Hospital Management System

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DECLARATION

We declare that this written submission represents our ideas in our own words and where other's ideas or words have been included, we have adequately cited and referenced the original sources.

We also declare that we have adhered to all the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will cause for disciplinary action by the Institute and so evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

The Hospital Management System (HMS) is a comprehensive software solution designed to streamline and automate hospital operations. This system integrates key functionalities such as patient registration, appointment scheduling, billing, inventory management, and reporting into a unified platform. The primary objective of the HMS is to enhance operational efficiency, improve patient care, and ensure accurate data management. By automating routine tasks and centralizing information, the HMS reduces administrative workload, minimizes errors, and supports better decision-making through real-time data access. Ultimately, the system aims to provide a seamless experience for hospital staff and patients, leading to optimized healthcare delivery and operational excellence.

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Chapter 1

OBJECTIVE

The main objectives of the best hospital management system are:

- Computerize all the details of the patient and hospital
- Appointment scheduling of patients with doctors for mutual convenience
- To perform automation of workflows
- Secure hospital data and enhance retrievability as it contains sensitive information related to patients, staff, and hospital
- Design a system to improve patient experience
- Reduce operational costs of hospitals
- Provide reports and analytics for management anytime for better decision making
- Connect all departments on a single platform and bring in better coordination across.
- Provide the administration with a single point to retrieve any data
- Handle activities of all departments in a hospital like a pro:
- Reception desk
- Front Office/OPD Management
- Patient management (scheduling, registration, and IPD management)
- Patient care management (pathology labs)
- Labs and radiology department
- Billing department
- Pharmacy/ Medical stores
- Financial Accounting (billing, accounts payable/receivable, payroll, and general ledger)
- Insurance processing
- Inventory management
- Facility management

Chapter -2

INTRODUCTION

A patient is registered to the hospital by filling up a form. The form data is entered into the system by an operator using a graphical user interface. In the interface, there will be some mandatory fields as mentioned in the form. After filling up and submission using the interface, all data will be saved in the database to the corresponding tables. The patient is registered and then he/she will book an appointment to visit a doctor in which a form is to be filled to enter the time slot, date, symptoms and choose a doctor if a patient is not educated enough to use the online services, he/she can give a call to the hospital register the patient as well as book the appointment in no time. Then this data is transferred to the allotted doctor and receptionist where the doctor visits the patient and prescribes tests and medicines.

After the treatment is over the patient visits will be updated in database.

2.1 PROBLEM DOMAIN

Till now, using the traditional methods used in the hospitals, the patients had to wait in a long queue and fill up their details and then move to the doctor to have consultation. This process was repeated at every step including the prescribed tests, taking reports, buying medicines, re-consulting the doctor and getting assigned the doctor which makes it a very time-taking and exhausting process for the patients as well as the receptionist to do all the job in a smooth manner, this process exhausted the patient which sometimes led to hard results. The billing is something which in hospitals is done in bits and pieces and is a problematic situation for families. Sometimes the patients are not so educated to fill the admission forms in the hospital which causes a delay in their admission and may sometimes lead to deprivation from the facilities provided by the government and the hospital.

2.2 SOLUTION DOMAIN

The main purpose of this software is that it makes the things easy for the patients as well as their receptionist and the hospital staff. The application provides an online database of the patients to the hospital as well as the patients, which helps in their further treatment. This will lead to queues getting shorter and dispersing faster as most of the patients can register themselves easily through their mobile phones. And they can be directly assigned the doctor and the doctor can view the patients' medical history just by logging in into the patient's database. Which can lead to a smoother process and the patient cannot have to wait in long queues and get exhausted as the patient will be assigned a ward directly and the doctor can directly visit the patient into his ward, eliminating the situations of waiting in queues. This will also allow the receptionist and the hospital staff to help the not so educated part of the society, as the people standing in the queues will be less the receptionist can easily help the people who are not introduced to the latest technologies. The traditional methods in the hospitals used were asking the patients to pay at every step but when the patients database is accessible to the hospital staff. Then the billing can be done at the time of the discharge of the patient not at every single point. Which makes it easier for the patients and their attendants to gather the money at one point not at every point during the treatment.

Chapter 3

METHODLOGY

Software engineering is carried out using preferred procedure techniques to progress the quality of a software development effort. A methodology is defined as a collection of procedures, techniques, tools, and documentation aids which will help developers in their efforts (both product and process related activities) to implement a new system. For successful implementation, a well-organized and systematic approach is crucial. Therefore, several methodologies were developed to encourage the systematic approach to planning, analysis, design, testing and implementation. Methodologies offer various tools and techniques to assist in analysis, design and testing in terms of detailed design of software, data flowcharts and database design.

3.1 Documentation: Methodology provides support for large documentation.

Analysis and Design Support: A well-defined structure of the methodology helps for analysis and designing to development process.

Implementation: The system should be implemented as per plan.

Testing Support: More testing, more reliable the product is.

Object Oriented Approach: Object oriented concepts will be used in developing the project as it supports component re-usability.

3.2 Agile development

Agile software development refers to software development methodologies centered round the idea of iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams. The ultimate value in Agile development is that it enables teams to deliver value faster, with greater quality and predictability, and greater aptitude to respond to change. Scrum and Kan-ban are two of the most widely used Agile methodologies. Below are the most frequently asked questions around Agile and Scrum, answered by our experts.

3.3 What is Agile?

Figure 7. Agile Diagram.

Agile software development refers to a group of software development methodologies based on iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams. Agile methods or Agile processes generally promote a disciplined project management process that encourages frequent inspection and adaptation, a leadership philosophy that encourages teamwork,

self-organization and accountability, a set of engineering best practices intended to allow for rapid delivery of high-quality software, and a business approach that aligns development with customer needs and company goals. Agile development refers to any development process that is aligned with the concepts of the Agile Manifesto. The Manifesto was developed by a group of fourteen leading figures in the software industry, and reflects their experience of what approaches do and do not work for software development. Read more about the Agile Manifesto. Did you know that Agile can also be applied to hardware projects? Learn about C prime's revolutionary Agile for Hardware framework.

Chapter -4

REQUIREMENT SPECIFICATIONS

A. Hardware Requirement

- Processor: i3 and above
- RAM: 256MB or more

B. Software Requirement

- Fast Ethernet
- LCD monitor
- Space-saving footprint
- Development End: Spring Boot, Spring MVC, Hibernate, Servlet, MySQL •
- Designing End: JSP, HTML5, CSS3, Bootstrap 5
- Tools: Eclipse IDE, MySQL Workbench 8.0 CE, Browser.

