

A Project Report
On
E-MEDICAL SERVICES

Submitted for the partial fulfilment of the requirement for the
award of the

**Degree of B. Tech
(Information Technology)**

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DECLARATION

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

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CERTIFICATE

This is to certify that Project Report entitled “**E-Medical Services**” which is submitted by **Shyama Gupta (1873513051)**, **Tanya Agrawal (1873513056)**, **Swati Rani (1907350139004)** in partial fulfilment of the requirement for the award of degree B.tech. in Department of Information Technology of Dr A.P.J. Abdul Kalam Technical University, U.P. Lucknow is a record of the candidate own work carried out by him/her under my/our supervision. The matter embodied in this Project report is original and has not been submitted for the award of any other degree.

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ABSTRACT

The objective of this project is to develop an E-Medical Services system. The purpose of implementing this application was to create a system through which a patient can easily choose and make an online appointment for a doctor just by sitting at home. The second objective was to replace manual medical file keeping system with online database management system. The application was successfully implemented by using famous technologies and programming languages. This application does not aim to target any specific group but every individual who wants to seek medical help and that is why it was kept in mind to keep the user interface simple and friendly while building this application. Like all other applications, this application also has a client side and a server side. This application was developed by using HTML, CSS, and JavaScript at the client side while PHP and MySQL on the server side. For now, basic functionalities have been implemented but for the future, work will be done to link pharmacies and laboratories to the system. Online follow-up for the distant patients is another feature that is aimed to add at later.

ACKNOWLEDGEMENTS

It gives us a great sense of pleasure to present the report of the B. Tech Project undertaken during B.Tech. Final Year. We owe special debt of gratitude to our guide **Prof. Sudhir Goswami, Department of Information Technology , Rajkiya Engineering College Bijnor**, for his constant support and guidance throughout the course of our work. His sincerity, thoroughness and perseverance have been a constant source of inspiration for us. It is only his cognizant efforts that our endeavours have seen light of the day.

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LIST OF ABBREVIATIONS

Sr. No.	Abbreviations	Expanding Form
1.	CSS	Cascading Style Sheet
2.	HTML	Hypertext Mark-up Language
3.	ER DIAGRAM	Entity Relationship diagram
4.	UI	User Interface

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CHAPTER 1 – INTRODUCTION

Health care is one of the fastest growing industries all over the world. Before the last few years, medical appointments were usually taken on the phone calls or by visiting the hospitals in person. This process needed the involvement of individuals so, the ability to take appointment was restricted to the availability of schedulers, phone lines or the physical presence of a person.

With the growth of time, everybody demanded timeless and efficient medical care delivery because manual appointments (that requires the physical presence of both individuals) and long waiting lines have formed an irritating situation for the healthcare institutions. So, it created a need for such an integrated health care system that could deliver seamless care to both outpatients as well as inpatients. The emergence of online appointment system offered timeless and efficient access to health care services. Therefore, for hospitals and other medical societies, online appointment booking has a great importance and a subject of interest.

Booking appointment online has become a new trend in the past few years and is considered as one of the key processes in the healthcare industry. Bailey (1952) [2] considered scheduling system as a trade-off or a compromise between a doctor and patient's waiting times.

Patients who get late for the appointments or who fails to come becomes the reason for the underutilization of a doctor's time. Idle and under utilization of doctor's time are also resulted by gaps in the appointment times (Bailey, 1954) [3]

Different researchers agreed that main patient dissatisfaction is caused by long waiting times. Cayirli (2003) [5] defined access time as the time between patients' request for the appointment and the time he is checked up. According to Veral, waiting time is the time between consultation and the scheduled time while neglecting the early arrival of a patient (Veral, 2003)[5] . Different researchers defined waiting /access time in different ways. A well-designed appointment system supposed to improve patients' satisfaction by reducing cost and time of clinics and hospitals especially in the busy lives we are leading today.

With the growing population need for more efficient ways to access a medical treatment is also growing. Through an online appointment scheduling system, a user gets access to the

doctor's online webpage and can make an appointment with online software. Patient/user can also provide additional medical history in advance, giving adequate time to the doctor to prepare the necessary information for consultation. In this way, online appointment scheduling systems are helping doctors and the patients and making the healthcare delivery efficient.

Nowadays there are many kinds of online appointment tools available in the market which are easy to set up and not too much expensive. Online scheduling system offers value-added services and lots of benefits to the doctors and patients. It makes the patient appreciated by eliminating the hassle of long waiting times. Online appointment systems are also getting popular because of its low-cost availability.

1.1 MAIN PURPOSE

The main purpose of this project is to link and bring all major private medical clinics of the city (of my country) to a single platform. So that patients can easily get access to the doctor's profile and make online appointments. The second purpose is to create an online medical history database so that doctors and patients can freely exchange patients' medical history information much easier, faster, and safer.

1.2 OBJECTIVE OF THE PROJECT

The main objective of the thesis is to provide quality medical care to the patients by bringing all medical practitioners of the city to a single platform so that everybody can easily access them and make appointments. The second objective is to replace the current manual file keeping system with an online medical patient database system.

1.3 AIM OF THE PROJECT

The aim of this project is to create a platform where patients and doctors can access /interact efficiently with each other and provide ease and comfort to the patients. It also aims to resolve the problems that patients have to face while taking appointments and keeping medical files. Patients can choose a medical practitioner based on their professional profile and other patient's reviews.

1.4 PROJECT SCOPE

This system is implemented for all the individuals who want to get treated by the city practitioners. The users can participate only if they have created an account through

the registration form and have provided their medical history. Once they get registered themselves further, they would not need to update their record as it would be done automatically after each doctor's visit.

1.5 STUDY LIMITATION

The lack of time was the main the limitation. Secondly, because there is no such system in my country so there may be some difficulties to implement and convince people to use this system.

CHAPTER- 2 PROPOSED SYSTEM

Recently, healthcare services can be delivered effectively to patients anytime and anywhere using e-Health systems. e-Health systems are developed through Information and Communication Technologies (ICT) that involve sensors, mobiles, and web-based applications for the delivery of healthcare services and information. Remote healthcare is an important purpose of the e-Health system.

In the context of healthcare support, the concept of e-Health [10] is a new approach to implement a healthcare system that is based on electronic processes and internet communications.

In our project we have introduced some new advancement in basic e-medical consultancy models. With the enhancement of these advance methods we ensure that the user will get better interface to interact with doctors. There are the list of functionalities which we are providing in our web application:-

1. Login for Doctor, Patient and Admin
2. Make Online Appointments
3. Video Call facility
4. Chat facility using WhatsApp
5. Feedback System
6. Online Prescription
7. Patient's previous record
8. Progress Tracking
9. Expert Panel

Here is the workflow of the Proposed System of e-medical services:

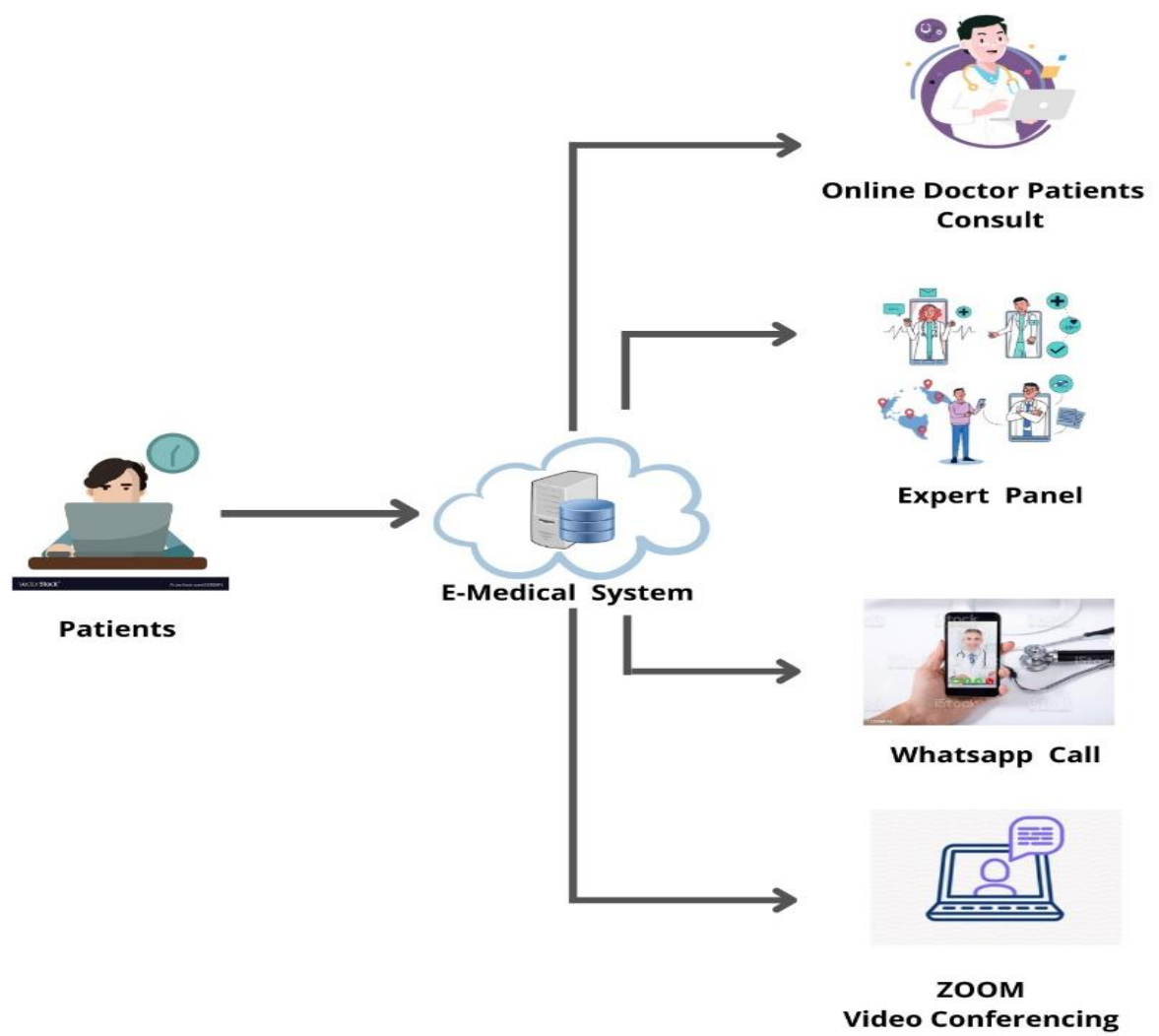


Fig 2.1. Workflow of Proposed System

CHAPTER 3- LITERATURE REVIEW

3.1 WAITING TIME

Fernandes et al. (1994)[6] defined waiting time as the period of time an individual wait until a specific action occurs. Waiting time was also defined as the time a patient entered a clinic or service point and gets consulted by a doctor with a prescription in his hand. There are two different ways in which the waiting time has been defined in the past. At first, waiting time is the time that starts when an individual comes for the appointment and it continues until the individual gets consulted by the doctor. In the second definition, it starts when an individual comes for taking appointment and ends when he got prescribed medicine after being consulted by the doctor.

