"Dr. Online:Find Your Doctor"-An Android Application

Project Report submitted in partial fulfilment of the

requirements

for the degree of

Master of Computer Application

Αt

Department of Computer Science and Engineering

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JUNE, 2022

Declaration of Authorship

I, Debarati Adhikari, declare that this thesis titled, "Dr. Online:Find Your Doctor" and the work presented in it are my own. I confirm that:

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- •Where I have consulted the published work of others, this is always clearly attributed.
- •Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- •I have acknowledged all main sources of help.
- •Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

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To whom it may concern

This is to certify that the work on this project entitled "Dr. Online:Find Your Doctor" has been satisfactorily completed by Debarati Adhikari, Roll No: 001910503025, University Registration No 149886 of 2019-2020. It is a bonafide piece of work carried out under my supervision at Jadavpur University, Kolkata-700032, for partial fulfilment of the requirements for the degree of Master of Computer Application from the Department of Computer Science and Engineering, Jadavpur University for the academic session of 2019-2022.

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Abstract

Faculty of Enginnering and Technology, Jadavpur University

Department of Computer Science and Engineering

Master of Computer Application

By Debarati Adhikari

The main goal of the project is to develop an android-based software which can solve the problems faced by people/patients at the time of booking doctors at a medical clinic. With the help of technology, it is an android-based approach to make the booking system and other activities completely online from the existing pen and paper-based physical system. It is expected to reduce time, reduce workload, increase functionality, and increase the effectiveness of a medical clinic. With the help of technology, it would also increase the business and profit of the healthcare industry in various ways.

Acknowledgements

On the submission of "Dr. Online:Find Your Doctor", I wish to express gratitude to the Department of Computer Science and Engineering for sanctioning a project work under Jadavpur University under which this work has been completed.

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I would like to express my gratitude and indebtedness to my parents and all my family members for their unbreakable belief, constant encouragement, moral support and guidance.

Last, but not the least, I would like to thank all my classmates of Master of Computer Application batch of 2019-2022, for their co-operation and support. Their wealth of experience has been a source of strength for me throughout the duration of my work.

Regards,

Debarati Adhikari

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Chapter 1

1.1 Introduction

Nowadays, mobile phones have become an essential part of our lives. People can't imagine a day without their smartphone. In the modern, always-on society, it can be disorienting to not have an Internet connection, but a simple click on a phone accesses the Internet. Mobile phones are becoming progressively connected to the Internet, which empowers people to do their shopping, communication and trip planning on the go. Mobile phones provide an instant connection to friends and family.



Android [1] is a mobile operating system based on a modified version of the Linux kernel and other open-source software. It is developed by Google. Android is mainly made for touchscreen mobile devices such as smartphones and tablets. Most versions of Android are proprietary. The core components are taken from the Android Open-Source Project (AOSP), which is free and open-source software (FOSS) primarily licensed under the Apache License. When Android is installed on devices, ability to modify the otherwise FOSS software is usually restricted, either by not providing the corresponding source code or preventing reinstallation through technical measures, rendering the installed version proprietary. Over 70 percent of Android smartphones run Google's ecosystem. The "Android" name and logo are trademarks of Google which imposes standards to restrict the use of Android branding by "uncertified" devices outside their ecosystem.

The source code has been used to develop variants of Android on a range of other electronics, such as game consoles, digital cameras, portable media players, PCs, each with a specialized user interface. Some well-known derivatives include Android TV for televisions and Wear OS for wearables, both developed by Google. Software packages on Android, which use the APK format, are generally distributed through proprietary application stores like Google Play Store, Amazon Appstore (including for Windows 11), Samsung Galaxy Store, Huawei AppGallery, Cafe Bazaar, and GetJar, or open source platforms like Aptoide or F-Droid.

Android has been the best-selling OS worldwide on smartphones since 2011 and on tablets since 2013. As of May 2021, it has over three billion monthly active users, the largest installed base of any operating system, and as of January 2021, the Google Play Store features over 3 million apps. Android 12, released on October 4, 2021, is the latest version.

The establishment and improvement of doctor-patient interaction systems is a very important requirement, especially now when mobile communication technology is developing rapidly. Using a mobile application allows us to manage the time and distance gap between doctor and patients. On the other hand, through the connection between mobile terminals, both doctors and patient can get specific and relevant information to achieve better interaction. Android is a Linux based open-source operating system which is mainly used in portal devices with excellent performance, thus making its market share grow. The platform, Web services and database technology are all gradually maturing, so that we can develop a doctor- patient interaction system on the Android platform to meet the needs of the patient and provide doctors with a more efficient and convenient means of communication with patients.

1.2 Literature Survey

Mobile apps have tremendous potential and scope to have a positive impact on whichever industry they touch. Mobile apps are transforming healthcare and education for the better. It would be a privilege to be part of something good and positive. Building mobile apps helps to achieve a sense of satisfaction through this work.

As the demand for healthcare facilities has increased over the years, there have been certain hurdles that have been encountered. The Inability to access healthcare facilities from faraway places, not being able to get doctor's appointments on time, irregular medical treatment – these are some of the issues that have given rise to a thorough solution under the healthcare IT solutions umbrella – the **Doctor Appointment APP**.

