HealthCare Connect System

A Project Report submitted
to
MANIPAL ACADEMY OF HIGHER EDUCATION

for partial fulfilment of the requirement for
the award of the degree
of

MASTER OF COMPUTER APPLICATIONS

Submitted by

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MANIPAL INSTITUTE OF TECHNOLOGY
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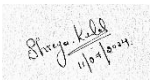
DEPARTMENT OF DATA SCIENCE & COMPUTER APPLICATIONS

July 2024

DECLARATION

I hereby declare that this project work entitled **HealthCare Connect System** is original and has been carried out by me in the Department of Data Science and Computer Applications of Manipal Institute of Technology, Manipal, under the guidance of **Dr. Sandhya Parasnath Dubey, Assistant Professor, Department of Data Science & Computer Applications, Manipal Institute of Technology, Manipal.** No part of this work has been submitted for the award of a degree or diploma either to this University or to any other Universities.



Place: Manipal

Date: 23/07/2024 Shreya Dinesh Kulal

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DEPARTMENT OF DATA SCIENCE & COMPUTER APPLICATIONS

Manipal
23/07/2024

CERTIFICATE

This is to certify that the project titled **HealthCare Connect System** is a record of the bonafide work done by **Shreya Dinesh Kulal** (*Reg. No.220970078*) submitted in partial fulfilment of the requirements for the award of the Degree of **Master of Computer Applications** of Manipal Institute of Technology, Manipal, Karnataka, during the academic year 2023-2024.

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TO WHOM IT MAY CONCERN

This is to certify that **Ms. Shreya Dinesh Kulal** (Reg No: 220970078) **from** MCA, Manipal Institute of Technology, Manipal, has successfully completed Project "**HealthCare Connect System**" and internship program from January 22nd 2024 to July 22nd 2024 at this company. During the period of internship program with us she was found punctual, hardworking and inquisitive.

We wish her every success in life.

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ABSTRACT

The HealthCare Connect System project, developed during my internship, includes an effective admin module to improve healthcare service management. Admins can effectively approve or reject registered doctors based on distance with this method, guaranteeing that medical services are available within a 5-kilometer radius. I concentrated on using React.js, Node.js, Express.js, and MongoDB to construct different admin module components as an essential part of this project.

The admin module gives administrators access to a complete dashboard with listings of doctors and patients as well as statistics through a secure login mechanism. Additionally, the interface makes it easier to manage profiles and appointments. Adding, editing, and deleting administrator profiles as well as managing patient and doctor information are important functions. Administrators also have the authority to accept or reject appointments, which guarantees a well-organized scheduling process.

The technology also has the ability to view medical records and create invoices, which improves the overall effectiveness of healthcare administration. The project mixes organized progress with the freedom to modify and update features as needed through sequential and iterative development approaches. This strategy guarantees the HealthCare Connect System's adaptability to changing needs and offers admins and patients a convenient user experience.

All things considered, the admin module of the HealthCare Connect System is essential to the smooth administration of healthcare services, which enhances accessibility, effectiveness, and efficiency in the healthcare industry.

In conclusion, the admin module for the "Healthcare Connect System" effectively addresses the challenges involved in monitoring healthcare operations, such as managing doctors and patient care. This project serves as an example of how cutting-edge web technologies may be skilfully combined to offer a dependable and user-friendly platform for healthcare administration, thereby improving the standard of both patient care and administrative processes.

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INTRODUCTION

1.1 Introduction

This chapter provides an in-depth summary of the Healthcare Connect System project, including its goals, motivating factors, and enabling technology. The goal of the project is to create a complete, user-friendly platform that links doctors with patients in certain geographic areas, thereby modernizing the management of healthcare. The goal of the project is to guarantee data accuracy in healthcare administration, decrease manual labor, and improve operational efficiency.

The first section of the chapter provides an overview of the condition of healthcare practices today, highlighting the difficulties posed by manual processes and inefficiencies which indicate the need for creative solutions like the Healthcare Connect System. It examines the project's motivating factors, highlighting the need for a simplified and effective alternative for traditional healthcare systems. Administrators schedule appointments, maintain both doctor and patient profiles, and securely handle data. Simplified scheduling of appointments, easy access to medical records, and a user-friendly directory of doctors and specialists are all advantageous to patients.

In addition, the chapter outlines the hybrid development methodology that was used, combining iterative and sequential techniques to ensure flexibility and adaptation. React.js, Node.js, Express.js, and MongoDB are used widely, illustrating how these technologies help build a reliable, flexible, and user-friendly platform. The talks in the following portions are grounded in this chapter's detailed review of the project's origins, goals, and technology setup. It sets the stage for an in-depth understanding of the Healthcare Connect System project's effect and future possibilities by preparing the reader for understanding the exact goals, procedures, and results.

1.2 Area of Work

The Healthcare Connect System offers a creative and effective substitute for traditional structures with the goal of transforming healthcare management. The platform makes use of modern technology to speed up procedures like appointment booking, patient data management, and medical record access, guaranteeing that patients and healthcare providers can readily handle and retrieve extensive data.

Key challenges addressed by the Healthcare Connect System include:

- **Operational Efficiency**: Medical workers may focus on important initiatives and increase overall efficiency by automating repetitive tasks, which minimizes manual labor.

- **Data Accuracy**: By reducing errors brought on by human data entry and strengthening the integrity of medical records, the platform guarantees accurate and dependable records.
- **Patient Management**: Better healthcare administration and delivery are made possible by all-inclusive tools for keeping track of patients, appointments, and medical records.

The Healthcare Connect System makes advanced healthcare management easily accessible and manageable, which promotes a culture of efficiency and continuous improvement.

1.3 Motivation

The motivation behind the Healthcare Connect System project stems from the need to address the challenges of manual processes, data inaccuracies, and inefficiencies in healthcare management. switching to more automated and efficient solutions is necessary because traditional techniques are frequently tedious and open to errors.

The project's goal is to transform healthcare administration by encouraging the use of streamlined, effective, and useful solutions. The Healthcare Connect System seeks to enable healthcare businesses to adopt cutting-edge management techniques that boost patient satisfaction and productivity while optimizing operational efficiency. It does this by utilizing technology and innovation.

A dedication to data integrity and operational quality is at the core of the project. The platform strives to make dependable, efficient healthcare management available to businesses of all kinds by providing an extensive feature set.

1.4 Objectives:

The objectives of the Healthcare Connect System project include:

- To design a user-friendly interface for administrators to efficiently manage doctor and patient data.
- To develop a robust appointment scheduling system that allows patients to book appointments and receive confirmations.
- To implement secure login and profile management functionalities for both administrators and patients.
- To enable the management of medical records, ensuring patients can view and manage their records online.
- To ensure data security and compliance with privacy regulations by implementing appropriate access controls and encryption mechanisms.

By identifying important outcomes, standards, and performance metrics, these objectives offer clarity and promote the development and impact of the Healthcare Connect System in the field of healthcare management.

1.5 Present Day Scenario:

Today's medical organizations must overcome multiple challenges that affect patient satisfaction and operational effectiveness. Healthcare workers frequently deal with data inconsistencies, inefficiencies, and increased workloads as a result of manual processes and antiquated technologies, which lowers productivity and raises stress levels.

Conventional techniques often lead to mistakes and extended processing times, which reduce organizational productivity and raise concerns about patient compliance and satisfaction. The delayed adoption of advanced healthcare management systems, despite their clear advantages, can be attributed to high initial implementation costs, a lack of awareness, and data security concerns.

To support the change to more strategic healthcare practices, efforts in technology development, reducing expenses, and awareness among users are needed.

1.6 Target Specifications:

The HealthCare Connect System's target specifications define the desired outcomes and features of the admin module in connection with the patient appointment scheduling and management system. These findings are significant because they directly address the strong difficulties healthcare professionals have in successfully managing healthcare services. By automating and streamlining the administrative processes, the HealthCare Connect System aims to achieve several key objectives:

- **Optimized Processes & Time Saving:** By automating repetitive administrative chores, administrators may concentrate on more important responsibilities, which improves healthcare facilities' overall efficiency.

- **Standardization and Accuracy**: The system reduces the possibility of manual errors and discrepancies in the administration of appointments, patient data, and doctor profiles by imposing universal administrative standards.

- **Increased Accuracy and Reliability**: By utilizing modern technology, the probability of errors and inconsistencies is decreased and managing of appointments, doctor records and patient records, and other administrative tasks is made accurate and dependable.

- **Robust Security and Privacy**: In line with relevant healthcare regulations and guidelines, the system guarantees the safe handling and privacy of patient and records and other sensitive data.

All things considered, the admin module of the HealthCare Connect System is a big step in the right direction toward modernizing and enhancing healthcare administration, which is good for both patients and doctors together. The system aims to provide a comprehensive and efficient solution for healthcare administration by fulfilling these target criteria, which will improve the quality of healthcare service delivery for everyone involved.

1.6 Project Work Schedule

January 22, 2024 – March 5, 2024:

- Software Installation and setup.
- Learnt MongoDB, API calls, ReactJS.

March 6, 2024 – April 2, 2024:

- Define project objectives and scope.
- Establish project timeline and milestones.
- Started working on database creation.

April 3, 2024 – May 1, 2024:

- Developed the admin backend.

May 2, 2024 – June 15, 2024:

- Integrated frontend components with backend API endpoints.

June 16, 2024 – July 18, 2024:

- Designed the front-end for the admin panel.

In summary, our proposed approach transforms administrative procedures by fusing cutting-edge technologies with user-centric design concepts. Our goal is to increase operational efficiency, simplify management responsibilities, and free up administrators to concentrate on enhancing patient care and organizational effectiveness by giving them a platform that works smoothly and efficiently.

1.7 Organization of the Project Report

The Healthcare Connect System's development and implementation are covered in great depth in this project report. Every chapter focuses on a different area of the project, giving information about the approaches used, the outcomes, and the implications of the effort.

Chapter 1: Introduction
This chapter introduces the healthcare domain and explains the importance of the project, setting the stage for the Healthcare Connect System. It highlights the need for a strong healthcare management system, talks about the inspiration behind creating the Healthcare Connect System, and lists the main goals and specifications. The chapter also includes a timeline of the project, with a focus on its important deliverables and milestones.

Chapter 2: Methodology
The steps involved in creating the Healthcare Connect System are explained in depth in this chapter. The architecture and modelling of the system's primary parts—Medical Report Management, Appointment Scheduling, Patient Management, and Admin Management—are covered. The chapter discusses the tools and technologies utilized, including React.js, Node.js, Express.js, and MongoDB, and defends the selected strategy, which mixes sequential and iterative methodologies. It provides a comprehensive picture of how the system was developed and verified by including a summary of the development methodology, team organization, and scheduled test cases.

Chapter 3: Results and Discussion
The outcomes of the Healthcare Connect System's implementation are examined in this chapter. It provides a thorough analysis of the system's operation and efficiency. To demonstrate the effective development of important elements such the Admin Dashboard, Patient Management, Doctor Management, and Appointment Scheduling, screenshots and visual proof are offered. The chapter evaluates the system's efficacy and efficiency in meeting user needs as well as how these features contribute to the project's goals.

Chapter 4: Conclusion and Future Work
This concluding chapter outlines with its secure logins, efficient administration, real-time statistics, and easy appointment scheduling, the Healthcare Connect System maximizes healthcare management. In order to increase effectiveness and impact, future improvements will incorporate patient feedback, automatic reminders, and sophisticated analytics.

CHAPTER 2
METHODOLOGY

2.1 Introduction

In Chapter 2 of our project report, we study in-depth the development and implementation processes of the Healthcare Connect System. This chapter offers a thorough examination of our methodology, starting with the design and modeling of the main parts of the system. We describe how different modules that are necessary for the system's operation are designed and organized, guaranteeing smooth operation and integration.

Our approach was guided by basic concepts and considerations, which we clarify by going into depth about the assumptions made during the development phase. We also present a comprehensive rationale for the methodology we have selected, emphasizing its applicability and efficiency in meeting the project's goals.

This chapter also examines the technology and tools used during the course of a project. We outline the software libraries, frameworks, and reference materials used, highlighting their vital function in supporting our methodology. These resources offered the framework and assistance required to guarantee the Healthcare Connect System ran smoothly.

The Healthcare Connect System's admin side module was developed using a hybrid process model that blends iterative and sequential techniques. This method included flexibility to allow for necessary alterations while allowing for structured progress through the project phases. The hybrid model was selected because it included the best features of iterative and sequential processes, guaranteeing thorough preparation and flexibility.

Each step of the development process, which included Admin Management, Patient Management, Doctor Management, Appointment Scheduling, and Medical Report Management, focused on a particular function. By facilitating the safe creation and retrieval of patient medical histories and reports, the medical report feature improves the standard and continuity.

React.js, Node.js, and Express.js were utilized for the front end of the project, while MongoDB was utilized for the database. The frontend and backend were able to communicate effectively because to the usage of RESTful APIs. Nodemailer was used to manage email notifications, guaranteeing dependable and secure communication.

2.2 Proposed Solution

- ✓ **Patient Registration and Management:** With the help of this module, new users can register by giving their personal details. To store and manage patient data while maintaining data integrity and security, a secure database structure built with MongoDB was created. In addition, patients have access to read and edit their medical histories.

- ✓ **Doctor Management:** The system has features for scheduling, specialties, and managing doctor profiles. In order to ensure effective patient care and simplified scheduling, doctors can manage appointment slots, change their availability, and view patient details.

- ✓ **Appointment Scheduling:** Using the system's availability display, patients can schedule visits with the doctors of their choice. The scheduling module minimizes the possibility of double booking by dynamically loading available slots for every doctor. This ensures real-time updates.

- ✓ **Email Notification Services:** This system has feature to remind patients of upcoming appointments and so on. Nodemailer is used to manage notifications, providing dependable and secure user-to-system communication.

- ✓ **Medical Report Management:** Doctors can create and oversee patient medical reports using this system. These reports are safely kept and available to patients as well as doctors. This feature promotes the quality and continuity of care by giving accurate medical histories.

