International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 9 Issue 7 ǁ 2021 ǁ PP. 68-72

Design of AUSHADHI –a Medical Chatbot

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Abstract
In today's fast paced world, people tend to ignore common health issues like cough, mild fever, weakness and so on. This may result into critical problems if not taken care on time. With the advancement of technology, however, health care is becoming accessible for a wider range of the society. Our project aims to build a medical healthcare android application based on cloud platform which can help people self-assess their health condition and based on that it helps them decide whether to consult a doctor or not. Our Android application will come handy in situations where people take the risk of ignoring their health issues due to long queues in hospitals for doctor's consultation. Moreover, in the present scenario of the pandemic, visiting hospitals has become a dreaded task for everyone due to the fear of being infected. The hospitals also are facing shortage of staffs and resources. Our chatbot will turn out to be very beneficial for users for whom getting regular health check-up is difficult due to unavailability of doctors in their locality or other reasons.

Keywords: *Health care, Android, Cloud computing, MBaaS (Mobile Backend-As-A-Service), Speech-to-Text, Text-to-Speech, Google APIs.*

Date of Submission: 06-07-2021 Date of acceptance: 19-07-2021

I. INTRODUCTION

Health-care has been the biggest concern of humans since the ancient times. As the technology advances every day, we find more space to improve the quality of the health-care that we have. Ubiquitous health-care has the potential to become cost effective and to improve quality of service. Mobile health- care system is one of the ubiquitous systems.

1.1 Android in Health Care

E-health, also called e-health care, use of digital technologies and telecommunications, such as computers, the Internet, and mobile devices, to facilitate health improvement and health care services. Mobile devices have become commonplace in health care settings, leading to rapid growth in the development of medical software applications (apps) for these platforms. Numerous apps are now available to assist health care professionals with many important tasks, such as: information and time management; health record maintenance and access; communications and consulting; reference and information gathering; patient management and monitoring; clinical decision-making; and medical education and training.

1.2 Cloud Computing in Android

As mobile centric apps and interfaces are the latest technology trends, creating applications powered by the cloud environment is a better approach as compared to the traditional method. With the help of cloud environment, one can create apps that are innovative, robust and user-friendly. As the cloud infrastructure is managed by the service provider, application developers can completely concentrate on creating the best apps.

- We can sync the required applications together on the cloud and as a result of this we can get the most recent data for various activities. Any change made to one instance of app is reflected in other users immediately because of the cloud technology.
- On the basis of volume of usage, mobile cloud computing has a low upfront cost. As the cloud environment works on the pay-per-use concept we only have to pay for the resources that are actually utilized.
- Users can get complete access to information through their mobile devices irrespective of their location.

1.3 MBaaS

In the mobile "backend" as a service model, also known as **backend as a service (BaaS)**, web app and mobile app developers are provided with a way to link their applications to cloud storage and cloud

computing services with application programming interfaces (APIs) exposed to their applications and custom software development kits (SDKs).

II. LITERATURE SURVEY

With the advancement of technology, today we have multiple chatbot applications available for people. The paper gives detailed information regarding the methodology used by our chatbot.

S Anil Kumar et al presented a paper, aims of self-diagnosing Health Care by a text-to-text diagnosis bot which connects patients about their medical issues and gives a customized diagnosis to support their symptoms but it uses only text conversations [1].

Abd-Alrazaq, Z. Safi, M. Alajlani et al Developed integral model including probability and fuzzy models for determination of human constitutional types, but it has not enough practical evidence for effectiveness and efficiency [3]. Q. Bao, L. Ni, and J. Liu propsed an Hybrid model chatbot that combines knowledge graph and a text similarity model, which provides Only text based and generic domain [6]

This system helps users to submit their complaints and queries regarding the health. It requires the users to register on Chatbot application. Then ask queries regarding to the health care and medical details. This paper lacks tolerance to noise[6]. J. E. Bibault et al presented Chatbot versus physicians to provide information for patients with breast cancer: blind, randomized controlled non inferiority trial to only specific domain[9].

