

FINAL YEAR PROJECT

FINAL REPORT

Smart teleclinic



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In Partial Fulfillment of the Requirements for the Degree Bachelor of
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DECLARATION

We hereby declare that this project report entitled “Smart teleclinic App” submitted to
the

“Department of Computer Science Sukkur IBA University”, is a record of an original work done by us under the guidance of Supervisor Dr. Ghulam Mujtaba and that no part has been plagiarized without citations. Also, this project work is submitted in the partial fulfillment of the requirements for the degree of Bachelor of Computer Science.

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Date:

Place:

Acknowledgment

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Abstract

Background: After the rise in the prevalence of COVID-19, the aim of every healthcare provider was to cater to its patient's using methods that do not require in-person visits. To achieve this, several doctors and medical centers initiated the concept of teleclinic. Teleclinic solutions helped provide necessary care to the patients by allowing them to communicate to a healthcare provider using a telecommunication platform. The purpose of teleclinic is to improve a patient's health by enabling two-way, real-time communication between a patient and a healthcare practitioner at a distant site. Initially, the aim of creating telemedicine providers was to treat and cater to the patients living in remote areas where there was a shortage of medical facilities. While it is still being used to address these problems, it's now also becoming a tool of convenience for the patients. Through the platform, a patient can discuss his/her symptoms, medical issues, and more with a practitioner in real-time. The patients will be able to receive diagnoses, learn their treatment options, and get a prescription while being in the comfort of their homes.

Aim: In this project, we aim to develop an android application for running teleclinic. Our proposed app will provide features such as, patient registration, doctors registration, appointment module, patients visit history, prescription module, payment module, reporting module, and live chat rooms.

Significance: We believe that our proposed application will be convenient and easily accessible, saving healthcare expenditure, personalized patient engagement, and better-quality care.

1. Chapter 01 introduction

Sound health of a human being is crucial. People are going through different strategies to be cured safely and easily.

One foremost solution is Telemedicine, which has emerged as a rapidly growing field in recent years, with the potential to revolutionize the way healthcare services are delivered. One promising application is the development of smart teleclinic technology, which could enable patients to receive medical consultation, diagnostic tests and other healthcare services remotely using advanced telecommunication tools.

1.1 Project scope

The project is used to have the remote diagnosis and consultation: It could allow patients to consult with doctors remotely, using video conferencing and other telemedicine tools. This could be especially useful for patients who are unable to travel to a physical clinic or who live in rural areas with limited access to healthcare. It could enable doctors and other healthcare professionals to access and manage patient medical records remotely, making it easier to coordinate care and share information.

It could also be used to manage medication schedules and reminders, making it easier for patients to stay on top of their medications and avoid complications.

1.2 Project background

A vital component of human life is health. When you are healthy, everything is simply beautiful. But as time goes on, maintaining excellent health becomes more and more difficult. The inability of the average person to access the best hospitals and doctors in their areas makes it difficult for them to receive timely, effective care. Particularly, routine checks are difficult to manage and are now out of reach for most individuals due to the high resource requirements. Additionally, finding a decent and highly skilled doctor can be difficult in these hectic times because we must wait in long lines to see them.

In our proposed solutions, we are making efforts to reduce the burden of consulting a doctor by developing a smart teleclinic which allows patients to receive medical consultations, diagnostic tests and other healthcare services remotely. It has the potential to revolutionize the way healthcare services are delivered, by making it easier and more convenient for patients to access care, reducing the burden on healthcare systems, and improving the quality and accuracy of diagnoses.

1.3 Project objectives

The objectives of project are listed below:

- digitalize clinical visits so that patients can receive effective care in their comfort zones.
- Increasing access to medical services
- Increase efficiency and cost effectiveness
- Enhance patient management and satisfaction
- Improve accuracy of diagnosis and treatment
- Ensure data privacy and security

1.4 Stakeholders

This system primarily has two stakeholders.

- Doctor: This system will undoubtedly benefit doctors in a variety of ways
- Patients: Who wish to receive quality care in familiar surroundings.

1.5 Operating environment

The Operating environment in which app will operate including android and for hardware platform we need android mobile with version minimum 6.0 Marshmallow and onwards versions. There must be an internet connection to the Doctor and patients end as there will be online consultation.

1.6 System constraints

1.6.1 -Software constraints

This system is mainly for online consultation; thus, the mobile phone must have decent internet connectivity. Additionally, it should have microphones for video and audio consultation.

1.6.2 -Cultural constraints

User should have technical knowledge of system

1.6.3. User Constraints

This project is developed for management of testing services, so it may be required that the project has more technical performance

1.7-Assumptions and dependencies

Users should have mobile phones with minimum version Marshmallow 6.0 and onward versions with an active internet connection all the time to respond to the system and have consultations.

2.CHAPTER no.2 Literature review

Teleclinic systems increases patient access to healthcare services and remove financial, logistical, and geographic obstacles that keep them from receiving timely and effective care. By utilizing technologies like videoconferencing, remote monitoring, and mHealth applications, teleclinic systems allow healthcare professionals to provide medical treatments remotely.

Teleclinic systems can deliver a range of healthcare services, including consultations, evaluations, diagnosis, treatment, and monitoring of patients with acute and chronic diseases, with the help of these technologies. By offering more convenient, fast, and personalized care, this system can also boost patient happiness, improve patient outcomes, and lower healthcare costs. Additionally, by allowing healthcare professionals to remotely give care to patients in those places, this system can help to solve manpower shortages, particularly in rural or neglected areas.

For achieving all the aims there are numerous applications that provide the services to the patients including

Marham.pk

Shifa4u

Sehat kahani and finally

smart teleclinic.

2.1 TOOLS AND TECHNOLOGIES USED IN OUR PROJECT

2.1.1. Android studio

We have used android studio as an integrated development environment for developing our project. It is user friendly and easy to code.

2.1.2. Kotlin

We have used the kotlin language for developing the application. It is widely used language used for the development of mobile applications. It has many benefits like

- Debugging is easier in writing applications.
- Open-source platform.
- It runs on any operating system.
- Compiler efficient.
- Secure coding can be done.
- It has a modern and standard library.

2.1.3. Firebase database

We have used a firebase database to store the user data in real time such as the medical history of a patient, his/her credentials, payment history and all that. Firebase Realtime Database is commonly used to store and synchronize user-generated data, such as chat messages, user profiles, and social media posts. Developers can use the Realtime Database APIs to write, read, and update data in real-time, and the data changes are automatically propagated to all connected clients.

2.1.4. Agora Api

For video calling service we have used the agora Api to have the real time video consultation of patients.

2.1.5. Jazzcash payment gateway

For payment we have used the jazz cash and E-wallet services.

For web portal we have used following tools and techs

Html, CSS, bootstrap, JavaScript, react js, node/npx

3. CHAPTER 03 REQUIREMENT SPECIFICATION

3.1. Functional Requirements

3.1.1. Use Cases

Authenticate

<Use case Id: Authenticate>		
Use case Id:	UseCase01	
Actors:	User	
Feature:	It is used to authenticate user.	
Pre-condition:	User must be registered in the application	
Scenarios		
Step#	Action	Software Reaction
1.	User opens the application	App allows user to enter their username and password.
2.	User enters their username and password to enter to the system.	Application verifies the credentials of the user and allows the authenticated users

3.	User is redirected to the home screen of the application.	
Alternate Scenarios:		
<p>1a: If user enters an incorrect username and password then system will generate the error message and user is not allowed to log in.</p> <p>2a: If the user has forgotten their password, they can click on the "forgot password" link, which prompts them to enter their registered email address. The app then sends a password reset link to the email address.</p>		
Post Conditions		
Step#	Description	
1	After the login user must perform other actions.	
Use Case Cross referenced		usecase02

Search Doctor

<Use case Id: Search for Doctor>		
Use case Id:		UseCase02
Actors:		Patient
Feature:		It is used to search for a doctor
Pre-condition:		Patient must have logged in to the application
Scenarios		
Step#	Action	Software Reaction
1.	Patient search for a doctor using filters including location, price, timing, and specializations of a doctor.	The app shows all the available doctors based on the search of a patient.
2.	Patient selects a doctor and clicks on his/her profile.	The App will take user to the next page where the details of the doctor are present.
3.		