2.3 Development Approach

The Healthcare Connect System is being developed using a hybrid process framework that combines iterative and sequential techniques. The project started with a thorough planning stage that established the goals, parameters, and specifications. The goal of the concurrent design and development phases was to use Node.js and Express.js to create a solid backend and React.js to create an interactive frontend. MongoDB was used to handle and store data securely. Important functions including doctor management, patient registration, appointment

scheduling, and notification services were created in an iterative manner to enable ongoing improvement based on test run input. Reliable connection between the system and users was ensured by integrating email notifications through the usage of Nodemailer. The development team employed an organized approach throughout the process, going over and improving each module on a regular basis to guarantee smooth integration and peak performance. This careful procedure made it easier to create a complete and user-friendly healthcare system quickly and effectively.

2.4 Team Structure

The project's team structure consists of four individuals, each contributing effectively to ensure smooth progress. The team's tasks include both front-end and back-end development, and they are structured to offer comprehensive coverage of every project component. One person focussed on the patient side, another on the doctor side, and two members concentrated on the admin side (sharing the job among each other). In front-end development, React.js and Bootstrap are used to construct interactive user interfaces, optimize performance, and guarantee cross-browser compatibility. Using Node.js, Express.js, and MongoDB, back-end development involves integrating third-party APIs, managing database interactions, and developing server-side logic. In order to synchronize the front-end and back-end components, coordination and collaboration are essential. This includes managing data exchange, establishing authentication protocols, and guaranteeing platform consistency. Alignment and synchronicity among team members are ensured by frequent team meetings, code reviews, and cooperative problem-solving sessions. In spite of their distinct duties, team members collaborate closely, drawing on their own skills and knowledge to develop a cohesive and user-friendly platform that satisfies the requirements of admins, doctors, and patients.

2.5 Activity Diagram:

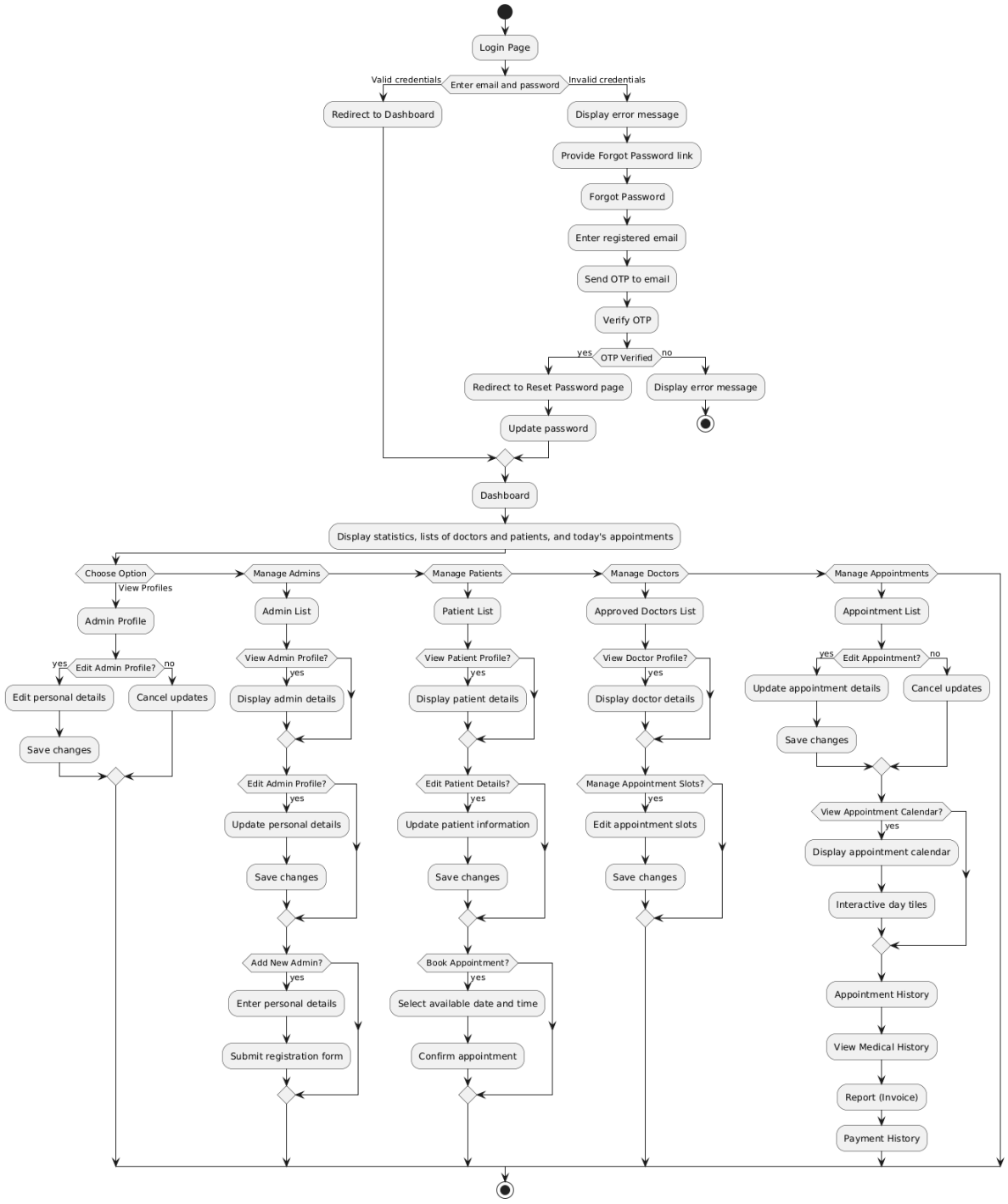

Figure 2.1: Activity Diagram for HealthCare Connect System – Admin Module

This activity diagram illustrates how a medical management system works, including how users manage their profiles, schedule appointments, and log in.

2.6 Sequence Diagram:

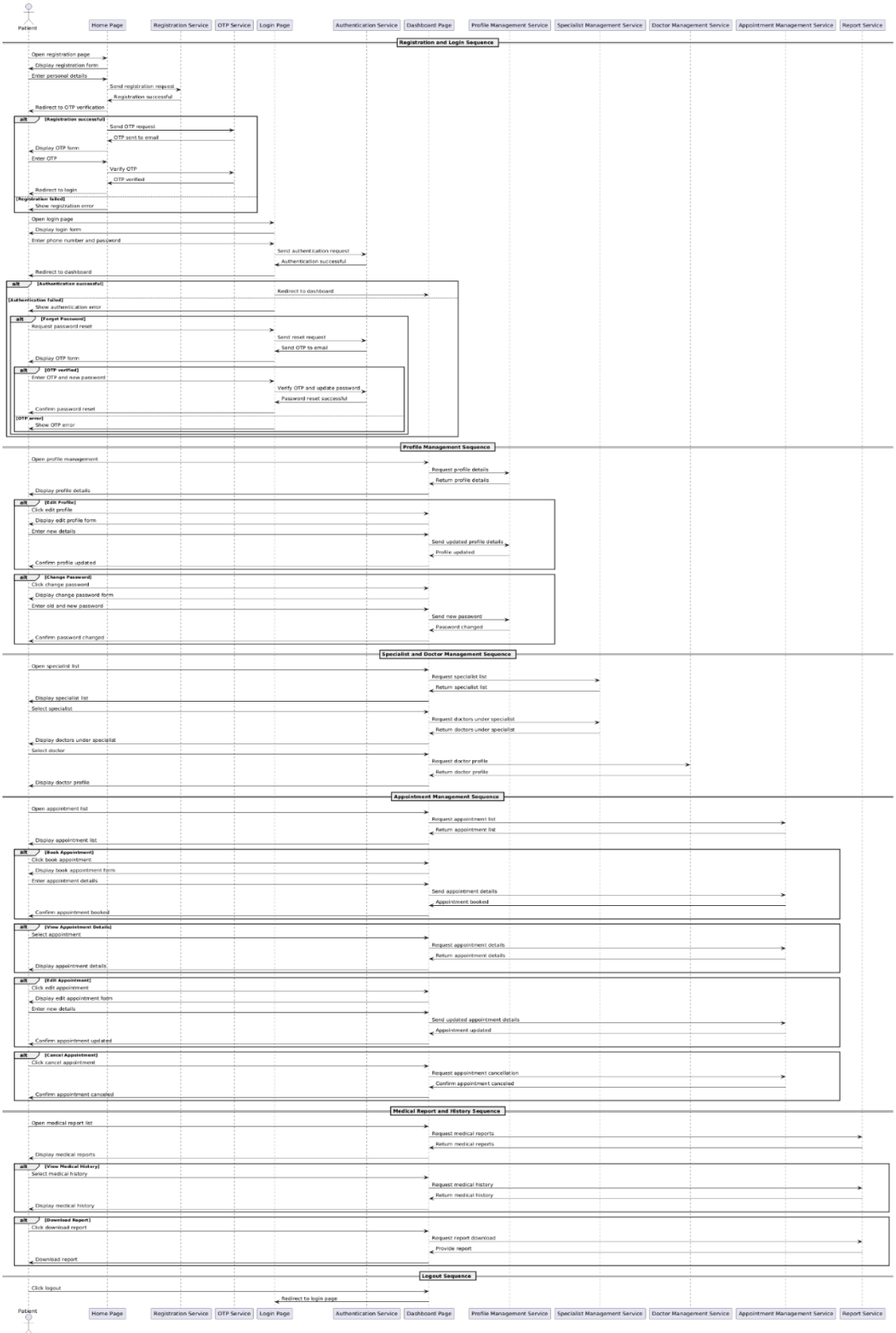

Figure 2.2: Sequence Diagram for HealthCare Connect System – Admin Module

This sequence diagram for the admin module starts with the login process, in which the admin visits the login page, enters credentials, confirms the OTP, and gains access to the dashboard. It then moves on to other interactions in a healthcare management system. The admin can browse, add, modify, and delete admin profiles as part of the admin management sequence. Managing doctor profiles, adding new doctors, and accessing the doctor list are all part of the doctor management sequence. Viewing the patient list, adding new patients, and changing patient information are all covered in the patient management process. The process for managing specialists include managing doctors under each specialist as well as inspecting, adding, updating, and removing specialist kinds. Scheduling visits, reviewing appointment information, keeping track of medical records, and presenting bills are all included in the appointment and medical report processes. By logging the admin out and redirecting them to the login page, the logout sequence ends the interactions.

2.9 Detailed Test Cases

Table 1: Detailed Test Cases and Responses.

SI.NO	Test Case	Response
1.	Admin logs in with valid credentials	The system should authenticate the admin and redirect to the dashboard.
2.	Admin schedules an appointment for a patient	The system should save the appointment details and display a confirmation message.
3.	Admin generates an invoice for healthcare services	The system should display the invoice with options to print, download as PDF, mark payments, and send the invoice.

2.10 IMPLEMENTATION DETAILS:

The pseudo-code below outlines the operation of the Healthcare Connect system's admin side module:

1. Start Healthcare Connect Admin Module.

2. Display the Login Screen:
    2.1 Prompt admin to enter email and password.
    2.2 Validate credentials.
    2.3 If valid, navigate to the Dashboard.
    2.4 If invalid, display error message.

3. While admin does not choose to log out:

3.1. If admin navigates to "Forgot Password Screen":
    a) Prompt admin to enter registered email.
    b) Send OTP to the email.
    c) Navigate to OTP verification page.
    d) Validate OTP.
    e) If valid, navigate to Reset Password page.
    f) Prompt admin to enter new password.
    g) Update the password in the database.
    h) Display success message and navigate back to Login Screen.

3.2. If admin navigates to "Dashboard":
    a) Display statistics, list of doctors, list of patients, and today's appointments.
    b) Provide functionalities to view profiles, message doctors/patients, and manage appointments.

3.3. If admin navigates to "Add Admin Screen":
    a) Prompt admin to enter personal details (name, username, email, mobile number, password, and profile image).
    b) Validate inputs.
    c) Save the details to the database.
    d) Display success message.

3.4. If admin navigates to "Edit Admin Screen":
    a) Display admin profile details.
    b) Allow editing of details (name, email, mobile number, username, user type, and profile image).
    c) Provide options to upload a new profile image.
    d) Validate and save changes to the database.
    e) Display success message or cancel updates.

3.5. If admin navigates to "Admin List Screen":
    a) Display a list of administrators with profile details.

b) Allow actions like viewing, editing, and deleting admin profiles.

3.6. If admin navigates to "Admin Password Update Screen":
a) Prompt admin to enter new password.
b) Validate new password.
c) Update the password in the database.
d) Display success message.

3.7. If admin navigates to "Admin Profile Screen":
a) Display detailed admin profile information.
b) Allow editing and deletion of the profile.

3.8. If admin navigates to "Approved Doctors List":
a) Display a list of approved doctors.
b) Allow viewing profiles, managing appointment slots, and deleting doctor details.

3.9. If admin navigates to "Add Patient Screen":
a) Prompt admin to input patient details and upload a profile picture.
b) Validate inputs.
c) Save details to the database.
d) Display success message.

3.10. If admin navigates to "Edit Patient Screen":
a) Display patient details.
b) Allow editing of personal information, contact details, address, and profile picture.
c) Validate and save changes to the database.
d) Display success message.

3.11. If admin navigates to "Edit Patient Password Screen":
a) Prompt patient to enter new password.
b) Validate and confirm new password.
c) Update the password in the database.
d) Display success message.

3.12. If admin navigates to "Patient List Screen":
a) Display a list of patients with their details.
b) Allow viewing, editing, deleting patients, and booking appointments.

3.13. If admin navigates to "Patient Profile Screen":
a) Display patient information and list of appointments.
b) Allow filtering of appointments by status.
c) Provide options to view details, approve, or reject appointments.

3.14. If admin navigates to "Specialist Type List":
a) Display a list of specialist types.
b) Allow viewing associated doctors, editing specialist details, and deleting specialist types.

3.15. If admin navigates to "View Doctors Under Each Specialist":

a) Display doctors categorized under various specialties.
b) Allow viewing doctor profiles, messaging doctors, and booking appointments within each specialty category.

3.16. If admin navigates to "Book Appointment Screen":
a) Prompt admin to select doctor, date, and time.
b) Check availability of slots.
c) If available, confirm the booking and update the database.
d)Display success message.