Adding fuel to the fire is the pandemic that has almost obliged one and all to opt for online healthcare services rather than physically visiting doctors and clinics. Looking at the need of the hour, there have been the best online doctor consultation apps that have made things much easier. Before we investigate the most popular of them today, let us understand what an app to book a doctor's appointment is and what its features are.

There are already some android applications through which patients can book an appointment with a doctor and have interaction with the them, these applications are called "Telemedicine" applications. For example—Practo, MFine, Lybrat, Tata Health, Doctor 24X7, HealthPlix Spot, Sminq, Doctor On Demand and others are examples.

- **Practo**^[2]: Practo is one of the popular doc booking apps that offers some features such as online video consultation, booking doctor's appointments after choosing the specialist needed, getting digital prescriptions and others. It provides all the information about doctors, such as experience, qualification, consulting fees, timings and so on. It is ideal for those who look for specialised doctors for different ailments.
- **MFine**^[3]: MFine is a well-known, single app for all the healthcare people need. It is beneficial to consult with any specialist online, via phone, chat, or video call. It is an AI-powered healthcare platform that makes online doctor consultation an easy task. It has a wide network of doctors affiliated with good hospital chains. It is easily accessible and flexible, which is most liked by users.

- **HealthPlix SPOT**^[3]: HealthPlix SPOT is a popular app for doctors that assists in taking patient practise online, enhancing patient outcomes, and saving time. It is a virtual clinic that collects payments for appointments, has online video and audio consultations, creates the online clinic in a single click, and promotes the clinic at the same time. This app allows writing prescriptions in multiple languages. It has seamless integration with AI-based digital assistance.
- Lybrate^[3]: Lybrate is an online platform that connects doctors and patients seamlessly. It offers an effective way to connect with doctors while sitting at home at your own convenient time. It helps doctors to grow their professional network, create a better online reputation and offer the best patient care.
- **Tata Health**^[2]: Tata Health is another telemedicine app. It provides specific features to users, such as doctor appointment booking, online consultation, lab tests and the delivery of medicine. It also has a "health locker" which allows the user to store medical records online.

1.3 Objective

People often face difficulties in booking an appointment at a clinic. Going physically to the clinic, not having a clear picture of the availability of doctors, and also booking by calling may create some delays and problems.

The aim of the project is to design and implement android-based software to manage all the operations and procedures of a clinic via an android application. Its excellent performance on mobile terminals makes it possible for patients to be able to know about the best doctors from different departments, while doctors can manage their patients' appointments from anywhere and also determine the patient's problem as long as the patient provides all the necessary details while booking. "**Dr. Online**", a new system based on Android technology, enables the patient to book his/her appointments from anywhere through their mobile phones within 2-3 minutes. Our purpose is to build a system that will help the needy or every person who wants to save their precious time.

It permits the healthcare providers and also the users to enhance operational effectiveness, reduce maintenance costs, reduce errors, reduce time consumption, and improve the user experience too.

1.4 Tools and Technologies used

- Language used: Java
- Android Studio
- Firebase

Chapter 2

In this chapter the problem statement, purpose, overview, feasibility study will be discussed.

2.1 Problem Statement

With the increasing number of patients, it is getting more difficult for people/patients to book an appointment at a clinic manually, i.e. by physically going to the clinic and booking an appointment by pen and paper mode or by calling the clinic and booking.

2.1.1 User Problems:

- It is very time-consuming to physically go to the clinic to book an appointment.
- o It is not always possible to get an appointment through a call. The call line can get busy due to simultaneous calls.
- The user may not get a clear idea of all the available doctors.
- o For older patients, both the procedures are quite difficult.

2.1.2 Doctor's Problems:

- o The doctor can get an idea of how many patients they are going to see only by checking the information manually when the receptionist provides him/her with the document.
- o A doctor cannot manage or appointments by himself/herself.

2.1.3 Management Problem:

- o Recruiting a new doctor.
- o Assign a doctor to patients.
- o The patient faces a lot of queries.
- o In a manual system, a small mistake can lead to a huge problem.

2.2 Purpose

The purpose of the project is to create an android-based software to build a direct interaction between doctor and patient, solve the problems faced during manual booking of appointments and give the patient and the doctor a simple and user-friendly platform. This application is also able to handle multiple users and multiple doctors at a time.

2.3 Overview

To solve all the problems faced while the booking process is manually done, the android based software is designed in a robust manner. In this application-

2.3.1 The user gets the features –

- o Email-based secured registration process.
- o Unique email and password based authentication.
- Smooth and secure environment.
- Simple and user friendly.
- A list of doctors from different departments is available for booking on a particular day.
- o 24*7 booking facility.

2.3.2 The Doctor gets the features –

- o Email and password based login authentication.
- Secure Registration process.
- o The ability to check all the bookings from anywhere at any time.
- Accept or cancel the booking.
- o Details about the patient.
- o Update profile information.
- o Smooth and secured environment.

2.4 Feasibility Study

This project is feasible from all angles. A feasibility study is conducted to see if the project, on completion, will serve the purpose of the organisation for the amount of work effort and time spent on it. A feasibility study of a system proposal is according to its workability, which is the impact on the organisation, ability to meet their user's needs and effective use of resources. This document provides the feasibility of the project that is being designed and lists various areas that were considered very carefully during the feasibility study of this project, such as technical, operational and economic feasibility studies.