C. Combi et al presented narrative descriptions to MedDRA: automagically encoding adverse drug reactions, which has inability to handle negations in textual medical records [10].

Jefferson S. Medenilla and others presented a paper provides a paediatric generic Medicine consultant Chatbot using Left and Right Parsing Algorithm but it can only be developed into a web-based application[14].

Divya Madhu and others presented A Novel approach for medical assistant with trained chatbot using Natural language processing and pattern matching algorithm. Provides the prescription and composition of medicine without consultation of a doctor. The model consists of improvement in health care system using cloud using bio sensor networks but the data stored on cloud does not have enough security mechanisms. It is not accessible for everyone as it works on intranet[8].

Jasni Mohamad Zain et al presented a paper aims in designing a Chatbot for diabetics' patients using Sequence Words Deleted (SWD) technique using Pattern matching algorithm. The application keeps repeating the previous question until the keyword is detected[18].

III. SYSTEM DESIGN

In our prposed architecture, the Android application is accessed by the user and doctor to login. The Android application validates the credentials by accessing the Parse server on cloud.

The architecture is comprised of the following system components:

- Android interface
- User/Doctor
- Cloud storage

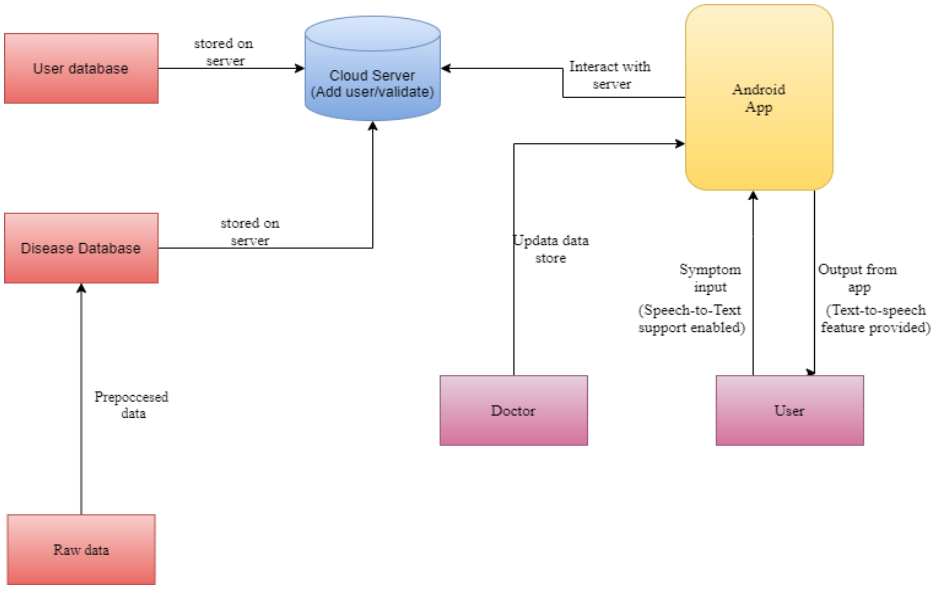

Figure1. System Architecture

IV. IMPLEMENTATION

A. Login module

The Android activity for Login/Register is designed. A new user should register himself in the application first. The details entered are validated and if found correct, the user details are stored on the cloud storage.

The user when logs in to his account, credentials entered by him/her are validated by connecting to the cloud server and storage and accordingly user is taken to the dashboard. Users can use Forgot Password feature wherein when they enter their username, their password is sent on their registered mobile number.

B. Data Preprocessing

The dataset was downloaded from Kaggle, and Exploratory Data Analysis was conducted on it. The existing dataset then, was processed to obtain a list of disease and all their possible symptoms in CSV file. The data was processed using the Python modules. The processed data was then stored on the Cloud storage.