3.17. If admin navigates to "View Appointment Calendar Screen":
a) Display a calendar with upcoming and current day appointments.
b) Interactive day tiles change color based on appointment statuses.
c) Clicking on specific dates provides access to appointment details.

3.18. If admin navigates to "Appointment List Screen":
a) Display scheduled appointments with patient and doctor details.
b) Provide editable options and status indicators for efficient scheduling management.

3.19. If admin navigates to "Appointment History Screen":
a) Display a list of approved, rejected, pending, completed, and canceled appointments.
b) Allow actions such as approving, rejecting, completing, or canceling appointments.

3.20. If admin navigates to "Add Description Screen":
a) Prompt admin to add patient disclaimer and select treatment name with description.
b) Save the details to the database.
c) Display success message.

3.21. If admin navigates to "View Medical History Screen":
a) Display a comprehensive medical history including completed appointments.
b) Provide options to view detailed medical records including disclaimers and bills.

3.22. If admin navigates to "Report (Invoice) Screen":
a) Generate and display an invoice for healthcare services.
b) Include treatment fees and disclaimers.
c) Provide options to print, download as PDF, mark payments, and send invoices.

3.23. If admin navigates to "Payment History Screen":
a) Display a history of patient appointments with payment details.
b) Provide options to view invoices.

4. Log out or Exit Healthcare Connect Admin Module.

2.10.1 Patient Management

An essential component of the Healthcare Connect System, the patient management module gives admins the ability to effectively manage patient records. The system makes it easier to add, alter, view, and remove patient information, guaranteeing safe and efficient management of patient data. The procedure for keeping correct patient records is simplified with the help of this module.

The operating logic of the function is explained by the pseudo-code that follows:

1. Initialize the Patient Management System.
2. Display the patient list.
3. While user does not choose to exit:
    3.1. If user chooses "Add Patient":
        i. Prompt user to enter patient details.
        ii. Save the details to the database.
    3.2. If user chooses "Edit Patient":
        i. Prompt user to edit patient details.
        ii. Update the details in the database.
    3.3. If user chooses "Delete Patient":
        i. Confirm the deletion.
        ii. Remove the patient details from the database.
    3.4. If user chooses "View Patient":
        i. Display detailed patient information.
4. Exit the Patient Management System.

2.10.2 Appointment Management

Patient appointment scheduling and tracking are managed by the appointment management module. Admin may schedule, view, update, and manage appointments with this module, which makes the process run smoothly and efficiently for patients as well as doctors. Additionally, the system has features for tracking the status of appointments.

1. Initialize the Appointment Management System.
2. Display the appointment list.
3. While user does not choose to exit:
    3.1. If user chooses "Book Appointment":

i. Prompt user to select patient and doctor.

ii. Select available date and time slots.

iii. Confirm the booking and save it to the database.

3.2. If user chooses "Edit Appointment":

i. Prompt user to edit appointment details.

ii. Update the details in the database.

3.3. If user chooses "View Appointments":

i. Display the list of appointments.

ii. Allow filtering by status and other criteria.

3.4. If user chooses "Manage Appointment Statuses":

i. Update the status of appointments (e.g., approved, rejected, completed).

4. Exit the Appointment Management System.

2.10.3 Tools Used

The development of the Healthcare Connect System involved utilizing a variety of tools and technologies to ensure an efficient, secure, and interactive application. Here is a detailed overview of the tools used:

- ✓ **Frontend Development:**
  React.js: This powerful framework for front-end programming allowed for the creation of a dynamic and engaging user experience. A smooth and responsive user experience was made possible by this.

- ✓ **Backend Development:**
  Node.js: Node.js provided a high-performance server-side environment for running JavaScript, and it was the basis for backend development. This made it possible to develop scalable and effective APIs.

  Express.js: The server-side logic and handling of HTTP requests and answers were constructed using Express.js, a lightweight and adaptable Node.js web application framework.

- ✓ **Database:**
  MongoDB: A NoSQL database called MongoDB was selected to store and retrieve data. Its scalability and adaptable schema design were crucial for managing the Healthcare Connect System's intricate data structures.

- ✓ **API Development:**

RESTful API: The application's backend services were made to be modular, stateless, and reachable through standard HTTP methods by implementing RESTful API principles during its development. This made it easier for the frontend and backend to communicate effectively.

- ✓ **Email Notifications:**
  Nodemailer: To ensure safe and dependable communication, Nodemailer was integrated to send email notifications to users for a variety of functions, including account verification, password resets, and appointment reminders.

The creation of the Healthcare Connect System required the integration of various tools and technology. The team implemented Node.js and Express.js for the backend, React.js for the frontend, and MongoDB for data management to produce a reliable, safe, and easy-to-use application.

CHAPTER 3
RESULT ANALYSIS

In this chapter, we present the analysis of the results from the development of the Healthcare Connect System. We offer a thorough analysis of the system's functionality, efficiency, and performance in achieving its goals. This section's screenshots provide visual evidence of the application's main features and interface, showing how key elements were implemented in their finished form. These pictures highlight important sites that show how each part of the Healthcare Connect System connects, including the Admin Dashboard, Patient Management, Doctor Management, and Appointment Scheduling. The color screenshots show the successful development of the application's main features and give a clear picture of the system's architecture and operational effectiveness.