Alternate Scenarios:

1a: If there are no availability of a doctor in a specific location then app will show a message to patient indicating that there is no availability of the doctor.

Post Conditions

Step#	Description
1	After searching the doctor, patient can view the list and profiles of doctors
Use Case Cross referenced usecase03	

Book appointment**<Use case Id: Booking of appointment>**

Use case Id:	UseCase03
Actors:	Patient
Feature:	It is used to book the doctor appointment.
Pre-condition:	Patient have selected the respected doctor on the "search doctor" page.

Scenarios

Step#	Action	Software Reaction
1.	Patients navigates to the book doctor appointment page.	The page loads and display the form for patient to fill in.
2.	Patient selects the type of appointment he wants to book.	The page displays the appointment types like physical, online and appointment for lab tests.
3.	Patient enters the details including name phone number and the appointment type.	The form is filled with the patient's given input.
4.	Patient clicks the "book appointment" button.	A dialog box appears, displaying the details of the appointment such as appointment timing, charges.
5.	Patient confirms the appointment.	The appointment is confirmed and patient is redirected to the confirmation page.

Alternate Scenarios:

<p>1a: If the patient cancels the booking, the dialog box closes and the patient remains on the appointment booking page.</p> <p>3a: If user has not confirmed the appointment and navigates to the other page then still appointment is not confirmed and user has to do the process of booking again.</p>		
Post Conditions		
Step#	Description	
1	Doctor's slots are reserved for the specified time and appointment cannot be booked.	
Use Case Cross referenced		usecase04

Make payment

<Use case Id: Make payment >		
Use case Id:	UseCase04	
Actors:	Patient	
Feature:	It is used to make the payment.	
Pre-condition:	Patient is logged in to the application and has jazz cash account.	
Scenarios		
Step#	Action	Software Reaction
1.	Patient navigates to the make payment's page.	The page loads and display the payment options.
2.	Patient selects the payment option.	The page displays the options for payment such as jazz cash or E-wallet.
3.	Patient enters the account details for the payment	
4.	Patient clicks the "confirm payment" button.	The dialog box appears displaying the details of the payment including the amount paid and timing.
Alternate Scenarios:		
1a: Patient navigates to the other page without confirming the payment then booking can not be confirmed.		
Post Conditions		

Step#	Description
1	Patient has not required amount in his/her account and make no payment.
Use Case Cross referenced usecase05	

Consult doctor

<Use case Id: Consultation of doctor via audio or video call >		
Use case Id:		UseCase05
Actors: Patient		
Feature: It is used to consult a doctor according to the specified appointment		
Pre-condition:		Patient must have good internet connectivity and microphones connected to the mobile phone.
Scenarios		
Step#	Action	Software Reaction
1.	Patient navigates to the consultation page.	The page loads and displays the consultation details.
2.	Patient selects the consultation type from the give options.	The page displays the consultation options such as audio or video call.
3.	Patient clicks the consultation type.	Page loads and asks for the permission to allow camera and microphones respectively.
4.	Consultation starts.	
Alternate Scenarios:		
1a: Doctor can end the consultation call keeping in view the privacy premises. 2a: If the internet connectivity is weak at patient's or doctor's end consultation ends there. 3a: If patient is not available on the specified time booked by him/her, doctor will wait up to 5-10 minutes otherwise his consultation will be cancelled without refunding the amount.		
Post Conditions		
Step#	Description	
1		
Use Case Cross referenced		usecase06

Free Chat

<Use case Id: After consultation chat with doctor>		
Use case Id:	UseCase06	
Actors:	User	
Feature:	It is used to do free chat with doctor after consultation if he has any issue.	
Pre-condition:	Patient must have consulted to doctor before and has previous record of consultation.	
Scenarios		
Step#	Action	Software Reaction
1.	Patient navigates to the free chat box page.	App displays the free chat box service.
2.	Patient sends request to the doctor for doing chat.	App will send patient's request notification to the doctor.
3.	Doctor accepts or he can reject the Patient request for chat.	Notification of acceptance or rejection will be sent to the patient's end.
4.	Patient and doctor starts chatting.	
Alternate Scenarios:		
1a: If patient has weak internet connectivity, then chat box closes and chat ends there.		
Post Conditions		
Step#	Description	
1	Chat is done successfully and patient's query is solved.	
Use Case Cross referenced	Usecase7	

View history

<Use case Id: Patients view the record>		
Use case Id:	UseCase08	
Actors:	Patient	
Feature:	It is used to allow patient to view his records or history.	

Pre-condition:		<i>Patient is logged in to the application and he has consulted to the doctor before.</i>
Scenarios		
Step#	Action	Software Reaction
1.	Patient navigates to the records page.	App displays the options for viewing the records
2.	Patient selects the option such as prescription record, appointment record and payment receipt to view.	App moves to the specified option selected by the patient and display all the records of patient.
3.		
4.		
Alternate Scenarios:		
1a: Patient has not visited any doctor then he has no records to visit.		
Post Conditions		
Step#	Description	
1	<i>Patient successfully viewed the records and activities taken by him.</i>	
Use Case Cross referenced		usecase09

View History of doctor

<Use case Id Doctor can view records >		
Use case Id:	UseCase09	
Actors:	Doctor	
Feature:	It is used to view the records or history of patients.	
Pre-condition:	Doctor is logged into the application.	
Scenarios		
Step#	Action	Software Reaction

1.	Doctor navigates to the records page.	Application displays the options in the doctor's profile.
2.	Doctor can view the records of patients, their prescriptions, upcoming appointments, and payments.	Application displays all the respected information of the patient to doctor.
3.		
Alternate Scenarios:		
1a: Doctor has not consulted any patient before so he has no record of patient to view.		
Post Conditions		
Step#	Description	
1	Doctor can successfully view all the records of patients and payments. Doctor can verify his/her payments.	
Use Case Cross referenced		

3.2. Non-functional requirement

3.2.1. Performance requirement

Smart teleclinic services will be used by the hospitals and clinics to give patients and doctors relief and easy access to medical care therefore it is necessary that the system should perform accurately and quickly without troubles.

The system should be able to handle a large number of users and provide fast response times, as delays or downtime could result in patients being unable to access medical care.

3.2.2. Security requirement

The system must contain different types of users to define access constraints.

The system should ensure the security and privacy of patient data, as well as provide secure login and authentication mechanisms.

The system should do transactions securely.

3.2.3. Scalability requirement

This teleclinic app likely generate a significant amount of data including patient records, medical history and other information. The apps scalability requirement should take into account the amount of data being generated and ensure that the app's infrastructure should handle the volume.

User capacity: The application should be able to handle the large number of concurrent users without going through any performance issue.

The system should be scalable to accommodate an increasing number of patients and healthcare providers as the teleclinic grows.

3.2.4. Usability requirement

The system should be user-friendly, with clear navigation and a simple interface that allows patients to easily schedule appointments, access their medical records, and communicate with healthcare professionals.

3.2.5. User Documentation

We will provide users with user's manual and our contact details inside the application if they need any help then we will be available for them

4. Chapter no 4 problem definition

4.1.1. Problem description

The traditional healthcare system faces several challenges that make it difficult for patients to access medical care easily and efficiently. There are a lot of hurdles in a way to get the optimal health care at hospitals.