2.4.1Technical Feasibility:

For Technical feasibility study, complete functionality has been checked to be provided in the system. This project is technically feasible as appropriate technologies and skills have been used to develop the project. The application is made using the Android Studio, which is an official Integrated Development Environment (IDE) for Google Android operating system and for the database Firebase has been used.

2.4.2Economic Feasibility:

Economic Feasibility is very important aspect to be considered while developing a project. This Feasibility analysis usually requires for making appropriate estimate of the resources required, cost of development, development time for each option. This project is economically feasible because of the following reasons:

- It will save time for user's as user can get an appointment of a doctor without going to the hospital or medical shop or the clinic.
- The project goal can be achieved within the resource limit allocated to it.

2.4.3Operational Feasibility:

Operational Feasibility concentrates on how a project satisfies the requirements identified by the user in the requirement analysis phase of the software/system development.

Chapter 3

Dr. Online:Find Your Doctor – Design:

In this chapter the project design will discussed.

3.1Module Design

Doctor and Patients (normal user) are the two types of user of the "Dr. Online" app. Therefore there is two different module in the application. The different modules are —

- o Patient's module
- o Doctor's module

The system is designed in a way that a user can send an appointment booking request to a particular doctor and the doctor can confirm or cancel the appointment booking request. The appointment booking update will be shown in the notification page of the user.

3.1.1. Patient's Module

Patient is the actual user of the module.

Stimulus and Response:

An user can login in the app if he/she have already registered in the "Dr.Online" app. If not he/she must register in the app and then he/she will be able to see doctors' list from different departments as well as their details and book an appointment and gets a confirmation from the Doctor.

***** Functionalities:

Booking Appointment Online:

The main purpose of the "Dr. Online" android application is to make the online booking procedure simple, smooth and secured.

Flow of the Process:

- User logs into the system.
- o In the Dashboard user can see his/her name and email id at the top of the page.

- o Click On the "Doctors" button.
- o A Department list shows up.
- User can write the desired department in the search bar or can search in the list and click on the specific department.
- o A list of doctors belongs to that specific department shows up.
- o User can select a doctor by seeing the details of the doctor.
- o Click on the selected doctor.
- o Doctor details and Patient form shows up.
- User fills up the patient detail form and click on the "Book Your Appointment".
- o All the booking details stores in the Firebase firestore database.
- o A page of booking confirmation shows up to the user.

Get notification about booking appointment:

- o User logs into the system.
- o Click on "Booking update" button.
- A booking details page shows up and user can find the booking status information.

3.1.2 Doctor's Module:

Doctors can also have an account of them. Doctors can check the appointments booked by the patients on any particular date and also their appointment history.

• Stimulus and Response:

Doctor logs into the system and checks the appointments booked to him.

• Functionalities:

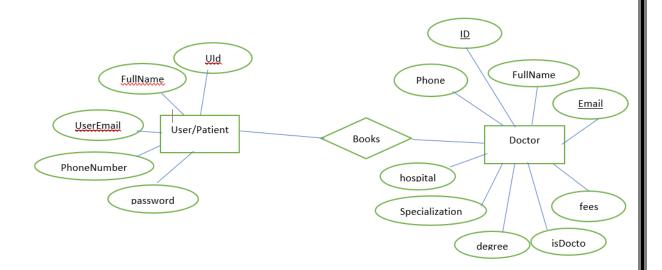
Checking the appointments:

- o Doctor logs into the system.
- o He/she has to click on "My Patients" to check all the appointments.

❖ Accept or reject the appointments:

O If Doctor is available at that particular date and time and want to treat that patient by seeing patient details and primary symptoms provided by the patient, he/she can confirm the booking by clicking on the "Accept" button. The Doctor can reject the booking by clicking the "Reject" Button. The patient will get notified about the confirmation.

> ER Diagram



3.2 Project Features:

3.2.1 Patient Authentication:

To start with user must login in with email id and password. For the first time users, they need to create an account.

The process flow for creating an account:

- o Click "Don't have an account? Register".
- o Click on "Patient Registration" button.
- o Fill the field of name, contact number, email id and password.
- o After that click on "Register Now!" button and the account creation will be completed.

After account creation

- o The Login page will show up again automatically.
- o Fill the field of registered email id and password.
- Click on "Login in" button.
- Now if the email and password is valid user enters the system and performs the necessary tasks and logs out.
- ❖ If the email and password is not valid the screen will show the message "Login Failed" and the user cannot enter the system.

3.2.2 Doctor Authentication:

Doctor must login the system with name, email id, password. If doctor is using the app for the first time, he/she must Register to the app.

The flow of the account creation process:

- o Click "Don't have an account? Register".
- o Click on "Doctor Registration" button.
- o Fill the field of name, contact number, experience, specialization, degree, email id and password.
- o After that click on "Register Now!" button and the account creation will be completed.

After the successful registration the doctor is will be taken to the Doctor Login Page.

- o Fill the field of registered name, email id and password.
- Now if the email and password is valid user enters the system and performs the necessary tasks and logs out.

❖ If the email and password is not valid the screen will show the message "Login Failed" and the doctor cannot enter the system.

3.2.3 Doctor's Clinic location via Google map:

Patients can book an appointment with a doctor online as it is less time-consuming and they can get an appointment from anywhere. but the majority of patients want to visit the doctor physically. This "Dr. Online" app provides directions to the doctor's clinic on a Google map.