AUTHENTICATION

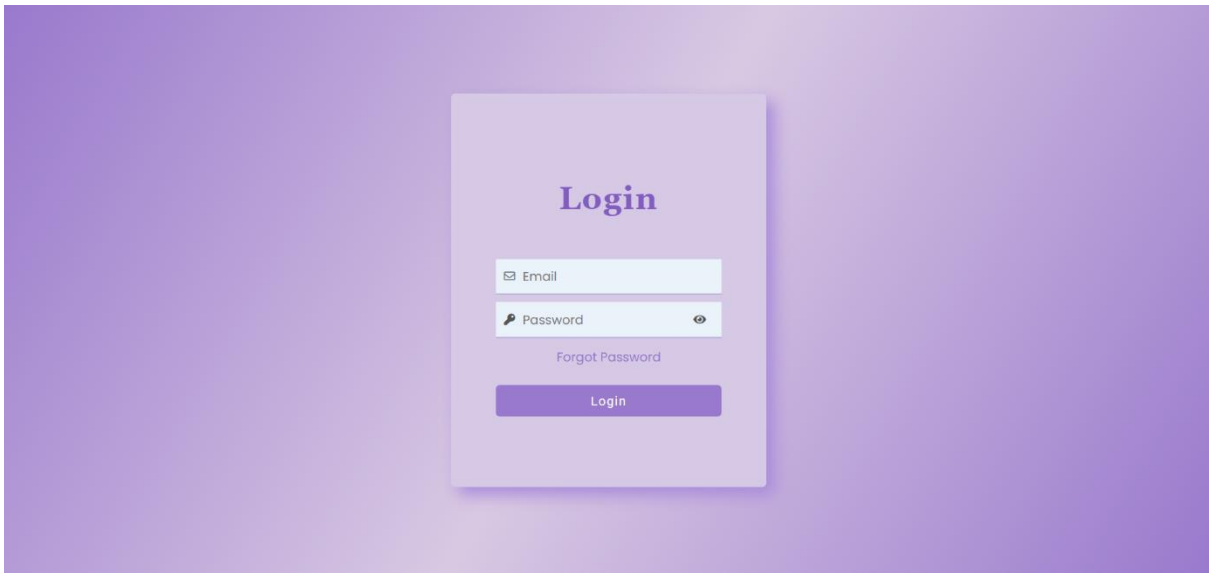

Fig 3.1 Admin Login

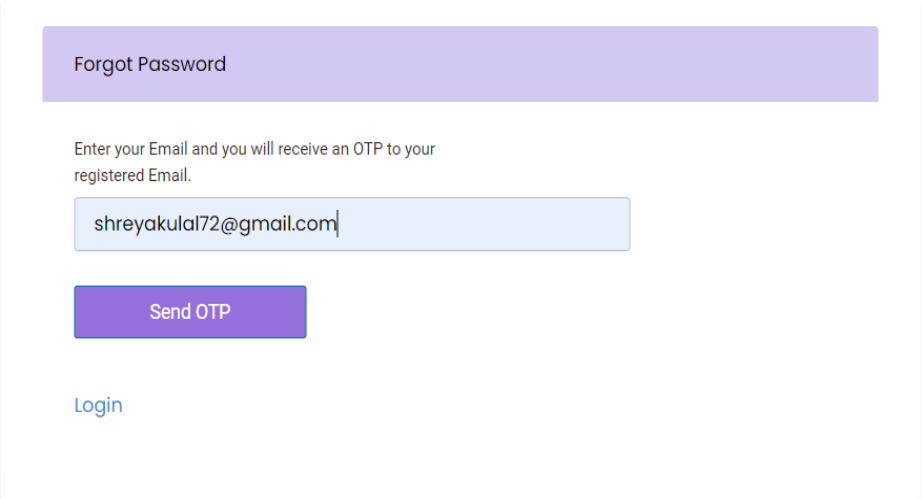

Fig 3.2 Admin Forgot Password

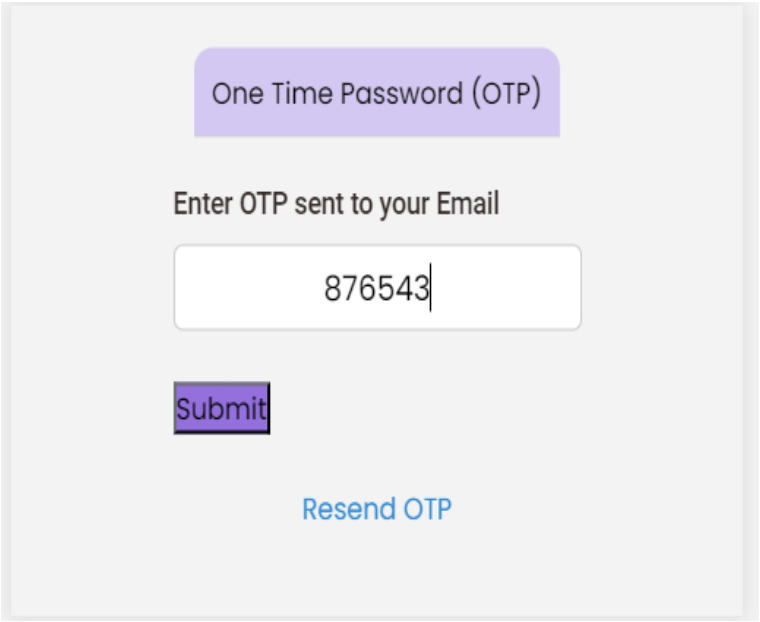

Fig 3.3 OTP Verification

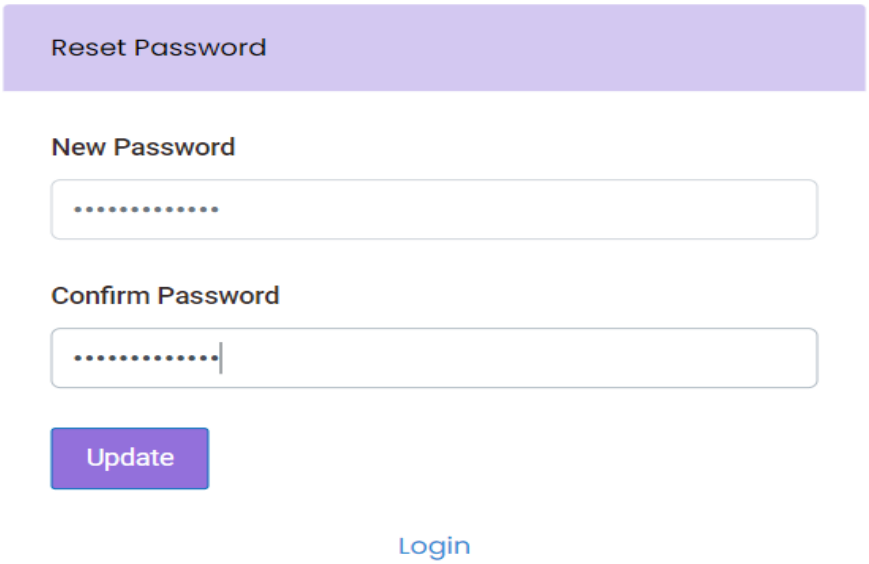

Fig 3.4 Reset Password

DASHBOARD

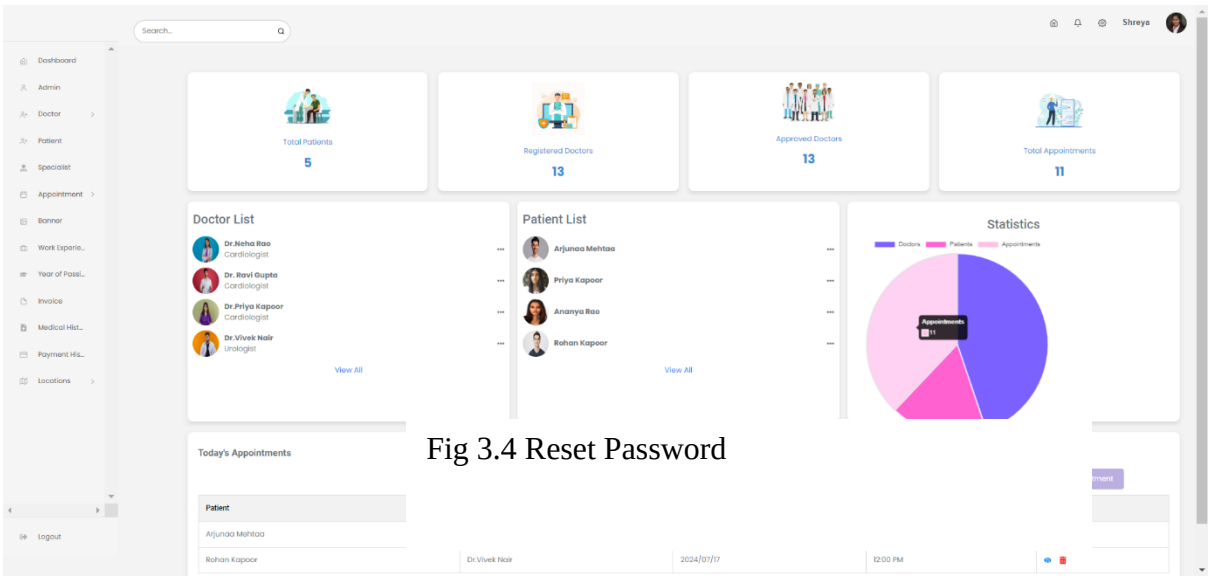

Fig 3.4 Reset Password

Fig 3.5 Admin Dashboard

ADMIN MANAGEMENT

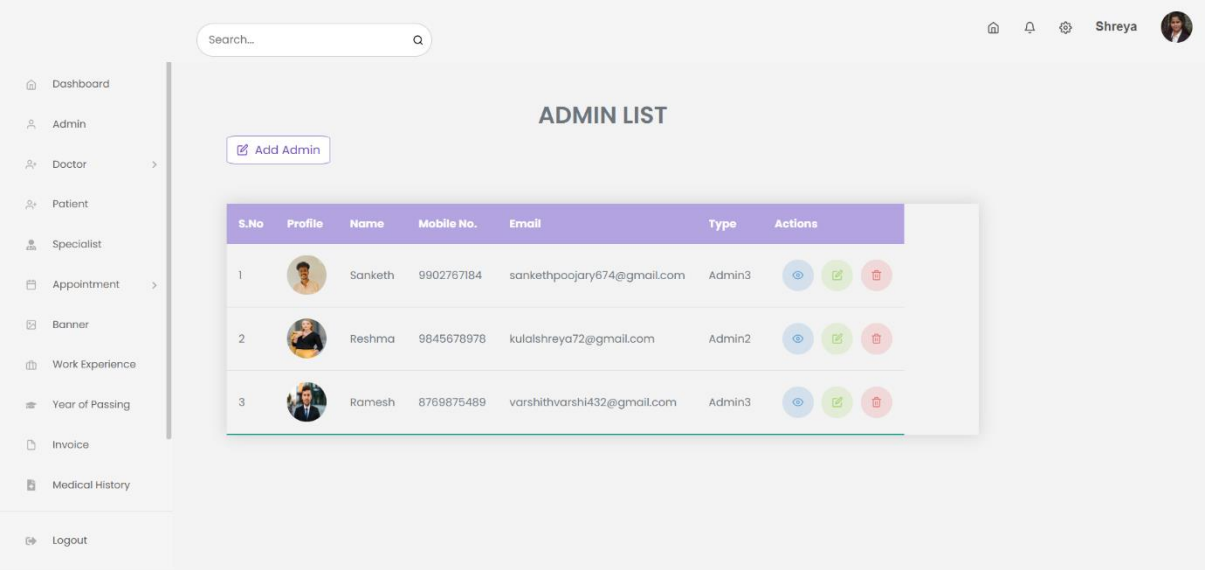

Fig 3.6 Admin List

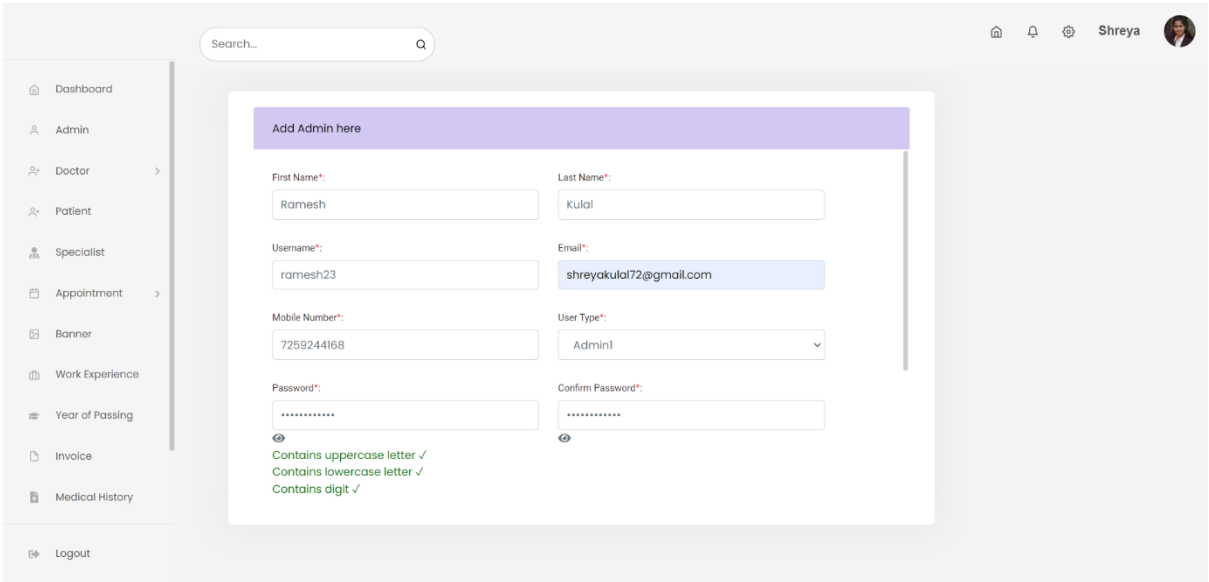

Fig 3.7 Add New Admin

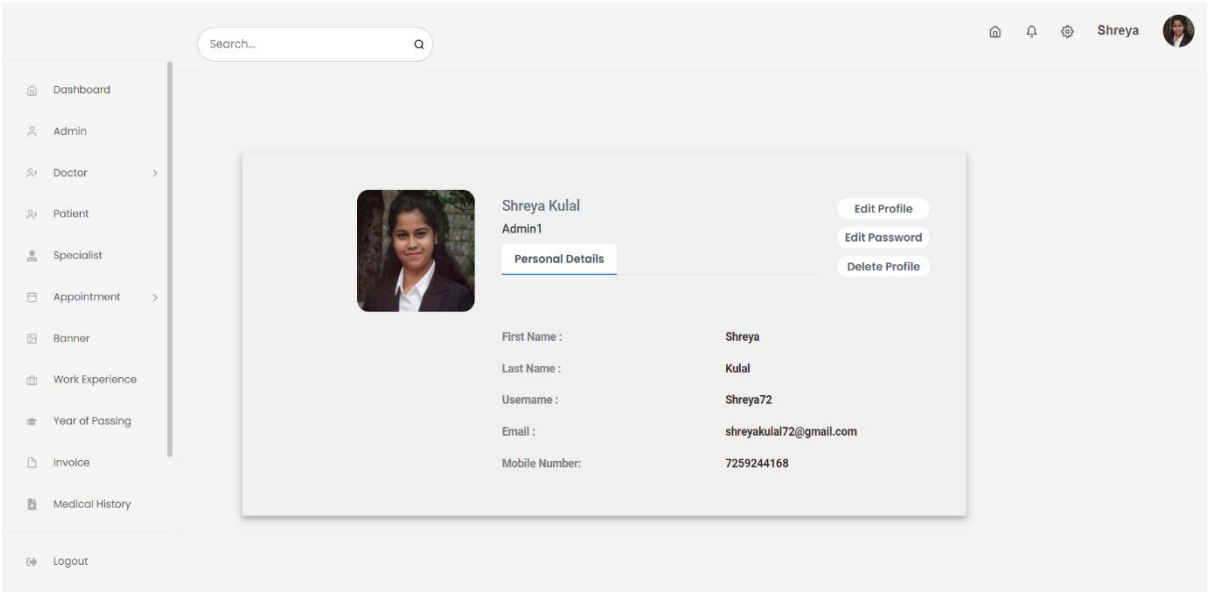

Fig 3.8 Admin Profile

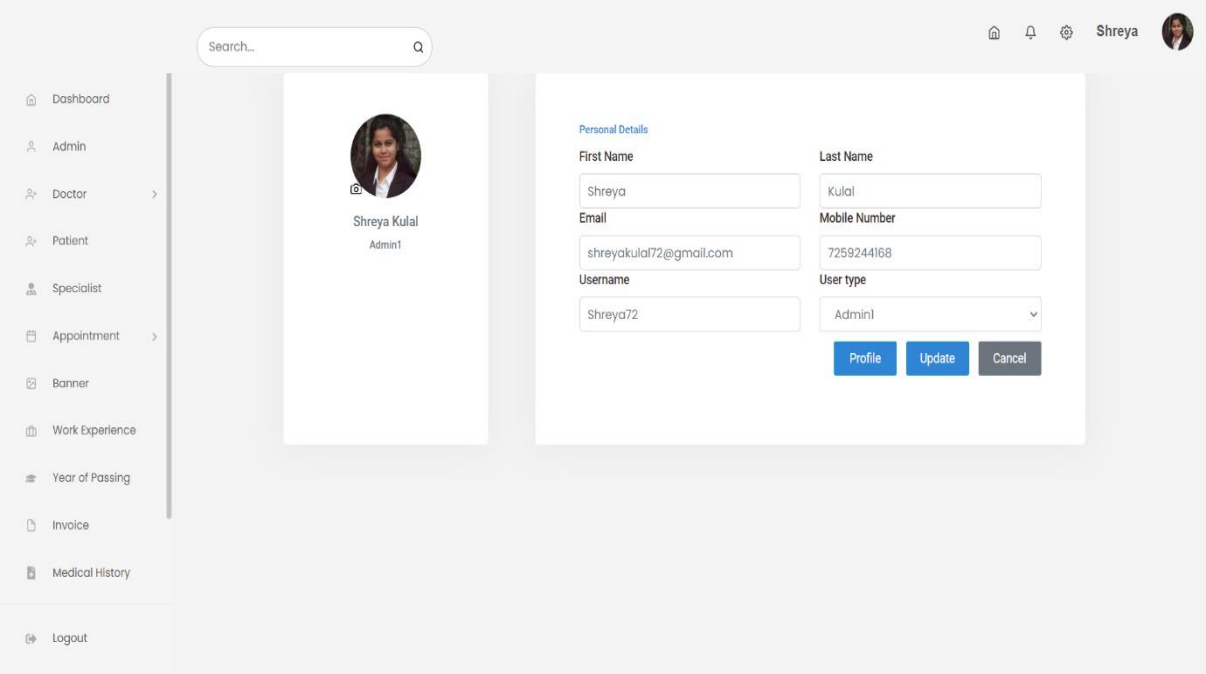

Fig 3.9 Edit Admin Profile

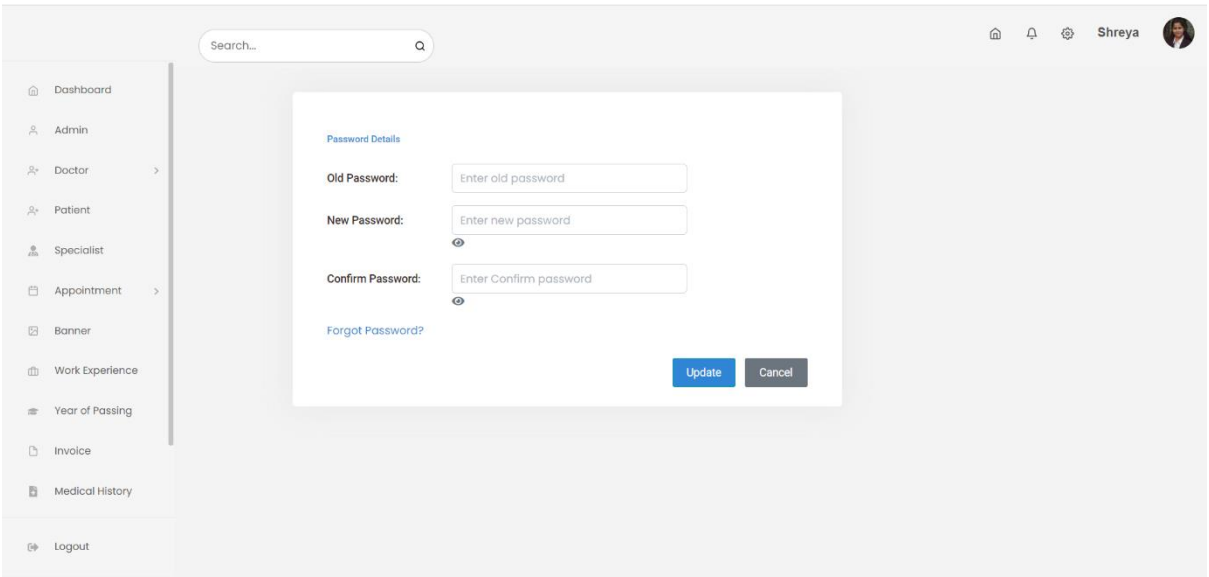

Fig 3.10 Edit Admin Password

DOCTOR MANAGEMENT

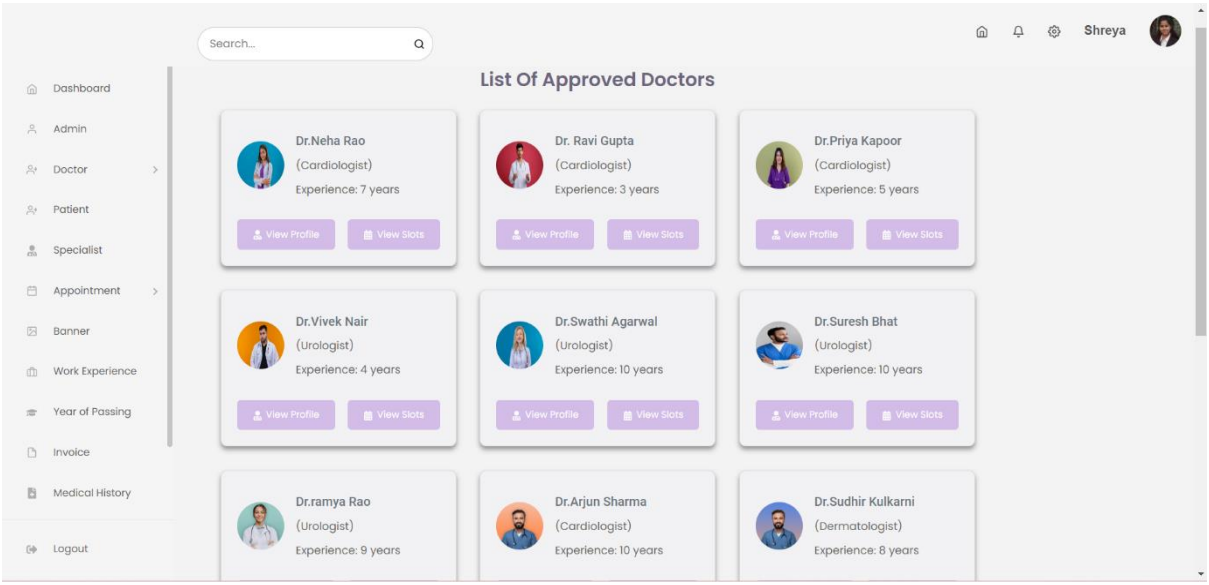

Fig 3.11 Approved Doctors List

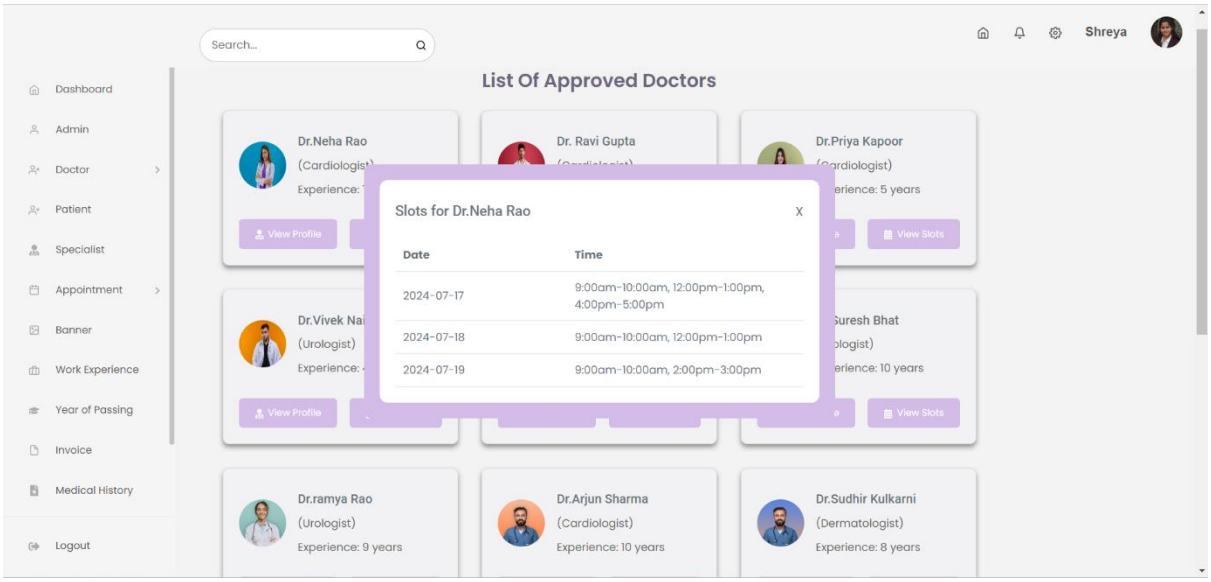

Fig 3.12 Approved Doctors Slot View

SPECIALIST TYPE MANAGEMENT

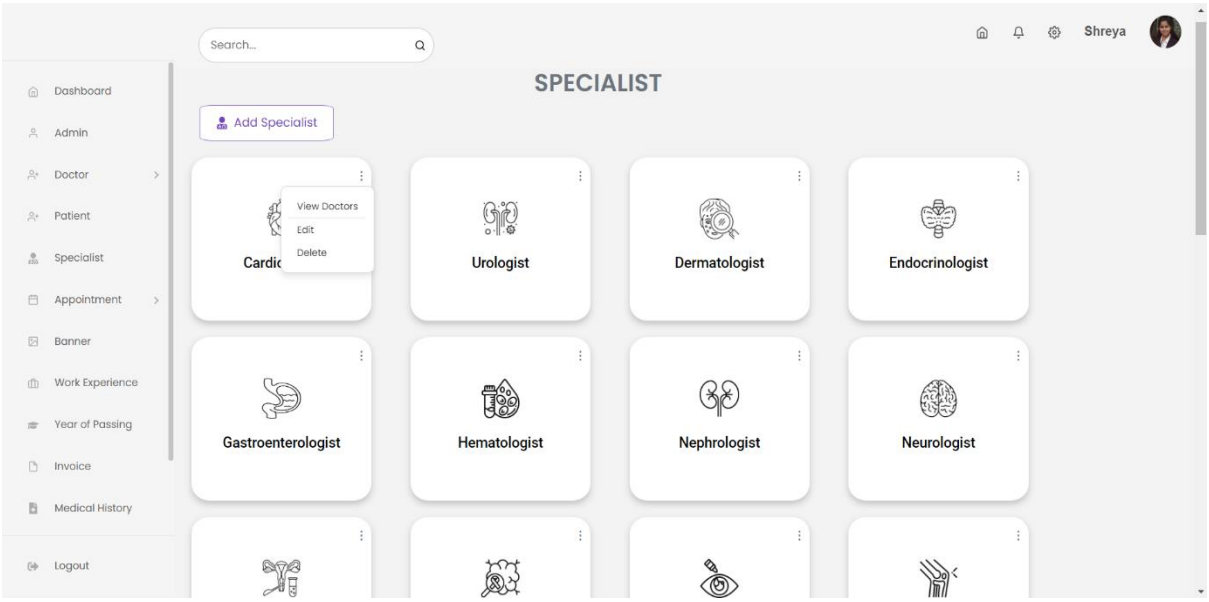

Fig 3.13 Specialist Type List

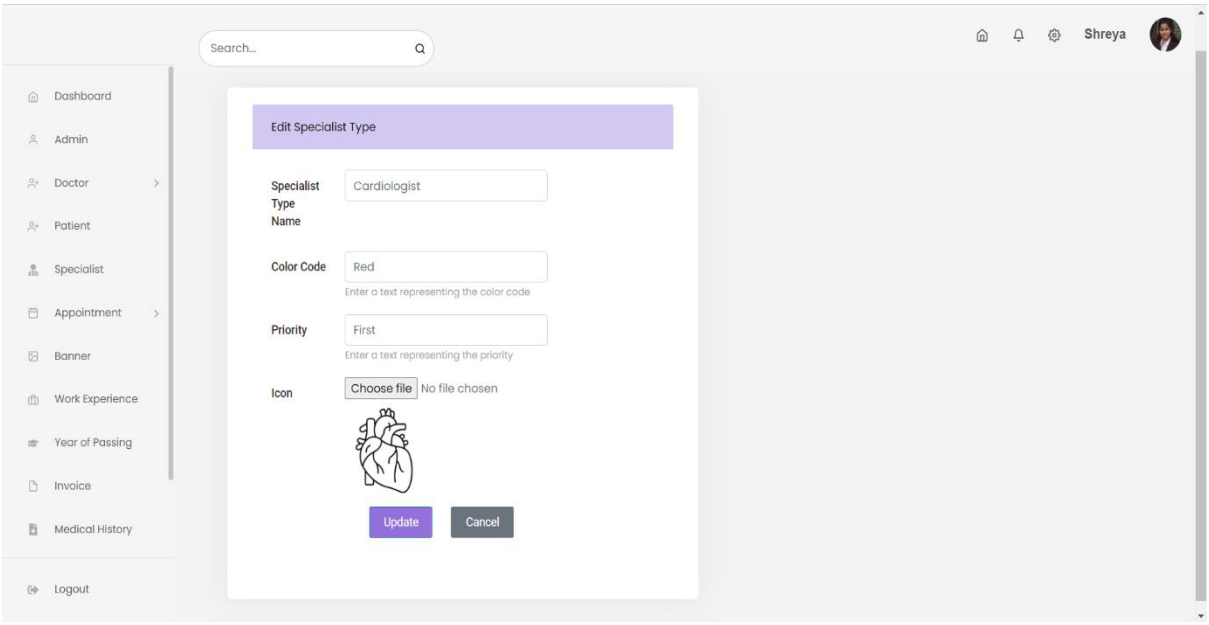

Fig 3.14 Edit Specialist Type

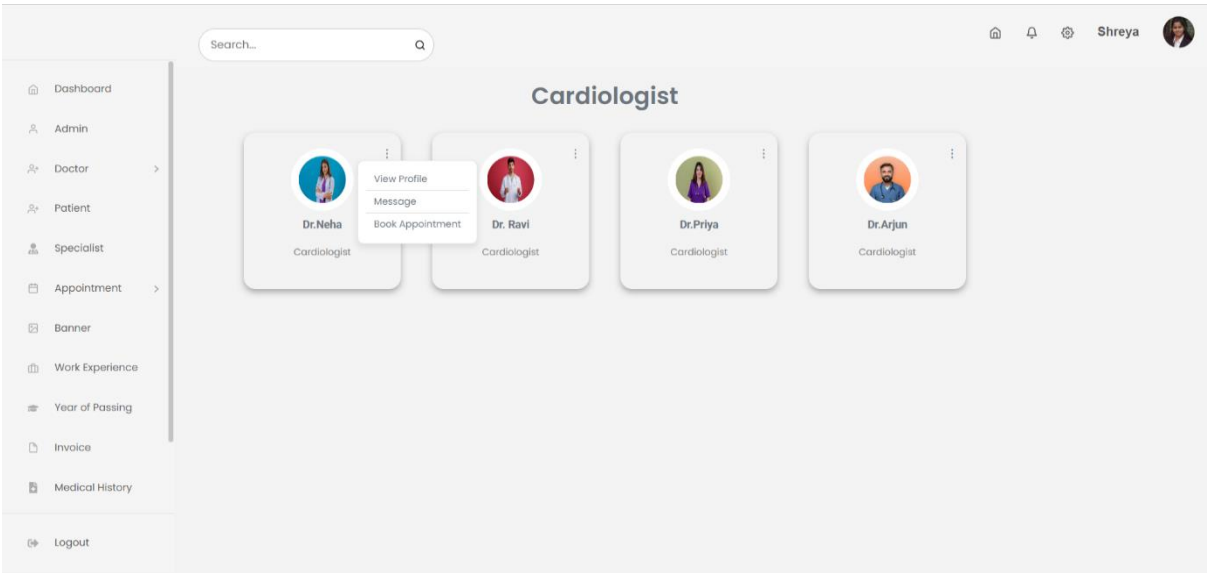

Fig 3.15 Doctors Present Under Each Specialist Type

PATIENT MANAGEMENT

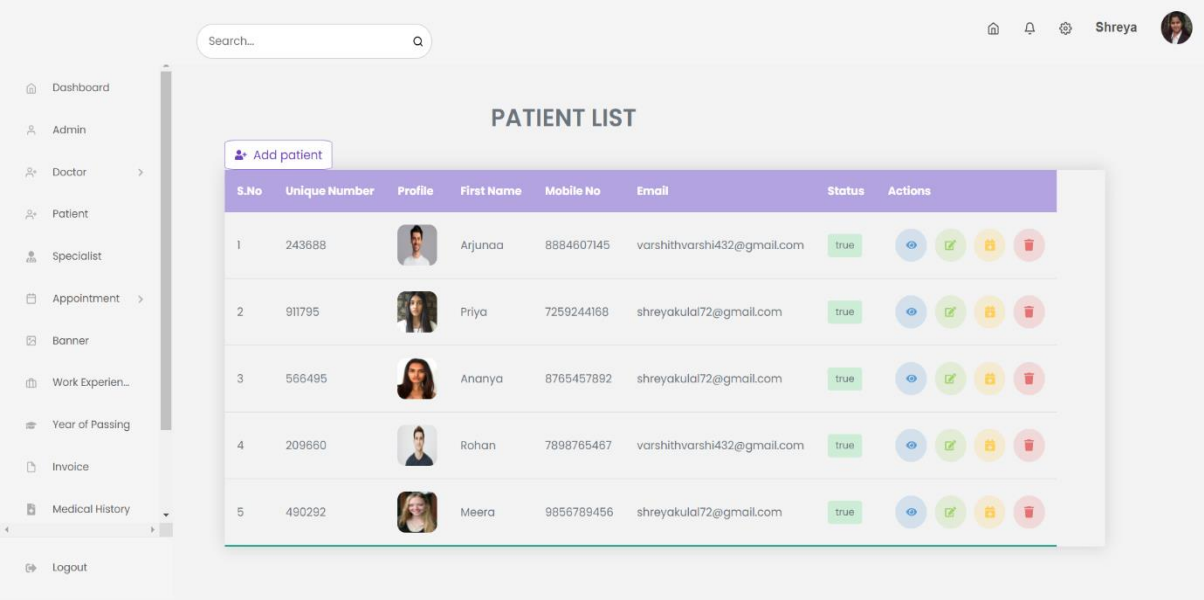

Fig 3.16 Patient List

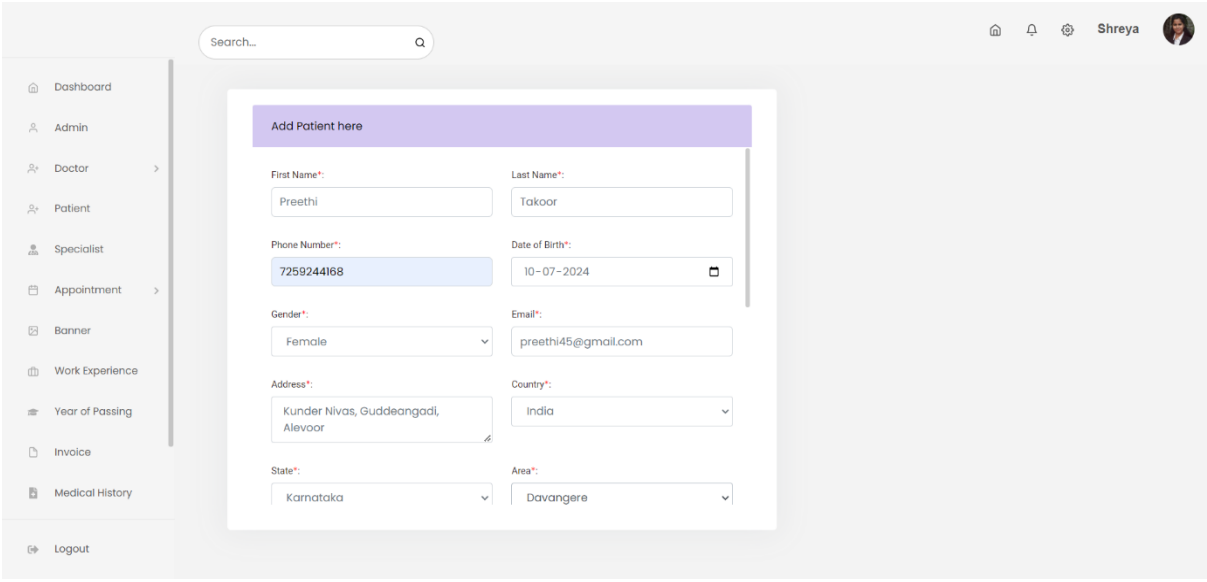

Fig 3.17 Add New Patient

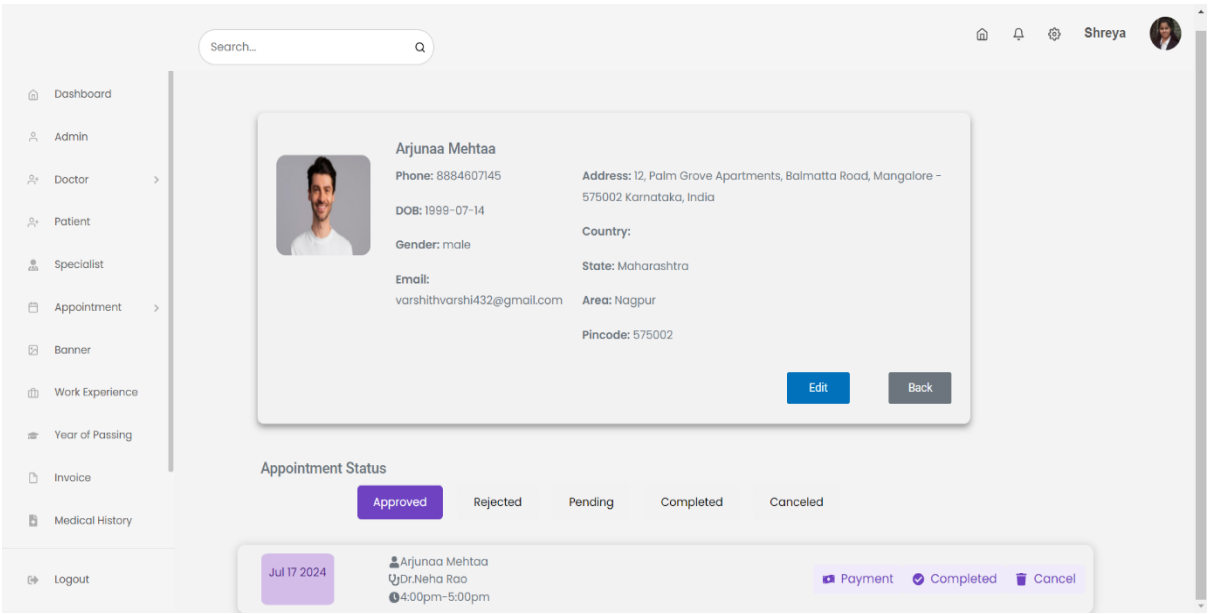

Fig 3.18 Patient Profile

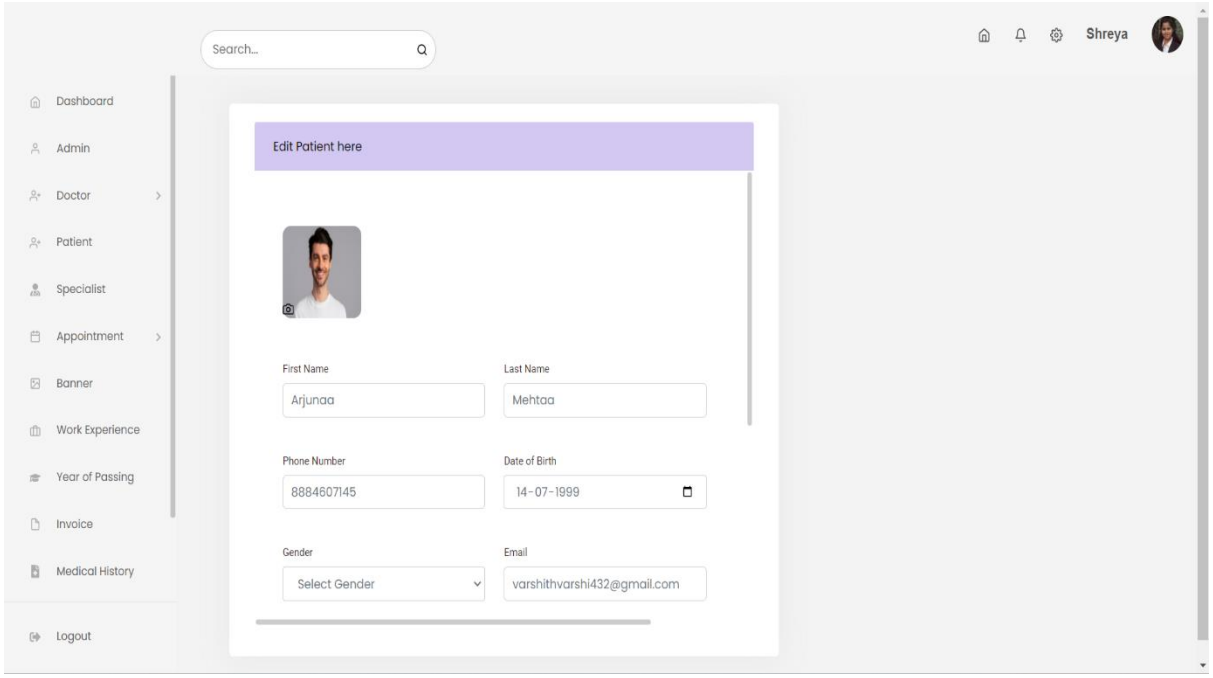

Fig 3.19 Edit Patient Profile

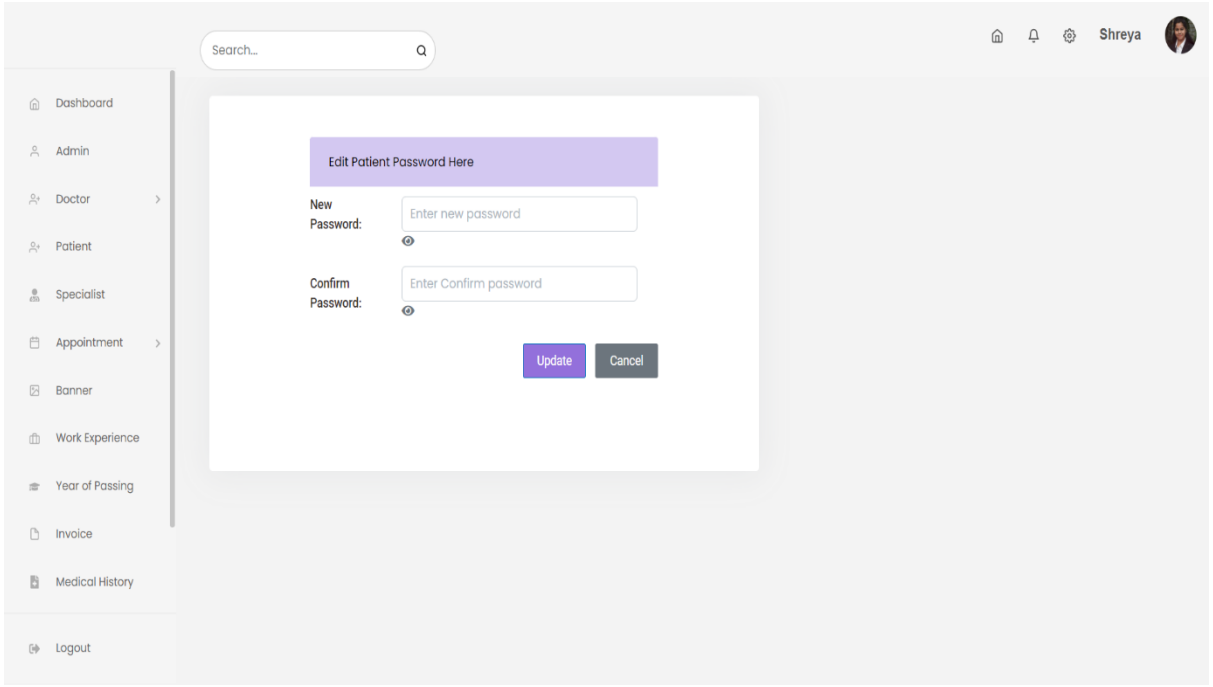

Fig 3.20 Edit Patient Password

APPOINTMENT MANAGEMENT

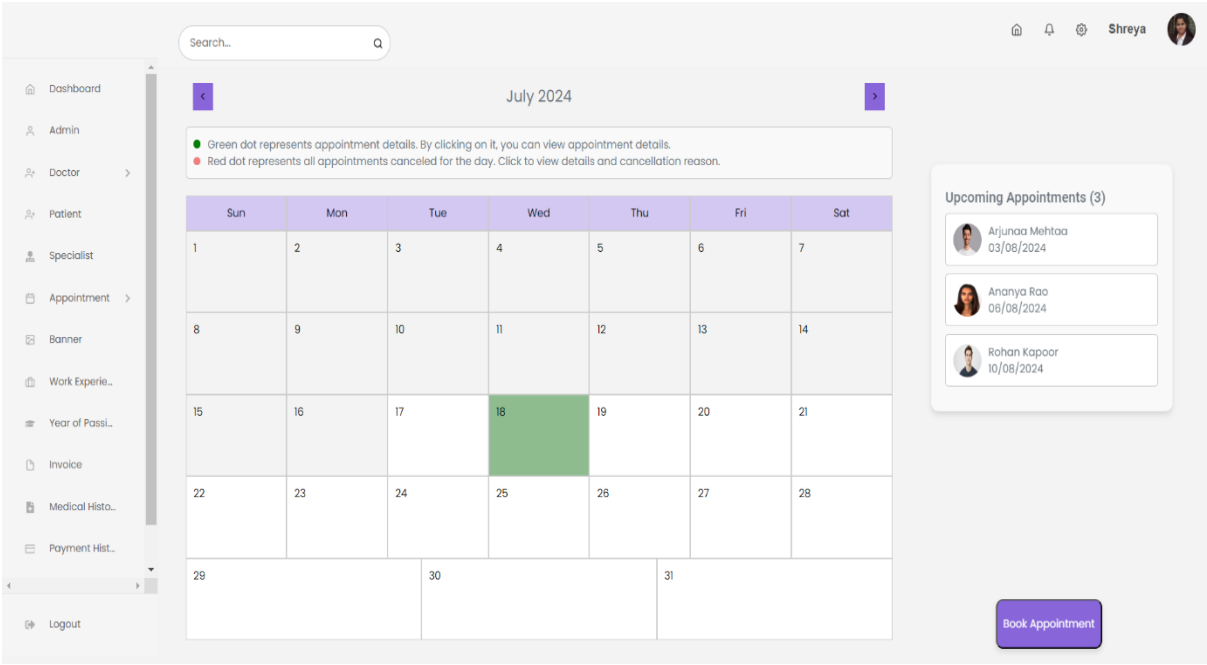

Fig 3.21 View Appointment Calendar

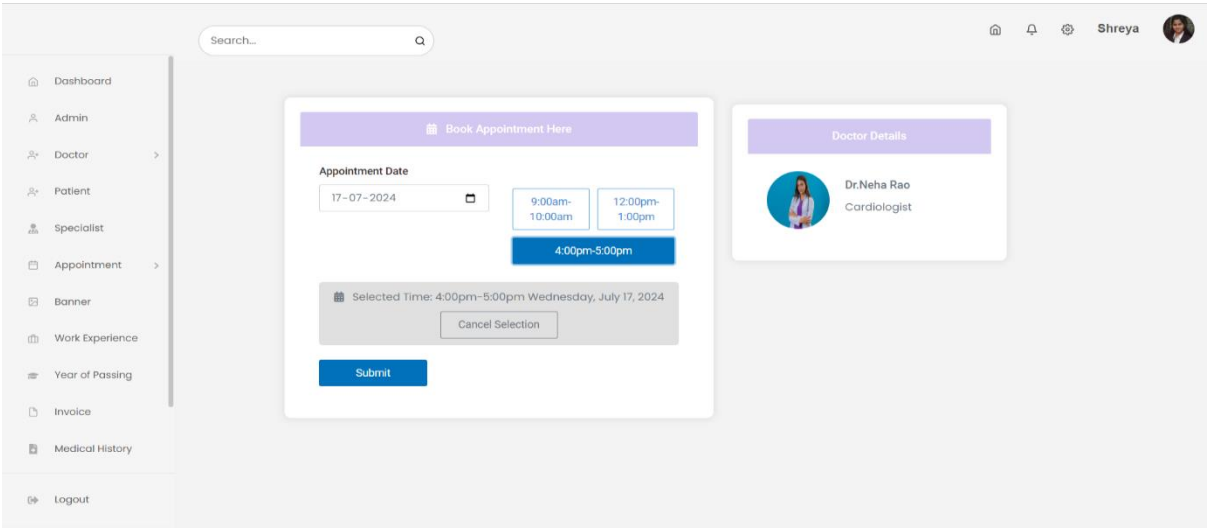

Fig 3.22 Book Appointment

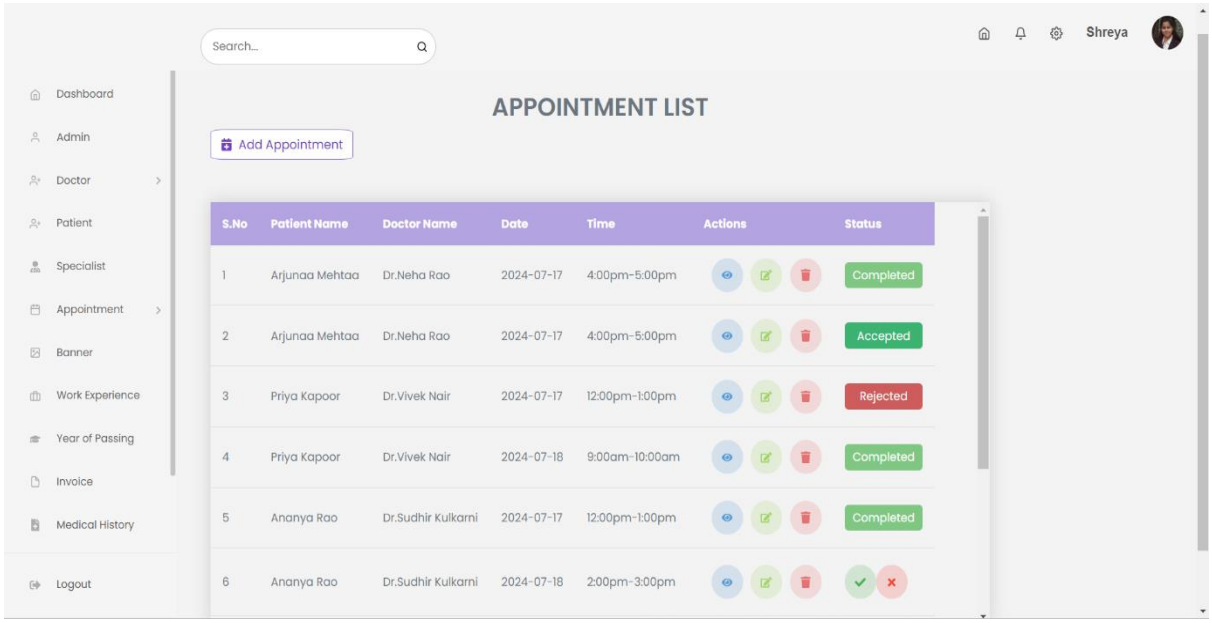

Fig 3.23 Appointment List

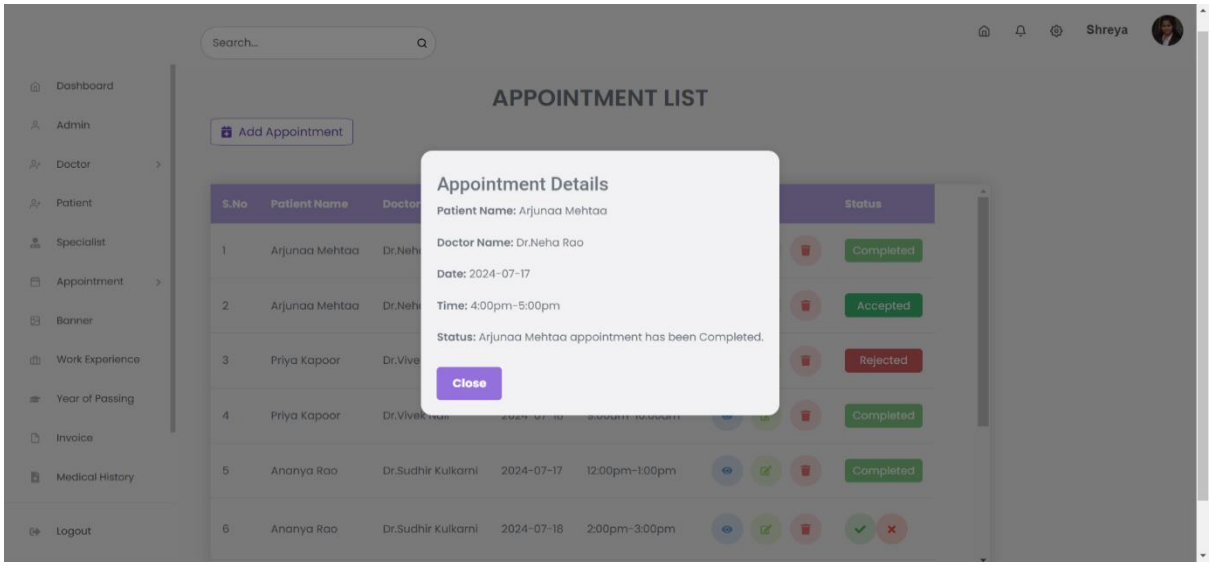

Fig 3.24 View Appointment