People in remote or rural areas often have limited access to healthcare facilities due to distance, lack of transportation, or poor infrastructure.

People could find it challenging to make appointments during standard business hours or might need to take time off work to see a healthcare professional.

Also, healthcare services can be expensive, and many people may not be able to afford the costs of medical care or prescription medication along with transportation expenses.

Besides this, there is a shortage of medical professionals in many places, which can cause long waits for appointments and make it difficult to get specialized care.

And after covid19, people may be forced to avoid crowded public places, such as hospitals and clinics, due to the outbreak of contagious diseases or epidemics, which may limit their access to medical care.

Due to the huge rush to the hospitals whether in emergency or any way, there may be a heavy administrative burden on healthcare practitioners, which could lead to higher expenditures and less time with patients.

In some instances, patients may not receive the best care possible because to things like misdiagnosis, prescription mistakes, or a lack of access to specialized care. Poor health outcomes and higher healthcare expenses may follow from this.

As a result of a lack of coordination and communication between healthcare providers, healthcare services may be fragmented across several providers. Medical errors, higher healthcare expenses, and worse health outcomes may arise from this.

Keeping in view all the major problems mentioned, wholly solely people are far away from getting good healthcare regardless of their geographical location.

4.1.2. Solution

4.1.3. Smart teleclinic App

The objective of our project is to provide a handy solution to these problems by developing a user-friendly mobile application, enabling patients to access medical care remotely through video conferencing, phone consultations, or online messaging. This allows patients to consult with healthcare providers from the comfort of their own homes or workplaces, eliminating the need to travel long distances or take time off work. It also helps to reduce costs by providing an alternative to costly in-person consultations and can provide access to specialized care from providers located in different parts of the world. Additionally, tele clinics can help to control the spread of infectious diseases by reducing the number of people visiting healthcare facilities.

4.1.4. **Smart teleclinic web portal**

Smart teleclinic's web portal will be used for advertising and detailing of doctors including the full details of doctor's profile, and users can also book the appointments using the web portal.

5. Chapter no.5 methodology

5.1. Purpose

The purpose of this chapter is to define and outline the design process that we used to create our Smart teleclinic App. This section will also include a list of specifications for testing the finished product to see if the system was successfully implemented in accordance with the suggested design.

5.2. SOFTWARE DEVELOPMENT METHODOLOGY

5.2.1. Agile Methodology

The agile methodology is used in the design and development of the smart teleclinic app. With this approach, it is possible to break up large projects into smaller sprints and carefully assess the procedures as they are being created. At different stages of the project's development, numerous tools were also used to manage, develop, and debug it. The phases of the agile approach are listed below, along with the many tasks that are carried out during each step.



Requirements

In this phase, requirements are gathered from stakeholders and these written requirements are used to explain each stage of the project, including the need, expenses, assumptions, dependencies, success metrics, and dates for completion. These requirements are typically provided in a single document

Design

To apply a technological solution to the problems specified in the product requirements, software designers here create scenarios, layouts, and data models.

The first step is to create a higher-level or logical design that specifies the project's objectives, scope, typical traffic patterns for each component, and connectivity points. Following completion, it is transformed into a physical design using certain hardware and software technologies. The tools which were used in this phase are:

Adobe xd: It is a powerful, vector-based tool for digital design and prototyping user interface and user experience. Adobe XD has a wide range of features and applications, making it an essential tool for any UX designer.

Visual paradigm: Visual Paradigm is a software design tool that allows users to create a wide range of diagrams, such as UML diagrams, flowcharts, and ER diagrams, to model and design software applications.

Star UML; Star UML is an open-source software modeling tool for designing system and software models. The flowcharts and other diagrams for the projects, it was used to develop the diagrams for our project like database diagram, class diagram, entity relation diagram, and so on.

Development:

The start of technical development comes after the design phase. This stage of the waterfall process could be the quickest because the designs have already been finished. Applications are coded at this phase in accordance with project specifications and needs, and some testing and

implementation are also involved. In the event that significant revisions are required during this stage, going back to the design step may be essential.

-Android Studio: Android Studio provides the complete development environment to develop ready-to-run Android applications, so we used it to make the consultation application for doctors as well as patients to have the medical talks.

-Firebase: Firebase provides a cloud-hosted, NoSQL database that can be used to store and sync data in real-time between multiple clients. This makes it easy to build applications that require real-time updates. So, we use it to store patients records and history.

-Visual studio code IDE: This code editor was used to develop the frontend of web applications, since it is user-friendly and offers features and extensions like IntelliSense, debugging, snippets, etc. and to develop backend of the project as it provides smart coding assistance for efficient development.

React: React.js, more commonly known as React, is a free, open-source JavaScript library. It works best to build user interfaces by combining sections of code (components) into full websites. Originally built by Facebook, Meta and the open-source community now maintain it. One of the good things about React is that you can use it as much or as little as you want! For example, you can build your entire site in React or just use one single React component on one page.

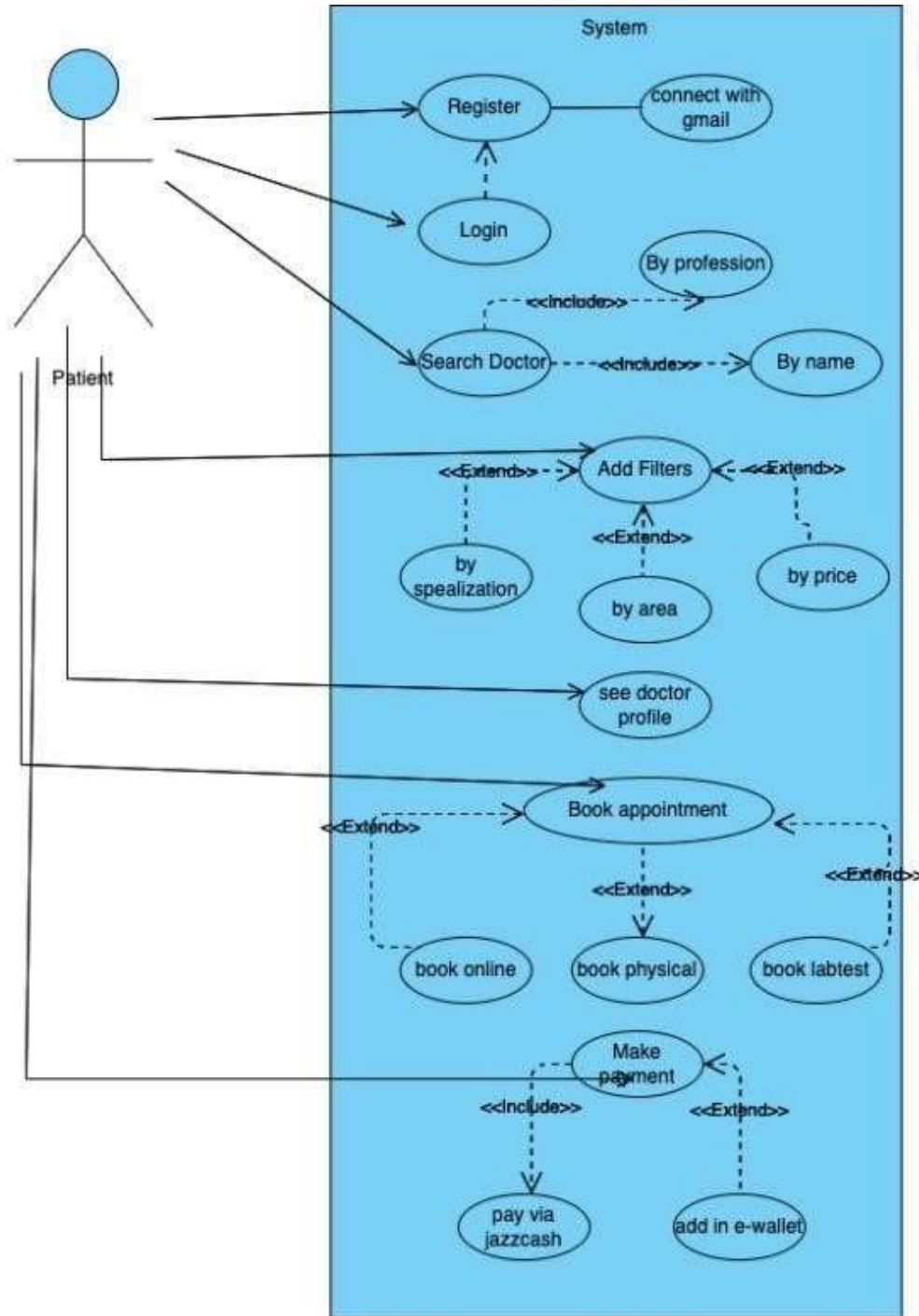
We have used react to build our web portal, we have also used html, css, java script, bootstrap and node js fin the development of our web site for medication.