3.2.4 Doctor's profile update:

If the doctor wants to update the details provided by him or her, he or she can do that because the app provides the doctor that facility to update any information in the future.

Chapter 4

Implementation

In this chapter "Dr. Online:Find Your Doctor" application implementation will be discussed.

4.1 Pre-Requisites:

To carry out the objectives of the project following are the hardware and software requirements.

4.1.1 Hardware Requirements:

- O Intel Core i5-8400 3.0 GHz or better.
- O 8 GB RAM
- 8 GB of available disk space minimum (IDE + Android SDK + Android Emulator)

4.1.2 Software Requirements:

4.1.2.1 Android Studio^[4]:

Android is the official Integrated Development Environment (IDE) Android apps can be written using Kotlin, Java, and C++ languages. The Android SDK tools compile your code along with any data and resource files into an APK, an Android package, which is an archive file with an .apk suffix. One APK file contains all the contents of an Android app and is the file that Android-powered devices use to install the app.

4.1.2.2 Firebase^[5]:

- <u>Firebase Authentication</u>-Firebase Firebase Authentication makes easy for developers to build secure authentication system and sign in experience for users. The feature offers a complete identity solution, supporting email and password accounts, phone auth as well as Google, Facebook, Twitter login and more.
- o <u>Firebase Firestore</u> Cloud Firestore is a cloud-hosted, NoSQL database that your Apple, Android, and web apps can access

directly via native SDKs. Cloud Firestore is also available in native Node.js, Java, Python, Unity, C++ and Go SDKs, in addition to REST and RPC APIs.

o <u>Firebase Realtime Database</u> - The Firebase Realtime Database is a cloud-hosted database. Data is stored as JSON and synchronized in realtime to every connected client. When you build cross-platform apps with our Apple platforms, Android, and JavaScript SDKs, all of your clients share one Realtime Database instance and automatically receive updates with the newest data.

4.1.3 Operating System:

o 64-bit Microsoft Windows 8/10/11.

4.1.4 Browser:

Google Chrome

4.2 Different Functionalities Implementations:

- **5.2.1 Activity-** An activity is the entry point for interacting with the user. The activities work together to form a cohesive user experience.
- **5.2.2 Jump to different activities through Intents-** In the project intents have been used to go to different activities. In this project Explicit and Implicit both intents have been used.
 - o **Explicit Intent:** For Explicit Intent, an object of the Intent has to be initialised and then it must be passed through "startActivity()" method to go to another acitivity. For example ,I have used explicit intent to jump from Main Activity to Login Activity-

```
Intent intent=new
Intent (MainActivity.this, com.example.dronline.LoginActivity.cla
ss);
startActivity(intent);
```

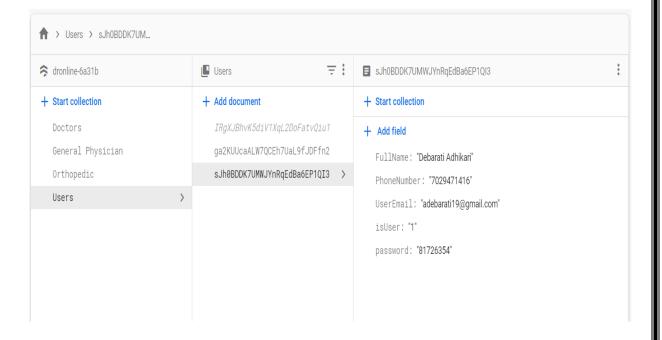
o **Implicit Intent:** I have used Implicit intent to show the hospital location on the google map-

```
Intent intent=new Intent(Intent.ACTION_VIEW,
Uri.parse("geo:0,0?q=R N Tagore"));
startActivity(intent);
```

- **4.2.3 RecyclerView:** The RecyclerView widget is a more advanced and flexible version of ListView. I have used RecyclerView to get the doctor lists from different department.
- **4.2.4 Layout -** A layout that arranges other views either horizontally in a single column or vertically in a single row. Set android:orientation to specify whether child views are displayed in a row or column. To control how linear layout aligns all the views it contains, set a value for android:gravity. I have used Linear Layout to design the project.
- **4.2.5 Saving data in Firebase Firestore** To save the data in firebase firestore I have used Map. For example-

```
FirebaseUser user=fAuth.getCurrentUser();
Toast.makeText(PatientRegistrationActivity.this, "Account Created!",
Toast.LENGTH_SHORT).show();
DocumentReference
df=fstore.collection("Users").document(user.getUid());
Map<String,Object> userinfo=new HashMap<>();
userinfo.put("FullName",fullname);
userinfo.put("UserEmail",email);
userinfo.put("PhoneNumber",phone);
userinfo.put("password",password);
//specify if the user is admin
userinfo.put("isUser","1");
df.set(userinfo);
```

All user registration data is stored in the firebase firestore in the collection "users" with a unique id.



4.2.6 Fetch data from the Firebase Firestore- To fetch data from firestore database I have used "Document Reference" object. I have fetch user name and email id,

```
FirebaseUser user=fAuth.getCurrentUser();

DocumentReference df=
FirebaseFirestore.getInstance().collection("Users").document(user.getU id());
df.get().addOnSuccessListener(new
OnSuccessListener<DocumentSnapshot>() {
    @Override
    public void onSuccess(DocumentSnapshot documentSnapshot) {
        username.setText(documentSnapshot.getString("FullName"));
        useremail.setText(documentSnapshot.getString("UserEmail"));
    }
});
```

4.3 Result and Analysis:

Here are some screenshots of the project. The design is done in the layout files(.xml).