With the passage of time, long waiting lines at doctor's clinics became a major problem in developing countries. In a South African health clinic, block appointment system was introduced as an experiment, in which waiting time for patients was measured for the period of one week before and after the implementation of the appointment system. During the experiment, interviews were taken from focus-group, staff, and patients and from results it was realized that acute medically ill patients with prior appointments had short waiting times as compared to the patients without appointments.

It has also been stated that the appointment system has no benefit for the patients not seeing the doctor or who are taking routine repeated medication. Later it was realized that the block appointment system offers shorter waiting time only for acutely ill patients and not for others.

3.2 APPOINTMENT DELAY

It has been proved in the past research that there is a direct relationship between appointment delay and cancellation of the appointment. Appointment delay[6] [2] is defined as the time which starts when an individual request for an appointment and ends until he/ she gets consulted by the doctor. Longer appointment delays cause more appointment cancellations. So, the best way to reduce appointment cancellations or no-shows is to minimize the time gap between the appointment request and doctor's

check- up/consultation time. Minimizing this gap is called open access (abbreviated as OA) or advance access policy which later became a popular practice and part of an active research also. Both positive and negative results were experienced by the researchers in their experiments. Some practitioners were in the favour of OA and highly recommended it, and on the other hand, there were some practitioners who disagreed and were against of OA implementation.

3.3 MANAGING PATIENT'S APPOINTMENT

In a health care centre, an application which is used to manage and minimize patient waiting time is called managing patient's appointment [4] system. Some health care clinics use this kind of applications while some do not. Medical clinics who use such applications usually have shorter waiting times as compared to those medical clinics who do not use any appointment application. Patients who supposed to wait more than an hour for their medical check-up feel disgraced and unfair. Patients can evaluate the quality of any medical centre based on the waiting time they have to experience. Therefore, it has become important to consider factors like “saving time” and “minimizing idle time” while developing any patient’s appointment system. Whereas according to Klassen (2002), scheduling doctor’s time and patient’s appointment supposed to depend on the seriousness of the case and patient’s need.

3.4 ONLINE BOOKING

An online appointment system is a web-based system which is made up of independent components or web pages, working together for a common purpose. Such systems are available on the internet for the users to accomplish some purpose.

3.5 EXISTING SYSTEM

There is a huge trend of private medical clinics and hospitals. Doctors run their own private clinics and consult patients during the evening or any time of the day depending on their availability. Some are popular and known to all while some are known by few people.

This situation proves to be a challenge for new practitioners as they are known to very few people even if they have a good academic background. On the other side, patients also face difficulty in finding and choosing a nearby doctor. Unscheduled appointments, long waiting lines and keeping medical files in physical form are also the common problems faced by the people/ patients.

3.5.1 Determination of Problem

Challenge for new practitioners

Starting a private clinic can be a challenge for new practitioners. For example, if a new doctor wants to open his clinic there is no platform exist, by which or from where people can get to know about his clinic.

The problem for a new individual in a city

In the same way, the same problem goes for any person new to the city as he is unknown, who is the best or closest clinic to go for a medical check-up.

Long waiting lines

To get doctor's consultation, patients come twice to the clinic once for taking the appointment and second time for the check-up. Some patients visit the doctor without any prior appointment resulting in a long waiting time. There is also a possibility that they don't consultation by the doctor even after a long waiting line.

Managing paper-based medical files

Patients must carry their medical related report or files every time they visit a doctor. And sometimes they lost their files too.

3.5.2 Proposed System

In “E-Medical Services” I have tried to consider all of the above problems with the existing system. My objective was to provide a platform where all practitioners and

patients can be brought together. In this application, all practitioners either new or working for a long time can sign up themselves. This way people can get to know and choose to visit any doctor of their choice. By using this application user will be able to know and access the professional profile of each registered doctor from all specialties. Doctor's profile includes information regarding their professional experience, practicing license, educational background, clinic timings, working days, clinic accessibility and other patient reviews also. Users would be able to book appointment sitting at their homes.

The user can choose a doctor close to them or have more professional experience or have more good reviews from the other patients. New practitioners can easily join the platform and start taking appointments without the need of any expensive advertisement.

When registering as a patient, the user can give all necessary medical history so that he doesn't need to keep or bring his medical file when going for a check-up. Every time when a user books his appointment, the doctor can easily get access to the patient's profile and also update medical record.

3.6 PATIENT'S APPOINTMENT TIME

Scheduling appointments for the patients started long years ago. Primarily appointment system was developed to minimize doctor's idle time because it was thought that doctors time is more valuable as compared to the patient's waiting time. But later it was realized that the importance of minimizing the patient's waiting time is as important as the doctor's time. So now while developing an appointment system doctor's idle time and the patient's waiting time both factors are given equal importance. Patient's scheduling also includes improving quality health services, reducing doctors and nurses idle time and reducing patient's waiting time.

CHAPTER 4- APPLICATION TECHNOLOGIES

The purpose of this project is to build an Online Dr-Appointment System. It is important for the user to understand how this application works and knowing the technologies that are used to implement this project. For a better understanding, all steps are described in detail to give a full overview of the system.

4.1 WEB SERVER

Role of a web server is to communicate between the client side and server side by storing, processing and delivering web pages to the client side. Usually, web browser initiates the communication using HTTP by sending the request of a specific resource and server gives the response with the content of that requested resource. For this project work, Apache HTTP server was chosen, and it exists on the WAMP service. Apache HTTP server is one of the popularly used web server software used in a lot of project works.

4.1.1 Apache Web Server

Apache web server is a free, open source and most popularly used software. Apache web server is used by many famous websites such as Apple, Wikipedia, and PayPal. Another reason for its popularity is that it can run on multiple operating systems such as Linux, UNIX, windows, and macOS.

4.2 PROGRAMMING LANGUAGES

In this project, PHP was chosen as a server-side programming language and MySQL was selected as a backend database. HTML, CSS, and JavaScript were used for the client-side work.

4.2.1 PHP

PHP is a server-side programming language commonly used to develop dynamic web pages. It is free and accessible in numerous different versions. It can be used on multiple OS such as macOS, windows, UNIX and different platforms. Because it is a

scripting language so in this program code is taken after the program execution. PHP can also be used in desktop applications.

One of the reasons for choosing PHP in this project is that it supports MySQL which is chosen as a database in our project. PHP programming language makes easy to present images and PDF files on HTML pages

Client-side programming

For the development and designing of web pages HTML, CSS and JavaScript languages were used. HTML for creating the web pages, CSS for styling and for adding further functionalities JavaScript was used.

JavaScript

JavaScript is dynamic, high-level scripting language and considered to be one of the core three technologies of the world wide web. It is considered an important part of a web application. It is used for adding functionalities and making web pages interactive. In simple words, it informs the browser about a certain activity or event that occurred and changes the web page as a response to that event, for example, a click on a button.

HTML

Hypertext Markup Language (HTML) is used for creating web pages and web applications. It describes the structure of the web pages. Information from the HTML documents is sent to the web browser to render or display on the multimedia pages. Html used to describe the structure of a document by presenting a document in a heading, paragraph, image, list, links and other objects like that. Web browser presents the HTML document by using its tags.

CSS

It is important to make HTML pages attractive to the users and for this purpose, developers choose colours, nice fonts, and different layouts. All this work is done by the CSS. In short, CSS is used for styling of a HTML document. It is designed in such

a way that enables separation of content and presentation so that it makes easier any change of content without interfering with a design. It also enables multi web pages to share the single CSS file for styling to reduce repetition and complexity.

Backend technology

For this project work, MySQL was chosen as a database.

MySQL

It is an open-source relational database management system[11] which aims to offer multiple user access to several databases. In simple words, a database is a collection of data which can be a list of shopping items, number of items in a shopping centre or even a vast amount of numerous data in a corporate network. To manage such kind of data, a database management system is required such as MySQL which aims to access data and perform functions like add, remove or edit data. Since MySQL is a relational database so it stores data in different tables instead of putting into a large storeroom. Storing/organizing data into tables increases the accessibility speed and flexibility.

Applications which demand availability and scalability use MySQL. Because it has the capability to recover and cope with failures on the host, MySQL, operating system or the hardware that may cause downtime. Scalability refers to the ability to spread the database as well as application queries. MySQL is reliable for data security. MySQL has a good memory management system and provides multiple development interfaces (ODBC, JDBC).

Since MySQL is a free open-source software so anyone can download it without paying anything and make changes into the source code. For this project, MySQL was chosen because it is very easy to use and PHP's ability to work with MySQL.