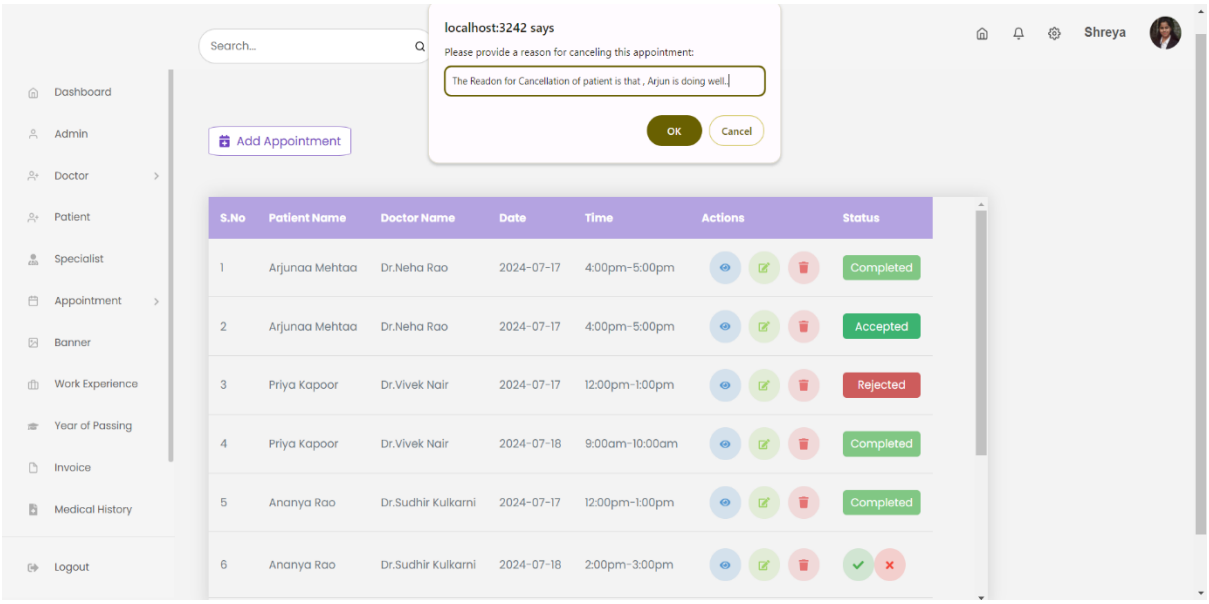

Fig 3.25 Cancel Appointment

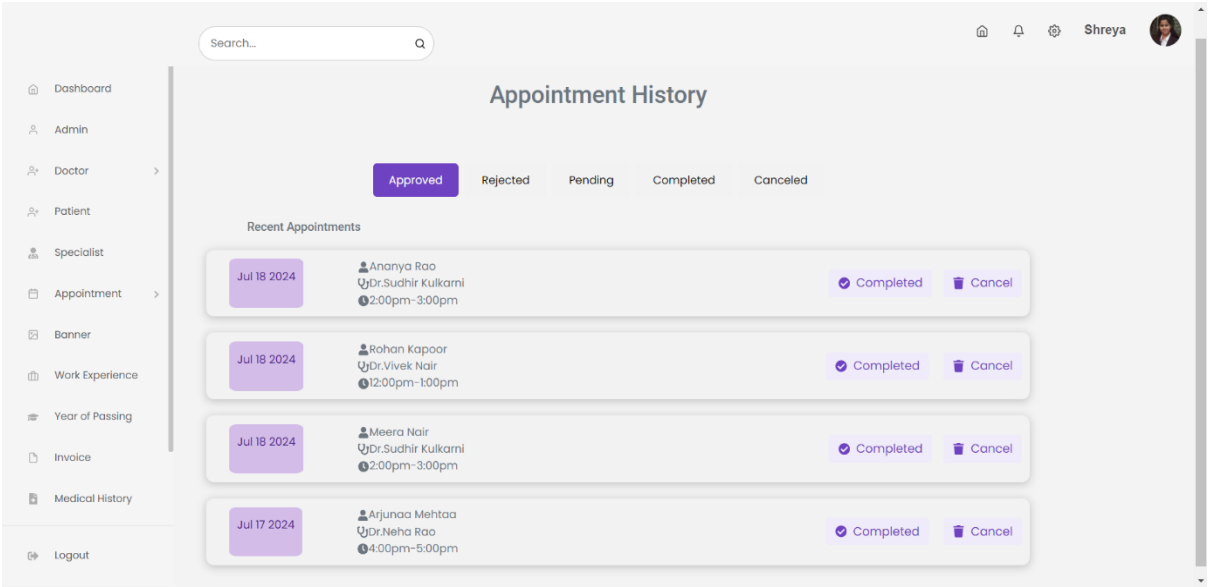

Fig 3.26 View Appointment History

MEDICAL HISTORY AND REPORT

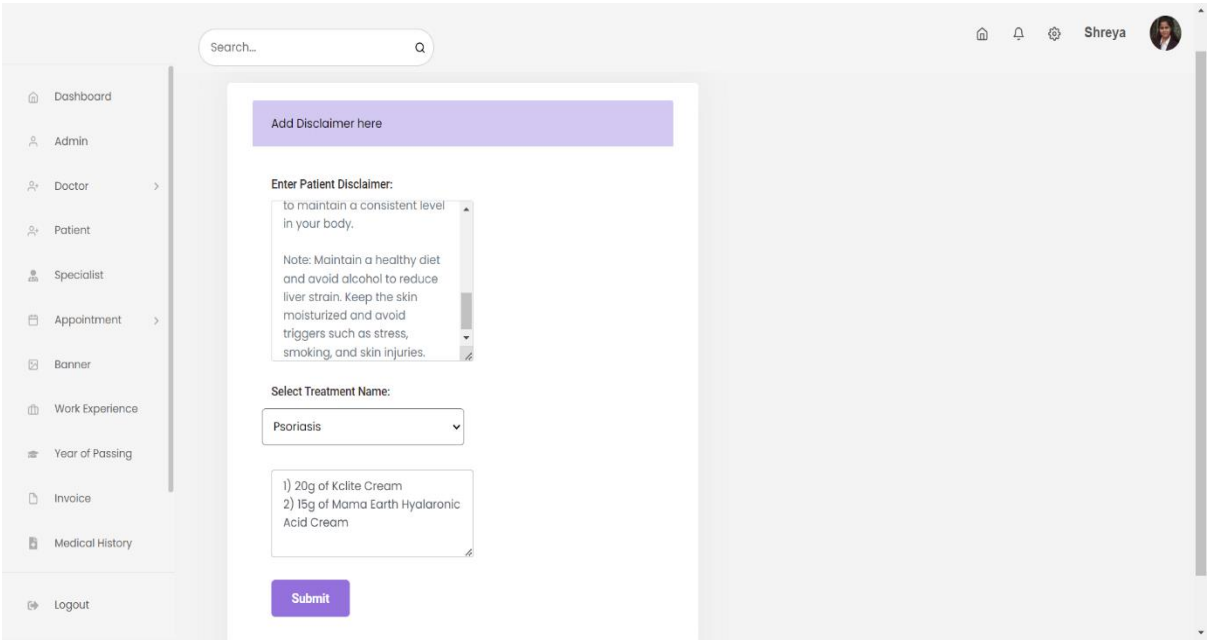

Fig 3.27 Add Description

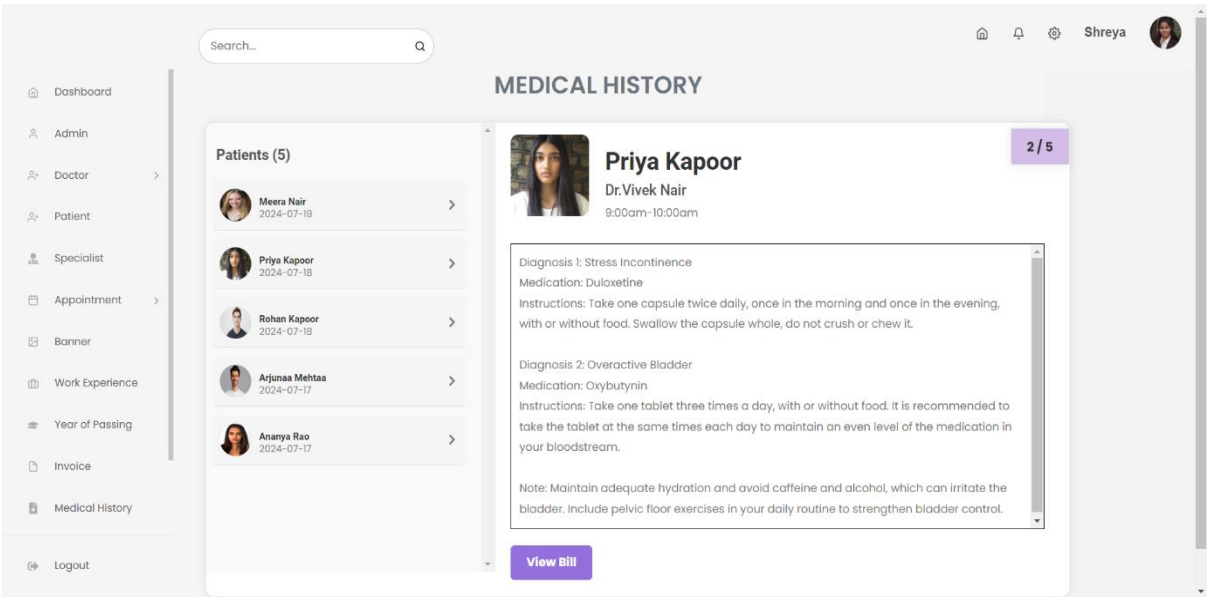

Fig 3.28 View Medical History

INVOICE AND PAYMENT HISTORY

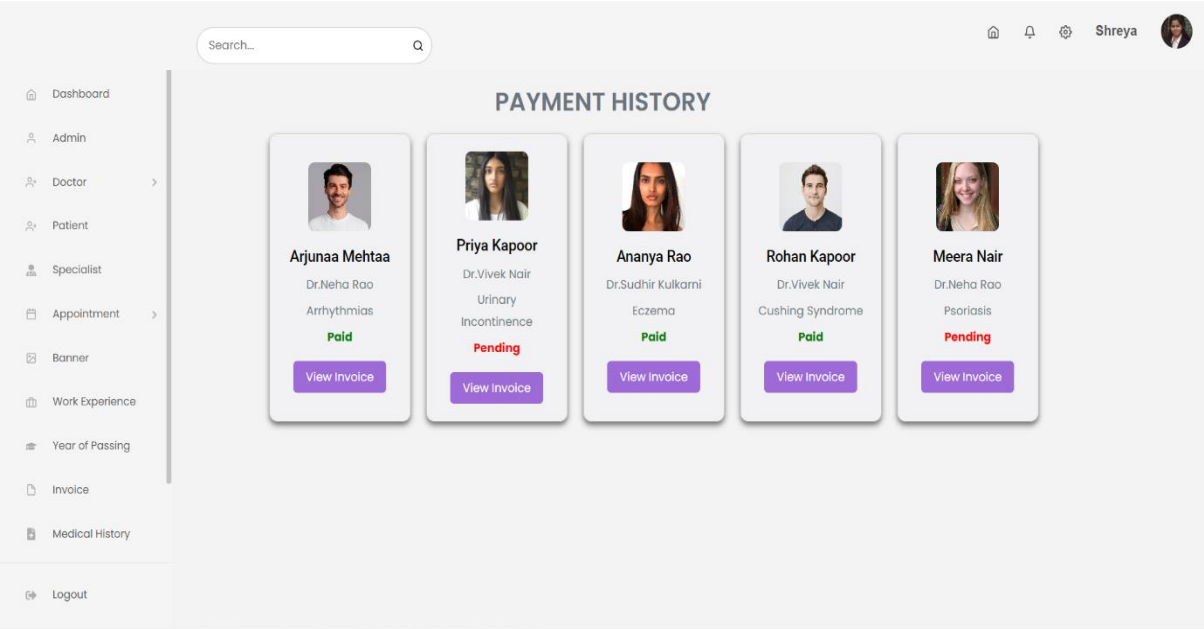

Fig 3.29 View Payment History

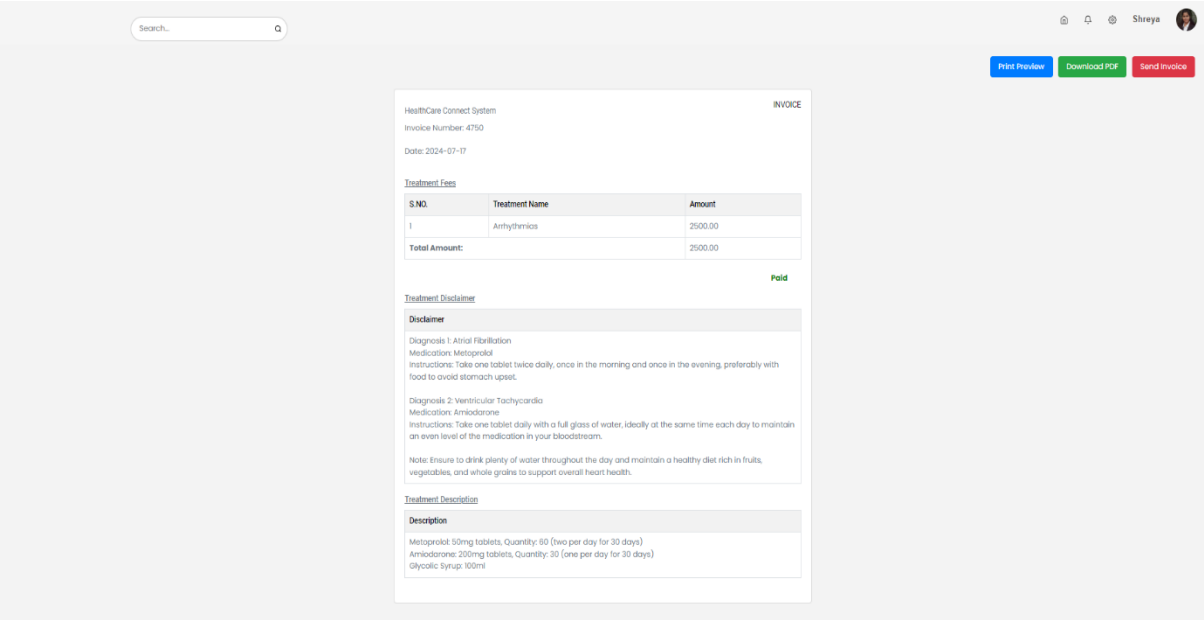

Fig 3.30 Invoice

BACKEND ADMIN TABLE:

Entity	Attribute	Data Type	Key	Description
Admin	_id	Number	PK	Unique identifier for admin
Admin	admin_firstname	String		First name of admin
Admin	admin_lastname	String		Last name of admin
Admin	admin_profile_image	String		URL or path to admin's profile image
Admin	admin_password	String		Encrypted password for admin login
Admin	admin_mobile_no	Number		Admin's contact number
Admin	admin_email	String		Admin's email address
Admin	admin_username	String		Admin's username
Admin	admin_type	String		Type or role of admin
Admin	admin_created_by_id	Number	FK	Reference to the admin who created this admin
Admin	admin_updated_by_id	Number	FK	Reference to the admin who last updated this admin
Admin	admin_deleted_by_id	Number	FK	Reference to the admin who deleted this admin
Admin	admin_created_date	Date		Date and time when admin was created
Admin	admin_updated_date	Date		Date and time when admin was last updated
Admin	admin_deleted_status	Boolean		Indicates if admin is deleted (true/false)

The admin table in the Healthcare Connect System stores detailed information about administrators, including their personal details (name, contact info, profile image), login credentials (encrypted password), and roles. It tracks who created, updated, and deleted each admin record with respective foreign keys and timestamps. The table ensures secure management and traceability of admin actions, with a boolean field indicating if an admin is deleted. This structure supports efficient administration and robust data integrity within the system.

CHAPTER 4
CONCLUSION AND FUTURE SCOPE

4.1 Summary of Achievements

In summary, the Healthcare Connect System has been effectively designed to optimize the management of healthcare through the provision of smooth appointment scheduling, effective patient and physician administration, and strong administrative features. The system has an efficient password management system, an extensive dashboard with real-time analytics, and a secure login and authentication process. Specialized features include comprehensive medical history monitoring, flexible appointment scheduling, and automated email notifications for timely reminders and updates. Comprehensive reporting and safe payment tracking also improve operational effectiveness and user experience, which is a major development in healthcare administration. This initiative is a prime example of how technology can enhance healthcare administration and accessibility for the benefit of both patients and medical professionals.

4.2 Future Scope of Work

As we look to the future, several enhancements can be considered to further improve the functionality and impact of HealthCare Connect System.

1. **Automated Reminder System:** By setting up an automated reminder system with SMS notifications, patients and physicians will receive timely reminders about upcoming appointments in an easy-to-reach manner. The admin will be in charge of scheduling and sending out reminders. This will improve punctuality and adherence, which will decrease missed appointments and increase the efficiency of healthcare delivery overall.

2. **Patient Feedback System**: The implementation of a patient feedback system will make it possible to gather and examine patient opinions on their experiences receiving medical care. This would assist healthcare providers improve the standard of service and patient happiness by offering insightful information about areas that need improvement.

3. **Advanced Analytics**: Deeper insights into healthcare data will be possible with the introduction of advanced analytics. Comprehensive trend analysis, improved decision-making, and individualized patient care will all be made possible by this feature, which

will ultimately lead to better healthcare outcomes and increased operational effectiveness.

Through the integration of these upcoming improvements, the Healthcare Connect System will be able to advance and provide even more benefits to its customers. As long as the system is developed and improved, it will continue to be a vital instrument in the healthcare sector, improving patient outcomes and simplifying clinic operations.

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CO AND PO MAPPING

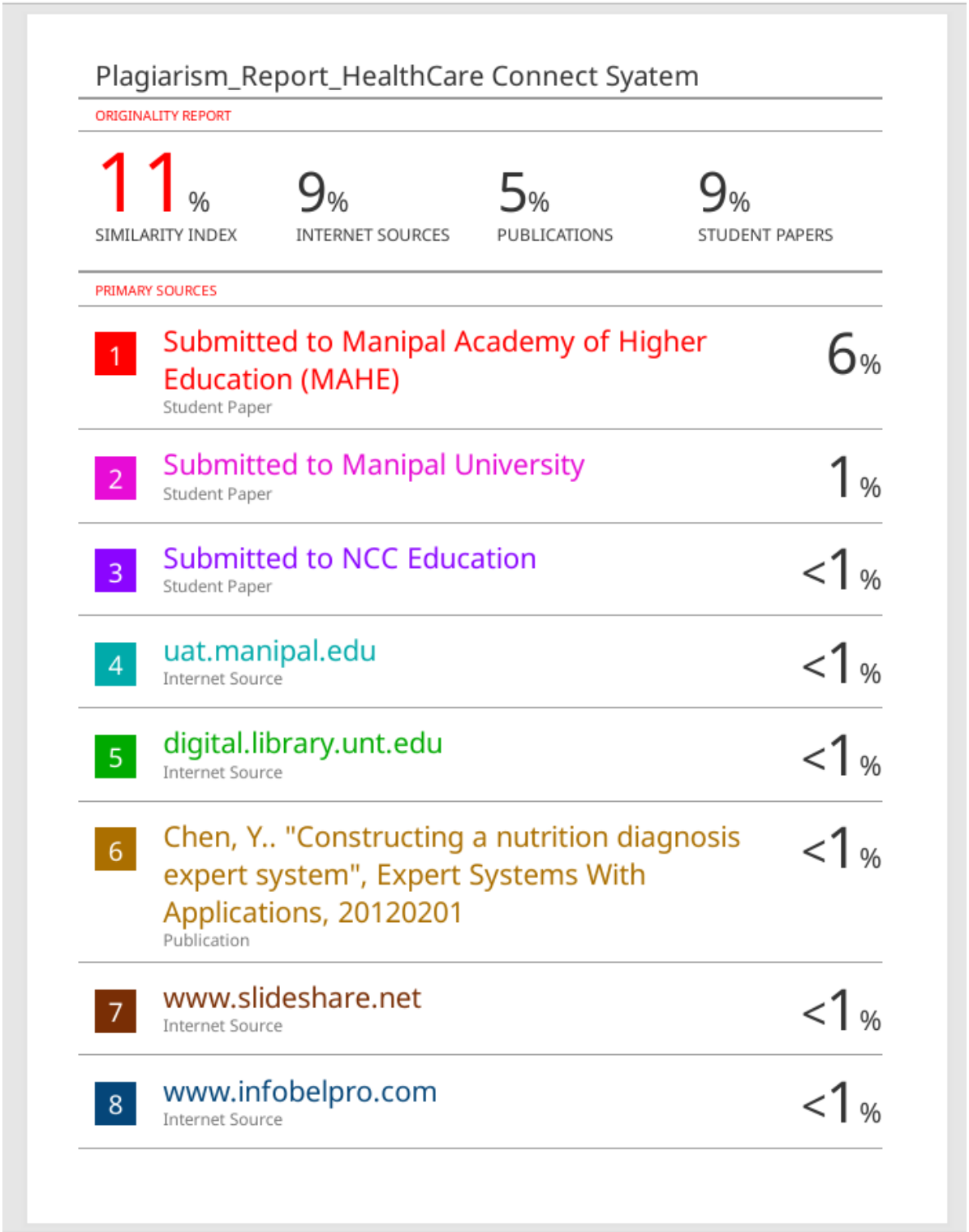
Table A1.1 Course Articulation Matrix

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
MCA 5298.1	Apply mathematical, statistical, and software engineering techniques to identify, formulate, synthesize and solve the problems from various areas of software industry	2	3	2	2	2	1	1	2	3	2	2	2	2	2	1
MCA 5298.2	Gain proficiency in programming languages and techniques to develop and implement solutions that leverage software engineering and learning and analytics .	3	2	3	2	2	1	1	2	3	2	2	2	3	3	1
MCA 5298.3	Utilize industry-standard tools to analyse, design, develop, deploy and test applications, integrating software engineering methodologies and principles.	3	2	2	2	3	1	1	2	3	2	2	2	3	3	2