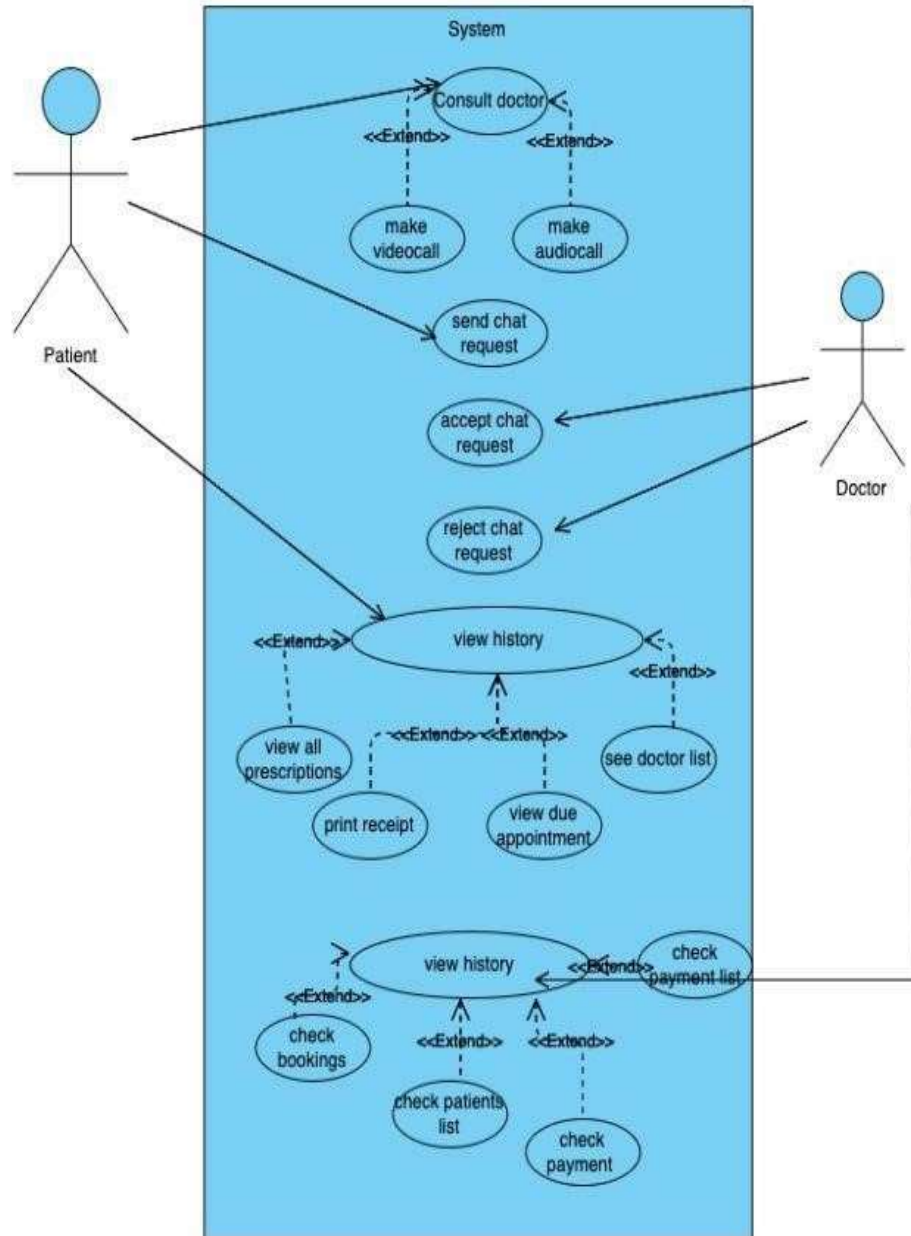
-Verification and testing: To ensure there are no faults and that all requirements have been satisfied; testing is required before a product is made available to users. This will provide a positive user experience with the programmed. The product manager's provided personas, user case scenarios, and design papers will serve as the foundation for the testing team's test cases.

-Firebase Test Lab: Firebase Test Lab is a cloud-based testing service provided by Google that allows you to test your Android app on a wide range of virtual and physical devices.

Maintenance: The maintenance phase starts after the program has been distributed to clients or deployed in the market. A team will be tasked with handling updates and releasing new versions of the program as bugs are detected and user change requests are received.

