

Healthcare App - Video Conferencing Appointment and Record Management

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Abstract - The Covid-19 pandemic has created many challenges and problems for all the public services due to social distancing. Healthcare services faced major difficulties while serving people, as it was the most required service during pandemic. It includes inadequate capacity of hospitals, unavailability of doctors, rapidly increasing number of patients, avoiding contacts while medical treatment, etc. The Covid-19 pandemic was the powerful alert that we live in a complex and highly unpredictable world. It was nearly impossible for all to step out of home to get any health care services. In the midst of these problems and challenges lies an opportunity for the healthcare industry to be in a better position and transform their situation. The major challenge was lack of adequate capacity to handle the increasing patient volume. Many of the people were not able to get treated because of unavailability of beds. Managing and guiding patients in this pandemic was being difficult for healthcare managers and the government. To keep the healthcare industry working during such pandemic, executives need to take steps towards creating a safe patient care process and environment. Our application facilitates the user with online booking of video appointments as well as in-person appointments with the specialist doctor with few clicks. Receipts for successfully booked appointments will be sent to patients via email. The application will also provide facility for saving previous record and history management for an individual user. Expense tracking of all appointments will be taken care of in the application. This results in time saving and cost-effective application for the healthcare sector. Also patients can register for blood donation and organ donation through our app. Patient can see the history of their past appointments. For self disease management and patient education health articles are provided. The main benefit of our application is that the patient does not need to step out for minor medical problems.

Key Words: Covid-19, Application, Patients, Time-saving, Cost-effective, Pandemic.

1. INTRODUCTION

The Covid-19 pandemic had an adverse effect on healthcare infrastructure all over the globe. As India has a huge population it became more difficult to provide medical services to each of us. Many people were not able to have access to medical facilities owing to the lockdown

and social distancing. Unavailability of beds was the major challenge for hospitals, eventually many people couldn't get treatment on time. Nowadays, smartphones have reached every hand and every home. As a result, people are making use of the beneficial mobile applications to make their everyday life easier. The number of smartphone users is growing rapidly, including among healthcare professionals. In the pandemic situation it becomes difficult to go out even for medical purposes. Many medical applications for smartphones have been developed and widely used by healthcare professionals and patients. Also, smartphones can play a vital role in patient education, disease self-management, and remote monitoring of patients. This small device can be used as a tool of awareness.

Our application named Pocket Doctor helps users to book appointments and interact with doctors anytime and anywhere. It provides easy access to specialist doctors in a few clicks. The appointment can be taken for in-person visit as well as online video appointment. After successfully securing the appointment slot, patients will get the receipt via email. Pocket Doctor app being facilitated with video conferencing features allows the user to get good medical consultation without stepping out of home. Also provides facility for previous records and previous appointment history management for individual users which make our application more user friendly. In addition to the above, it also enables users to register for blood and organ donation. Also the App keeps track of expenses for the appointments. The main objective of our application is to develop a platform that provides a anywhere, anytime available service for patients to get diagnosed or interact with doctors through the online video conferencing with a medical record management feature. This results in the cost effectiveness of the app and saves time.

2. PROPOSED FRAMEWORK

Fig 1. Shows the flow of our proposed system. Some of the existing systems only have appointment booking whereas our proposed system provides online video consultation anytime and anywhere. In this system, for crowded hospitals in person appointment is provided which is missing from the existing systems. Other features that are provided in the proposed system over the existing systems

are expense tracking, past records management, medical journals, video for doctor to study are provided. also our system provides blood and organ donation.

In this paper, we propose a platform that connects patients and doctors anywhere, anytime. This framework mainly consists of two main modules i.e Patient and Doctor. Patient module consists of features like online video consultation booking, in-person appointment and many more. Doctors can have an online consultation with patients and give them prescriptions. This framework consists of modules like Interface, Device, Doctor, Patient, Authentication, Firebase.