MCA 5298.4	Apply theoretical knowledge to real-world engineering problems and manage complex engineering projects.	3	2	2	3	2	1	1	2	3	2	2	2	1	2	2
MCA 5298.5	Acquire skills of collaboration and independent learning.	2	2	2	2	2	1	1	2	3	2	2	3	1	1	1
MCA 5298 (Avg. correlation level)		**2.6**	**2.2**	**2.2**	**2.2**	**2.2**	**1**	**1**	**2**	**3**	**2**	**2**	**1.6**	**1.6**	**2.2**	**1.4**

Table A1.2 Program Articulation Matrix

COURSE Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PS02
MCA 5298	**Project Work**	**2.6**	**2.2**	**2.2**	**2.2**	**2.2**	**1**	**1**	**2**	**3**	**2**	**2**	**1.6**	**2.2**	**1.6**

PLAGIARISM REPORT



Plagiarism_Report_HealthCare Connect Syatem

ORIGINALITY REPORT

11%	9%	5%	9%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

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PROJECT DETAILS

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Register Number	220970078	Section / Roll No	B
Email Address	shreyakulal72@gmail.com	Phone No (M)	7259244168
Project Details			
Project Title	**HealthCare Connect System**		
Project Duration	6 Months	Date of reporting	22/01/2024
Organization Details			
Organization Name	**SOFTIONIK SOLUTIONS PVT.LTD , MANGALURU**		
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Designation	Chief Technical Officer (CTO)		
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Email address	sandhya.dubey@manipal.edu		

Softionik
INNOVATION OF IDEAS

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contact@softionik.com

Date: 20-01-2024

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Shreya Dinesh Kulal** (Reg No: 220970078) from MCA in the Department of Data Science and Computer Applications, MIT, Manipal has started 6 months internship program at this company.

We wish her every success in life.

Sudheendra

(Sudheendra)
Project Manager
Softionik Solutions

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