5.3. Use Case Diagram





5.4. Class diagram

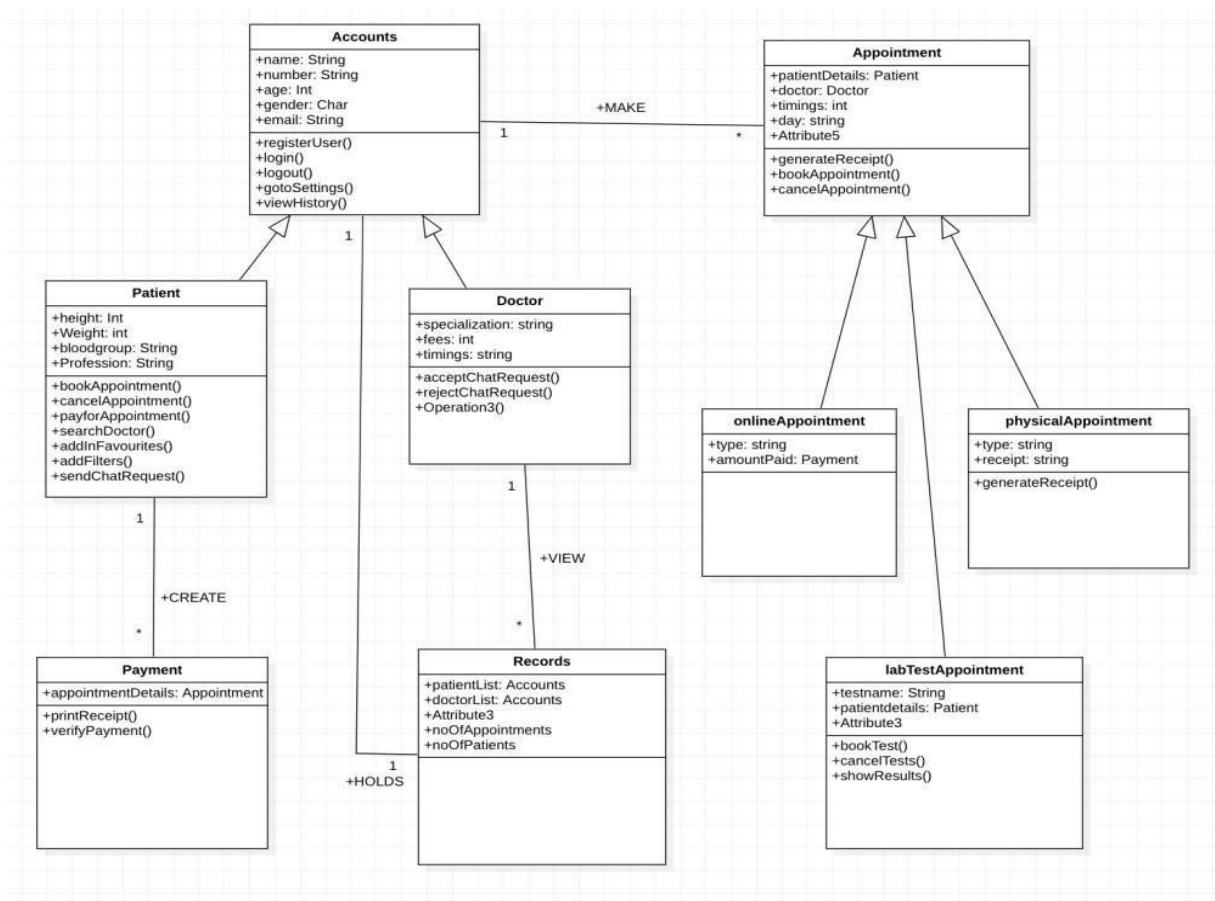
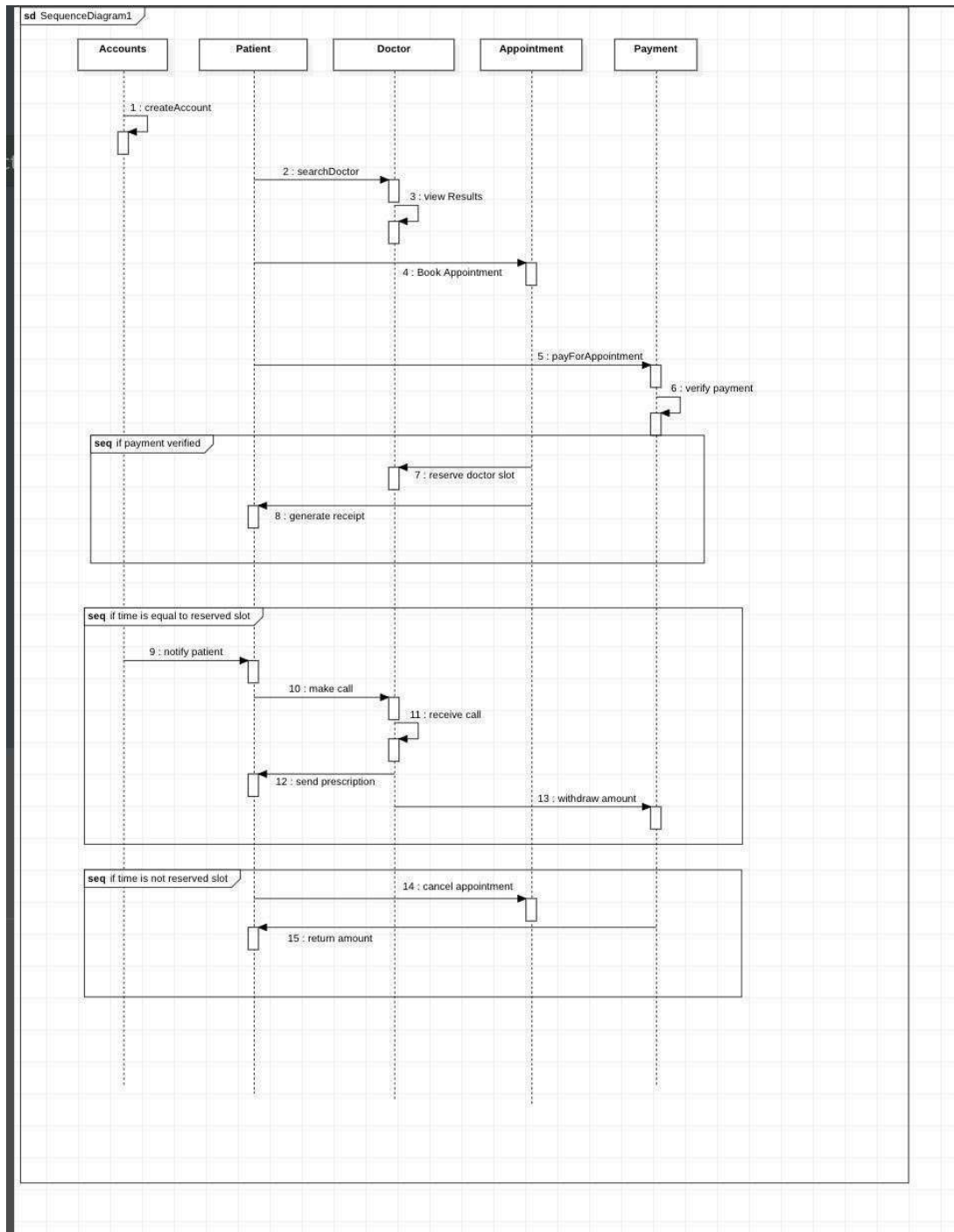