4.1 Use Case for Administrator

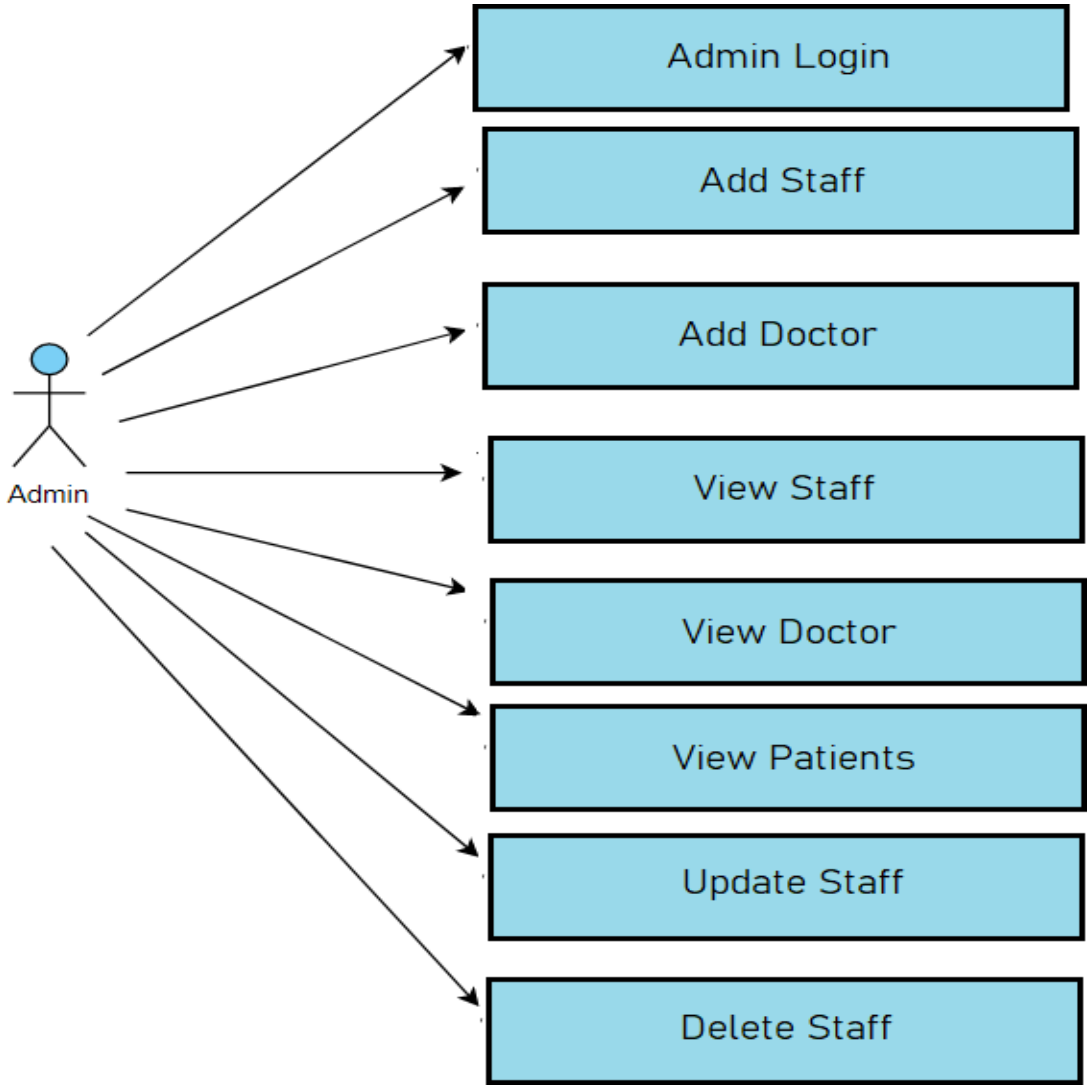


Figure 1. Use Case for Administrator

4.2 Use Case for Patient

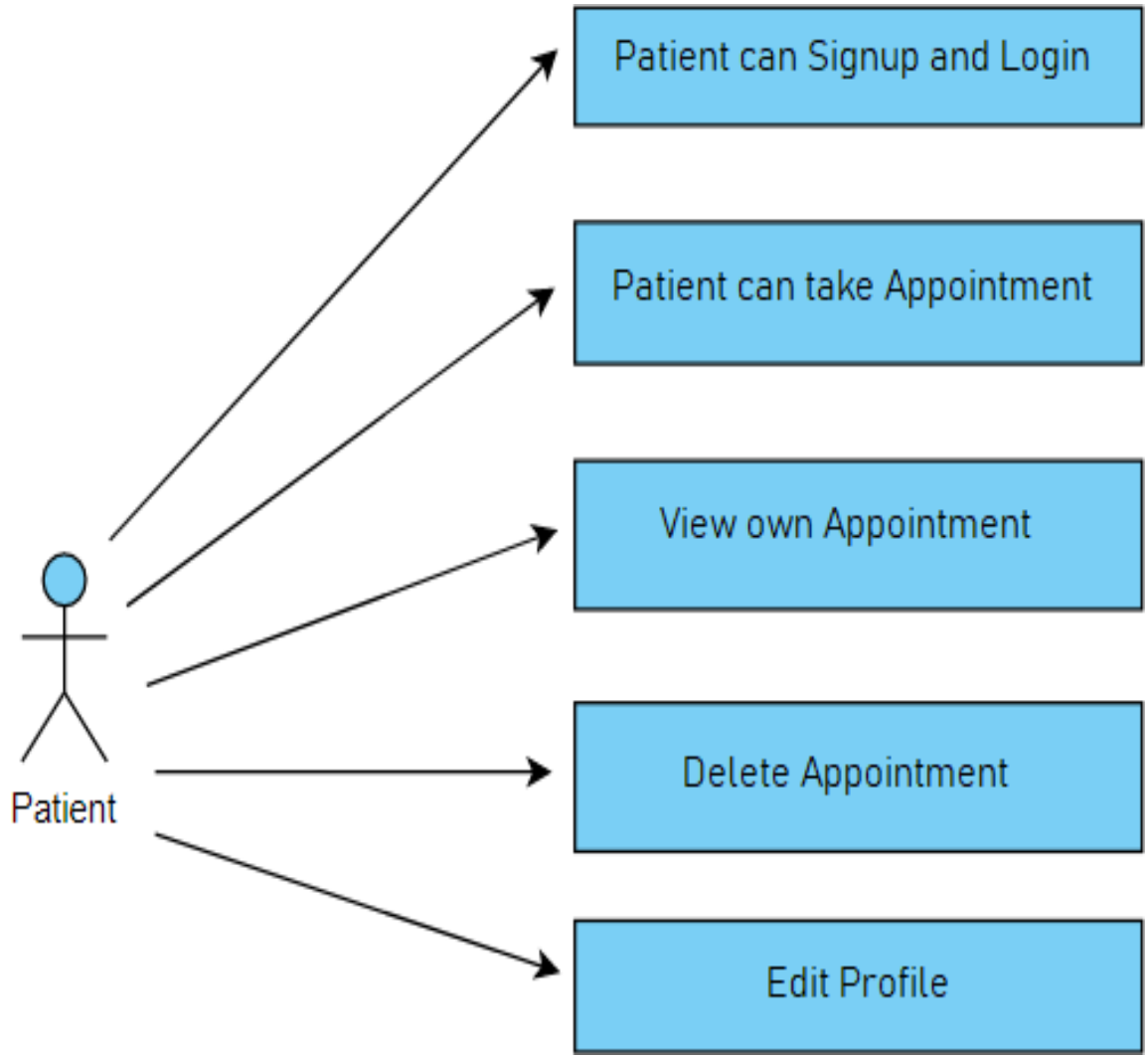


Figure 2. Use Case for Patient

4.3 Use Case for Receptionist.

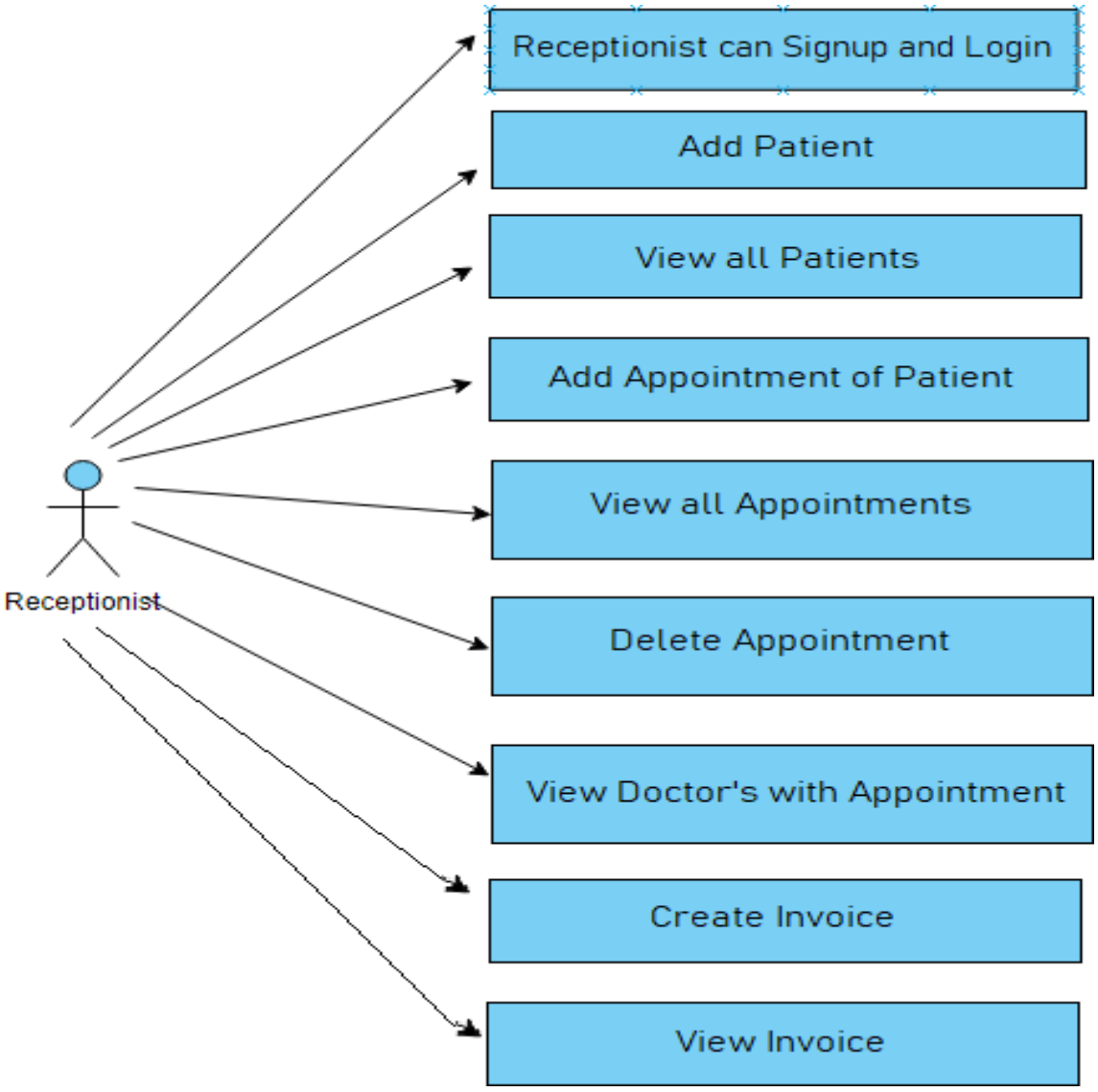


Figure 3. Use Case for Receptionist.

4.3 Use Case for Doctor.

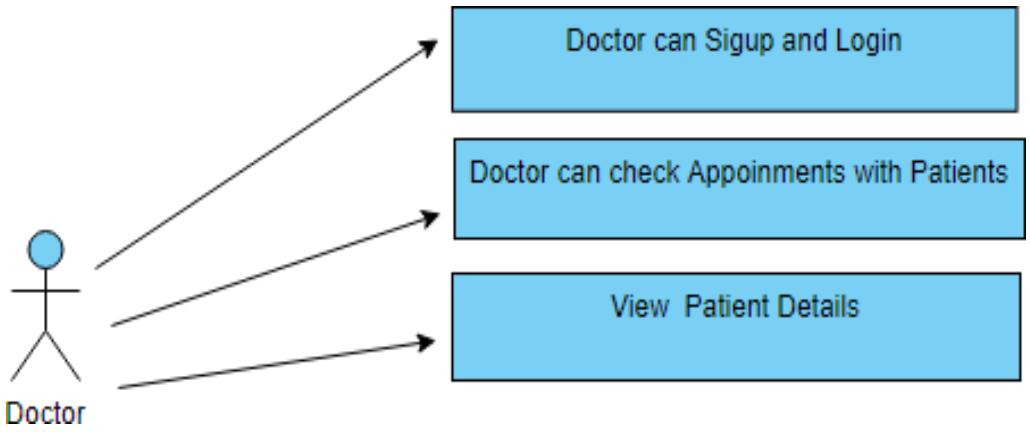


Figure 4. Use Case for Doctor.

5. FLOW DIAGRAM

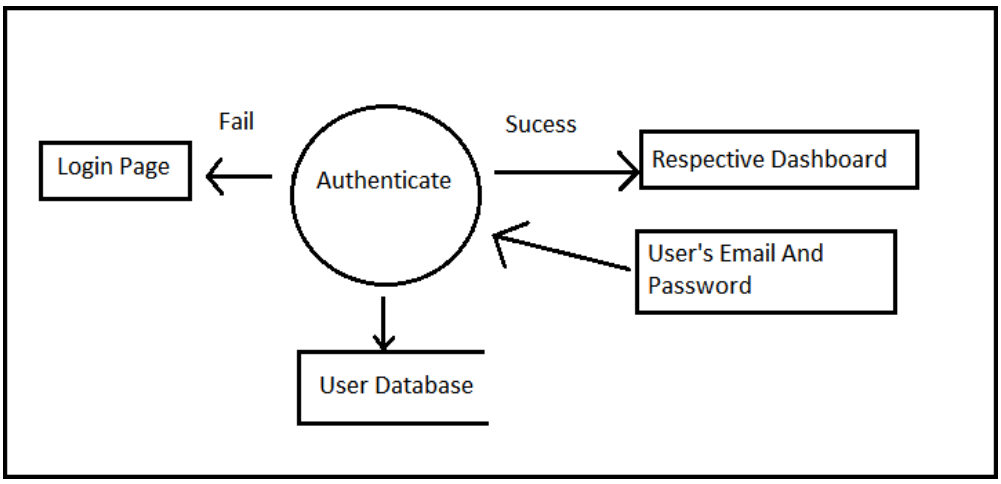
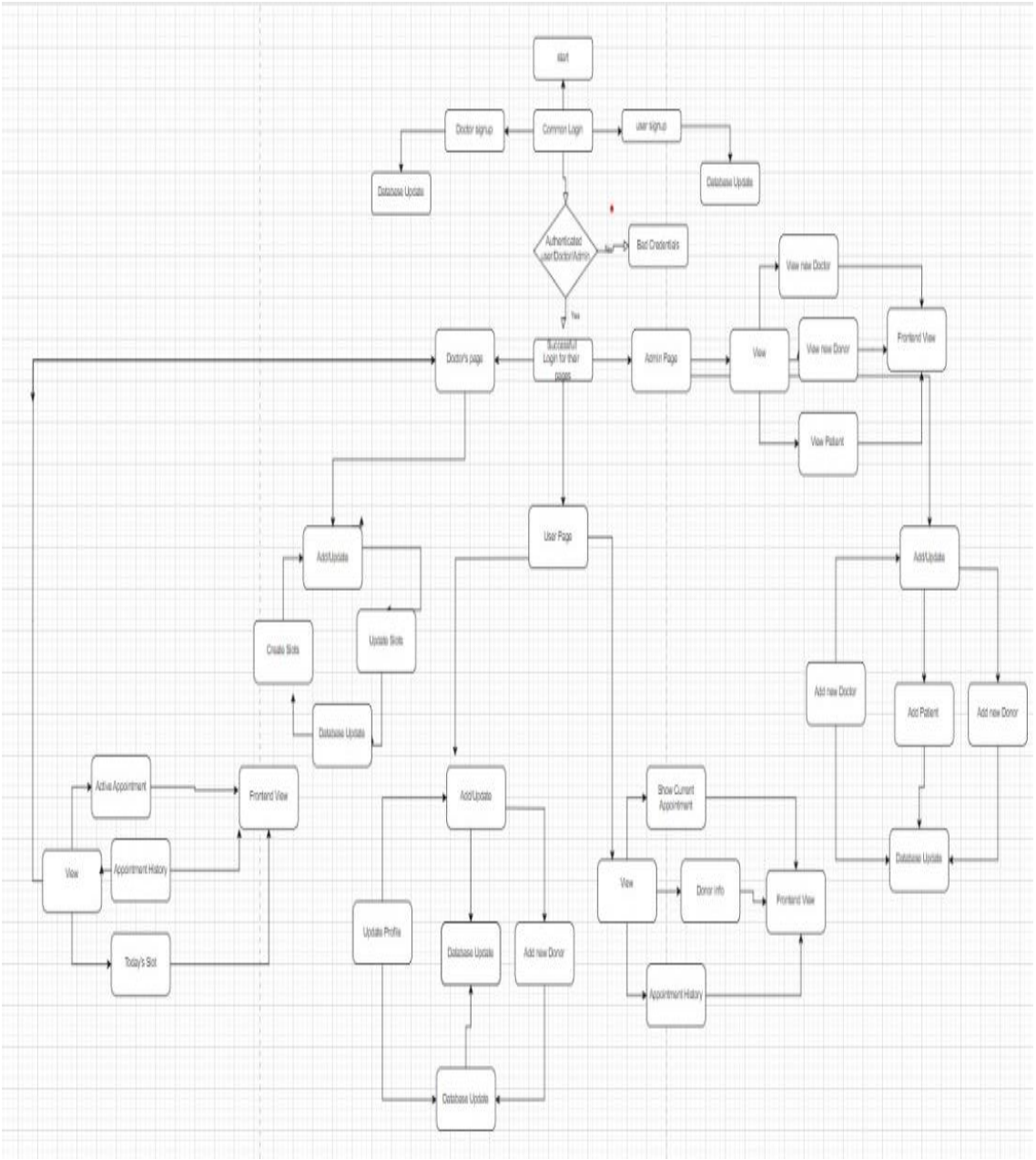
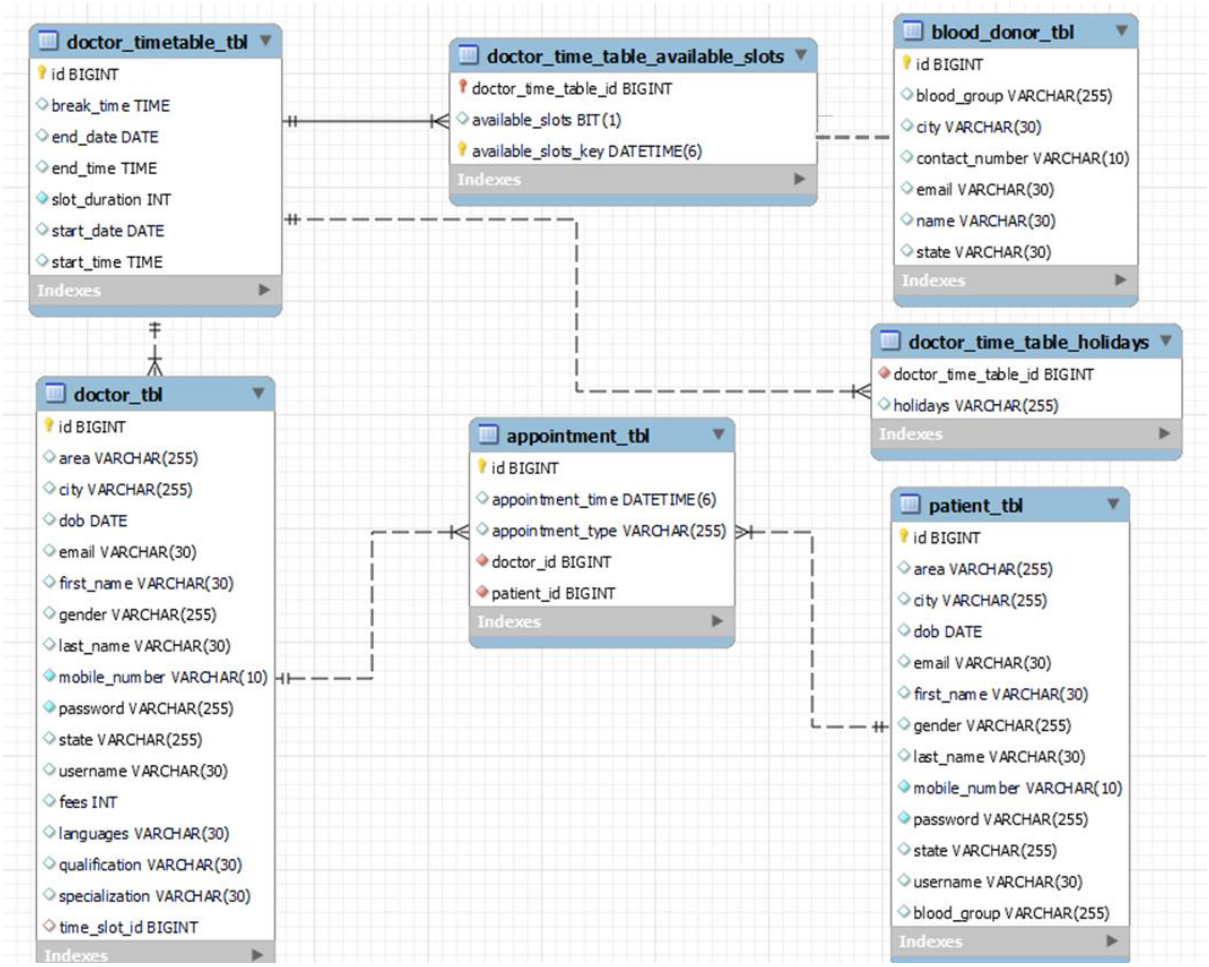


Figure 5.data flow diagram

6.ACTIVITY DIAGRAM



6.2 ER Diagram



7.GANTT CHART

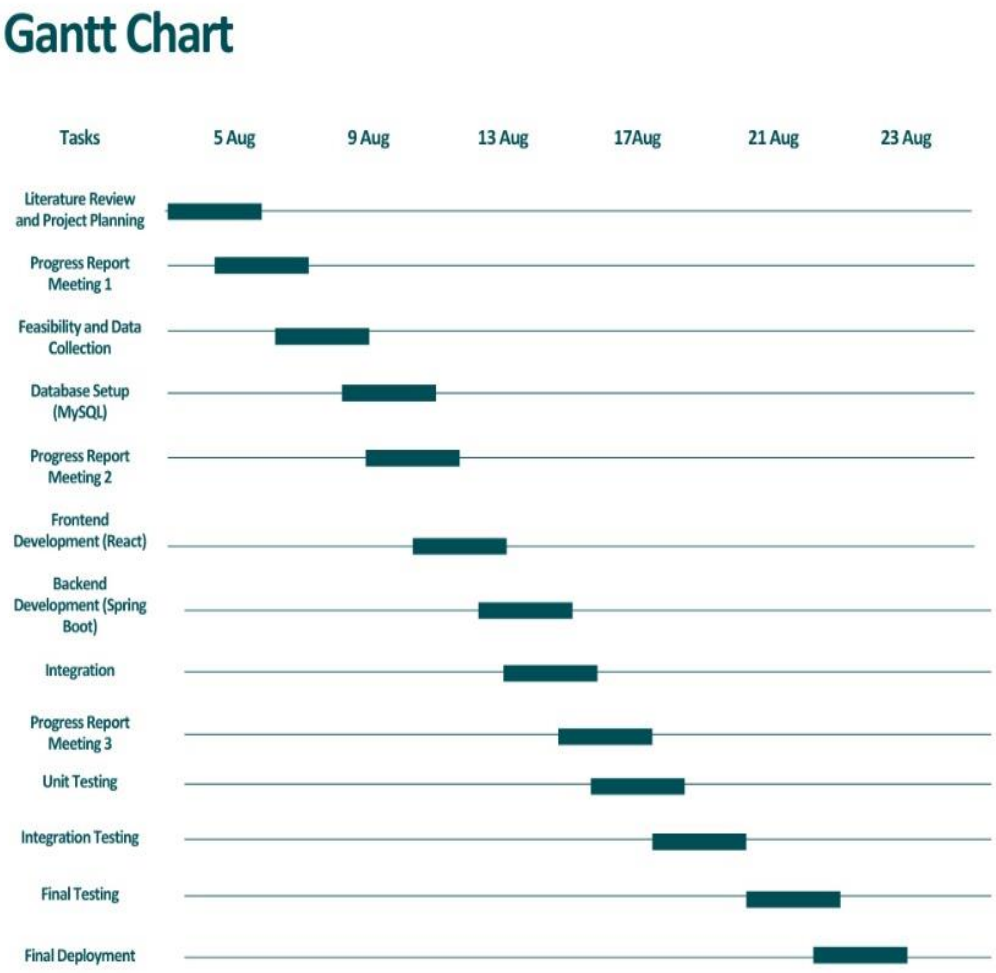


Figure 6. Gantt Chart

8.TECHNICAL CODE

8.1 Technologies Used

8.1.1 React:

React is a declarative, efficient, and flexible JavaScript library for building user interfaces. It lets you compose complex UI's from small and isolated pieces of code called "components". React is a JavaScript library for building user interfaces. React is used to build single page applications. React allows us to create reusable UI components. All the front end was completed with the help of React.

8.1.2 MySQL

MySQL is a relational database management system based on the Structured Query Language, which is the popular language for accessing and managing the records in the database. MySQL is open-source and free software under the GNU license. All the User's data which is part of Hospital management system is managed with the help of MY-SQL.

8.1.3 Spring Tool Suite

Spring Tool Suite is an IDE to develop Spring applications. It is an Eclipse-based development environment. It provides a ready-to-use environment to implement, run, deploy, and debug the application. It validates our application and provides quick fixes for the applications. With the help of Spring tool suite, we created a Spring Boot project from Eclipse and used it for the developing the back-end part.

8.1.4 VS 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 IDE's, such as Visual Studio IDE With the help of V S Code, we created a react.js project and used it for the developing the front-end part.

8.1.5 Git Lab

GitLab is a web-based Git repository that provides free open and private repositories, issue-following capabilities, and wikis. It is a complete DevOps platform that enables professionals to perform all the tasks in a project—from project planning and source code management to monitoring and security. All the project source code and documentation version control as well as management was done using Git Lab.

1. RESULT ANALYSIS

- Login Page:

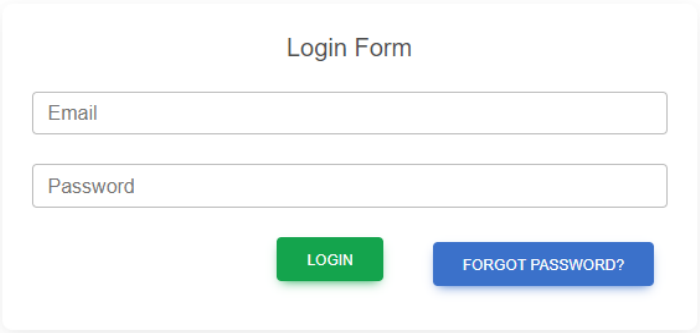


Figure 8. Login page

- Admin Portal:

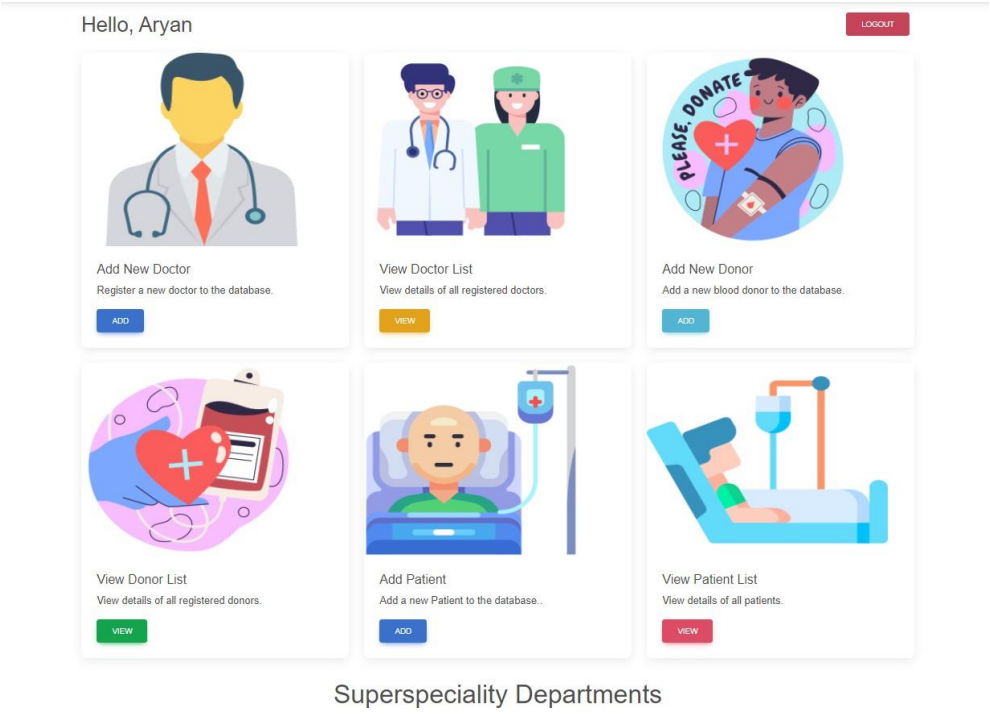


Figure 9. Admin portal

- Add New Doctor:

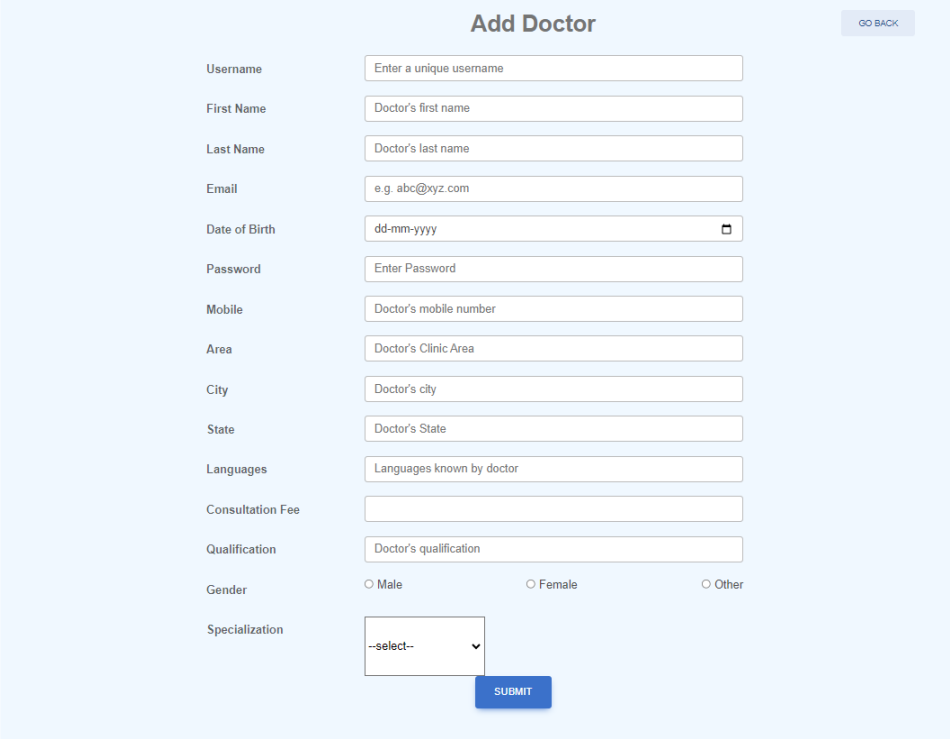


Figure 10. Add new Doctor

- Add New Donor:

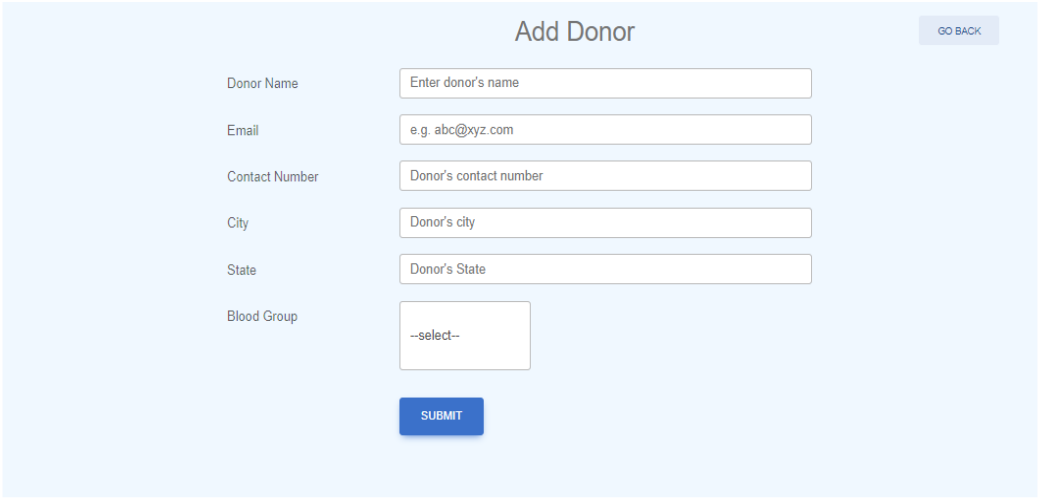


Figure 11. Add New Donor

- User Registration

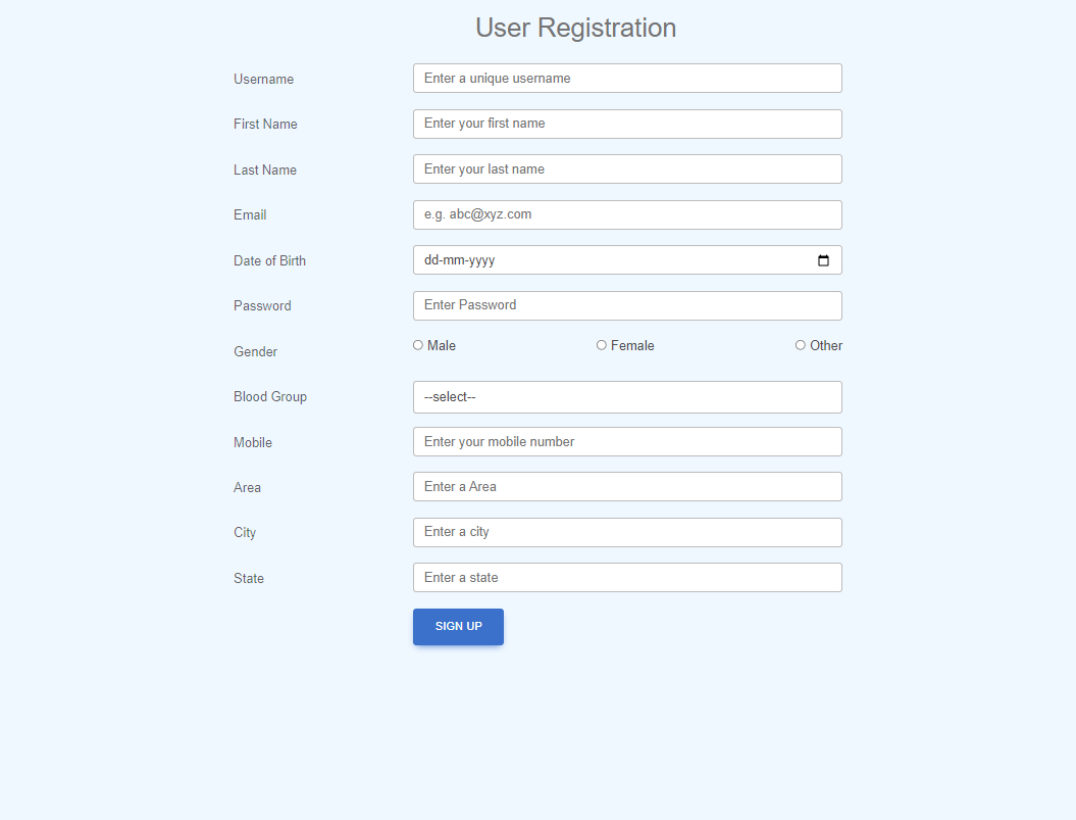


Figure 12. User Registration

- View Doctor List:

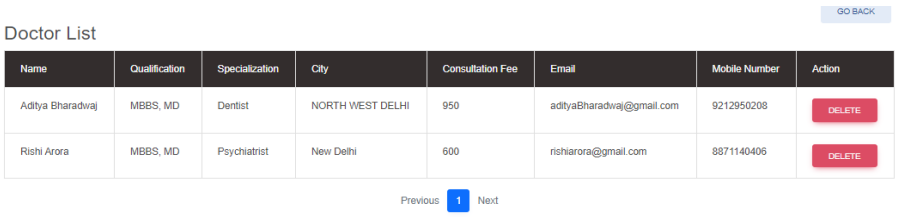


Figure 13. *View Doctor List*

- View Patient List

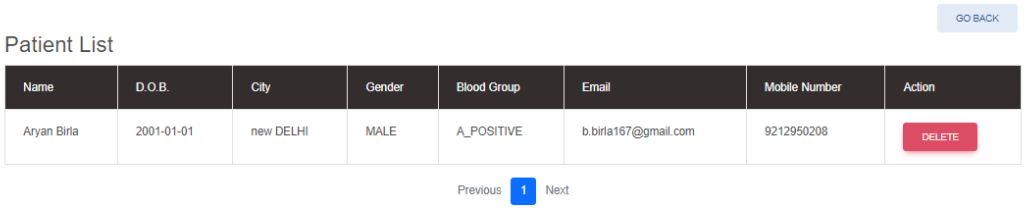


Figure 14. View Patient List

- User Page:

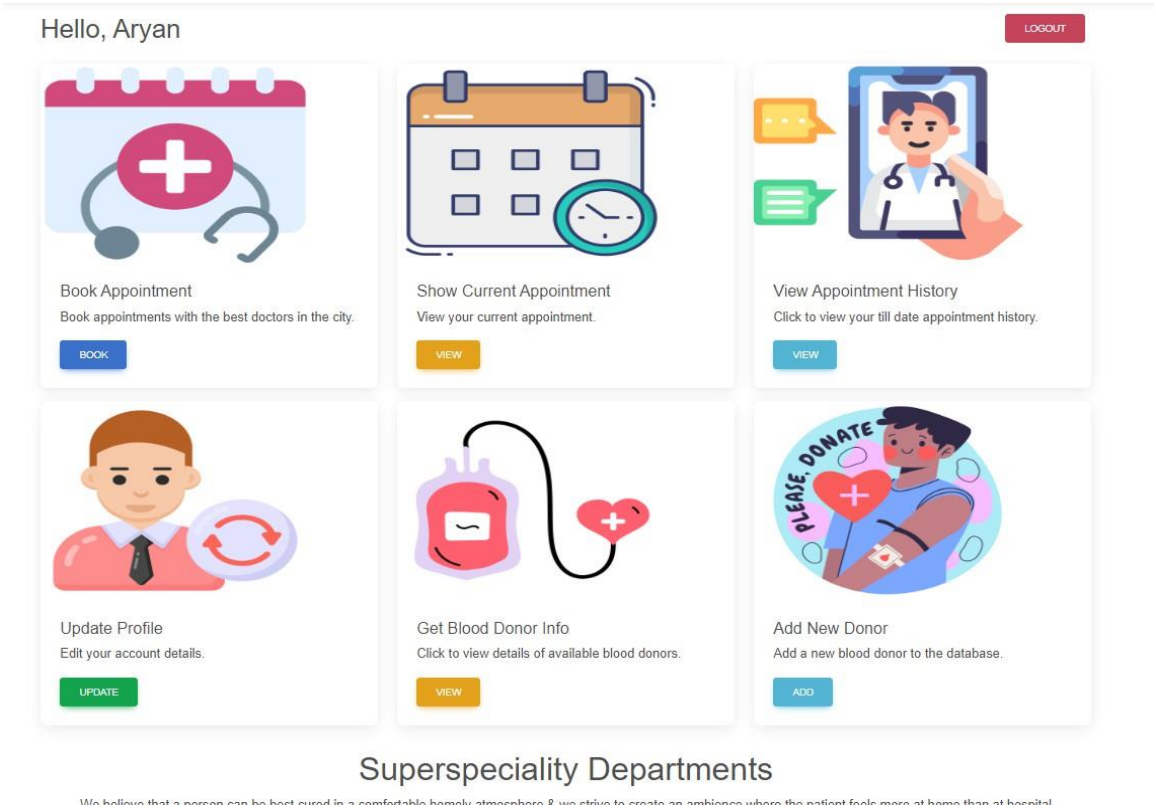


Figure 15. User Page

- Update Profile:

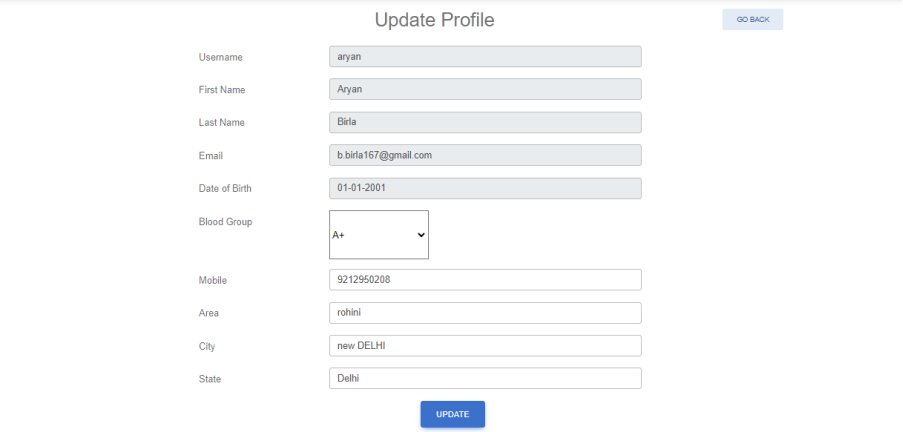


Figure 16. Update profile

- Blood Donor Info:

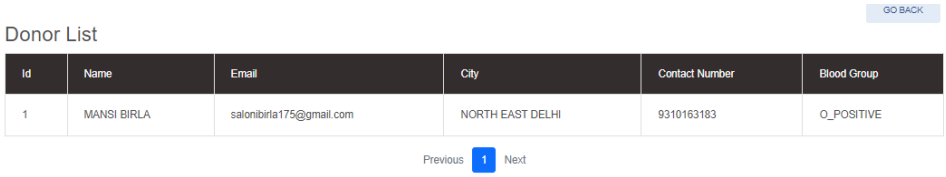


Figure 17. Blood Donor Info

- Book Appointment:

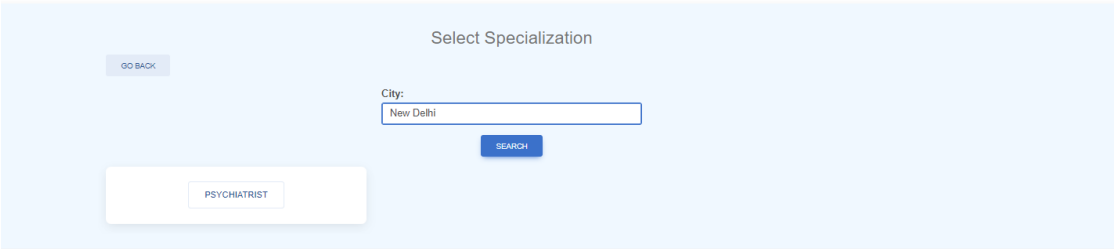


Figure 18.Book Appointment

- Doctor Login Page:

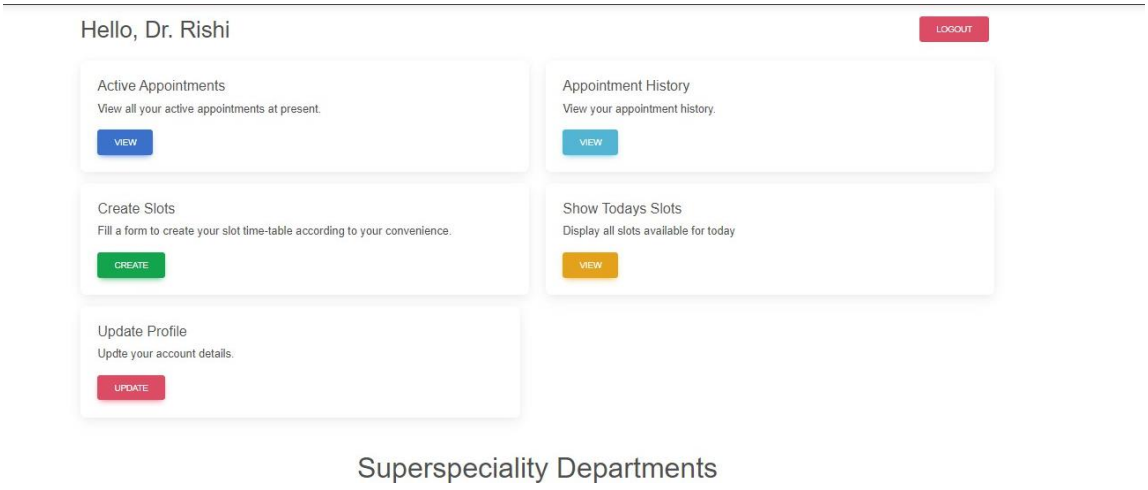


Figure 19. Doctor Login Page

- Create Appointment:

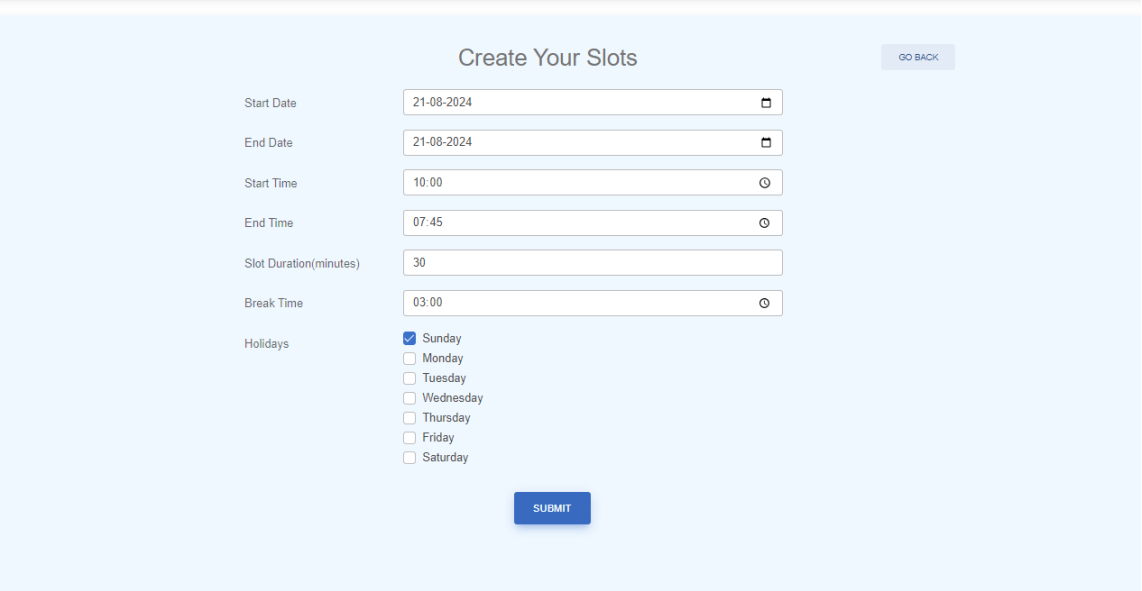


Figure 20. Create Appointment

- Today Slots:

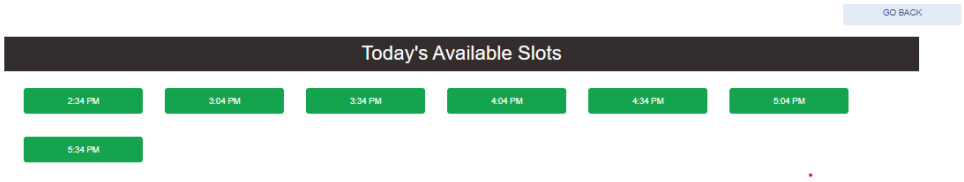


Figure 21. Slots

- Update Profile:

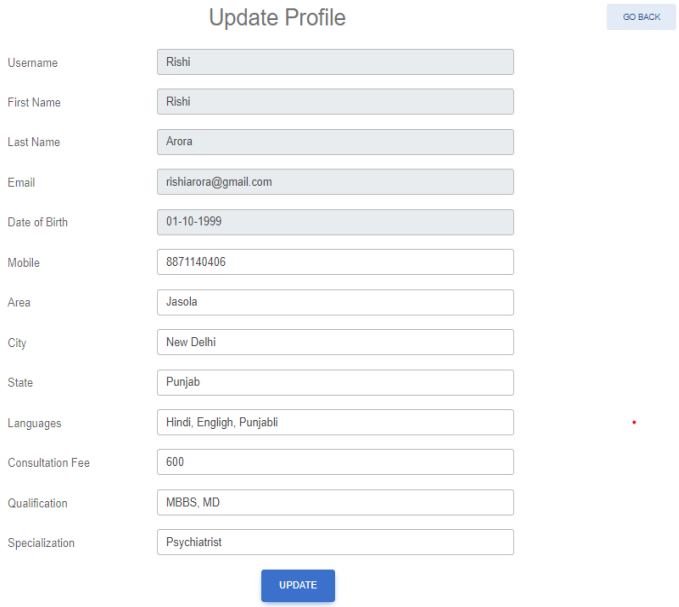


Figure 2. Update Profile

9.CONCLUSION

After reviewing our work, the conclusion is that we minimize the efforts of the patients to book an appointment. As we know the current pandemic situation the crowd gathering at the hospitals will be reduced as hospitals are the most critical places to spread the virus.

Our project will help to reduce the crowd contact, the patients are given appointment time slots to visit the hospital and meet the doctor. The doctor can also see the patients visiting and their health profile or symptoms.

We enable the hospital staff and management to securely save the data and fetch the data whenever necessary. The website is user friendly and secure to use. If any patient is not aware of the technology, he/she can register their data securely via receptionist.

We give access to 4 kinds of users namely admin, receptionist, doctor and patient using email and password which will be verified by the system, in case if any user happens to forget the password, we have given the service to change the password after validating the user data.

We have provided static as well as dynamic pages to display data. Every specified user has our functionalities and, in this manner, we have tried to achieve contact less appointments according to time slots. Managing staff information and to view information about users and make changes accordingly if necessary.

10.Future Scope

Innovation in healthcare technology is transforming the way hospitals and clinics manage their day-to-day operations. The rapidly evolving landscape of hospital management software is promising enhanced efficiencies, improved patient care, and a significant reduction in healthcare costs. The continuous advancements are shaping the future of this sector, and here's what you can expect with the upcoming trends.

10.1 AI and Machine Learning Integration

The integration of Artificial Intelligence (AI) and Machine Learning (ML) into hospital management software is not a mere buzzword, but a practical reality shaping the industry's future. AI applications range from predictive analytics that forecasts patient inflow to intelligent automation that reduces routine administrative tasks. With AI-enabled hospital management software, healthcare providers can make data-informed decisions, leading to improved patient outcomes and cost efficiencies.

10.2 Increased Adoption of Cloud Technology

Cloud computing provides a scalable and cost-effective solution for storing and managing vast amounts of health data. Cloud-based hospital management software can be accessed from anywhere, offering flexibility and a collaborative work environment. It aids in real-time data sharing, facilitating better communication among various hospital departments, and nurturing coordinated patient care.

10.3 Enhanced Data Security

With the growing sophistication of cyber-attacks and the high sensitivity of healthcare data, securing patient information is paramount. The future will witness hospital management software equipped with advanced data protection measures like end-to-end encryption, multi-factor authentication, and robust access controls to ensure data privacy and compliance with healthcare data protection regulations.

10.4 Advanced Analytics and Reporting

Future hospital management software will be data-driven, using advanced analytics to generate insights and support strategic planning. Real-time tracking, predictive modeling, trend analysis, and automated reporting will enable healthcare administrators to monitor performance, uncover areas of inefficiency, and make timely interventions. This places evidence-based decision-making at the fingertips of healthcare providers.

10.5 Integrated Telemedicine Options

The surge in telemedicine propelled by the COVID-19 pandemic is here to stay. Hospital management software of the future will feature integrated telemedicine platforms, allowing hospitals to provide virtual consultations, schedule appointments, manage remote patient monitoring, and maintain electronic health records seamlessly.

10.6 Streamlined IoT Device Integration

Medical IoT devices that monitor vital health parameters are becoming commonplace in healthcare. Hospital management software leverage these devices, integrating them into the system for real-time data capture, enhancing patient monitoring and delivering personalized care.

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