Figure 4.3.1: Dr.Online splash screen with app logo



Figure 4.3.2: The Welcome Page

User's Interface

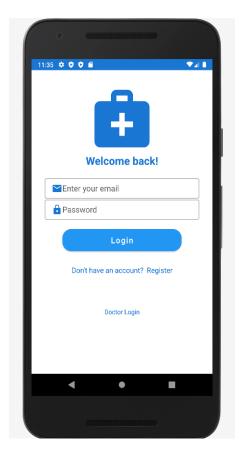


Figure 4.3.3: Normal user login page



Figure 4.3.4: If the user is using the app for the first time ,the user must register to the app and user must select the type of registration.

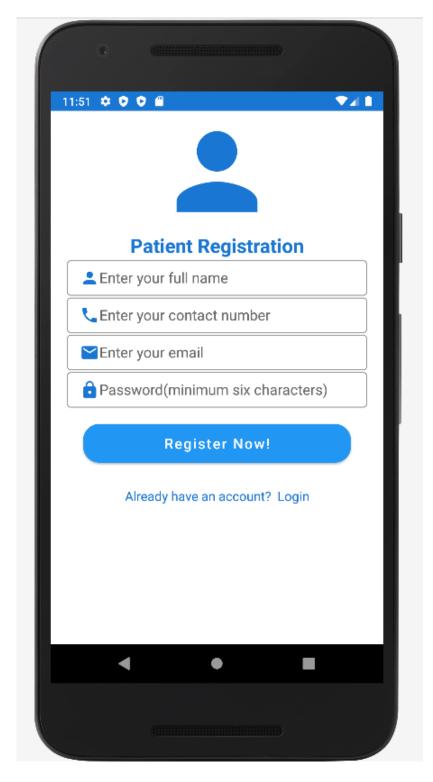


Figure 4.3.5: User registration form

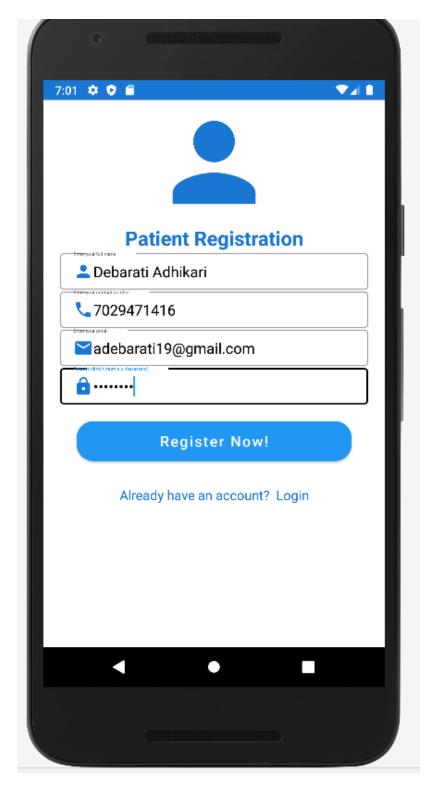


Figure 4.3.6: User Registration form after data entries



Figure 4.3.7: The User "Home page"

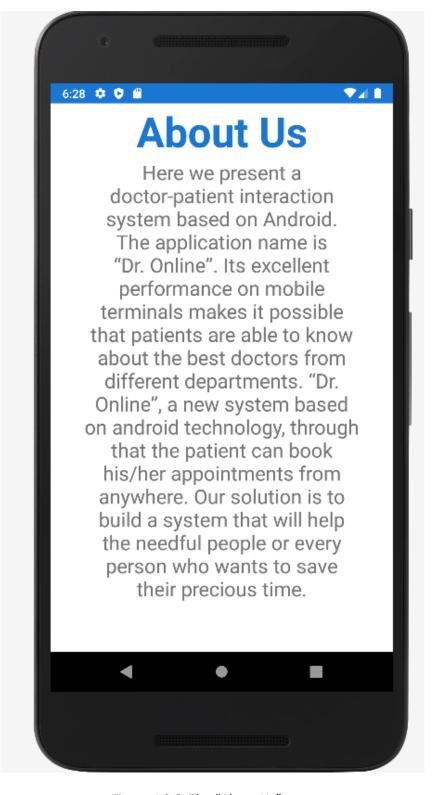


Figure 4.3.8: The "About Us" page

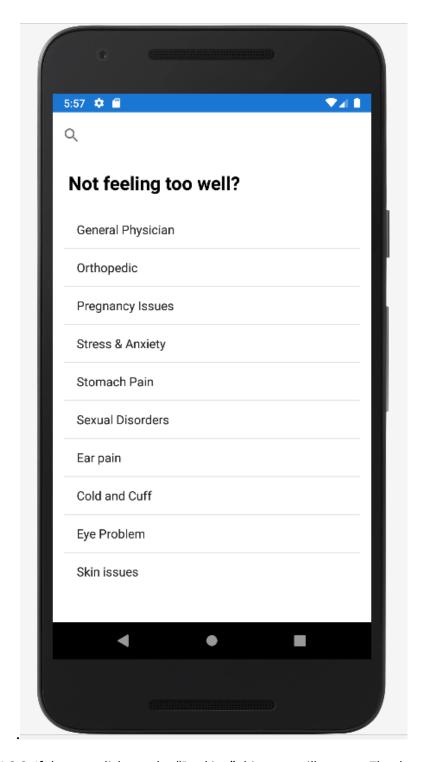


Figure 4.3.9: If the user clicks on the "Booking" this page will appear. The department selection page.