Figure 1: Class Diagram of Smart teleclinic app

5.5. Sequence diagram



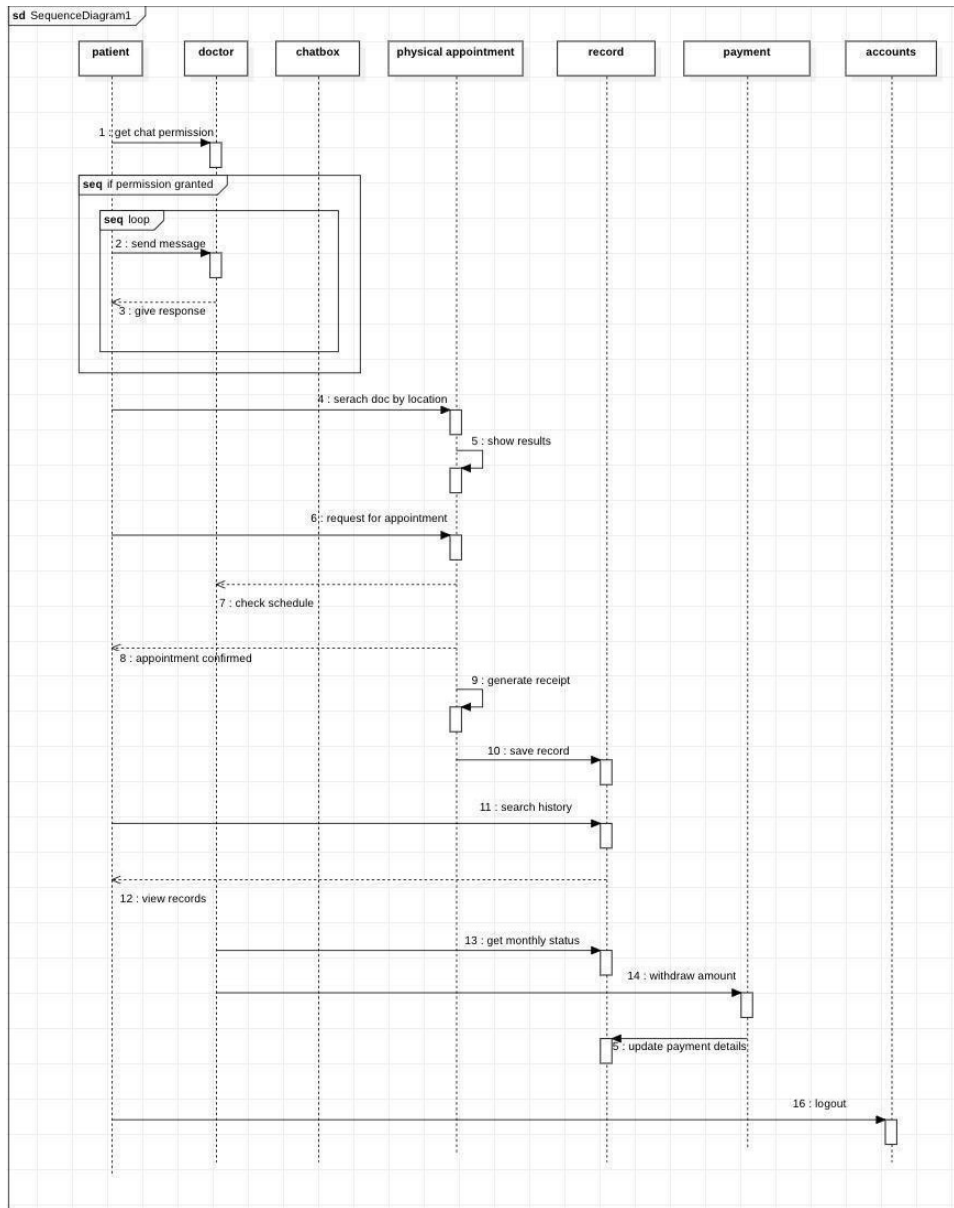


Figure 2: Sequence diagram of smart teleclinic app

5.6. ER Diagram

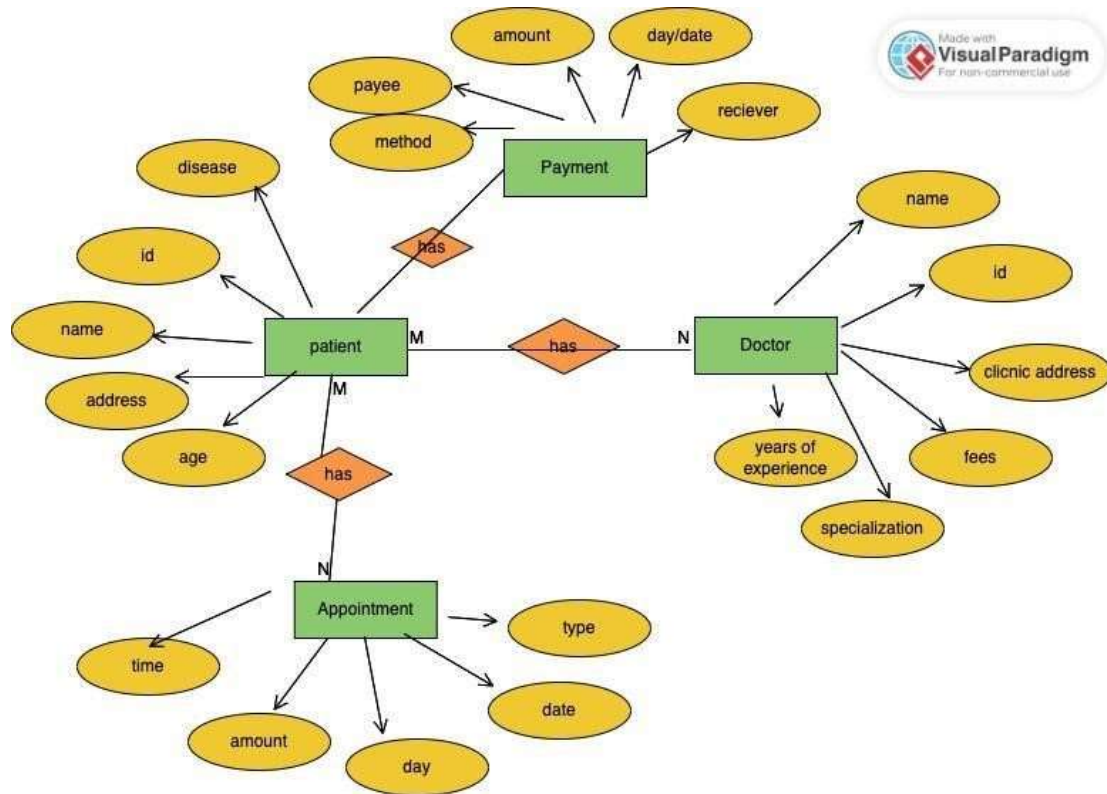


Figure 3: ER diagram of smart teleclinic app

6. CHAPTER 06 SYSTEM ARCHITECTURE

6.1.1 SYSTEM 3-TIER ARCHITECTURE:

Below figure shows the architecture of our proposed system. It is a three-tier architecture including a presentation tier (user interface), an application tier where data is processed, and a data tier or back-end where data is stored and managed (database).

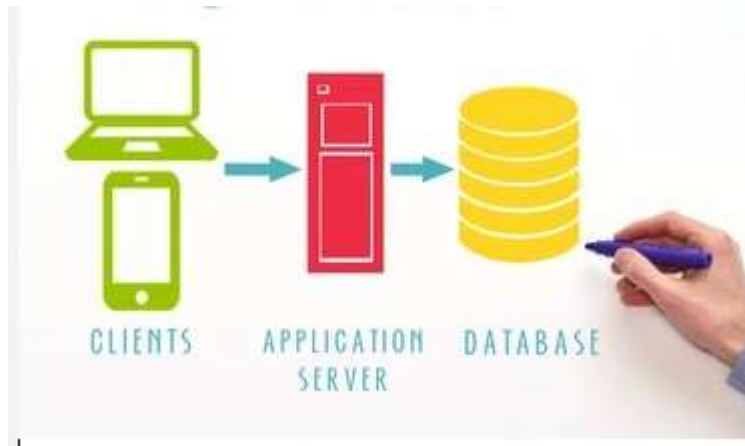


Figure 4; Architecture of smart teleclinic app

7. CHAPTER 07 IMPLEMENTATION AND TESTING

7.1. IMPLEMENTATION

7.1.1. Mobile application

Android studio: Used to develop the mobile application for consultation which is accessible by both doctor and patient to have the real time consultation.

The app is developed using the android studio which has UI integrated.

Firebase: It is a cloud-based database. We have used it in the development of our application to store the user credentials in real time. We have used this only database to store the records of patients and their medical history and payments. This stores files in cloud storage bucket irrespective of local machine storage.

Agora: Used for the video and audio consultation of doctor and patient in real time.

Agora's Video SDK makes it easy to embed real-time video chat into web, mobile and native apps.

In-app-messaging: We have given the in-app messaging service in our application to have the chat with doctor for asking in emergency. We have achieved it through firebase. Firebase In-

App Messaging helps to grow our app retention. The targeted contextual messages are sent in the form of Modals and Banners.

Jazz cash payment gateway: For the payment methods we have used jazz cash which mostly people have. It is Fast, reliable, and user-friendly. Perfect for e-commerce stores and Laravel developers.

7.1.2. Website application

We have developed web portal as well through which patient or doctor both can register themselves using our website.

Patient can view the specification and profile of doctor through website.

And our website also be used as the source of advertising through which we provide adds and updates of our mobile application and consultation dues and terms.

Our website also contains the link for the mobile application for the convenience of user to have the easy access of application.

The application is built accordingly.

React js: React.js, more commonly known as React, is a free, open-source JavaScript library. It works best to build user interfaces by combining sections of code (components) into full websites. We have used react to build our web portal, we have also used html, css, java script, bootstrap and node js fin the development of our web site for medication.

node js: It is used for Backend REST APIs development, with supported libraries like express, mongoose, JWT. The REST APIs for GET/POST/PUT/DELETE Methods are made by using this.

Firebase database: Firebase provides a cloud-hosted, NoSQL database that can be used to store and sync data in real-time between multiple clients. This makes it easy to build applications that require real-time updates. So, we use it to store patients records and history.