4.3 SOFTWARE TOOLS

For this project following source tools were chosen to perform various tasks:

Visual Studio Code

Visual Studio Code is a streamlined code editor with support for development operations like debugging, task running, and version control. It aims to provide just the tools a developer needs for a quick code-build-debug cycle and leaves more complex workflows to fuller featured IDEs, such as Visual Studio IDE.

XAMPP Server

XAMPP is a free and open-source software which empowers technologies, processes, and machines to link and work together. It is established by Apache. It stands for x-OS, Apache, MySQL, PHP, and Perl and used as a stage for coding and designing web pages.

XAMPP is very easy to install and has the capability to run on several platforms. XAMPP has very strict security settings and with a single command it can start and stop the server.

CHAPTER 5- SYSTEM ARCHITECTURE

System architecture of this system is divided/split into two parts. One is the client side and the other is the server side. Client-side is the user interface whereas the server side is the combination of web pages written by PHP and the MySQL database. PHP pages contain the written SQL queries which make the accessibility to database possible. The following figure shows the architecture of the system while the detail of the technologies used in this application is discussed in this chapter

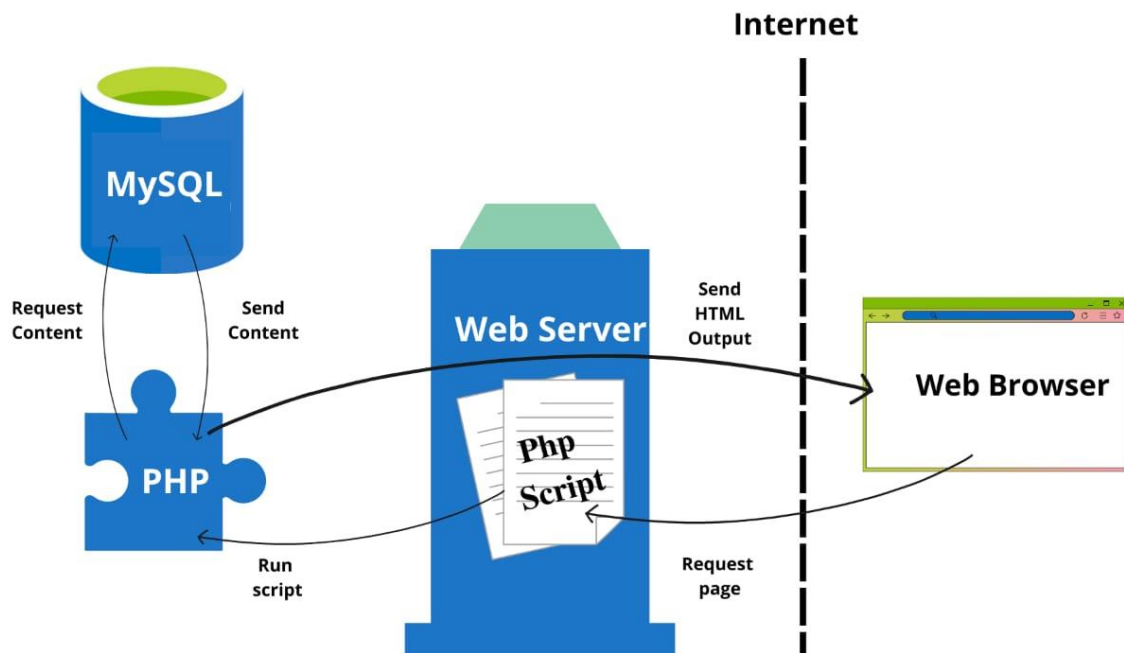


Fig 5.1. System Architecture

CHAPTER 6- REQUIREMENT AND SYSTEM DESIGN

6.1 SYSTEM OVERVIEW

We are implementing a web-based appointment system for booking an online appointment and keeping an online medical history. Users can sign up online, search for the nearby doctor and book appointment while sitting at their homes by using a web browser. Two different types of actors are using this system: user actor (patient), which can be registered to the system, search for the doctor and book an appointment. Administrative actor (doctor/ physician), which can log in to the system with a username and password, accept patient's appointment request and update medical record after each visit. The functionality and more features are explained in more detail in this chapter.

The main characteristics of the system are:

1. Every individual either a doctor or a patient will have an independent id, name and a profile. Doctors are further categorized by the specialty of practice
2. The user (patient) can get, change or cancel appointment time and view medical record while the doctor can make changes in his calendar and accept or reject appointment request by log in to the site and accessing his/her personal page.

6.2 USE CASES

To explain the better view and functionalities of the system, use case diagrams are chosen. The use case diagram is important to document the requirement of the system as well as to specify functionalities of the system. Use case diagrams better explain the way the user interacts with the system.

6.2.1 Patient Use Case

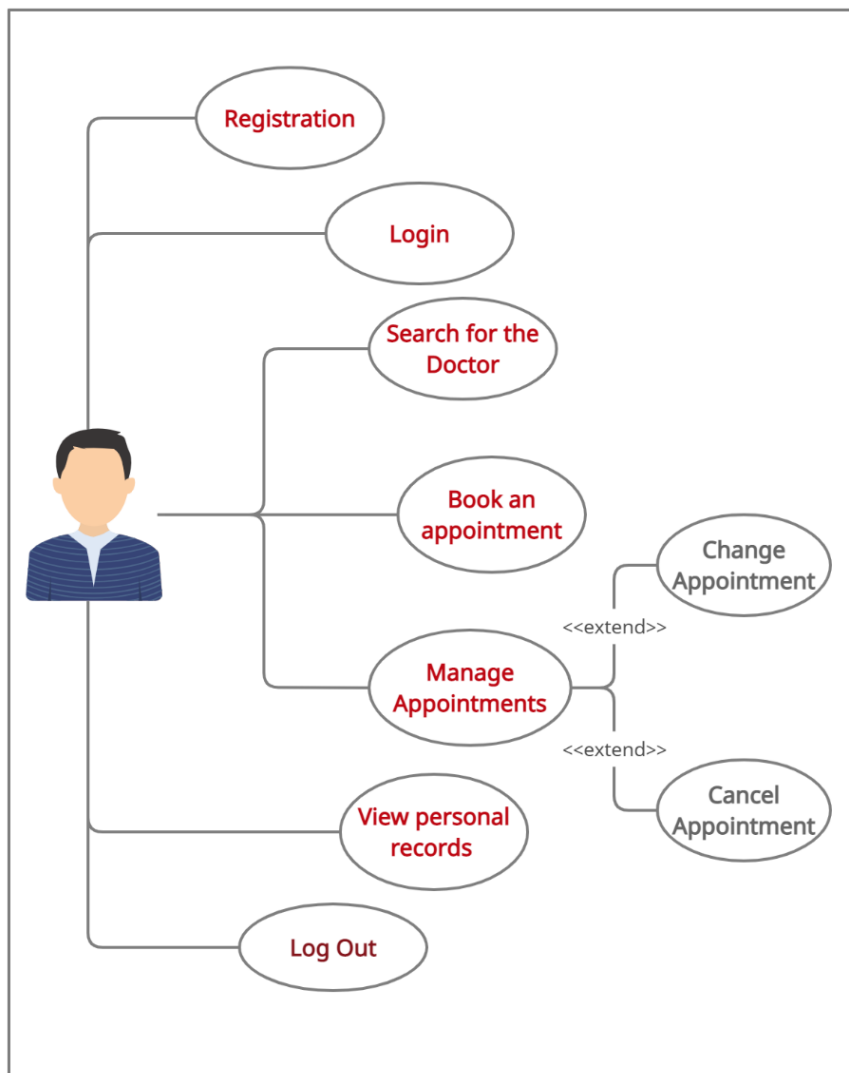


Fig 6.1. User's Use Case Diagram

USE-CASE 1 -Registration

Primary-actor: generic user/patient.

Description: To make an appointment, user registration is required.

Precondition: valid email address.

Basic use-case flow: For the registration process, the user/patient needs to give some information by filling the form. Some of the required information includes the following:

First name

Last name

Gender

Email

Address

Main scenario: The user/patient will go onto the patient sign-up button either from the main page or from the drop-down menu. After clicking the sign-up button, a registration form will appear, where the user must give his personal information i.e. name, gender, email address, etc. After giving the required information user will submit the form. If all the fields are filled including the valid email address and the user will be registered onto the system. In case of any missing entry or invalid format of an email or the error occurs onto the page.

USE-CASE 2: Login

Primary-actor: Patient/user.

Description: Before taking any appointment or get access to his medical record, the user must have to provide his username and password.

Precondition: the user must have a valid username and password.

Basic use-case flow: a valid username with a password must be entered by the user.

Main scenario: To be able to get into the system, the user needs to enter his username and password either from the main page or from the drop-down menu from the top of the page. After clicking onto the login button, authentication request will be forwarded to the system.

Exception: wrong/invalid entered username or password.

USE-CASE 3: Search for a doctor

Primary-actor: User patient/generic user

Description: In this use-case, any registered or unregistered user, can look and search for a doctor of any desired specialty.

Basic use-case flow: By going into the category of any specific specialty, the user can view the list of all registered doctors.

Main scenario: The user will go to the down menu at the top of the page. A list of all specialties will appear in a drop-down list. The user will hit on the desired specialty. After that, a page will open with all doctors of that specific specialty. Now the user has the choice to choose any doctor based on qualification, experience, location etc.

Exception: no exception for this use-case.

USE-CASE 4: Take Appointment

Primary-actor: User/patient

Description: After choosing a doctor user will go further to send an appointment request from the available timings.

Precondition: the user must be login

Basic use-case flow: The patient/user hits the button for taking an appointment for the doctor. A list of available timings will appear for the chosen date. The user will select the suitable time for him and send the request for approval.

Main scenario: The user will hit the button for "take appointment". List of available timings will appear for a chosen date. The user selects the suitable time. The user will hit the submit button to send the request for approval.

Exception: this use-case has no exception.