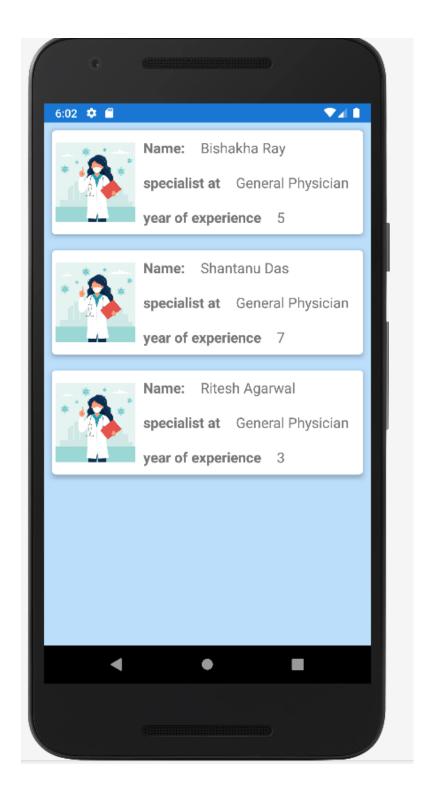


Figure 4.3.10: If the user clicks on "General Physician this page will appear. The list of "General Physician" doctors who registered in the "Dr. Online" app.

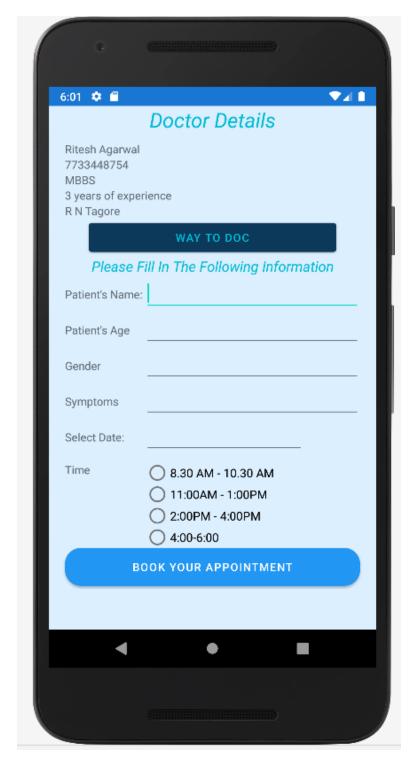


Figure 4.3.11: When the user clicks on particular doctor's name to book an appointment this page will appear. In this page user can see more details about the doctor and must provide all the patient's details to book an appointment.

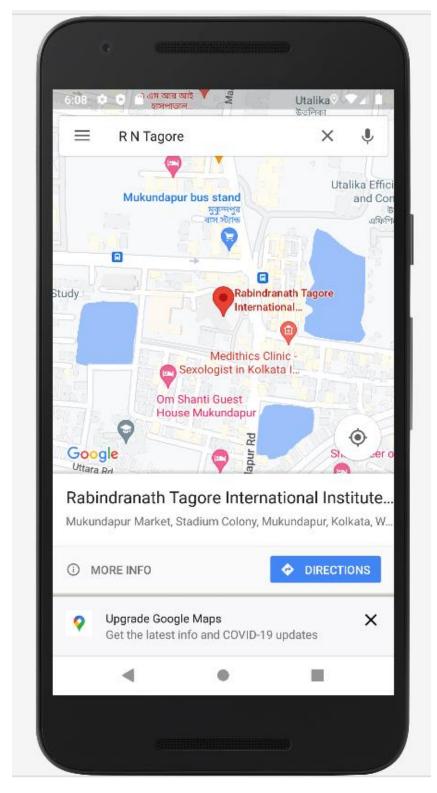


Figure 4.3.12: By Clicking on the "Way To Doc" button the user can see the hospital location of the doctor on Google map.



Figure 4.3.13: While choosing the date a pop-up calendar will appear.

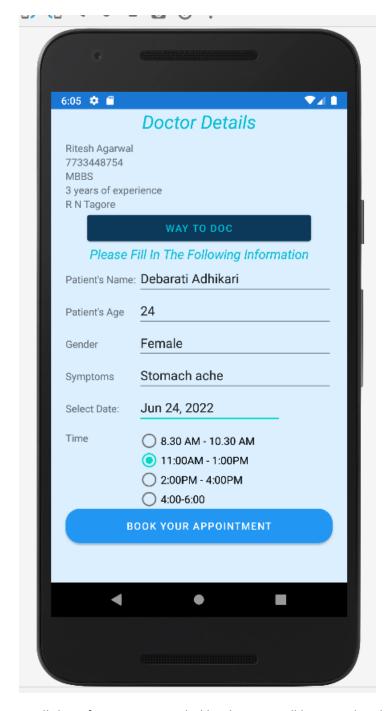


Figure 4.3.14: All the information provided by the user will be stored in the firebase firestore database.

