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ASTUDY ON CHANGING SCENARIO OFHOSPITAL MANAGEMENT SYSTEM

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ABSTRACT

The hospital's management system aims for enhanced profitability, administration, and patient care. This research seeks to develop a digital management system to improve hospital effectiveness and integration standards. A module was developed to facilitate tasks such as doctor appointments, lab test booking, pharmacy services, and accessing health programs. Additionally, an admin handling component allows administrators to manage users, pharmacy systems, health programs, and appointment scheduling. The system enables the generation of multiple reports as per the admin's requirements. Modules for managing admission bills, pharmaceutical payments, and monitoring pharmacy inventory were also created. The manual handling of records in hospitals is time-consuming and error-prone, prompting the need for online automation of day-to-day activities. Each research phase guided the study's development and workflow organization. The system was found to enhance work progress and employee productivity, generate hospital reports for transaction overviews, and facilitate patient details retrieval. Overall, the study improved hospital transactions, suggesting the need for frontend design enhancement.The manual handling of records in hospitals is laborious and prone to errors, given the pivotal role hospitals play in people's lives and daily routines. This project aims to alleviate these challenges by automating and digitizing day-to-day activities. The systematic development approach employed in each phase of the study ensured an organized workflow and guided researchers in creating a comprehensive solution. By streamlining processes such as appointment booking, pharmacy services, and health program management, the system not only enhances administrative efficiency but also contributes to better patient care delivery. Furthermore, the system's ability to generate various reports provides invaluable insights into hospital transactions, aiding in decision-making and resource allocation. The reduction of workloads through automation fosters improved management practices and enhances overall operational performance. The findings underscore the significant impact of digital management systems in transforming hospital operations, with recommendations for further enhancements to ensure optimal functionality and user experience.

Keywords— CNC, IoT,QR, modules, streamline, Digital management system.

INTRODUCTION

The hospital management system involves digital patient registration, organizing their data within the system, and managing patient records. The software automatically provides a search function for patients and staff, allowing users to check availability status for appointments and doctors. Access to the system requires a username and password, restricted to receptionists or administrators who can input data into the database, which is easily retrievable. The user interface is straightforward.

Data processing is efficient, particularly for individual use. For hospitals with multiple specialties, a Health Board System is implemented to streamline various administrative procedures. Hospital management

systems contribute to improved hospital analysis and activity-based pricing, thereby enhancing business growth, productivity, and work quality.

The project's aim is to simplify management processes such as patient registration, doctor appointments, and prescription writing. Current registration procedures are time-consuming, motivating the development team to design a system to benefit both patients and hospital staff, driven by the common challenges faced in hospitals.

Stakeholders desire a system that increases hospital efficiency, hence the emphasis on designing a system to streamline processes for quick and efficient hospital operations.

Additionally, the hospital management system project aims to mitigate the inefficiencies caused by manual registration processes, which often lead to delays and errors. By automating tasks such as patient registration and appointment scheduling, the system seeks to streamline operations and reduce the burden on administrative staff. This shift towards automation not only improves the accuracy of data entry but also frees up valuable time for healthcare professionals to focus on patient care. Furthermore, the system's ability to generate reports and analyze data allows for better decision-making and resource allocation within the hospital. Ultimately, the implementation of a comprehensive hospital management system represents a significant step towards modernizing healthcare administration and improving overall patient experiences.

REVIEW OF LITERATURE

Initially, a multitude of findings were amassed from databases using various search terms. Only studies employing maturity models were scrutinized, while those lacking such models were omitted. Among the foremost challenges plaguing current hospital management systems are operational efficiency and wait times spanning various procedures, departments, and individuals. To tackle this, a solution involving visual simulation empowers users to scrutinize existing processes and enact necessary tweaks to enhance service levels and process efficiency. This methodology yielded a final pool of 41 surveys, dispersed across a variety of sources. Doctoral dissertations accounted for 7.32%, while experts' dissertations comprised 9.76% of the total.

A. Current Systems: The organization's data is stored daily, resulting in an accumulation of numerous files over time. Hospitals manually handle every task, necessitating significant time and effort for completion. Manual processes exclusively govern daily operations at Zone Hospital, where patients schedule appointments and lab tests with the receptionist. Pharmacy items can only be purchased on-site, with no option for delivery. Healthcare options are exclusively provided on-site as well. Patient and doctor details, along with lab test results, are manually transcribed onto paper and subsequently entered into the computer. Reports are manually generated with the assistance of experts.

B. Challenges with Current System: The existing system is time-consuming, lacking security components, and reliant on manual execution for every task. Most tasks rely on specialists and human resources, with no direct communication with senior officers. Accuracy levels are subjective, and high expenses are incurred for manual system management. Retrieving backup data and transferring data pose challenges, as does integrating IoT technology and intelligent robotics. The manual system lacks user-friendliness and is unreliable in the current technological landscape.