USE-CASE 5: View-Appointment

Primary-actor: User/patient

Description: the user can view his medical history/appointments /prescriptions

Precondition: the user must be signed in.

Basic use-case flow: The user/patient will click on the name of the patient and it opens the patient's profile. By going into it the user can view the history by clicking on the button for the patient's old reports/history.

Exception: no exception for this use-case.

USE-CASE 6: Log Out

Primary actor: User/patient

Description: the user will log out from the system.

Precondition: the user must be logged in

Basic use-case flow: the user can sign out himself from the system.

Main scenario: the user clicks on the log out button. The system will bring the user to the main page for the generic user.

Exception: no exception for this use-case.

6.2.2 Doctor's Use Case

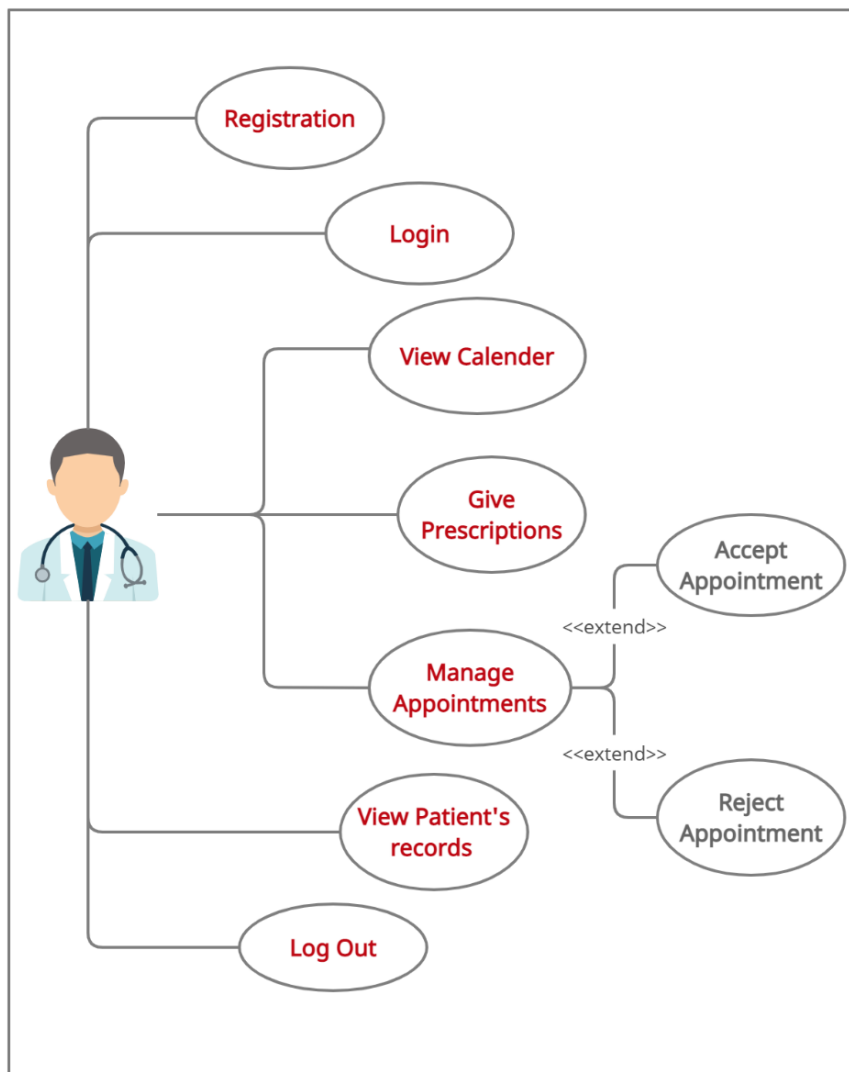


Fig 6.2. Doctor's Use Case Diagram

USE-CASE 1: Registration

Primary-actor: Generic user/doctor/admin

Description: To get online appointment requests, the admin must register a doctor on the application/system.

Precondition: and active email address.

Basic use-case flow: To add as a doctor, the admin must fill the form.

Required fields include the following information:

Full name

Email

Address

Speciality

Fees

Available

Timings

Main Scenario: To add the doctors on to the website first of all domain must have to logon to the website after words he can manage all the doctors he can add or delete the particular doctor prom the site he also can add the patients he can manage the patients to add the doctors he have to fill add doctors form which contains information about doctors like name , email address, mobile number, gender, speciality etc

USE-CASE 2: Log In

Primary-actor: User/doctor

Description: For further functions, the user must have to provide his email address and password.

Precondition: the user must enter the username and password.

Basic use-case flow: user/doctor should provide his username and password to log in.

Main Scenario: To be able to get into the system, the user needs to enter his username and password either from the main page or from the drop-down menu from the top of the page. After clicking onto the login button, an authentication request is forwarded to the system.

Exception: occurs if fails to provide username and password.

USE CASE 3: Accept Or Reject A Request

Primary-actor: User/doctor

Description: User/doctor can accept or reject any patient's request.

Precondition: User/doctor must be signed in.

Basic use-case flow: User/doctor selects any date and decides to accept or reject any appointment request.

Main scenario: After logging in, all the patient's appointment requests will be appearing on the according to the dates. User /Doctor will select or reject the appointments. User /Doctor can view all the appointment requests. User /Doctor can select the option to accept or reject the appointment request.

Exception: no exception for this use case

USE CASE 4: Log Out

Primary-actor: User/doctor

Description: the user/doctor will log out from the system.

Precondition: the user/doctor must be signed in

Basic use-case flow: the user/doctor can sign out himself from the system.

Main scenario: the user/doctor clicks on the log out button. The system will bring the user to the main page for the generic user.

Exception: no exception for this use case.

6.3 SYSTEM DESIGN

6.3.1 Class Diagram

The class diagram is chosen to explain the design phase of the system. A class diagram describes classes of the system, attributes, and operations and relationships of the classes in a better way. We can also say that class diagrams are used to justify the structure or behaviour of use cases of the system. Class diagrams [10] best explain the conceptual model of the system in terms of entities and their relationships. The class diagram looks like a shape of a rectangle, comprising three compartments stacked vertically. The first top box comprises the class name, the second middle box contains the attributes of the class and third the last box contains the methods or functions performed by that class. The first compartment /box of the name is compulsory while rest of the two can be omitted to simplify the diagram. So, in any class diagram first compartment must be drawn while the second two compartments are optional.

The class "patient" contains multiple parameters (such as id, name, age, address), which depict the information of all the registered patients. The user class also contains the methods performed by these users such as get appointment, view/ create own medical record etc. In the same way, the class "doctor" has the parameters id, name, department, address possessing all the required information of the users registered as a doctor on to the system. Methods include accept/reject the appointment, check the patient, view a medical record of any patient etc. These methods are the functions performed by the users registered as a doctor on the system. The class "appointment" has the parameters of date and time, explaining what time or day patient user has requested for the appointment to the doctor. The class "department" has the parameters id and name and methods include add/ delete doctor and add or delete department. Every doctor user must belong to any department class. The "report" is another class containing methods like write report or prescribes medicine. In the end, class "admin" contains the parameters like id and name and methods of this class include manage users.

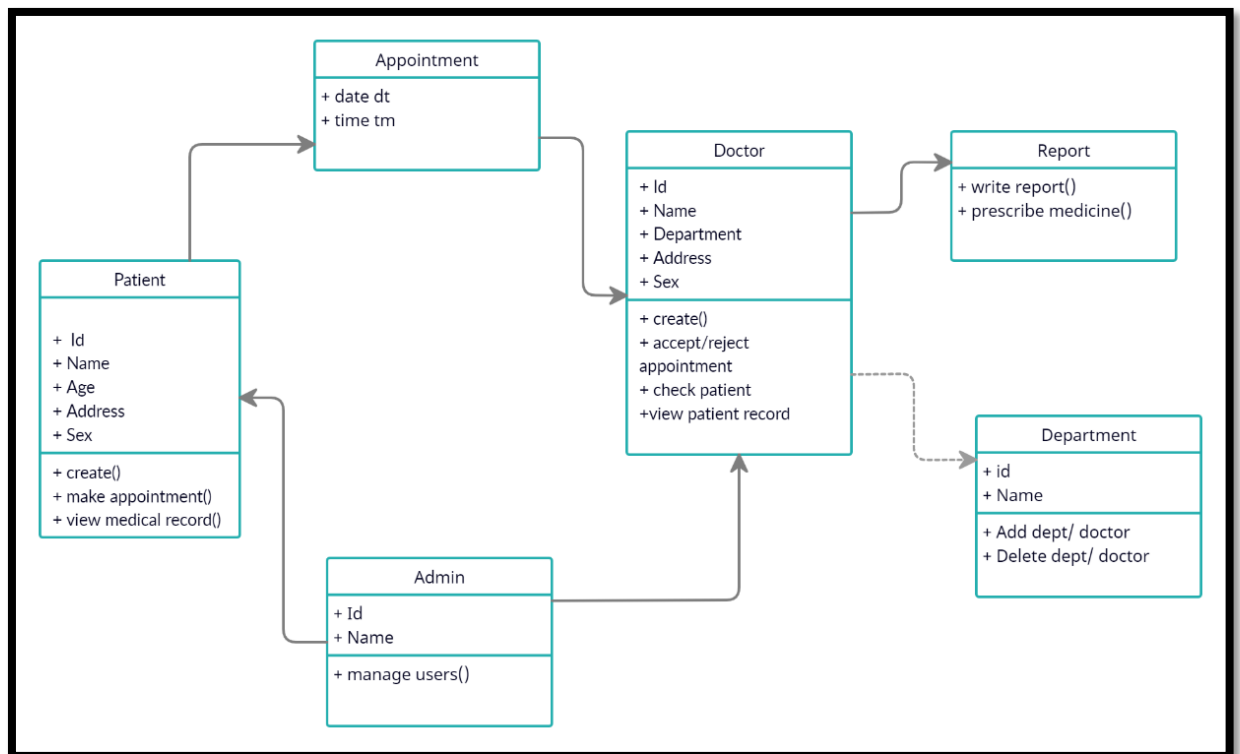


Fig 6.3 Class Diagram

6.3.2 ER Diagram

A basic ER model consists of objects called entities and specifies relationship among those entities. Purpose of this diagram is not to define any functionality rather show association and dependency among entities. ER diagram [10] is drawn with "rectangular boxes" as entities and the "straight lines" showing the relationship between these boxes. An entity is an object or a thing that has an independent existence and can be easily differentiated from others. Each entity has some attributes like name, age, address, department etc. In the following diagram the doctor, patient, appointment, admin etc, all are different entities [10],[11] So, an entity can be a person, animal, plant, event or a company.

Entities consisting of similar attributes make the entity sets. These entities have some association among each other which make a relationship. These relationships can be

"one to one" or "one to many" or "many to many". For example, a doctor and department can have "one to many" relationships, means one department can have many doctors but one doctor is related to only one department.

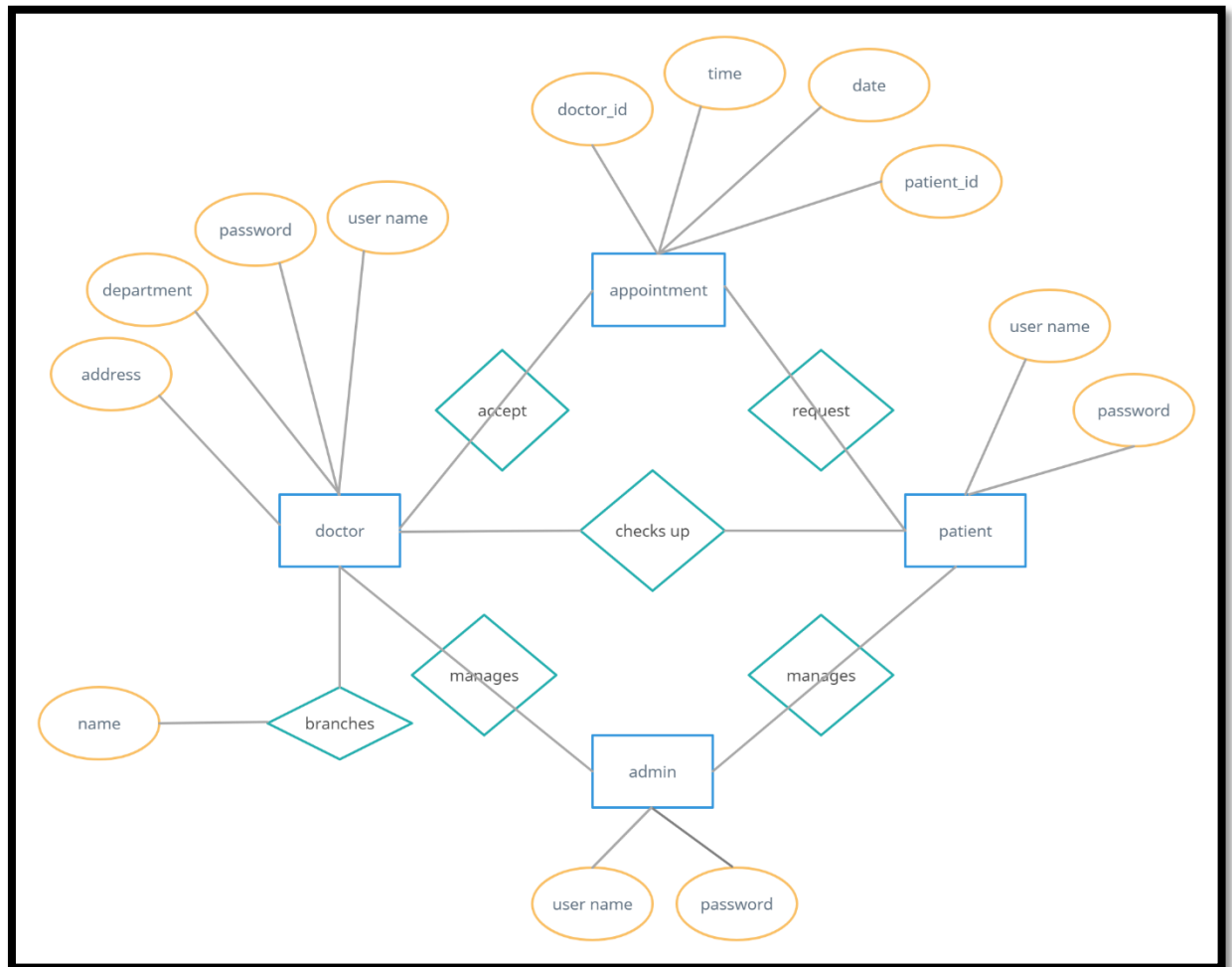


Fig 6.4. ER Diagram

6.4 SEQUENCE DIAGRAM

6.4.1 Registration of Patient

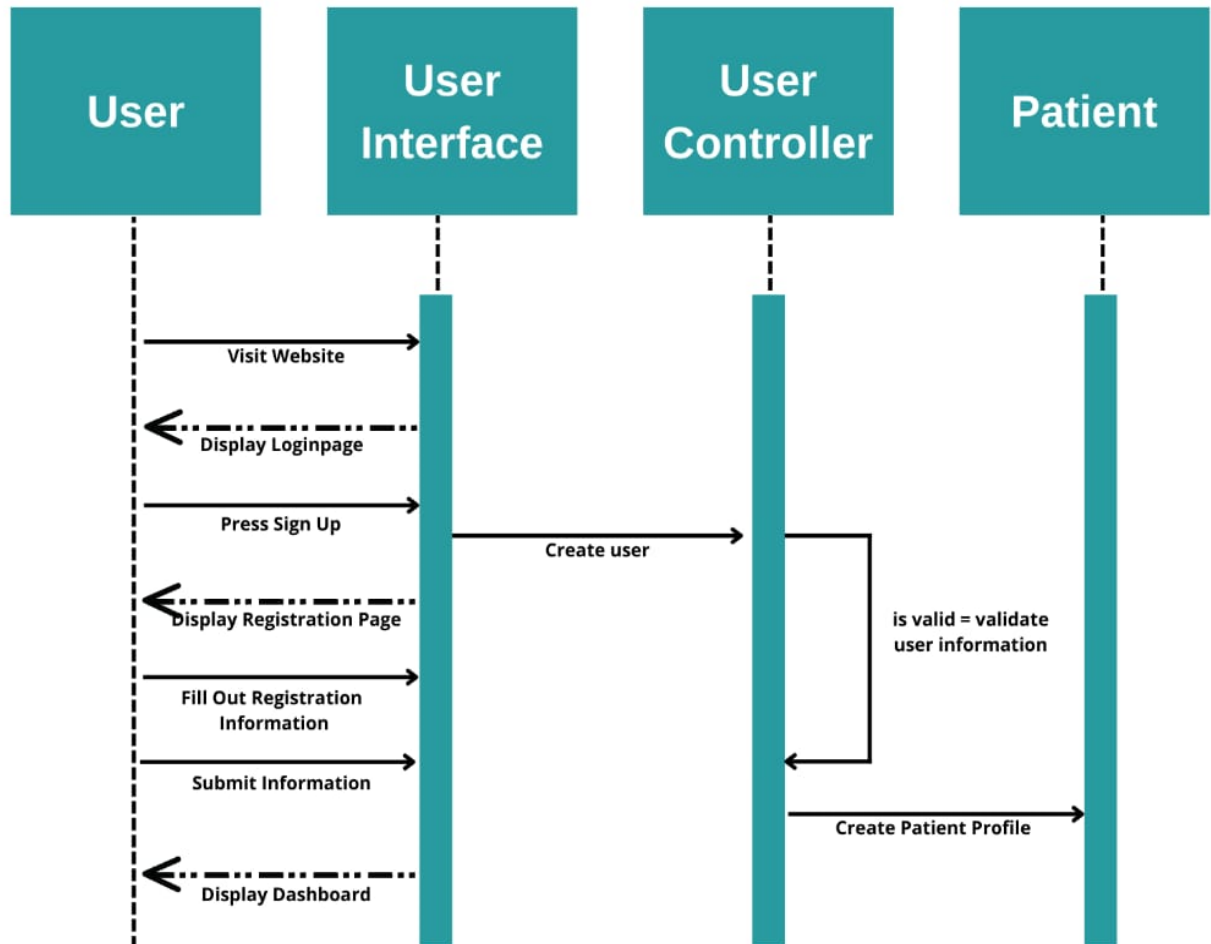


Fig 6.5 Registration of patient

6.4.2 Add Doctor, Patient, Department

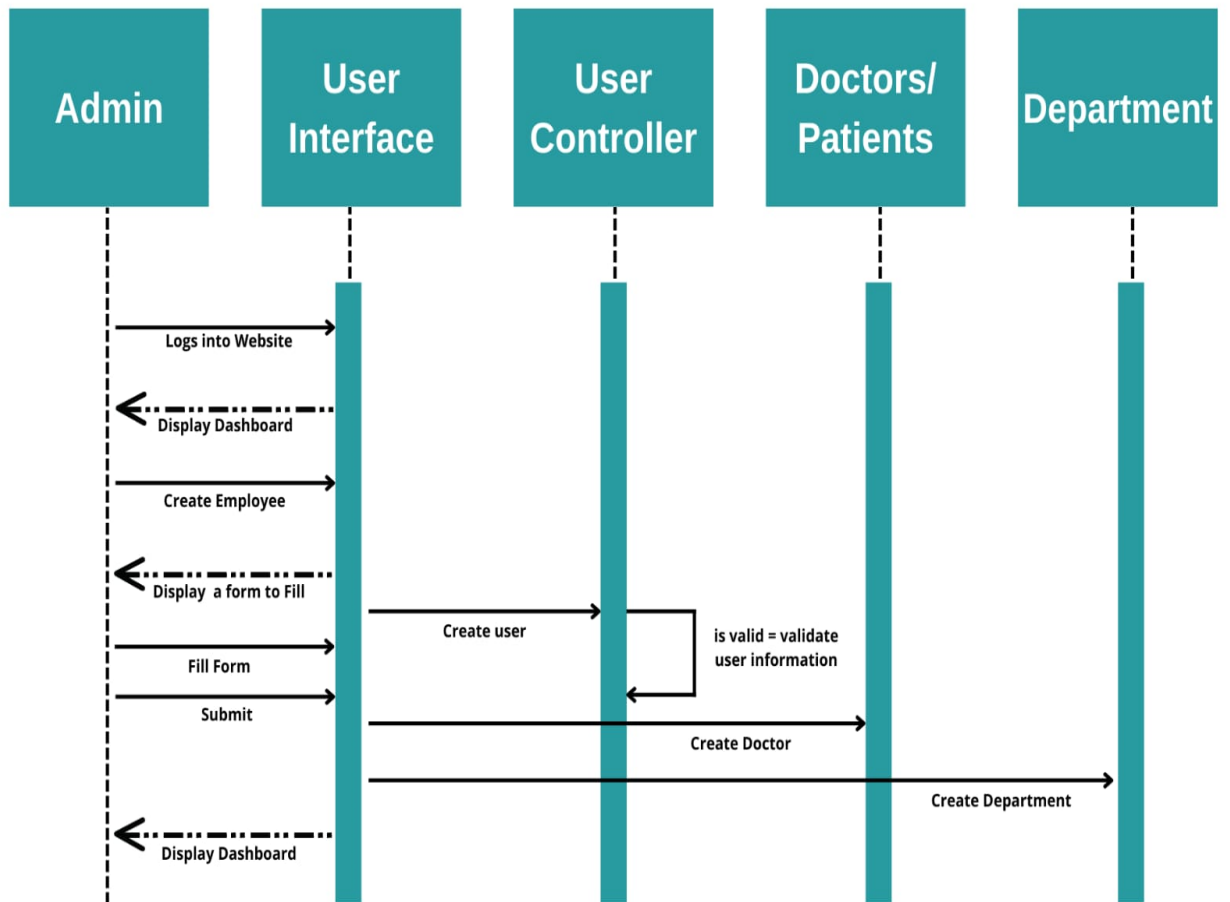


Fig 6.6 Add Doctor, Patient, Department

6.4.3 Consultation Request

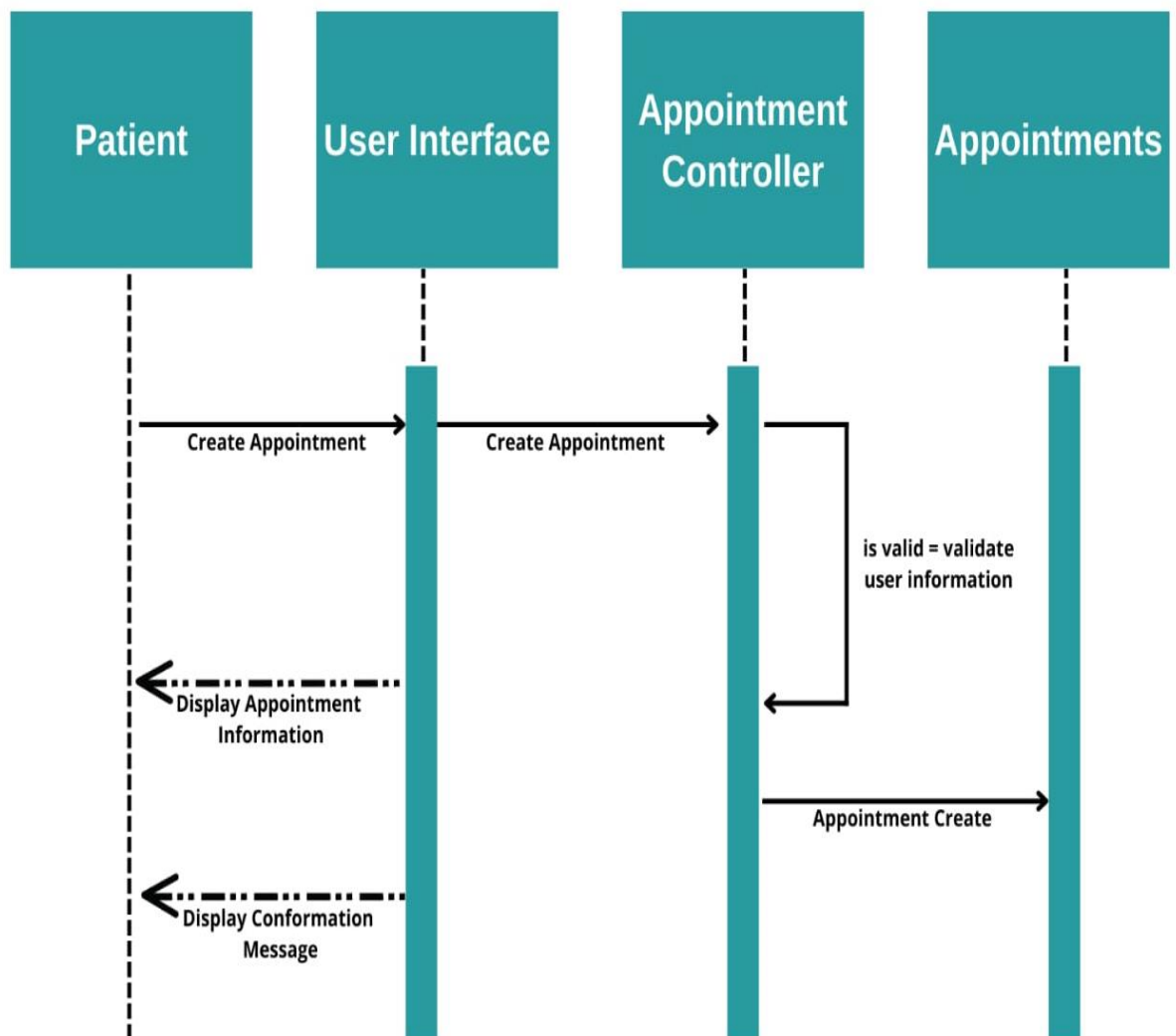


Fig 6.7 Consultation Request

6.4.4 Cancel Consultation Request

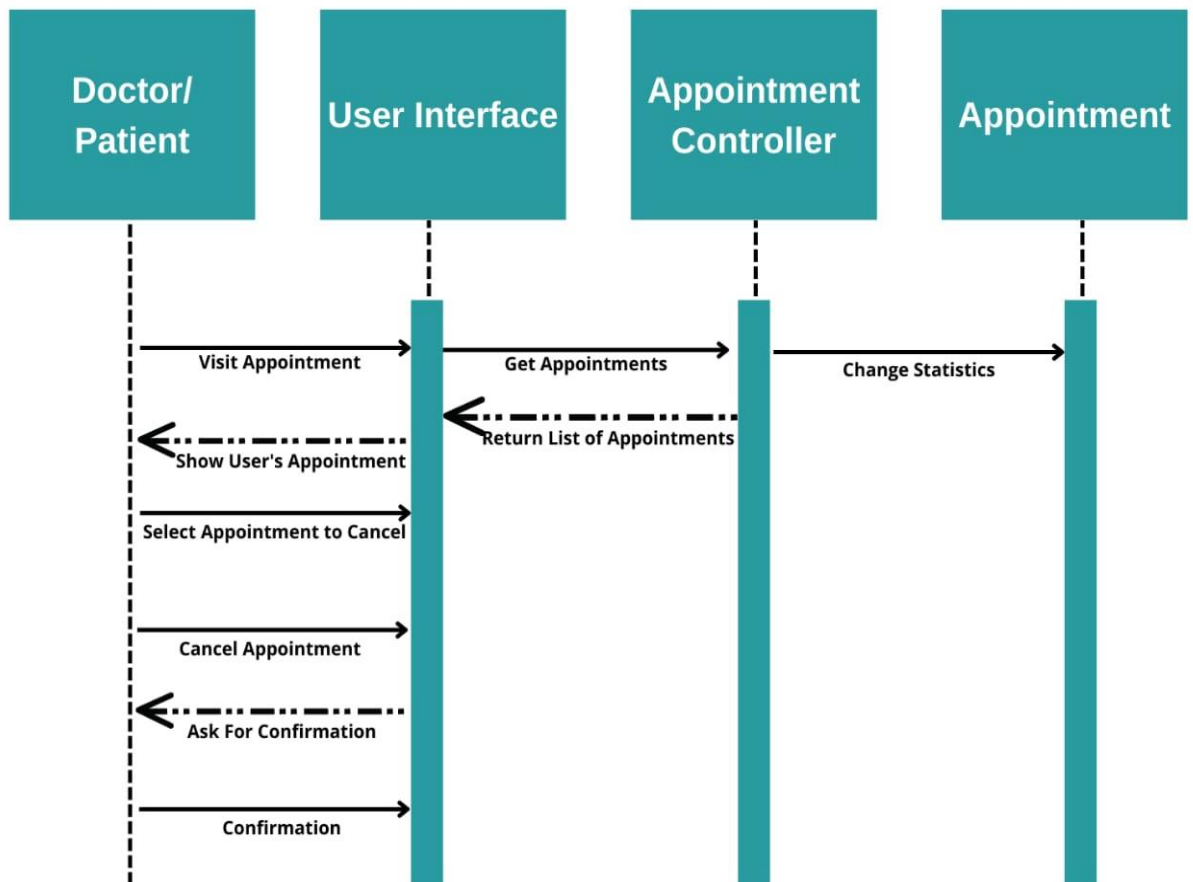


Fig 6.8 Cancel Consultation Request

6.4.5 Give Prescription

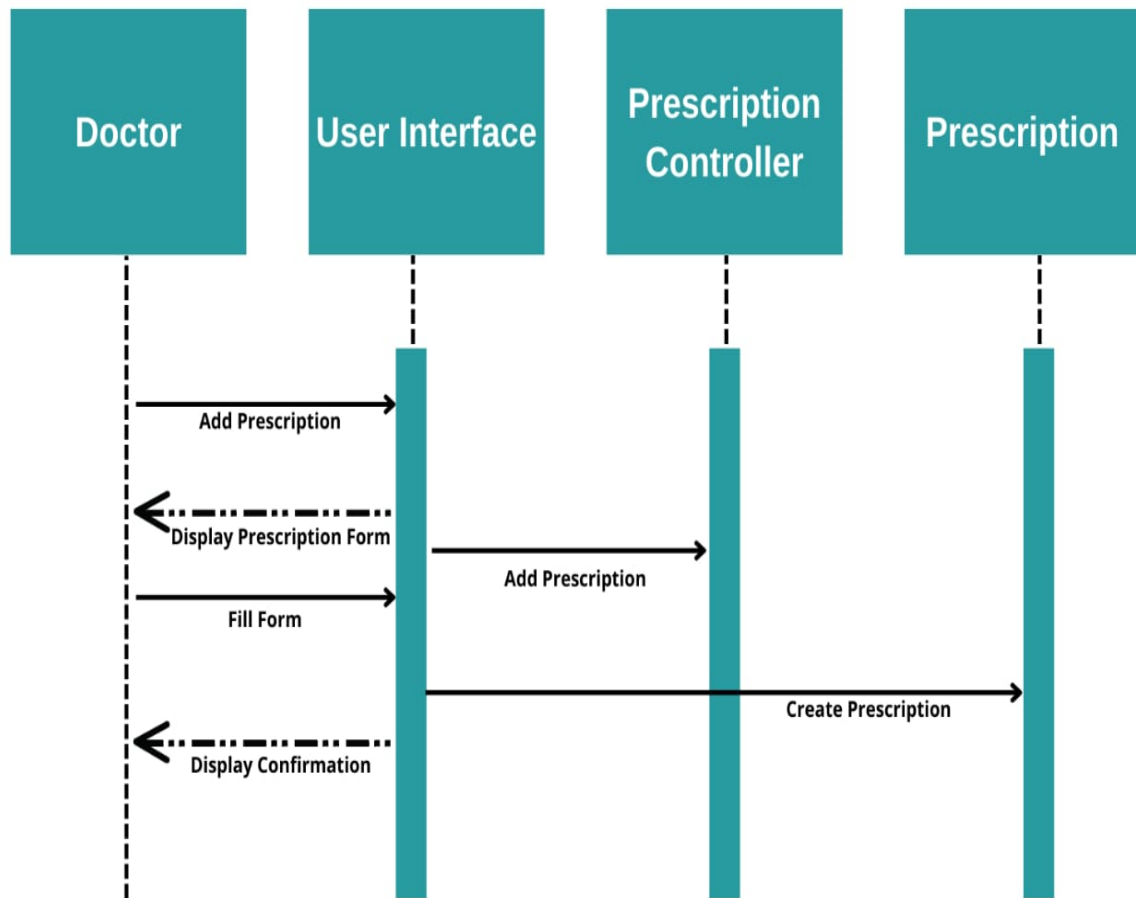


Fig 6.9 Give Prescription

CHAPTER 7- SYSTEM IMPLEMENTATION AND SOFTWARE TESTING

7.1 SYSTEM TESTING

For the sake of software quality assurance, system testing is a very essential thing to do. It is a process by which we try to make the system error proof by performing the program to find an error. The goal is to run the program, find errors or bugs and then fix them. Testing is considered a very essential step in software development and any system is not considered to be complete without this process. Different developers follow different approaches for system testing. System testing is followed to make sure that system is working fine and meets the requirements.

Table 7.1. Result of Testing

Test Case Id	Test Case Name	Preconditioning	Priority	Input Test Data	Steps to be executed	Expected Result	Success Result
1.	User Registration	No	High	Valid Email Address	Need to fill registration form and submit	Registration Successful	Done
				Invalid Email Address		Error	Error
2.	User login	Must be registered earlier	High	Valid Username and Password	Enter Username and Password	Login Successful	Done

				Username and Password		Failed and displayed error	Error
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7.2 USER INTERFACE LAYOUT

This online Dr-appointment system is the first system is very important to keep the interface simple and easy to be easily understood by a user. For this purpose, simple and common UI elements are used. It makes the common user to easily understand the system and get used to it. The below-given figure shows the prototype of the system. There is a horizontal menu list on top of the home page. This menu list contains drop down buttons such as specialization, patient, doctor, and contact. All these buttons open a new webpage. When a user brings cursor onto the specialization button, a drop-down menu list appears showing/ containing all the existing departments. All doctors are classified based on the departments or specialty. The user can choose to view the doctors of any specific specialty by clicking on this button. Next comes the button for the doctor. The user can register himself or sign in if he already has an account. Next button on the menu is for the patient, the user can again sign up or sign in if he/she has already an account. The last button on the menu bar is of “contact us”. Any user can call or send an email to the admin by using this option. This page contains all the information or possible ways to contact in case of any need. When we go down of the homepage there is a big picture to make the page look good and then again there are two blocks for the doctor registration/ sign in and patient registration/sign.

7.2.1 Homepage

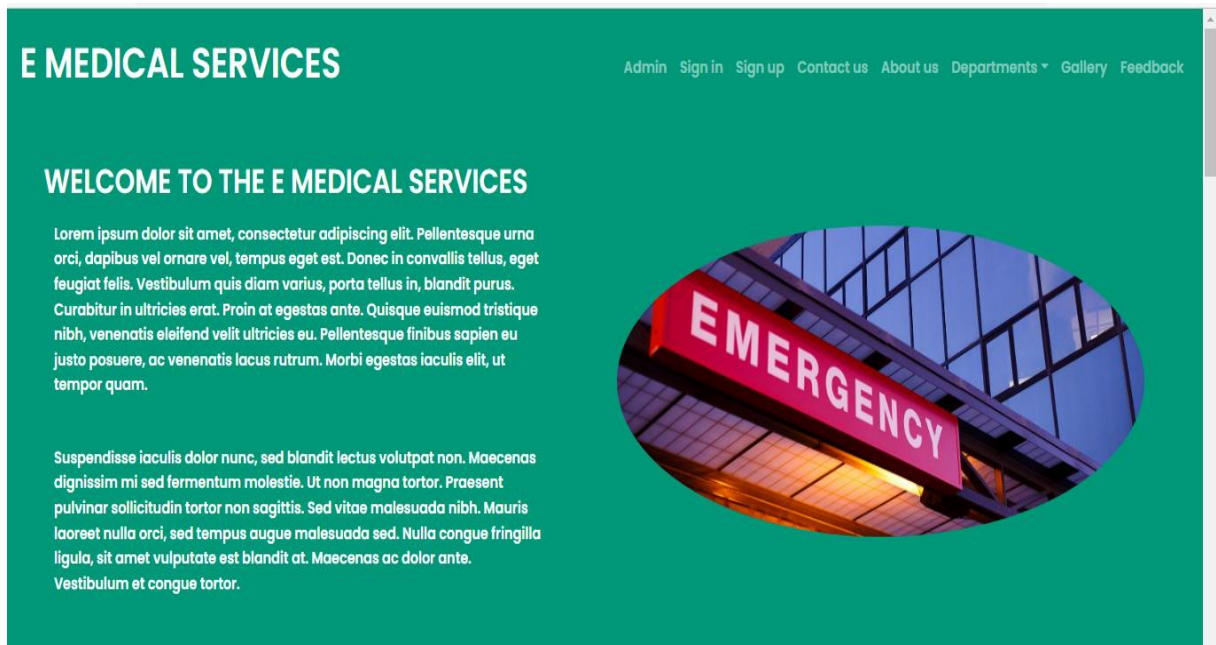


Photo 7.1 Homepage view

7.2.2 Registration Portal

The image shows a "PATIENT REGISTRATION" form. At the top, there is a green circular icon with a white silhouette of a person. Below it, the title "PATIENT REGISTRATION" is displayed in bold, dark green capital letters. The form contains several input fields: "Full Name" (with the placeholder "admin@gmail.com"), "Phone Number" (with a masked input "*****"), "Confirm Password" (with a small green checkmark icon to its right), and a dropdown menu for "Gender" with the placeholder "--Select Gender--". Below these fields, there is a link that says "Already have an account?" in red text. At the bottom of the form, there is a green button labeled "Patient Register".