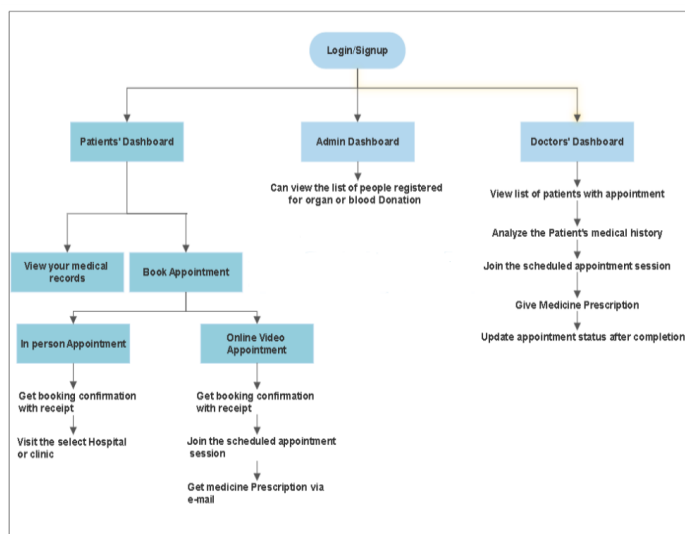


Fig- 1: Flowchart of Proposed System

A. Interface

To use this interface, users can register themselves as a patient or a doctor. The successful registered patient can simply sign in using authenticated credentials to book online or in-person appointments on our app. As the doctor gets logged in, the doctor gets a list of all the appointments to attend.

B. Patient

- Patients can get answers to their health problems by consulting doctors on our app.
- Initially the patient needs to Login or Register, after authentication the user can book an appointment. In Fig 2. Some visuals of the loading page and Registration page are given.
- We have two types of appointment -
 - 1. In-person appointment
 - 2. Video appointment

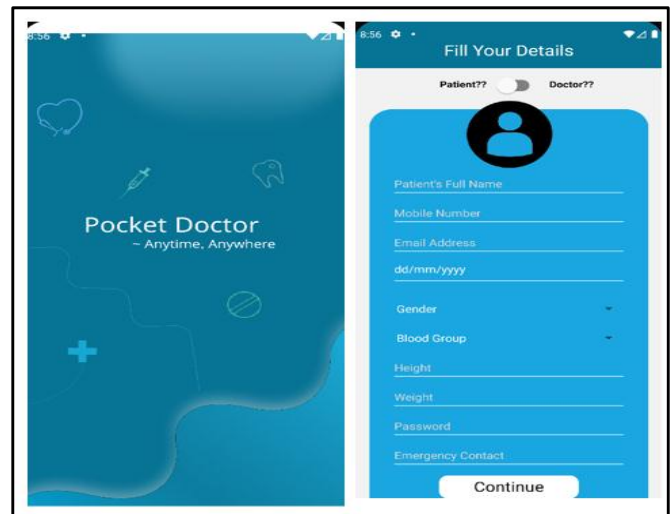


Fig-2 : Loading Page & Registration form

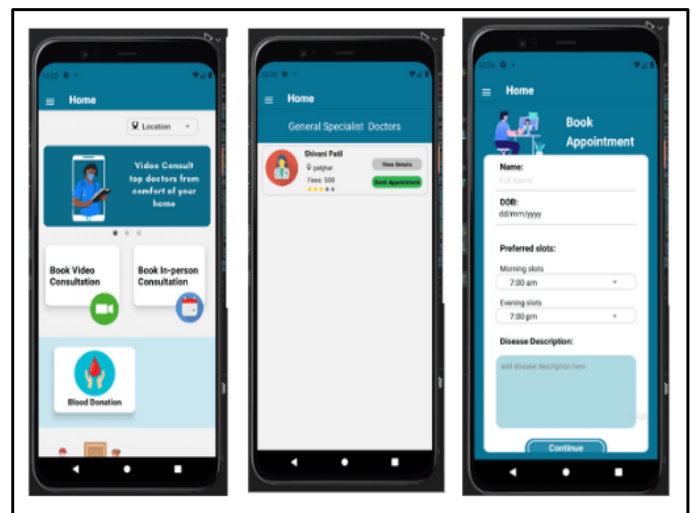


Fig-3 : Booking Appointment Page

- Patients can book an appointment for any required specialist.
- Patient will get a booking receipt from the doctor after the appointment.
- Patients can keep a track of the expense for all the appointments booked, canceled.
- Patients can also apply for organ or blood donation.
- We are also providing some other features like my appointment, expenses, history, and health article. In Fig 4. We can see some other features of our application like record uploading and expense management.
 - My appointment: In this section you will get all the information regarding scheduled appointments like doctor name, specification, date and time of appointment.

– Expenses : Records of all the expenses of appointment which are completed or refunded or missed.

– History: History of appointment done till current date with all details like doctor info, patient info, medicine details and other recommended tests.