JUSTIFICATION OF THE STUDY

The study justifies its importance based on several key points:

1. **Enhanced Profitability**: By streamlining administrative tasks such as managing appointments, handling pharmaceutical payments, and monitoring inventory, the digital management system aims to improve profitability by reducing operational inefficiencies and minimizing errors. With better management of resources and transactions, the hospital can expect to see financial improvements.

2. **Improved Administration**: Automating day-to-day activities eliminates manual handling of records, which not only saves time but also reduces the likelihood of errors. This leads to more efficient administration processes, allowing hospital staff to focus on more critical tasks, thus enhancing overall administrative effectiveness.

3. **Better Patient Care**: The digital management system facilitates easier access to services such as booking doctor appointments, lab tests, and pharmacy services. This ensures smoother patient

experiences and timely access to necessary healthcare services, ultimately improving patient care and satisfaction.

4. **Increased Productivity**: The study found that the system speeds up workflow and enhances the productivity of hospital employees. By automating repetitive tasks and providing tools for efficient management, employees can allocate their time more effectively, leading to increased productivity across the board.
5. **Comprehensive Reporting**: The system's ability to generate various reports offers valuable insights into hospital transactions and operations. This enables users to analyze data within specific timeframes, aiding decision-making processes and providing a clear overview of hospital activities.
6. **Reduced Workload**: By automating processes and centralizing information, the system reduces the workload on hospital staff, leading to better management and performance. This not only improves employee satisfaction but also ensures that resources are utilized more effectively.

OBJECTIVES OF THE STUDY

The objective of this study is to develop a digital management system for hospitals aimed at enhancing effectiveness and integration standards. Specifically, the study aims to:

1. Automate and streamline day-to-day activities in hospitals to reduce manual handling of records, which is time-consuming and error-prone.
2. Create modules for booking doctor appointments, lab test slots, pharmacy services, and health programs to improve patient care and administrative efficiency.
3. Develop an admin handling part of the system to manage users, pharmacy systems, health program management, and booking of appointments and lab tests.
4. Implement modules to manage admission bills, pharmaceutical payments, and monitor medicine inventory in the hospital pharmacy.
5. Generate multiple reports for the admin to provide insights into hospital transactions within specific dates.
6. Enhance the overall working progress and productivity of hospital employees, leading to better management and performance.
7. Provide a user-friendly interface, particularly focusing on improving the frontend design of the system to enhance usability and aesthetics.

RESEARCH DESIGN

The development of the hospital management system will be carried out in a step-by-step process, commencing with the creation of a database followed by the customization of the interface. Subsequently, the interface will be programmed, and specific codes will be scripted. Taking cues from existing systems, the aim is to refine and improve upon them for optimal outcomes. Through meticulous examination of the current system, the development team identified its merits and demerits, devising strategies to rectify the latter. The introduction of the five core modules of the solution system, encompassing appointment management, pharmacy management, healthcare program management, and doctor management, marks a significant milestone. In the pursuit of an alternative system, the current system undergoes thorough analysis through comparative methods. The selection of the most suitable software is contingent upon a comprehensive evaluation of available options. The initial phase of constructing a local database involves compiling a list of tables and establishing their interrelationships.

For system implementation, MERN technology is employed, leveraging JavaScript stacks favoured by numerous prominent organizations today. In crafting an appealing end-user interface, the development team integrates various React packages such as Material UI, React Bootstrap, Tailwind CSS, and Ant Designs. Backend development, executed using Node.js, prioritizes aspects like security, authorization, validation, authentication, and performance. To fulfil these requirements, developers utilize assorted packages like validator and crypted. Data insertion and management are facilitated by a non-relational database,

specifically MongoDB, selected by the administration team for its scalability, enabling swift handling of extensive data volumes. Furthermore, MongoDB accommodates seamless field and schema modifications, catering to unstructured, semi-structured, and structured data storage needs.

The database architecture is meticulously designed to efficiently manage patient records, doctor profiles, lab test details, medical program particulars, and pharmaceutical data. This information serves as a resource for system users whenever necessary, facilitating ease of use and expeditious appointment scheduling.

LIMITATIONS OF THE STUDY

- Despite advancements in technology, there are still numerous limitations to consider, particularly due to the rapid growth and scale of the hospital.
- Security concerns pose a significant challenge, especially in a competitive environment where malicious attacks and unauthorized access may occur.
- Regular updates focused on security measures are crucial for addressing these potential threats.
- The increasing volume of data necessitates a robust database system capable of effectively collecting and managing vast amounts of information.
- A high-end database system is essential to accommodate the growing number of consumers and their data requirements.
- Efficient front-end personnel are pivotal in the successful operation of the system. Providing them with proper training and instructions is essential for overcoming challenges effectively

REPORT AND ANALYSIS

Figure 1: System Overview

PROPOSED SYSTEM

A. Hospital Management System Background A Hospital Management System (HMS) serves as a centralized platform for organizing a hospital's data and operations. It encompasses not only the computer systems and networks but also the entirety of the hospital's information.

B. