The Hospital Management System

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ABSTRACT

The hospital's management system includes improved profitability, improved administration, and better patient care. The goal of this study is to create a digital management system that will boost the hospital's effectiveness and systems integration standards. It was able to produce a module that would provide some facilities, like booking doctors, booking lab test slots, pharmacy services, and getting health programs. This system consists of an admin handling part, which means admin can manage users, pharmacy systems, health program management, and manage booking of doctor's appointments and lab tests. And through this system, the admin can generate multiple reports according to his needs[7]. A module that would manage the admission bills and pharmaceutical payments; and a module that could monitor the medicine inventory of the hospital pharmacy. Problem statement because hospitals are associated with ordinary people's lives and daily routines the manual handling of the record is time-consuming and highly prone to error. The purpose of this project is to automate, or make online, the process of day-to-day activities. Each phase guided the researchers in the development of the study and helped them organize the workflow of each task. In conclusion, the researchers found that the system could speed up the working progress and productivity of hospital employees. It could also generate hospital reports that could help the users to provide an overview of the hospital transaction within specific date. It also provided the facility for searching for the details of the inquiring patient in the receptionist module. The system could reduce the workloads in the hospital, resulting in better management and working performance. In general, the study resulted in a better improvement of hospital transactions. It has been recommended that there is a need to enhance the frontend design of the system.

Keywords— Computer Numerical Control(CNC), Internet of Things (IoT), Quick Response(QR)

I. INTRODUCTION

The hospital management system contains computerized patient registration, sorting of their information into the system, and patient registration. The software can automatically provide a search facility for each patient and the employees. It has a search feature that lets you see each availability's status[03]. The availability of a doctor and patient information can be searched for by the user. With the use of a username and password, one can access the hospital management system[01]. A receptionist or an administrator can access it. They alone can add data to the database. The information is simple to retrieve. The user interface is quite simple[05,06].

Data processing is quick and very well for personal usage. For multispecialty hospitals, the Health Board System is created to cover a variety of hospital administrative procedures. The management of hospital analysis and activity-based pricing can be increased using hospital management systems[03,05]. The hospital management system enables you to grow your business and enhance productivity and work quality[02]. The goal of the hospital management system project is to simplify all management processes, including patient registration, doctor appointments, and prescription writing.

The user must go through a few registers. Time is lost because of this. Therefore, using this system will make it simple to manage everything process. Therefore, the development team are designing this system that can help both patients and hospital workers using the motivation of this scenario, which was frequently performed in hospitals[01,05]. So, the stakeholders would like to have this system that makes hospitals work quickly and efficiently.

II. LITRATURE REVIEW

Initially, a collection of results was gathered from the databases that were searched using various keywords. Only studies that used maturity models were examined from the results. The studies that did not make use of maturity models were dropped. Operational efficiency and wait times across various procedures, departments, and people are two of the biggest problems current hospital management systems are facing[4]. The solution includes visual simulation and gives users the power to examine current processes and make necessary corrections to boost service levels and process efficiency. A final sample of 41 surveys was created because of this method. 82.93% of them are spread among a variety of pieces, with doctorate dissertations making up 7.32% and expert's dissertations 9.76% of the total.[3,7]

A. Existing Systems

Organization's storage on a daily basis. All of these details are currently kept in the file system. There will accumulate several files because of this daily basis. The hospitals manage and handle every single task by hand. Therefore, it could require a lot of time and effort to complete each activity. A lot of labor is required. At the moment, manual processes are used only in Zone Hospital to manage daily operations. Patients will schedule appointments with doctors and lab tests with the receptionist. Only at hospitals may patients purchase pharmacy items; there is no option for patient delivery. Only at the hospital are the healthcare options offered to patients. All the patient details, doctor details, lab test results are manually taken on papers and feuded on computer latterly. And the reports will be generated by hands with the help o experts.

B. Existing System Problem

The existing system requires a lot of time. Absence of security components Every task needs to be completed by hand. The majority of tasks and activities depend on specialists and human resources. No direct communication with the senior officers. The accuracy level is subjective. High expense is required for manual system management. Difficulty in getting backup data and transfer data. Difficulty in inserting IoT technology and robotic intelligent. Manual system in lack in user friendliness and it not that much reliable with current technological world.

III. METHODOLOGY

The hospital management system will be created in two stages: first, a database will be created; next, the interface will be customized; finally, the interface will be programmed, and certain codes will be written. Learn from current systems and adapt from them for a better result. After thoroughly researching the current system, the development team were able to determine its benefits and shortcomings and find ways to address the latter. The five primary modules of the solution system were released. These include managing appointments, managing pharmacies, managing healthcare programs, and managing doctors[3]. To find a new system as a solution, the analysis of the current system is put through a comparing process. The best software will be selected after a review of the current software options[6]. Making a list of tables and specifying their relationships is the first step in building a local database[4].

The system was implemented using MERN technology which use JavaScript stack that is used by many large organizations in these days. To implement an end user attractive interface, development team used several react packages like material UI , React Bootstrap , tailwind CSS and ant designs. Backend is developed using node is. While implementing the backend developers focused on security , authorization , validation, authentication, and performance. To achieve those developers, use several packages like package validator, crypted etc. All the inserted data are stored and managed by a non-relational database. Data administration team have chosen Mongo DB With a scale-out design, manage massive amounts of data quickly. Allow for simple field and schema modifications and the storage of unstructured, semi structured, and structured data.

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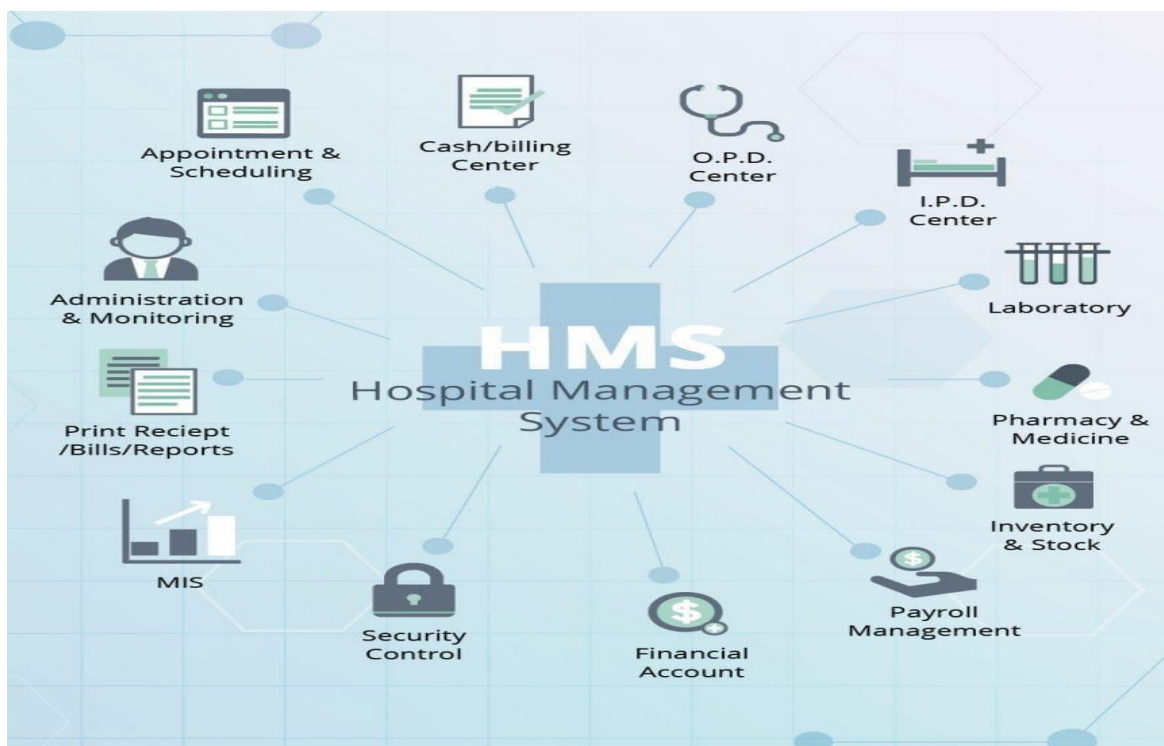
Figure 1: System Overview

IV. PROPOSED SYSTEM

A. Background of Hospital Management System

All of a hospital's data and operations are compiled on a single platform by a hospital management system. The hospital information system includes all of the hospital's information processing and storage components. This means that it encompasses more than just the computer systems, networks, and computer-based application systems that are installed on them. Rather, it refers to the information contained within the hospital as a whole.

B. Project Objectives

The objective of this project is to develop hospital management web-based application with a front-end with react and the back end with mongo database. This software will help to be more efficient in handling the booking doctors, booking lab test slots, pharmacy services, and getting health programs. This system consists of an admin handling part, which means admin can manage users, pharmacy systems, health program management, and manage booking of doctor's appointments and lab tests. of their patients. It also explains the user interface, different models that could be used to develop software such as this.
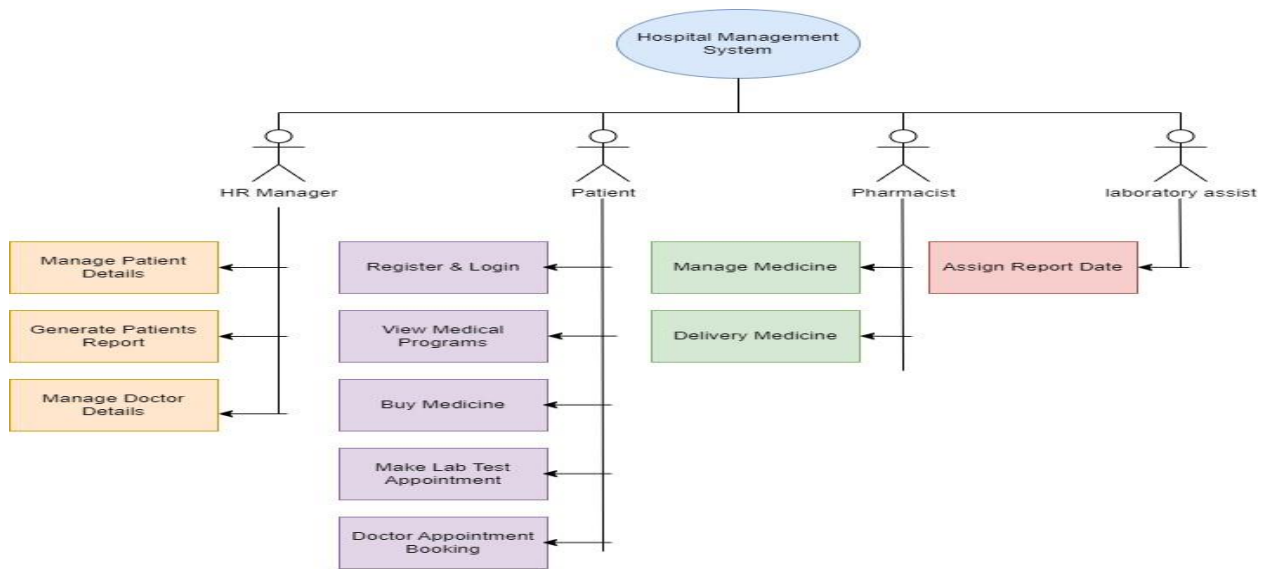
Figure 2: HMS High Level Diagram

Hospitals are the essential part of our lives, providing the best medical facilities to people suffering from various ailments, which may be due to changes in climatic conditions, increased workload, emotional trauma stress etc. It is necessary for the hospital to keep track of its day to-day activities & records of its patients, doctors, nurses, ward boys and other staff personals that keep the hospital running smoothly & successfully. But keeping track of all the activities and their records on paper is very cumbersome and error prone. It also is very inefficient and a time consuming process Observing the continuous increase in population and number of people visiting the hospital. Recording and maintaining all these records is highly unreliable, inefficient and error prone.

C. Overall System

A hospital management system is a computer system that facilitates in the efficient execution of the jobs of healthcare practitioners and helps manage information connected to health care. They oversee the data for all healthcare departments, including,
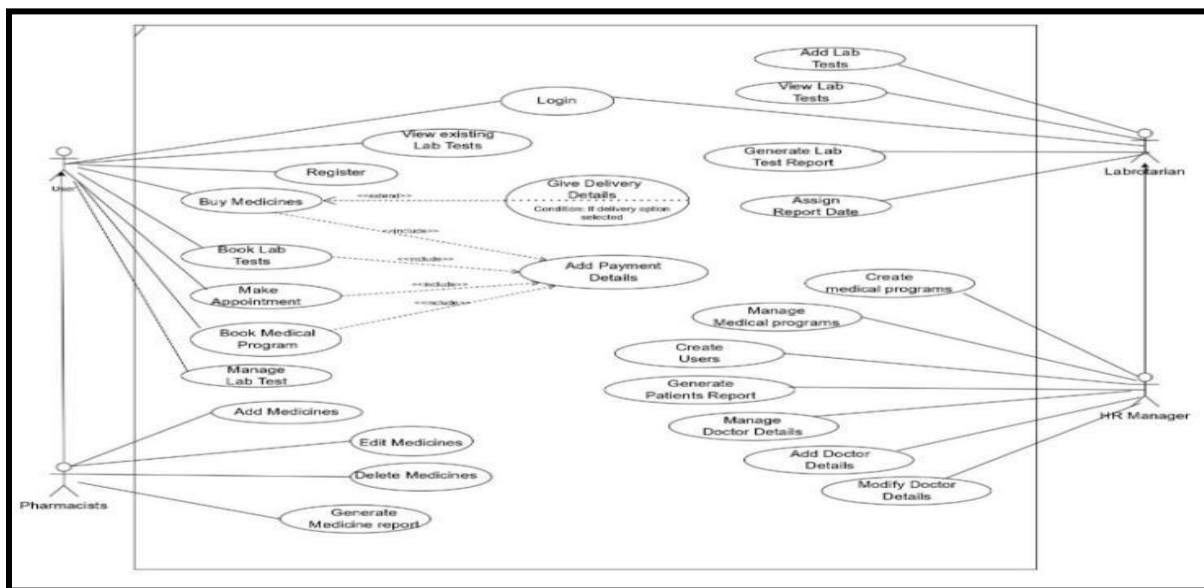
Figure 3: HMS Use case Diagram

User Management

The introduction of HMS was made to address the challenges involved with handling all patient paperwork related to each department of hospitalization while maintaining patient confidentiality. Using HMS, patients may schedule appointments with little effort because all their documentation can be managed in one location. HMS performs a variety of tasks for clients. Patients must register for their system if it authenticated, they would receive a confirmation main to their registered E-mail address. After their registration successfully they have to login to the system with valid credentials and if not, they would not access the system. Admin will manage the all-user details through admin panel, they can view all registered users and he can generate a report of all registered users to get the report for their management concerns.
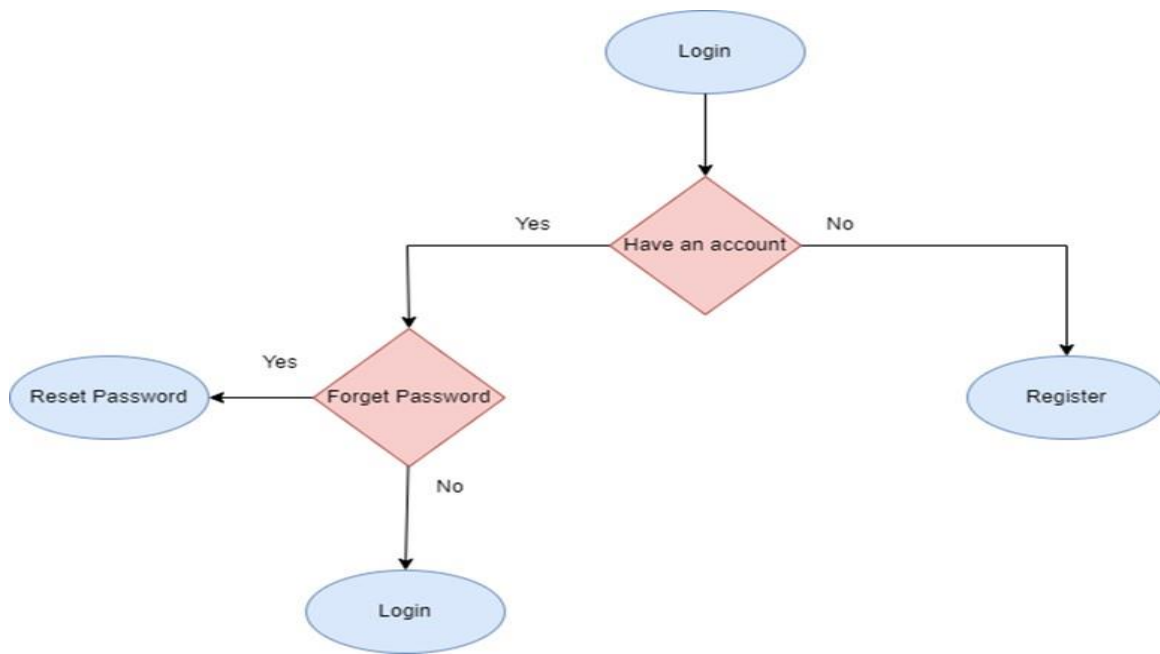
Figure 4: User Management Flow chart
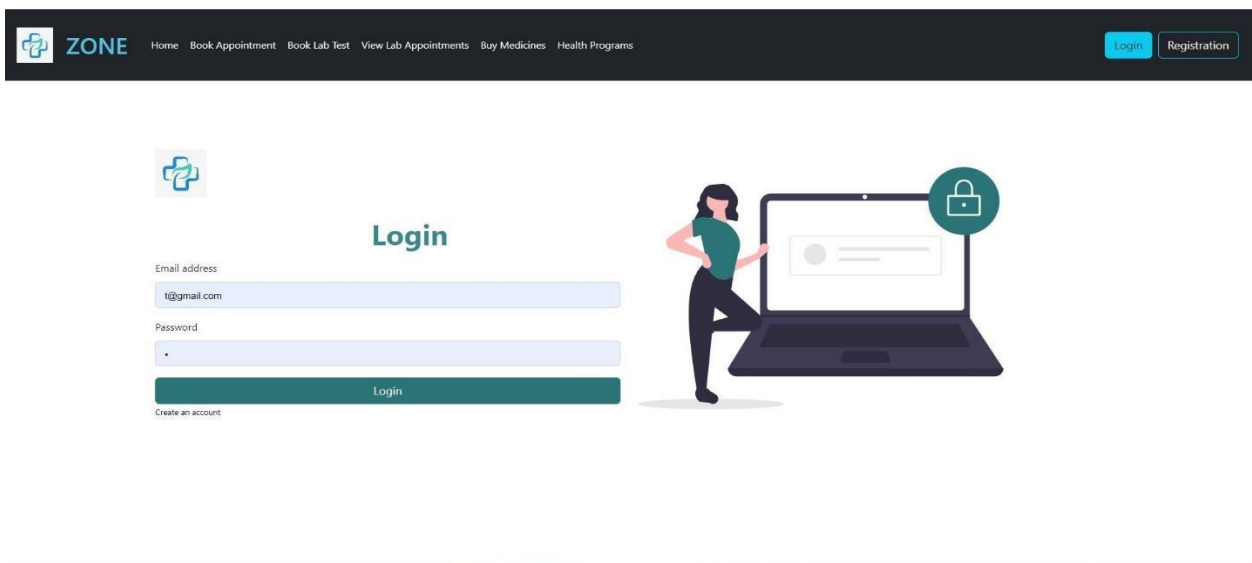
Figure 5: User Login Interface
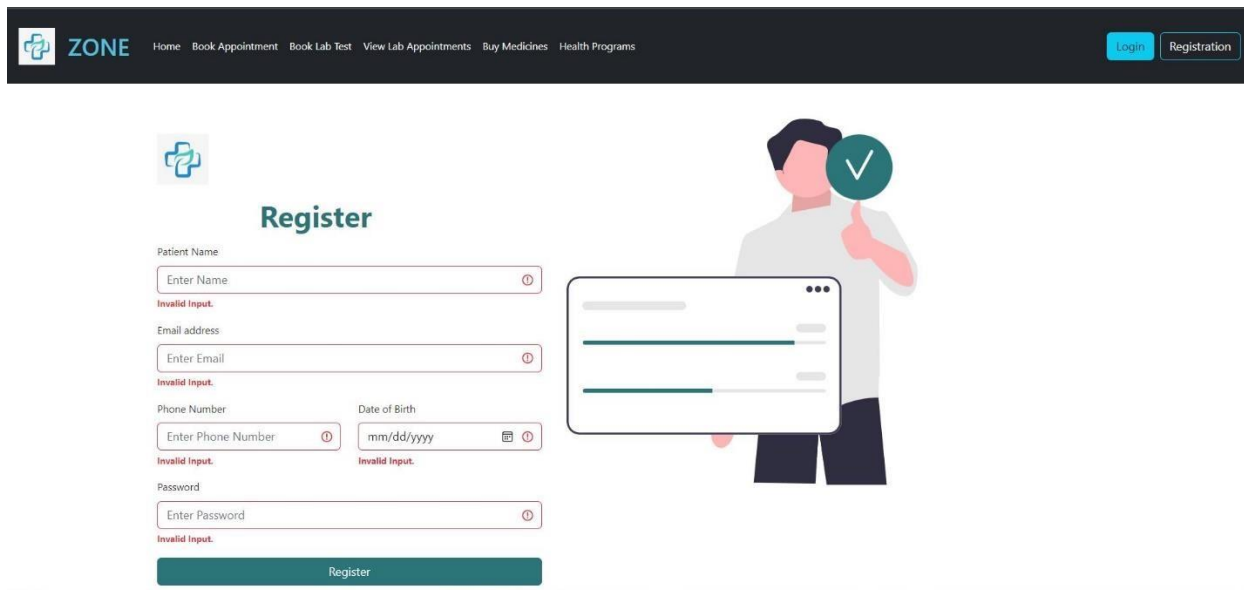
Figure 6: User Register Interface

Doctor Appointment Management

This interface is for getting Doctor appointment details from the customers. Initially the user is required to give the username, age, address. After entering the requested selected Doctor name, time, and date a user needs to click the Book Now button.
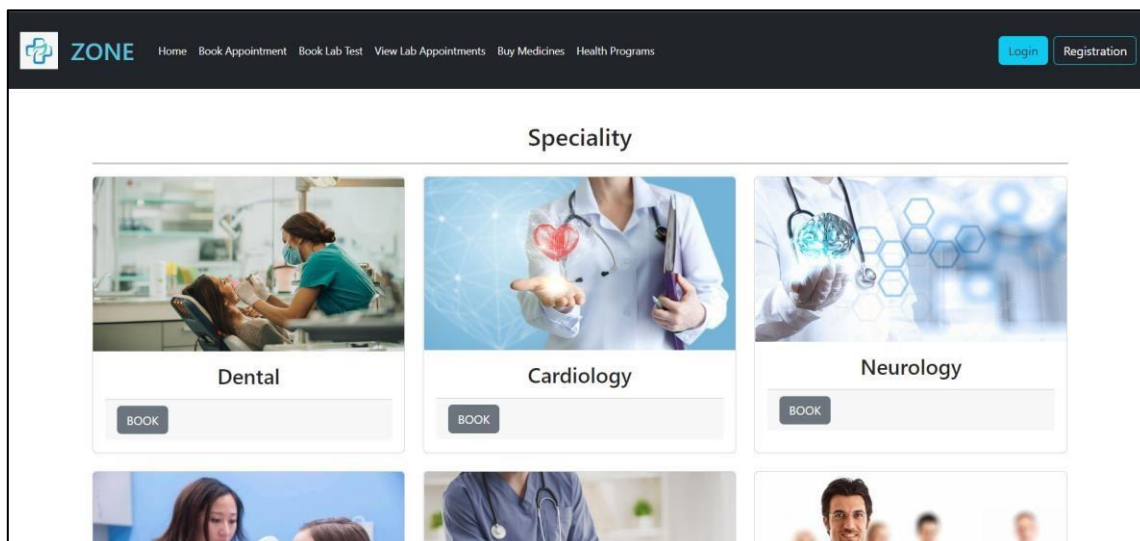
Figure 7: Doctor Appointment Management

Figure 8: Doctor Booking Interface

Figure 9: All Doctor Appointments Table (Admin View)

Figure 10: Single Doctor Appointment Details

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Figure 11: Edit Doctor Appointment Details

Laboratory Testing Management

This interface is for getting laboratory appointment details from the customers. Initially the user is required to give the username, age, address. can use it to record, store, and manage all the data relevant to inventory, samples, and testing. It is an excellent platform for doctors to coordinate a wide array of medical testing for patients. entering the requested selected testing, time, and date a user needs to click the Book.
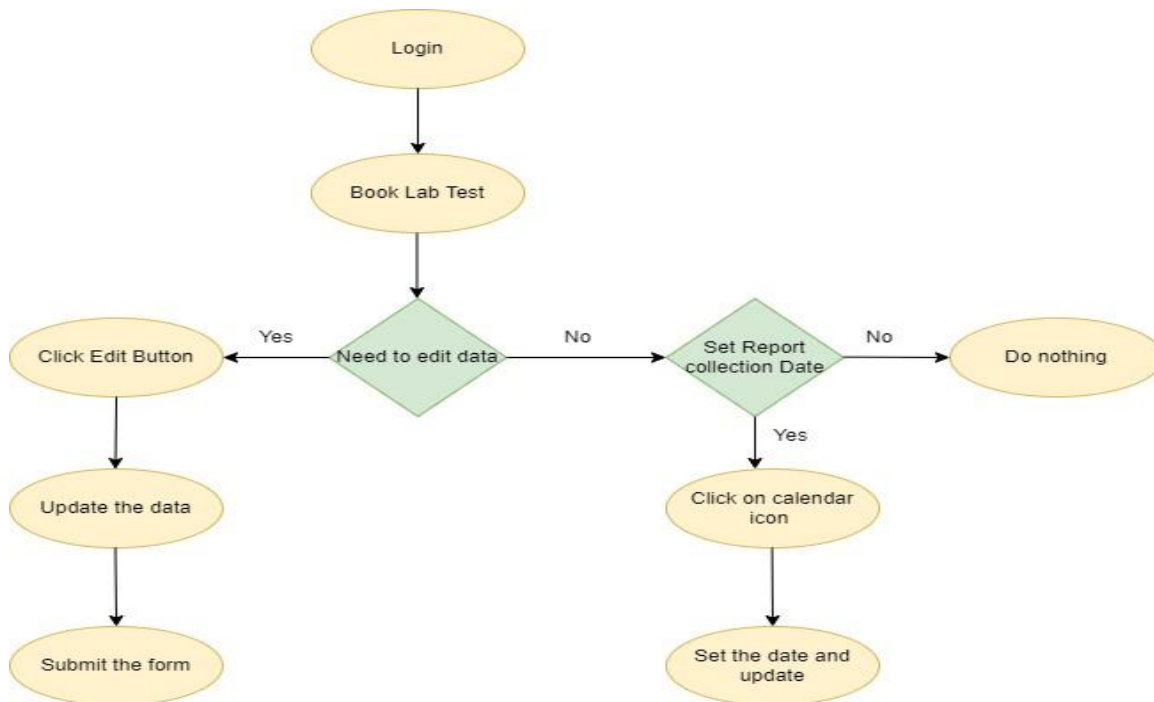
Figure 12: Lab Test Management Flow Chart
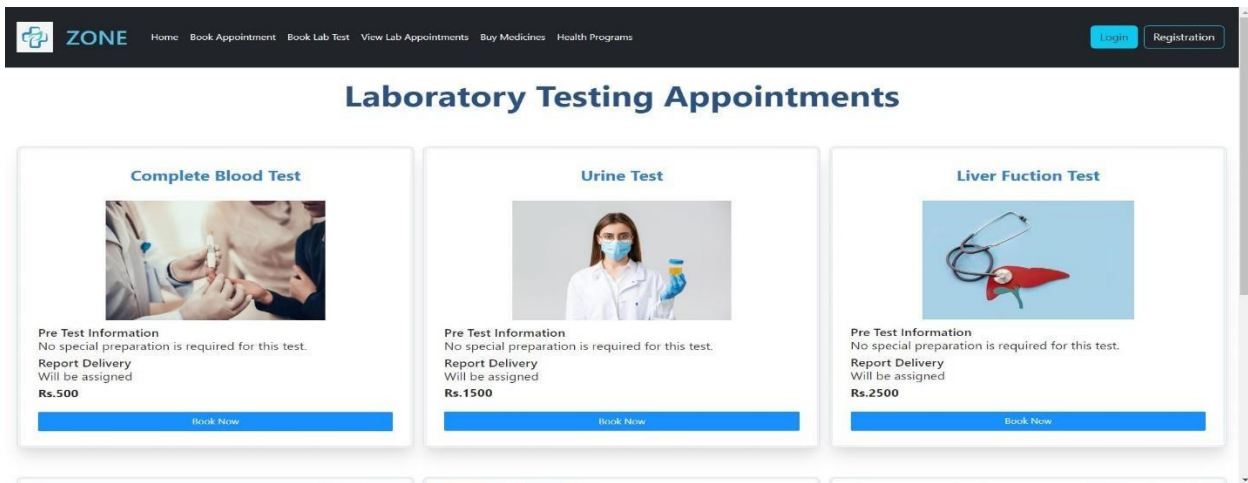
Figure 13: Lab Test Management Dashboard
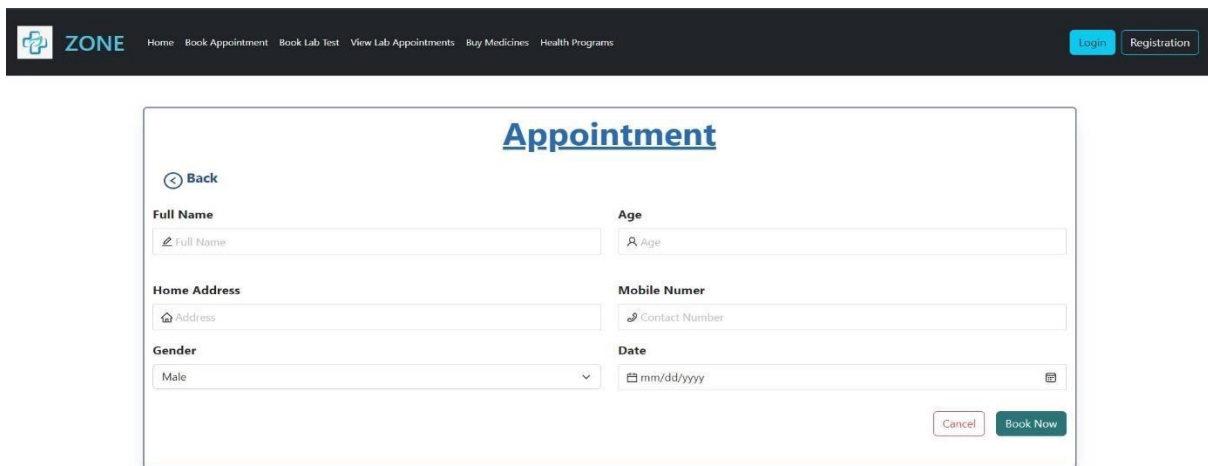
Figure 14: Lab Test Booking Interface

Figure 15: All Lab Tests(Admin View)
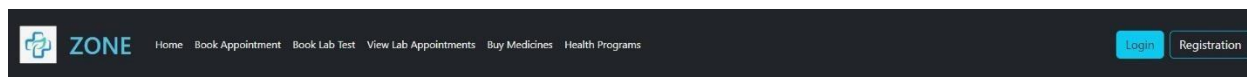
Figure 16: Edit Lab Test Details

Figure 17: All Lab Tests (Patient View)

Payment Management

This interface users can pay using PayPal portals. Initially the user will give all the delivery details after that he will get access to the payment portal which is PayPal. In that portal the user will give the card details to the system.
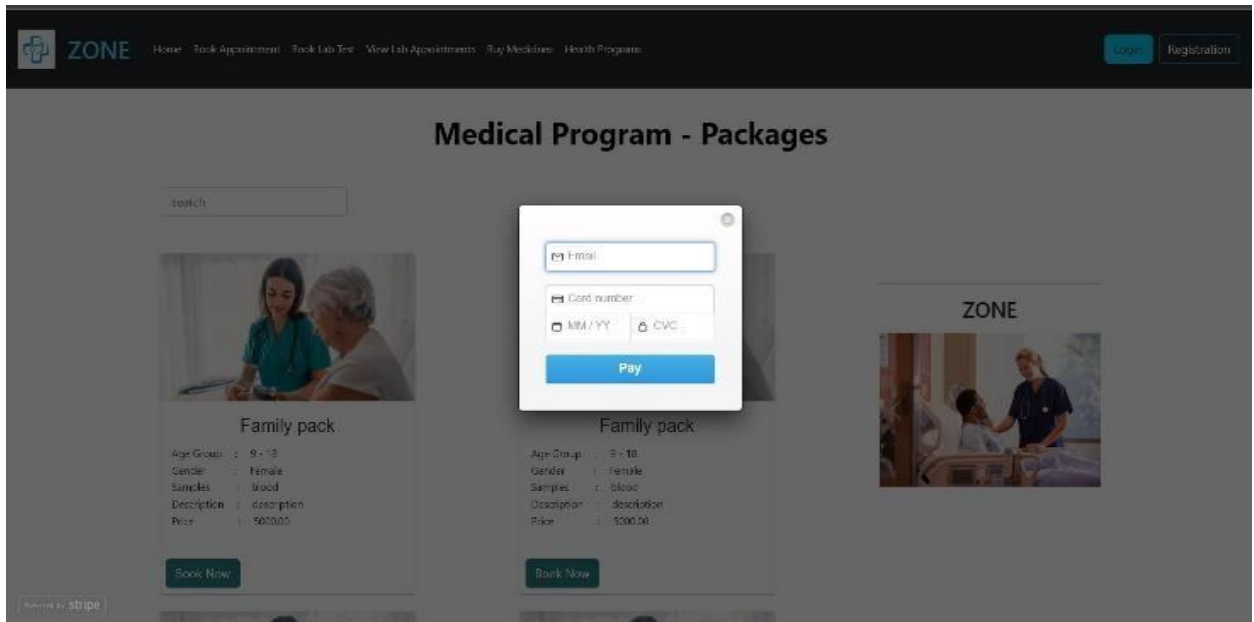
Figure 18: Make Payment Gateway

Pharmacy Management

In the pharmacy. Initially, the user needs to login to the system and navigate to the Pharmacy. Then the user selects the medicine which they are going to buy. The user medicine dashboard page carries the search bar, which helps to find the medicine which the user is looking for. Initially the user will get a glance at the medicine dashboard, if they could not find out the user can get the medicine details just by typing in the search bar.
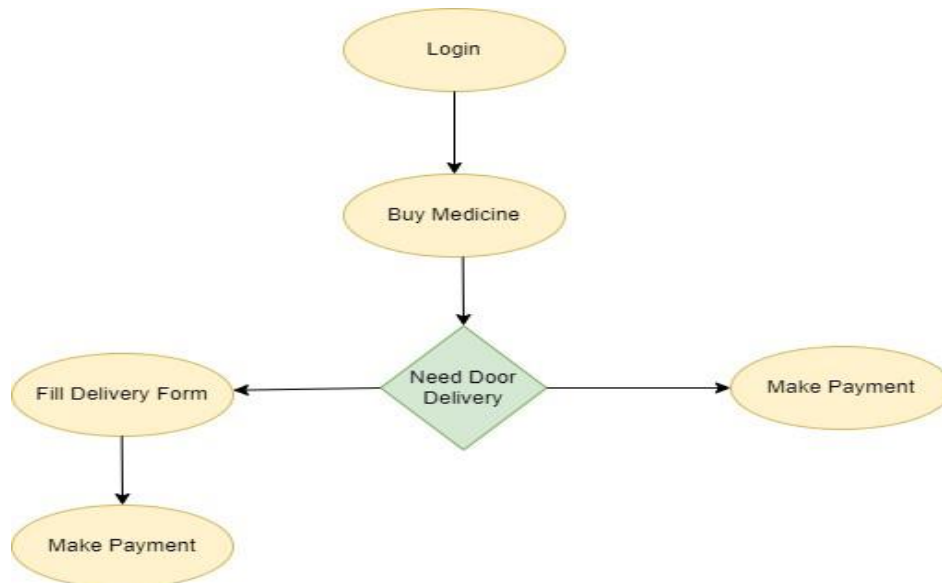

Figure 19: Pharmacy Management Flow chart
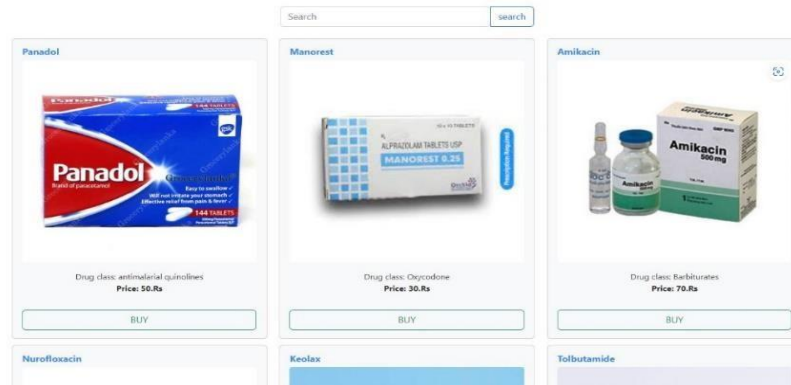
Figure 20: Pharmacy Management Dashboard
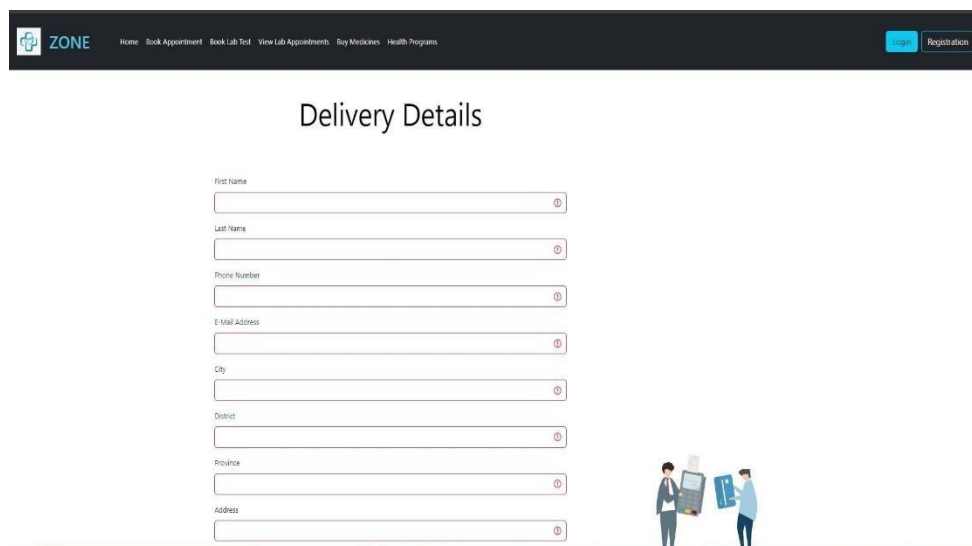
Figure 21: Medicine Delivery Interface
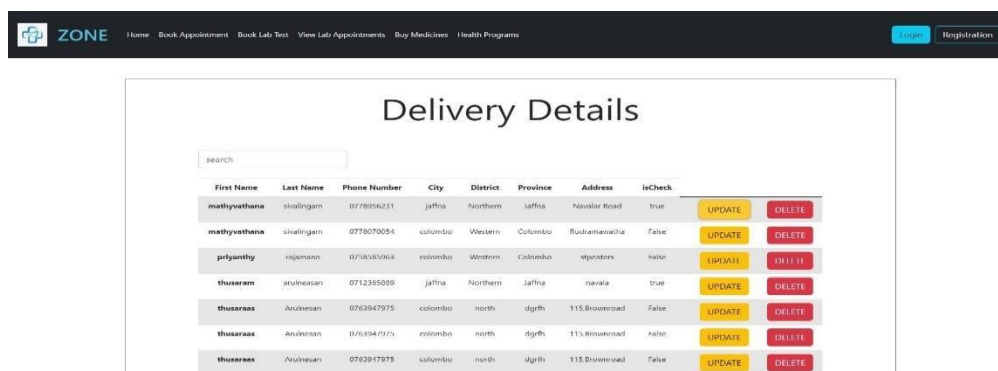
Figure 22: All Delivery Details (Admin View)
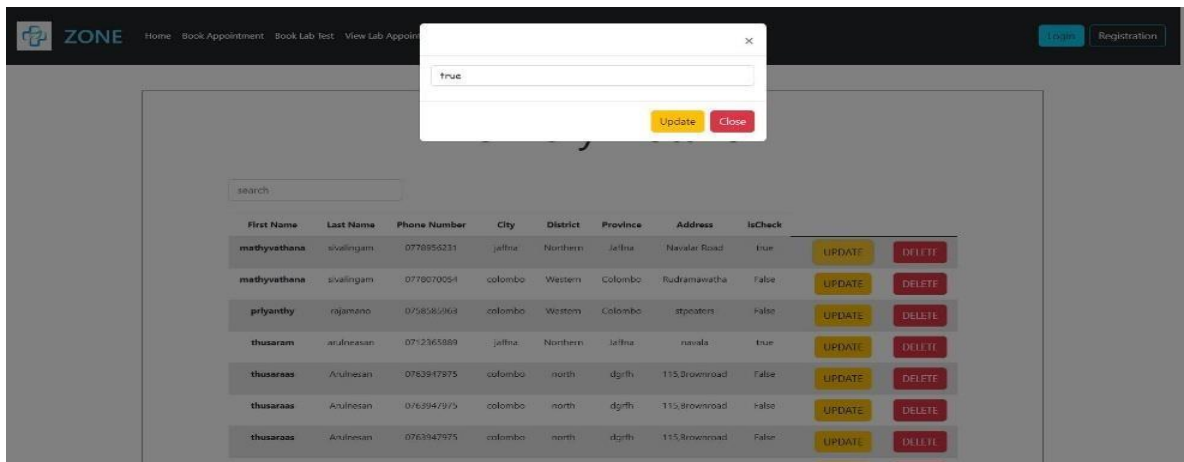
Figure 23: Delivery Details interface Interface

Health Program Overview Interface
    This is the interface where super admin can manage (Read, Delete) Health Programs. From this page admin can be able to see all the health programs and if it is necessary, he/she can be able to update and remove the programs by clicking the corresponding buttons. By giving the entry

in the search box admin can filter the records.