C. Prediction based on User Input

Once a user logs in, he/she can chat using the Android interface provided. The user inputs the symptoms he/she is experiencing. Next, based on the symptom entered a list of all possible diseases with that particular symptom is made. A list of symptoms of all the diseases in the list are collected. The user is now one by one asked each of these symptoms. When a user responds to any symptom as YES, a new list of possible diseases is made, which now includes the diseases whose symptom list has those symptoms for which user has responded YES until now.

When all the symptoms as necessary are asked and user responses on each of them are collected, the result is displayed as the diseases and primary aid which user may be having.

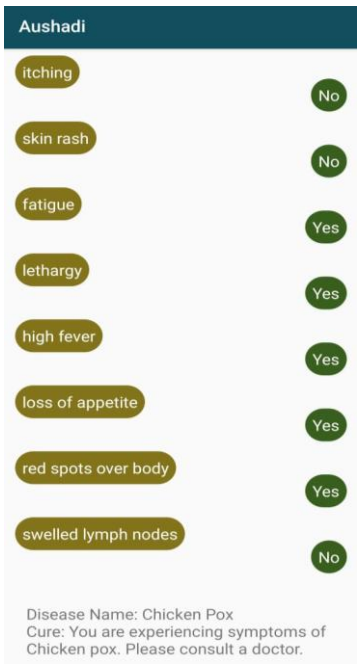

Figure2. Chatbot in Action

D. Doctor Activity

The Android application has a particular credential which will be provided to doctors. The doctor can login and view all the diseases which are there in the Cloud storage. The doctor can add new diseases and their cure and symptoms as they deem necessary. Also, when a doctor clicks on a disease, he can view all its symptoms. The doctor can then add new symptoms or also delete any of the symptoms as per the need.