– Health article: You can read health articles on topics like heart health, food and nutrition, women’s health, etc.

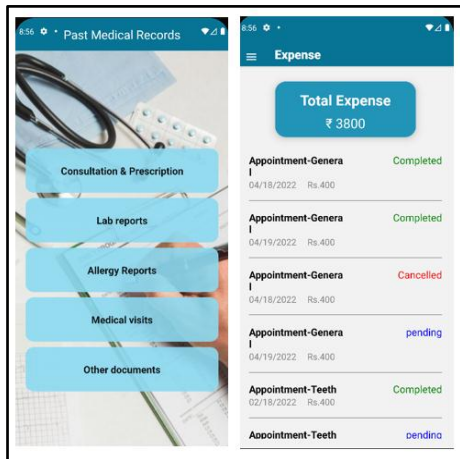


Fig- 4: Past Records & Expense Tracking

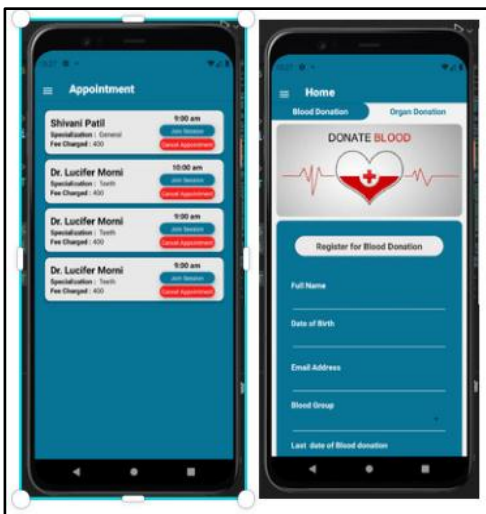


Fig- 5: Appointments and Blood Donation

C. Doctor

- After authentication, List of patients with an appointment for the day can be seen in the appointments section and according to the doctor can start the session.
- After the appointment is done, the Doctor can generate a digital prescription for the patient, that will be sent to the patient via Email.
- Doctors can also read some medical journal’s or documents or other health articles.

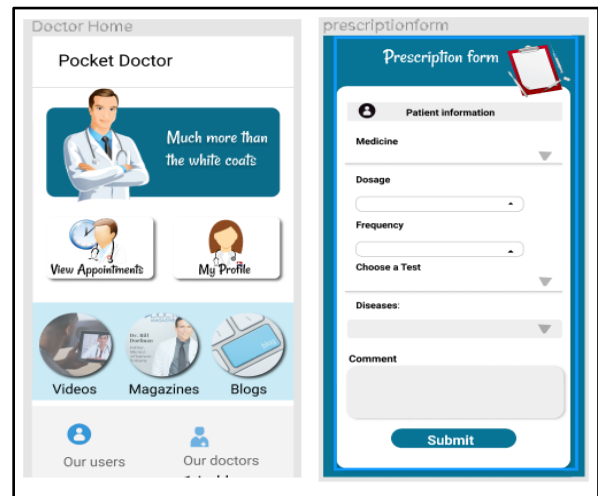


Fig-6 : Doctor Home & Prescription Form

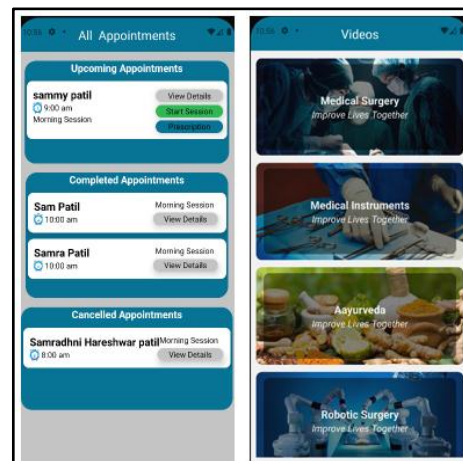


Fig-7 : Appointments and Guide Material Page

D. Admin

Admin can see all the details of the user who has applied for organ or blood donation. According to this information admin can contact any hospitals or reach to the hospitals that need the blood or organ. Admin dashboard is given in Fig 8.

E. Authentication

It manages the user’s credential and the session over the portal. Authentication has been done using email and password. Once the credentials are verified the user will get access to the portal.