Fig. 24: Available Health Programs(Patient View)

Figure 25: All Health Programs (Admin View)

V.   NON – FUNCTIONAL BENEFITS

The most crucial aspect of creating a system is ensuring user pleasure and the greatest possible user experience. In the management of health care, that is much more challenging. Users of today don't hesitate all that much to switch to other platforms to obtain services. Making sure services are of high quality benefits patients as well as healthcare professionals. The created health care system focuses mostly on five primary quantitative studies that are m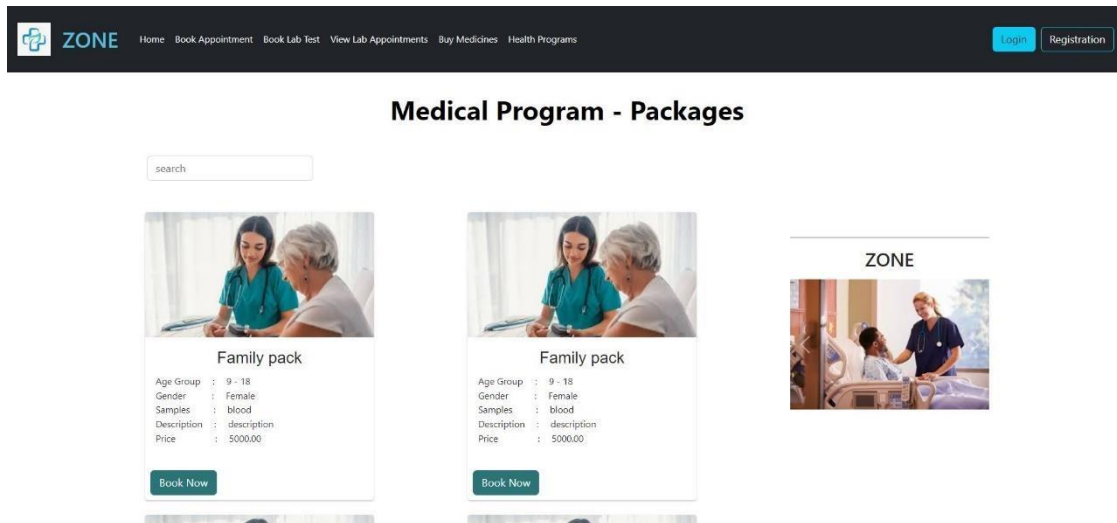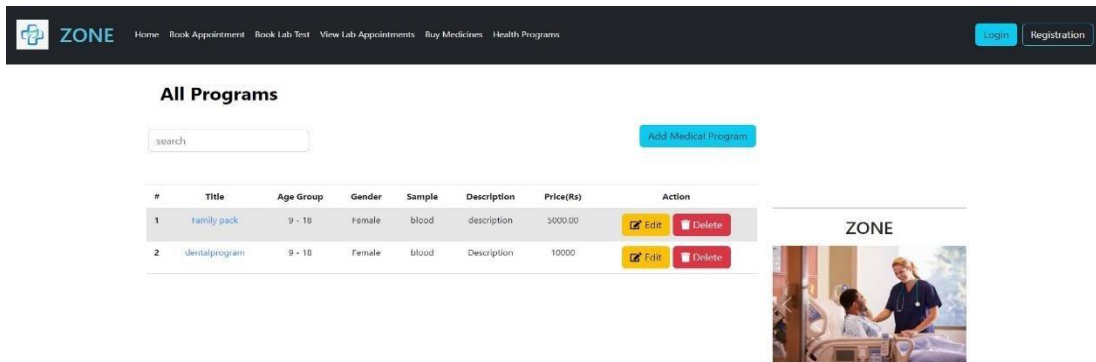ore crucial in offering the user superior services. The system should be tangible first and foremost. Tangible in the sense that the system should be simpler to support with the recently added physical components to the organization. Because the healthcare sector will continue to develop in the future. Therefore, the system ought to be more dependable going forward. The anticipated system ought to be more capable of completing the assigned duty impeccably and accurately. To give users uninterrupted service, the system has to be more responsive. Additionally, assurance refers to civility, credibility, expertise, and awareness of the needs of the consumer. In order for customers to grasp the system, it needs to be more sympathetic. Additionally, users should maintain open lines of communication.

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VI.   FUTURE ENHANCEMENT

This system may yet be able to develop further in the future. The system seems to like that the business can archive a lot of data by supporting IOT devices. For instance, using a QR code for every booking can help patients save a lot of time. Tracking medical consultants digitally. The development of this industry can be aided even more by proper space management employing sensors. The inclusion of a feedback component in the system enables users to submit suggestions for improvement. That improves the system even further. There are just five basic modules in the system as it is now created, but adding more modules like supply management, facility management, billing management, and operating theater management allows the system to be even better.

VII.   LIMITATION

This approach still has a lot of restrictions because of how quickly technology is developing and how big the hospital is getting. Issues with security are one of those. Due of the competitive environment, malicious attacks and unauthorized user attacks may occur. However, timely security-related updating aids in resolving that problem. A huge database is also required. As the number of consumers grows, the system's ability to collect and manage data must also improve. High-end database system is necessary to store those data. Front-end personnel who are more effective will work on that system. If they had the right instruction, they could overcome that.

VIII.   CONCLUSION

The development of a system for the well-known hospital Zone is the primary emphasis of this project. Most that hospital's daily operations are now computerized thanks to this system. Patients, pharmacists, lab assistants, and HR managers are the system's primary users. This hospital's work is organized utilizing a system that includes five modules. Those are the systems for managing doctors. Systems for managing reservations, pharmacies, human resources, and healthcare are also available. Using these modules, most of the work is computerized.

Like controlling medical information. coordinating the scheduling of lab tests, monitoring patient information, and managing the delivery process and pharmacy information. Additionally, the system is designed to produce accurate results for a variety of needs, including reporting on lab tests, patient bookings, pharmacy information, etc. This system makes it simpler to sort information by using the search feature. The system offers answers for every fundamental hospital task. This system primarily assists in providing an effective data storage method to maintain hospital facts. The system's ability to aid with data backup for the company is its most significant feature.

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