiple functions to handle different functionality. Init(), StartCall(), Listen(), ToggleVideo(), ToggleAudio().

Peer.js: Peer.js is responsible for providing all the functionality of peerjs library and WebRTC. Functionality of peerjs server is initialize the clients, Connects the clients, Disconnects the clients

3. Android App Module: The proposed android application module consists of many sub modules. A sub module is a component of your application that you can build, test, debug. The app module consists of two important files, the first is xml which is for frontend design and second is java or kotlin file for backend. The module consist four packages

ChatBotAPI: communicates between chatbot server and app

VideoCallAPI: communicates between videocall server and app

Authentication: provides authentication to users

Main: contains all other related files

C. Working:

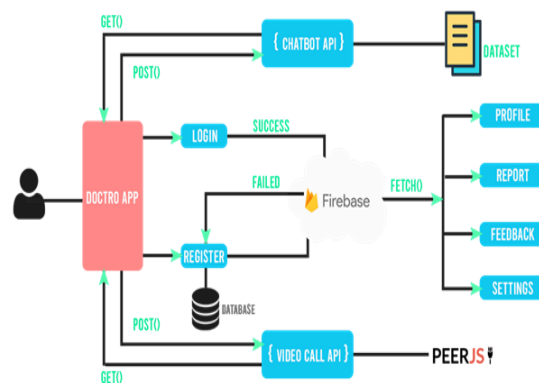


Figure 2: System Architecture

In the System Design of this application. If the user is new to the application there is no need to sign in or sign up. The user can directly use the features of the application such as the healthcare or medical bot for assistance purposes or consulting a doctor online. Both these features are implemented in the app with the help of APIs. The bot uses Python language and libraries like TensorFlow and Numpy to implement the core part of the bot and it is hosted using the Flask backend framework. The android app communicates with the bot API with GET() and POST() methods to get the response from the bot API. The video call or consulting feature is implemented using HTML, CSS for frontend and the backend coding with Javascript language. It uses a special library called Peer Js, which is a peer-to-peer connection API to connect the patient or user with the doctor online through video calling. The app uses Firebase Database to store and retrieve the necessary data and for authentication purposes. This application also provides different features like report, profile, feedback system. To implement these features the app uses Firebase Firestore, Firebase Storage and Firebase Authentication system.

VI. RESULTS

The result of the proposed system is an android application.

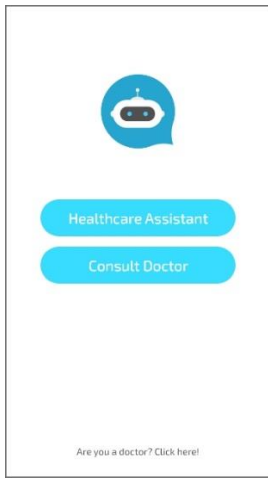


Figure 3: Home Screen

The home screen contains three options: Healthcare bot, Consult Doctor, Doctor registration.

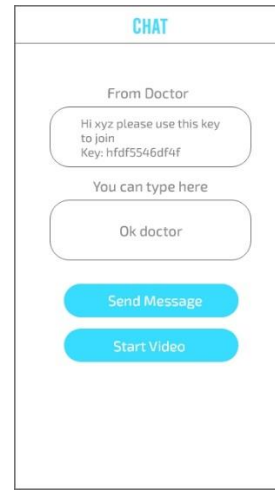


Figure 6: Chat System

The proposed system provides a secure way of communicating with doctor.

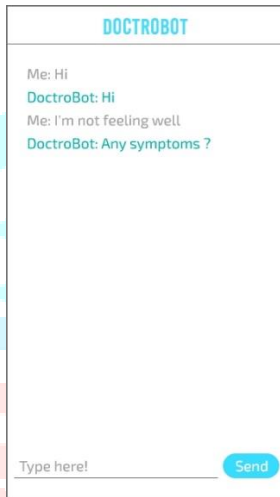


Figure 4: Healthcare Chatbot

The user can ask healthcare related questions to the bot and get response based on the condition like low, mild, high of user's health problem.