Photo 7.2 Patient's Registration Form View

7.2.3 Login Dashboard

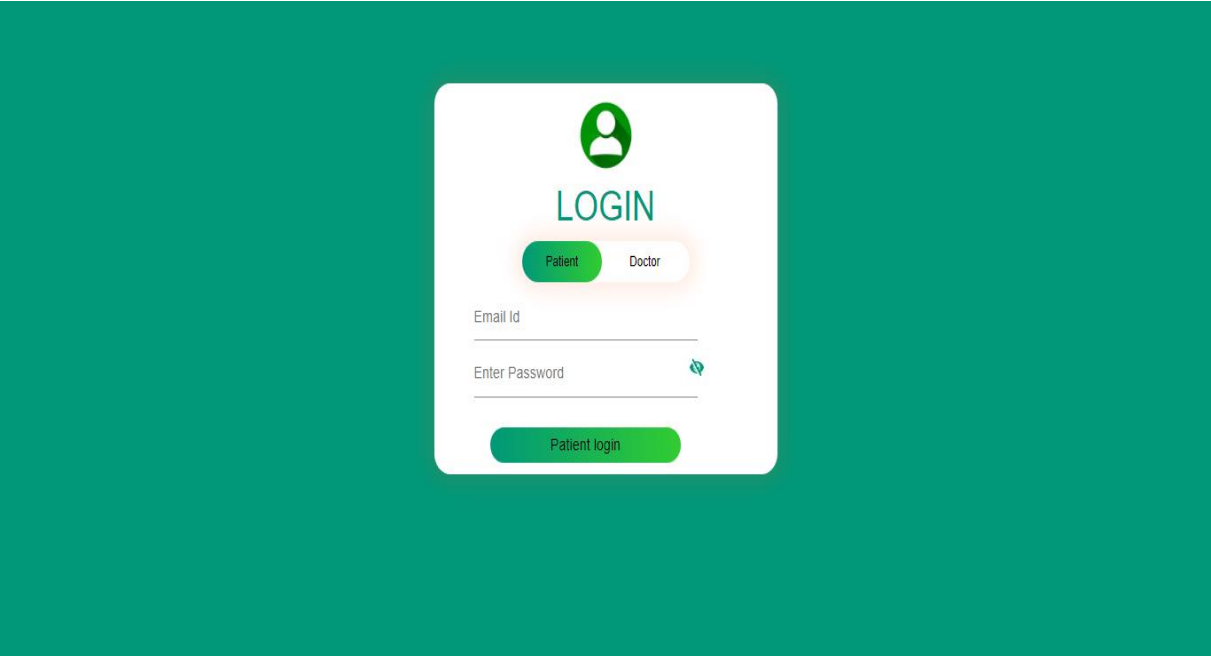


Photo 7.3 Login view

7.2.4 Book Appointment

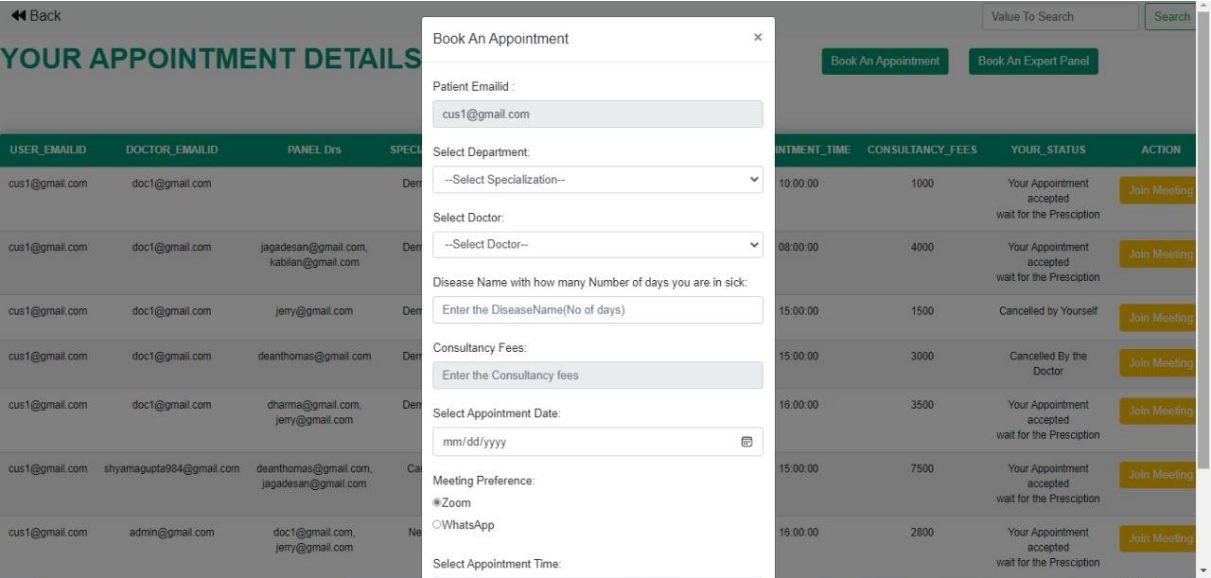


Photo 7.4 Booking an appointment view

7.2.5 Book an Expert Appointment

The screenshot shows a web application interface. In the background, there is a dashboard titled "YOUR APPOINTMENT DETAILS" with a table of appointment records. Overlaid on this is a modal window titled "Book An Expert Panel". The modal contains the following fields:

- Patient Emailid:
- Select Department:
- Select Doctor:
- Select Co-Doctor(s):
- Disease Name with how many Number of days you are in sick:
- Consultancy Fees:
- Select Appointment Date:

The background table has columns: USER_EMAILID, DOCTOR_EMAILID, PANEL Drs, SPECIALIZATION, DISEASE, APPOINTMENT_DATE, APPOINTMENT_TIME, CONSULTANCY_FEES, YOUR_STATUS, and ACTION. It contains several rows of appointment data.

Photo 7.5 Dashboard to book an expert appointment

7.2.6 Patient's Appointment Dashboard

The screenshot shows the "YOUR APPOINTMENT DETAILS" dashboard. It features a table with the following columns: USER_EMAILID, DOCTOR_EMAILID, PANEL Drs, SPECIALIZATION, DISEASE, APPOINTMENT_DATE, APPOINTMENT_TIME, CONSULTANCY_FEES, YOUR_STATUS, and ACTION. The table contains four rows of appointment data.

USER_EMAILID	DOCTOR_EMAILID	PANEL Drs	SPECIALIZATION	DISEASE	APPOINTMENT_DATE	APPOINTMENT_TIME	CONSULTANCY_FEES	YOUR_STATUS	ACTION
cus1@gmail.com	doc1@gmail.com		Dermatology	skin problem last 2 days	2022-05-28	10:00:00	1000	Your Appointment accepted wait for the Prescription	Join Meeting
cus1@gmail.com	doc1@gmail.com	jagadesan@gmail.com, kabilan@gmail.com	Dermatology	skin and other disease problem	2022-05-28	08:00:00	4000	Your Appointment accepted wait for the Prescription	Join Meeting
cus1@gmail.com	doc1@gmail.com	jerry@gmail.com	Dermatology	some disease problem	2022-05-28	15:00:00	1500	Cancelled by Yourself	Join Meeting
cus1@gmail.com	doc1@gmail.com	deanthomas@gmail.com	Dermatology	fever and skin problem, last 3	2022-05-28	15:00:00	3000	Cancelled By the Doctor	Join Meeting

Photo 7.6 Patient's Appointment Dashboard view

7.2.7 Doctor's Appointment Dashboard

Back

Value To Search

Search

APPOINTMENT DETAILS

SNO	PANEL_DETAIL	PATIENT_FULLNAME	PATIENT_EMAILID	CONTACT	GENDER	DISEASE	SPECIALIZATION	APPOINTMENT_DATE	APPOINTMENT_TIME	CONSULTANCY_FEES	STATUS	ACTION
1		cus1	cus1@gmail.com	9118771632	Female	skin problem last 2 days	Dermatology	2022-05-28	10:00:00	Rs 1000/-	Patient Appointment accepted	<div>Prescribe</div> <div>Start Meet</div>
2	jagadesan@gmail.com, kabilan@gmail.com	cus1	cus1@gmail.com	9118771632	Female	skin and other disease problem	Dermatology	2022-05-28	08:00:00	Rs 4000/-	Patient Appointment accepted	<div>Prescribe</div> <div>Start Meet</div>
3	jerry@gmail.com	cus1	cus1@gmail.com	9118771632	Female	some disease problem	Dermatology	2022-05-28	15:00:00	Rs 1500/-	Cancelled by Patient	<div>Start Meet</div>
4	deanthomas@gmail.com	cus1	cus1@gmail.com	9118771632	Female	fever and skin problem, last 3	Dermatology	2022-05-28	15:00:00	Rs 3000/-	Cancelled By the Yourself	<div>Start Meet</div>
5	dharma@gmail.com, jerry@gmail.com	cus1	cus1@gmail.com	9118771632	Female	fever, last 3 days	Dermatology	2022-05-28	16:00:00	Rs 3500/-	Patient Appointment	<div>Prescribe</div>

Photo 7.7 Doctor's Appointment Dashboard view

7.2.8 Feedback Form

FEEDBACK FORM

Please help us to serve you better by taking a couple of minutes.

How satisfied were you with our Service?

☐ Excellent

☐ Good

☐ Neutral

☐ Poor

If you have specific feedback, please write to us...

Additional comments

Your Name (optional)

Your Email (optional)

Your Number (optional)

SUBMIT FEEDBACK

Photo 7.8 Feedback Form view

7.2.9 Contact Dashboard

The image displays a contact dashboard with a dark teal background. On the left, a dark blue sidebar contains contact information. On the right, a white rounded rectangle contains a message form.

Contact Info

- Bhagvaanpura,Doharighat
MAU-275303
- shyamagupta984@gmail.com
- 8707000751
-

Send A Message

First Name Last Name

Email Address Mobile Number

Subject

Write Your Message Here.....

Photo 7.9 Contact Dashboard view

CHAPTER 8- CONCLUSION AND SCOPE

The objective of this thesis was to develop an Online Doctor's Appointment. The purpose of implementing this application was to create a system through which a patient can easily choose and make an online appointment for a doctor just by sitting at home. The second objective was to replace manual medical file keeping system with online database management system.

The application was successfully implemented by using famous technologies and programming languages. This application does not aim to target any specific group but every individual who wants to seek medical help and that is why it was kept in mind to keep the user interface simple and friendly while building this application. Like all other applications, this application also has a client side and a server side. This application was developed by using HTML, CSS, and JavaScript at the client side while PHP and MySQL on the server side.

For now, basic functionalities have been implemented but for the future, work will be done to link pharmacies and laboratories to the system. Online follow-up for the distant patients is another feature that is aimed to add at later stages.

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