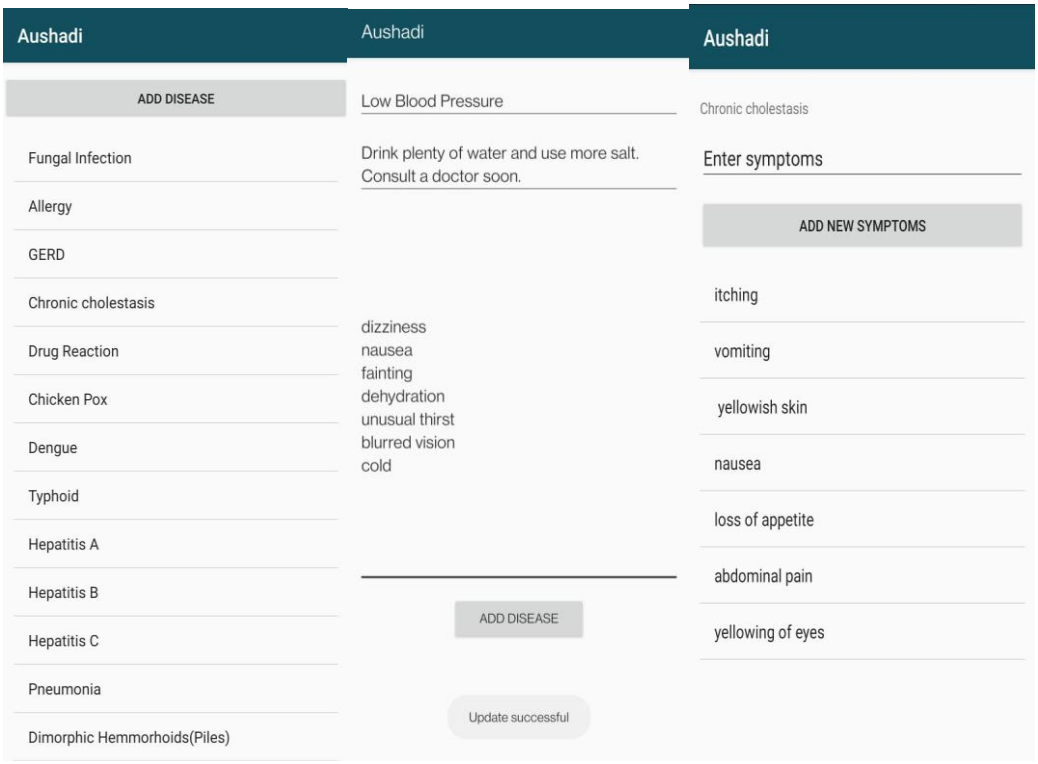

Figure3. Doctor Dashboard **Figure4. Add disease** **Figure5. Add symptoms**

E. Nearby Hospitals Search

The user dashboard allows the user to see all the nearby hospitals based on user's location. We have used Google Maps API for providing this feature. On clicking the nearest hospital button, the App will display the list of nearby hospitals within 6kms of location. On clicking the hospital name, Google Maps page opens which shows the location of the hospital. We can also get the direction to the hospital with the help of Google maps.

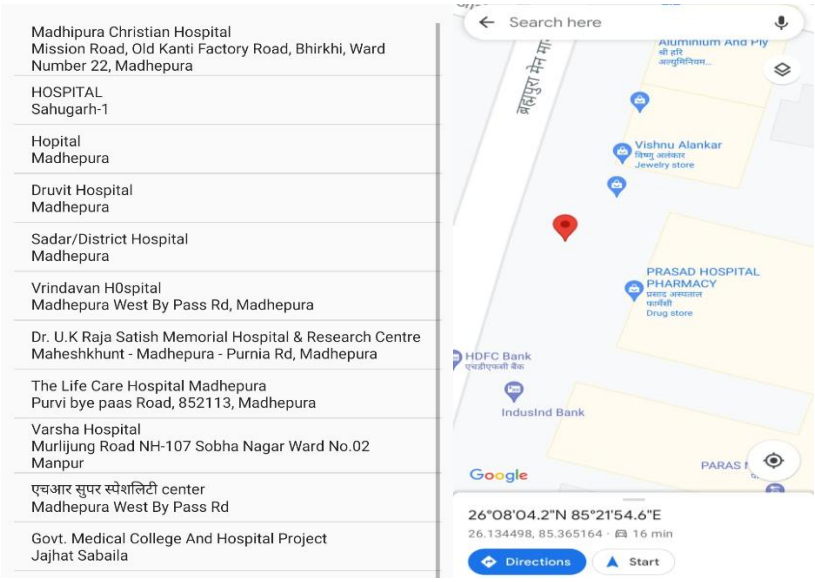

Figure6. List of Nearby Hospitals **Figure7. Google Maps**

F. Voice Support

The Android application has in-built support for Speech-to-Text and Text-to-Speech. For Speech-to-Text, Google API is used and for Text-to-Speech, Android intent is used. While entering symptoms, the user can exploit the Speech-to-Text functionality. When the final output of diseases is returned to the user, it is also read out loud using the Text-to-Speech functionality.

V. CONCLUSION

In today's world of pandemic and new emerging diseases, our initiative was to create a solution so that everyone can get the basic medical assistance by just installing an app on their smartphones. Aushadhi provides medical assistance 24x7 to the user using cloud for its backend database, the user need not to go to the hospital until it is a serious illness and the basic cure which can be found at home is provided for common health issues. If the chatbot finds the issue to be serious and must be handled by a doctor it will tell the user to consult the doctor. The chatbot has google maps integration to find nearest hospitals from users' location. A decision tree like algorithm is designed to provide the results based on the user's symptoms. A doctor login is provided to modify the changes in symptoms of diseases and add new diseases, it ensures reliability and updating of data that is provided to the app for disease prediction. In future the app may provide doctor's consultation, and a functionality to book appointments, if needed. The interface could be more user friendly.

REFERENCES

[1]. S. Anil Kumar, C. Vamsi Krishna, P. Nikhila Reddy, B. Rohith Kumar Reddy, I. Jeena Jacob, Self-diagnosing health care chatbot – IJAST Volume 29 Issue 5, pp. 9323-9330 July – 2020

[2]. Satyendra Praneel Reddy Karri, B. Santhosh Kumar, "Deep Learning Techniques for Implementation of Chatbots", Computer Communication and Informatics (ICCCI) 2020 International Conference on, pp. 1-5, 2020.