8.CHAPTER 08 Project Demo

8.1 Android App Screens



Figure.1 Splash Screen

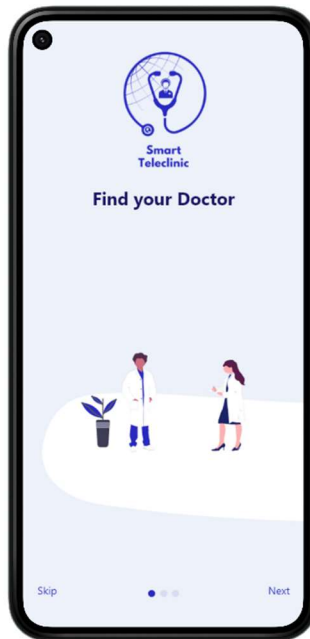


Figure.2 Onboarding 1

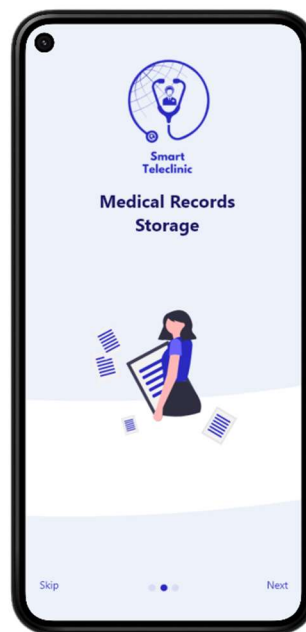


Figure.3 Onboarding 2

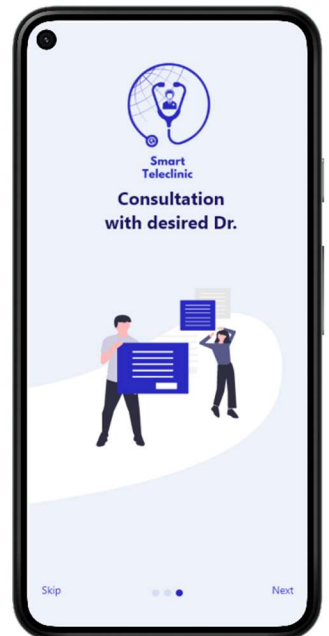


Figure.3 Onboarding 3

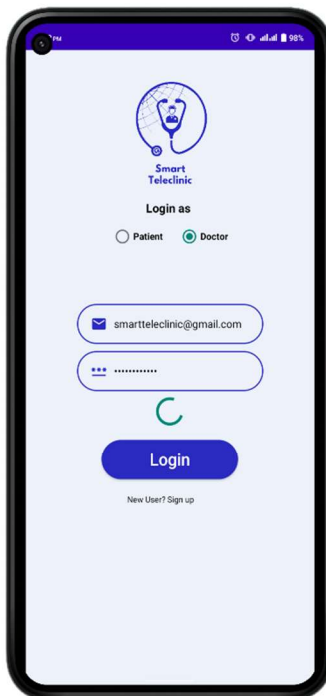


Figure.3 Login Screen

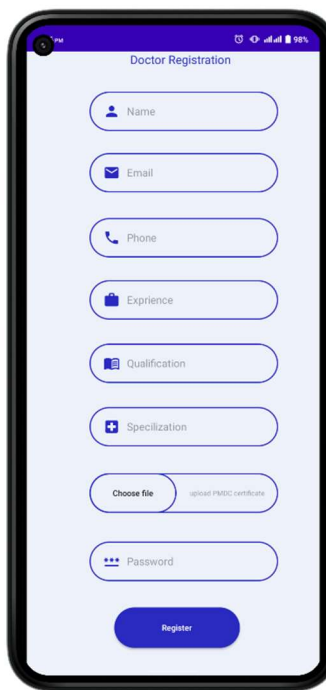


Figure.4 Doctor Registration Form

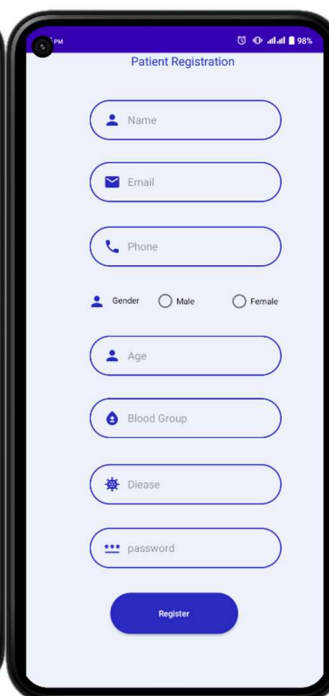


Figure.5 Patient Registration form

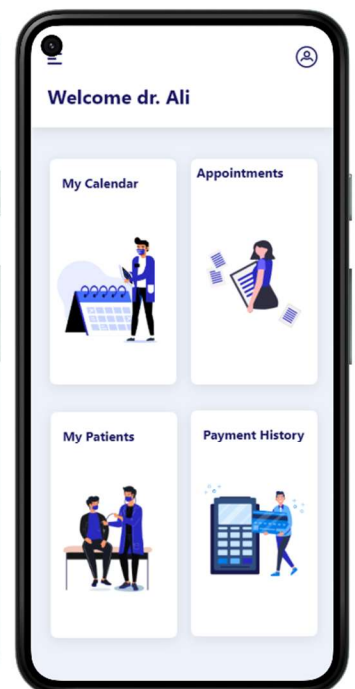


Figure.6 Doctor Dashboard

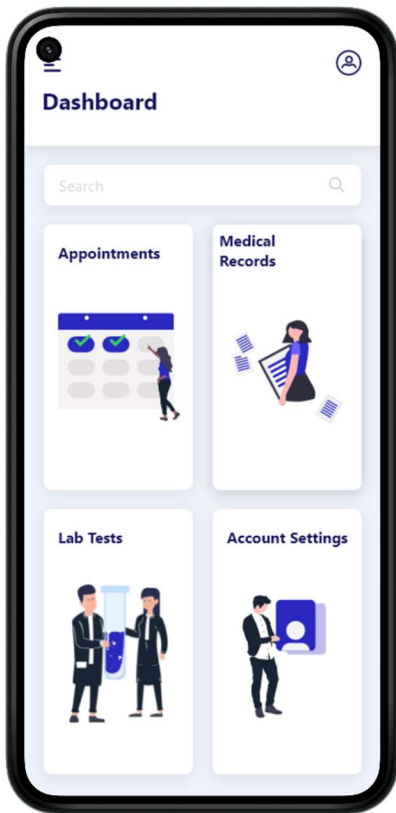


Figure.7 Patient Dashboard

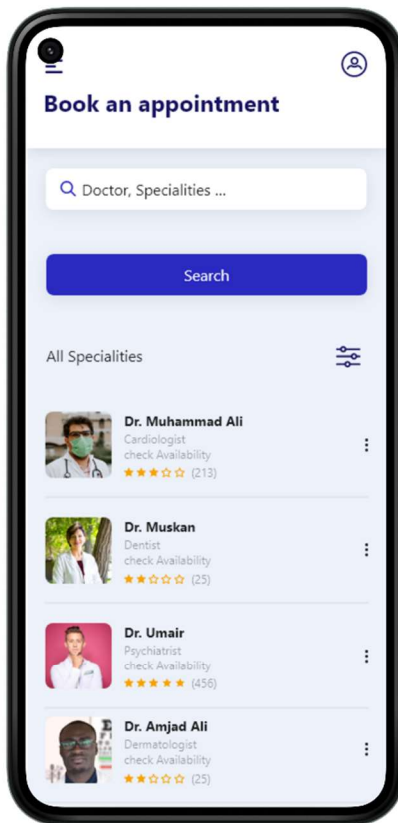


Figure.8 Find Doctor

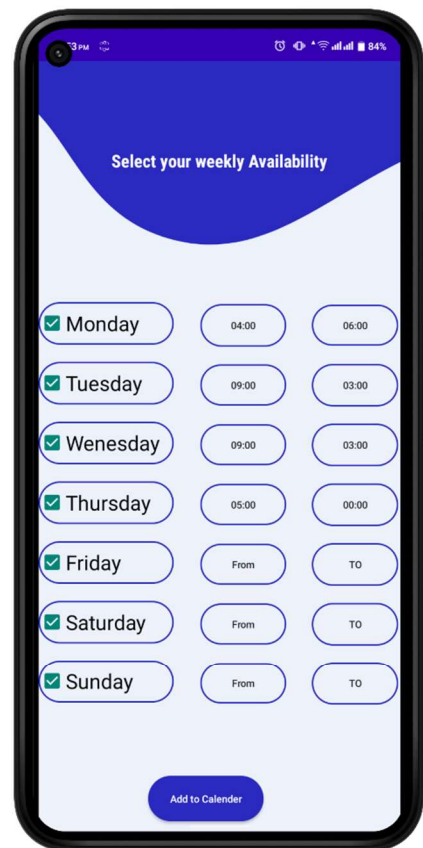


Figure.9 Doctor Availability schedule

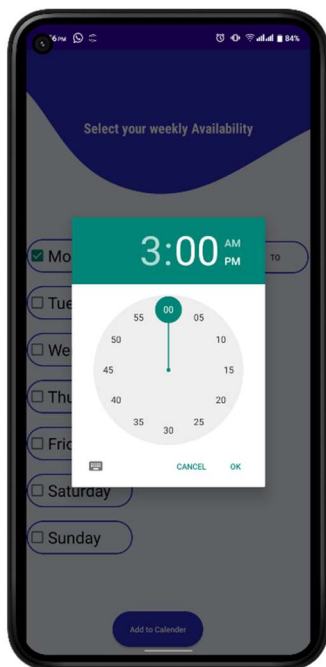


Figure.10 Clock popup



Figure.11 Summary dr. schedule

8.2 Website Screens

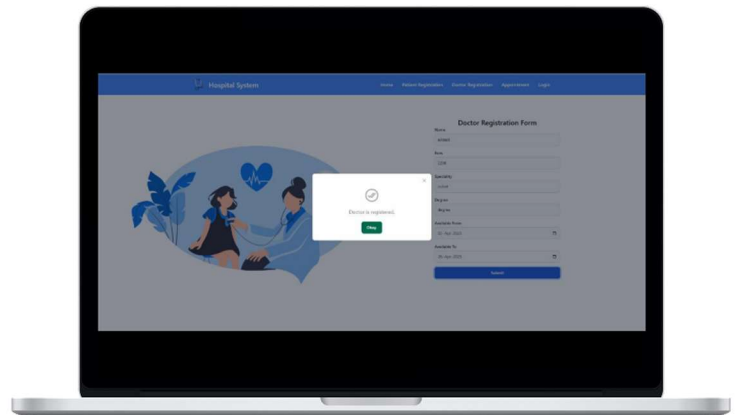
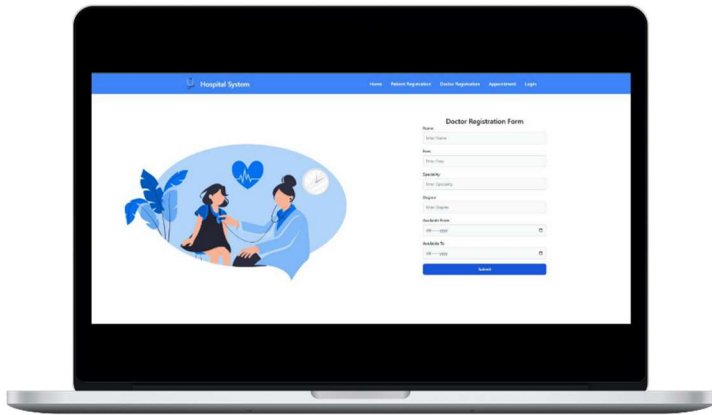
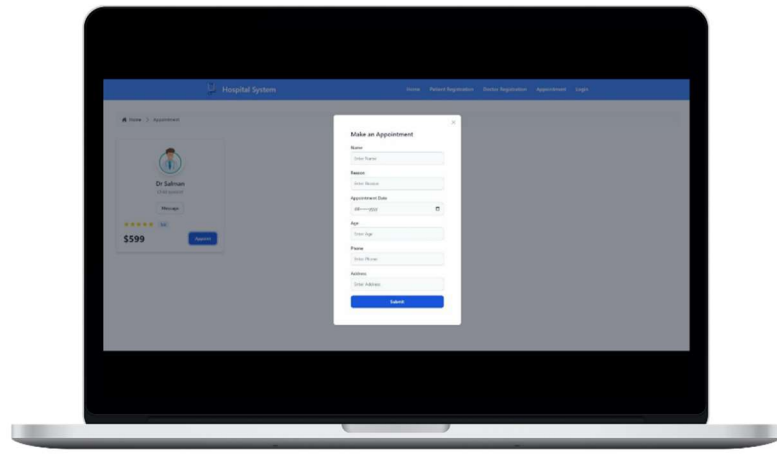
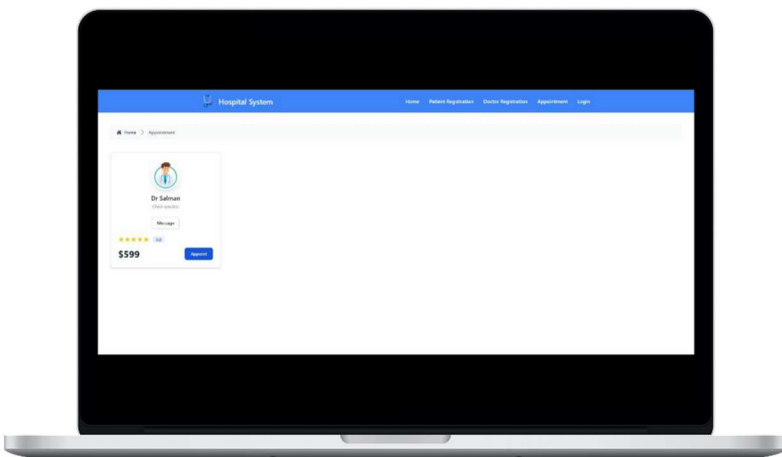


Figure.12 Doctor Registration from Website



9. CHAPTER 09 CONCLUSION AND FUTURE WORK

9.1. CONCLUSION

Teleclinic has continued to increase in uptake and shows tremendous promise in expanding access to health care, promoting patient disease management, and facilitating in-between health care visit monitoring.

It provides all in one solution to the problems by which users were enabled to have the right and efficient treatment in the right amount of time.

This smart teleclinic application not only helps patients to easily access desired health but also serves as a core ingredient in the doctors and administrators lives as well.

It eliminates the hectic and burdens of routine checkups of patients.

Also, it saves a lot of effort done by the administrators for managing each patient record.

Moreover, the usage of telecommunication in the world of medicine gives access to safe, affordable, and appropriate care

9.2. future work

There are numerous other applications that can be added into our programme to provide patients and doctors with greater flexibility and ease.

In rural locations where individuals do not have access to smartphones and the internet connectivity.

We can have our office there, as well as employees with decent internet access and PCs. People in the surrounding area can visit the office and can book the appointment to the desired doctor, and on the scheduled appointment people can revisit the office and have their consultation with the doctor easily via video conferencing or voice calls.

Furthermore, we can expand our application to the international level so that we can engage doctors from other nations to help patients.

That's it, we are providing Ready-to-use Plug and Play Product here. Extend if you want.

10.CHAPTER 10 References

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