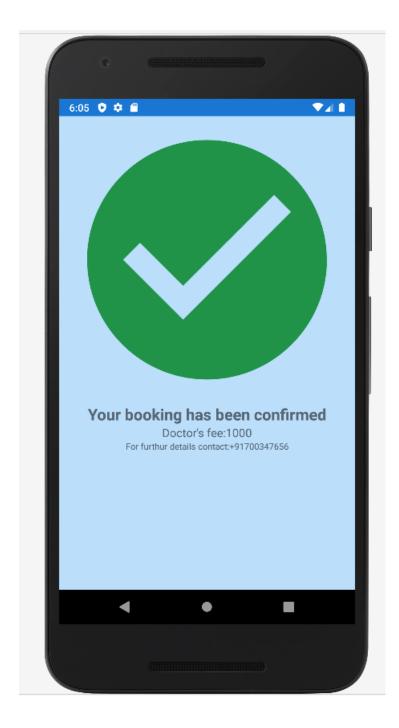


Figure 4.3.15: The booking confirmation page.

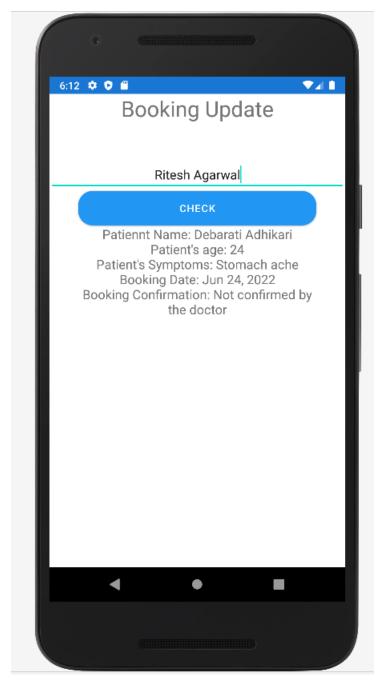


Figure 4.3.16: User Notification page before the doctor's confirmation.

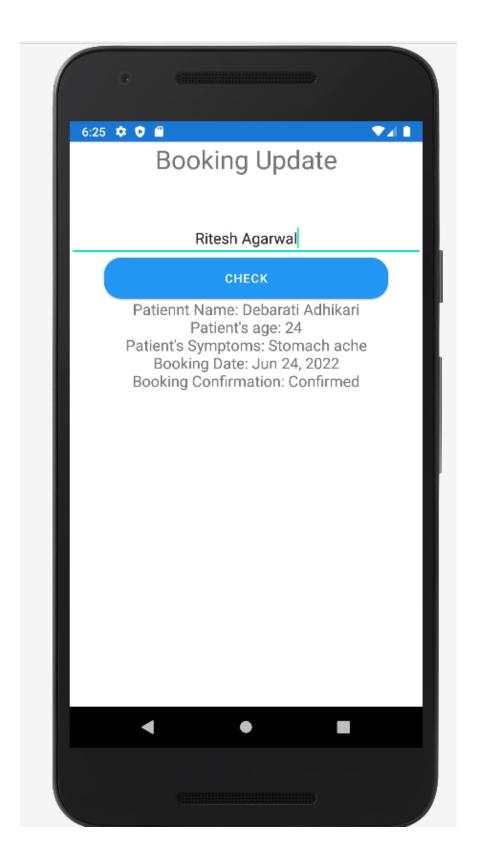


Figure 4.3.17: User notification page when the booking is confirmed by the doctor.

Doctor's Interface

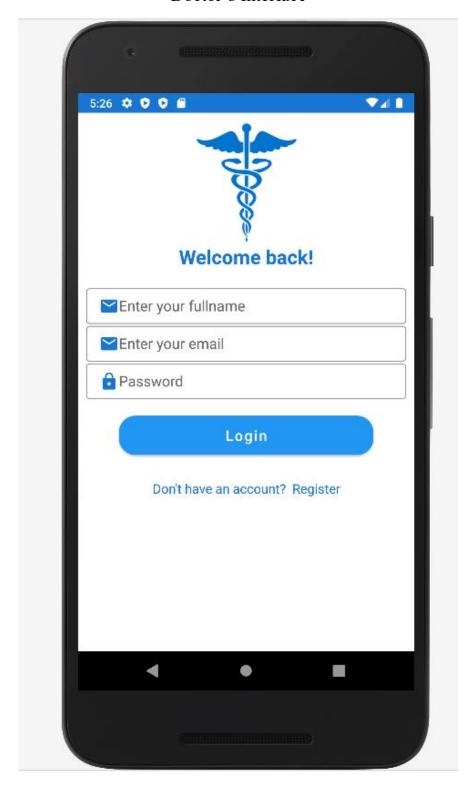


Figure 4.3.18: The Doctor's login page.