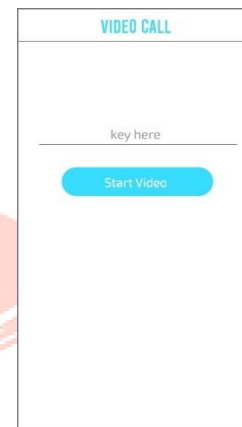


Figure 7: Video connection

A unique key will be given by the doctor to the user or patient to join the video call with the help of chat system.

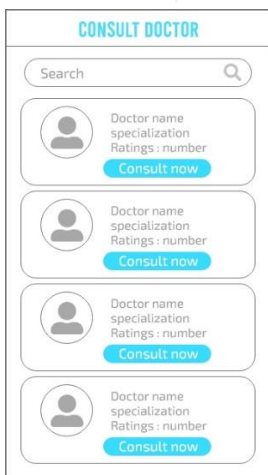


Figure 5: Consult Doctor

The consult doctors intent consists of list of different doctors the user can consult.

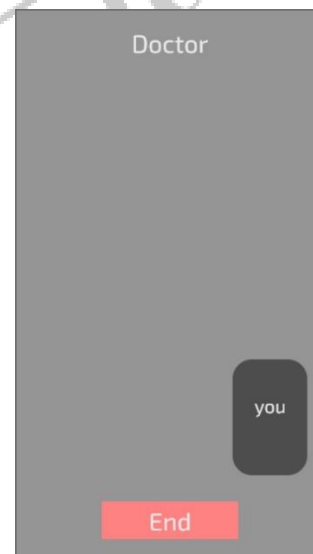


Figure 8: Video call interface

The video call user interface consists of two video players, one for the doctor and other for the patient. And it also consists of audio, video and end call buttons.

Figure 9: Doctor registration form

The doctor to show up in the doctors list of this application. The doctor needs to register with the following details, Name, Specialization, Phone number, Email, and a proof of being a doctor.

VII. CONCLUSION

As there is a need for result oriented healthcare chatbot, with the help of Artificial Intelligence we have developed a healthcare chatbot which is trained with appropriate datasets to give appropriate and accurate results. At the same time, as we are in a pandemic facing a deadly virus called Covid-19. We needed a way to consult a doctor online. Hence, with the help of Artificial Intelligence and latest technologies, this proposed system solves the problem of healthcare assistance and online consulting.

REFERENCES

- [1] Ashwini Shangrapawar, Ankita Ravekar, "Artificial Intelligence based Healthcare Chatbot System", IRJET Vol:07, Issue-02:Feb-2020.
- [2] Gopi Battineni, Jadhav, K.P, "AI Chatbot Design during an Epidemic like the Novel Coronavirus", Special Issue:Feature Papers in Artificial Intelligence in Medicine),2020
- [3] Flora Amato, Stefano Marrone, "Chatbots meet eHealth: automat zing healthcare", proceeding of diet, May-2018
- [4] Dinesh Kalla, Fnu Samaah, "Chatbot for Medical Treatment using NLTK Lib" IOSR Journal of Computer Engineering IOSR-JCE, Volume 22, Issue 1, Feb -2020
- [5] Cameron, G., Cameron, D., Megaw, G., Bond, R., Mulvenna, M., Neill, S. O, McTear, M. (2018). Best

Practices for Designing Chatbots in Mental Healthcare – A Case Study on iHelp. Proceedings of British HCI 2018

[6] Ibrahim Al-Mahdi, Kathleen Gray, Reeva Lederman. Online Medical Consultation: A review of literature and practice, 2015. Available at: <http://crpit.com/confpapers/CRPITV164Al-Mahdi.pdf>. Accessed on 6 March, 2018

[7] Rideout V. Generation Rx.com: how young people use the Internet for health information. 2001. Available at: <http://www.kff.org/content/2001/20011211a/GenerationRx.pdf>. Accessed 20 January, 2018.