F. Firebase

For managing and analyzing the user’s data a real-time firebase database has been used. Firebase is a cloud based application and it provides the authentication service. Firebase provides users with multiple features like data analysis, database and data recovery.

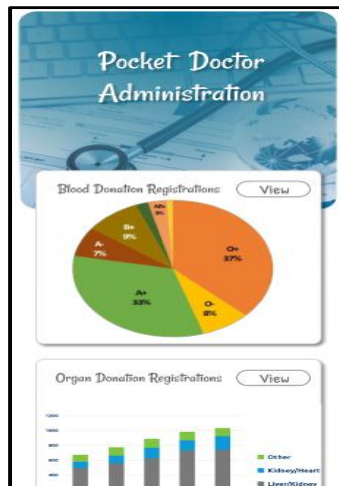


Fig-8 : Admin-Home Page

3. IMPLEMENTATION

The proposed platform is developed using react native, a JavaScript framework. React Native is a framework for writing real, natively rendering mobile applications for iOS and Android. For back-end services like storing and managing data, Firebase is used.

The design is based on a client-server architecture where the client is an android device and server as Firebase(server-less technology) can be used to develop this application. Firebase is an integration of many web APIs and programming language APIs.

The build system of this application has two types of relation i.e. Doctor relation and patient relation. This system is introduced at the time when patients book online appointments by completing an online transaction and at the time when an actual appointment happens with the doctor. When the patient books the appointment, all the information of the patient and the details of symptoms are added to the system. On the other hand, doctors can view scheduled appointments with the patient information added to the system and can consult them accordingly.

For this application to be built modules of react-native have been used in it.

4. SOFTWARE REQUIREMENTS

React-Native:

React Native (also known as RN) is a popular JavaScript-based mobile app framework that allows you to build natively-rendered mobile apps for IOS and Android. The framework lets you create an application for various platforms by using the same code-base. It is based on React, and it brings all its glory to mobile app development.

Firestore:

Google Firestore is a Google-backed application development software that enables developers to develop IOS, Android and Web apps. Firestore provides tools for tracking analytics, reporting and fixing app crashes, creating marketing and product experiments. The Firestore Real time Database lets you build rich, collaborative applications by allowing secure access to the database directly from client-side code. Real time events continue to fire, giving the end user a responsive experience.

Firestore authentication:

Firestore security applies Google's internal expertise to easily build app sign-ins. Develop simple, free multi-platform sign-in with Firestore Authentication. Firestore Authentication provides backend services, easy-to-use SDK's, and ready-made UI libraries to authenticate users to your app. It supports authentication using passwords, phone numbers, popular federated identity providers like Google, Facebook and Twitter, and more.

Stack Navigator :

React Navigation uses what's called a stack navigator to manage the navigation history and presentation of the appropriate screen based on the route taken by a user inside the app. The stack navigator also provides the transitions and gestures that feel like those of native IOS and Android.

Time module :

It is a module in python which provides functions related to functioning with time and for converting between representations.

JSON:

All the representing structured data can be formatted using JSON (JavaScript Object Notation). One can transmit and receive data between a server and web application. In Python, JSON is obtained as a string.

Calendar Native Module :

React-Native Calendar Events gives you direct access to the Calendar with IOS and Android. Doing so allows your app to access and edit any calendar, but also new fully-featured events can be created. A series of events with alarms and set to any calendar can also be created.

News API :

A news API provides programmatic access to news articles from multiple news websites and parses it to extract the news data, text and metadata. This is then delivered in JSON format, which can be integrated into your

applications, allowing you to easily stream data feed from news sources worldwide.

5. CONCLUSION

The main purpose of this application is to provide cost-effective time saving easy-to-use medical facilities at home comfort. With the use of Technology using video consultation one can get immediate treatment. Some other features are also provided for patients such as details of upcoming appointments, expense and history of all the appointments done so far, and health articles. The application is useful for both doctors as well as patients. Beside consulting patients, Doctors can also read news and can watch videos related to health. This app is the solution for getting cured without getting in contact with other people in such a pandemic-like situation.

6. FUTURE SCOPE

The growing awareness about health will definitely lead to a boost in the capacity of handling patients. With the use of an application, the healthcare management profession will see the newest possibilities and scope in the Healthcare industry. Many features can be added to this project in the future such as:-

- Disease predictors can be added to the application with which a patient can contact the appropriate doctor.
- Block-chain facilities can be added for a more secure early saving of patient records and history.

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