[3]. A. Abd-Alrazaq, Z. Safi, M. Alajlani, J. Warren, M. Househ, and K. Denecke, "Technical metrics used to evaluate health care chatbots: scoping review," Journal of Medical Internet Research, vol. 22, no. 6, 2020.

[4]. Nicholas A. I. Omoregbe, Israel O. Ndaman, Sanjay Misra, Olusola O. Abayomi-Alli, and Robertas Damaˇseviˇcius, Text-messaging based medical diagnosis – Hindawi, Journal of Healthcare Engineering, Volume 2020, Article ID 8839524.

[5]. R. B. Mathew, S. Varghese, S. E. Joy and S. S. Alex, "Chatbot for Disease Prediction and Treatment Recommendation using Machine Learning," 2019 3rd International Conference on Trends in Electronics and Informatics (ICOEI), Tirunelveli, India, 2019, pp. 851-856, doi: 10.1109/ICOEI.2019.8862707.

[6]. Q. Bao, L. Ni, and J. Liu, "HHH: an online medical chatbot system based on knowledge graph and hierarchical bi-directional attention," Proceedings of the Australasian Computer Science Week Multiconference, vol. 7, 2020.

[7]. Prashant Tiwari, Aman Jaiswal, Narendra Vishwakarma, Pushpanjali Patel "Android application for health care information management and predictor system",2017-IREJET, e-ISSN: 2395 -0056, p-ISSN: 2395-0072

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

[9]. Chaix B, Bibault JE, Pienkowski A, Delamon G, Guillemassé A, Nectoux P, Brouard B. When Chatbots Meet Patients: One-Year Prospective Study of Conversations Between Patients With Breast Cancer and a Chatbot. JMIR Cancer. 2019 May 2;5(1):e12856. doi: 10.2196/12856. PMID: 31045505; PMCID: PMC6521209.

[10]. Combi C, Zorzi M, Pozzani G, Arzenton E, Moretti U. Normalizing Spontaneous Reports Into MedDRA: Some Experiments With MagiCoder. IEEE J Biomed Health Inform. 2019 Jan;23(1):95-102. doi: 10.1109/JBHI.2018.2861213. Epub 2018 Jul 30. PMID: 30059326.

[11]. Ahmed Imteaj; Muhammad Kamrul Hossai "A smartphone-based application to improve the health care system"- International Conference on Medical Engineering, Health Informatics and Technology (MediTec)- 2016

[12]. N. A. Korenevskiy, "Application of fuzzy logic for decision-making in medical expert systems," Biomedical Engineering, vol. 49, no. 1, pp. 46–49, 2015.

[13]. Karolina Kuligowska, "Commercial Chatbot: Performance Evaluation Usability Metrics and Quality Standards of Embodied Conversational Agents", Professionals Center for Business Research, vol. 2, pp. 1-16, 2015.

[14]. Jefferson S. Medenilla, Sharleen Mae T. Nacion, Bien Michael B. Francisco: "Pharmabot" Vol. 3, No. 2, 2015.

[15]. Khyamling A. Parane; Naveenkumar C. Patil; Shivananda R. Poojara; Tejaskumar S. Kamble "Cloud based Intelligent Healthcare Monitoring System", IEEE-2014

[16]. P. Kaur, P.D., Chana, I.: Cloud based intelligent system for delivering health care as a service. Computer Methods Prog. Biomed. 113, 346–359 -2013

[17]. Lisa, B.A.: "Hospital uses cloud computing to improve patient care and reduce costs"-Accessed 20 Feb 2013

[18]. Abbas Saliimi Lokman, Jasni Mohamad Zain: "Designing a Chatbot for Diabetic Patients" – Research Gate 2007