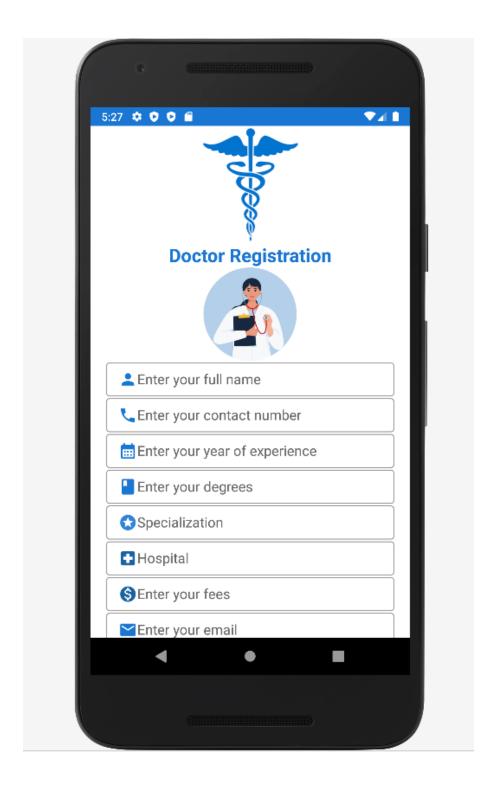


Figure 4.3.19: Doctor's Registration page.

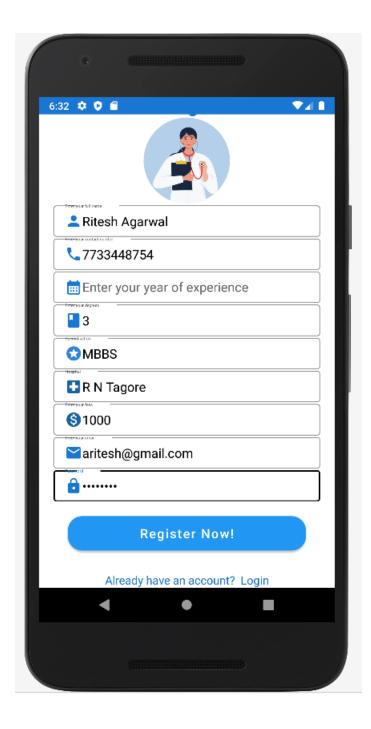


Figure 4.3.20: Doctor must provide all the information as this information will be stored in the firebase firestore database.



Figure 4.3.21: Doctor's home page.

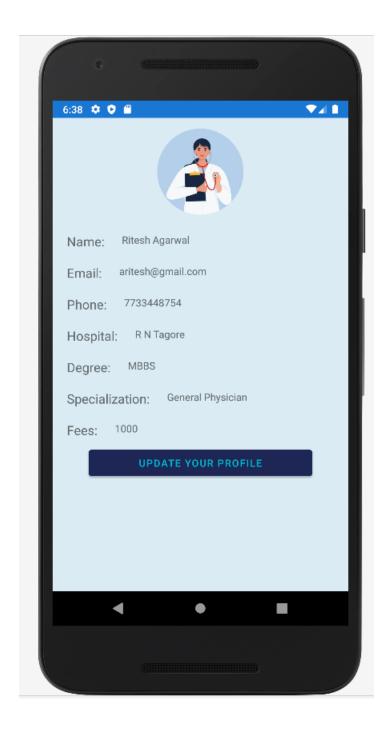


Figure 4.3.22: Clicking on "My Profile" this page will appear. Doctor also can update all his details if there is any need.

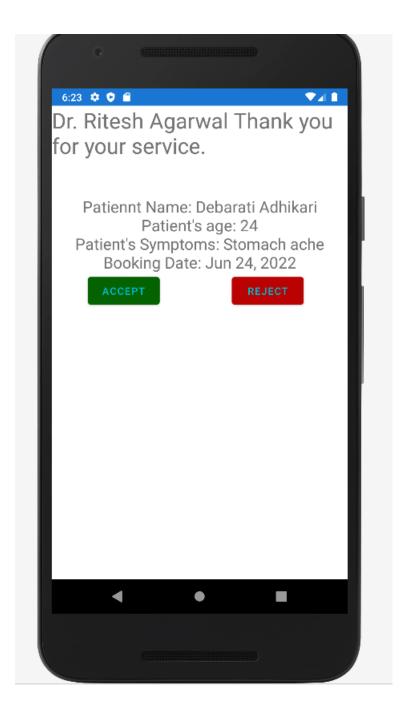


Figure 4.3.23: In the My Patients page doctor can see all the appointments.

Chapter 5

Conclusion

5.1 Summary:

This android application aims to simplify the tasks of the doctor and the patient. It will provide patients an easy way to get an appointment as they do not have to stand in a long queue to fix their appointment and also, they can book an appointment according to their choice in a more convenient way. This application helps the patient to save their time. Doctors need not worry about managing their appointments. The visible appointment list makes it easier for the doctor to plan his schedule. This application helps to build a direct interaction between doctor and patient.

5.2 Future Work

There are some tasks that can be carried out from "Dr. Online:Find Your Doctor" android application.

- o A medicine delivery system can be enabled.
- This has only been designed to manage the activities of a clinic, adding some more functionalities can lead it to be a Hospitality Management System application.

5.3 References

I have taken help from the resources are listed below-

- [1]: https://en.wikipedia.org/wiki/Android_(operating_system)
- [2]: https://timesofindia.indiatimes.com/gadgets-news/5-apps-that-you-can-use-to-consult-doctors-online/articleshow/83200933.cms
- [3]: https://www.spec-india.com/blog/top-telemedicine-apps#">https://www.spec-india.com/blog/top-telemedicine-apps#: ~:text=Here% 20are% 20the% 20top% 2020, Talkspace
 - [4]: https://developer.android.com/docs
 - [5]: https://firebase.google.com/docs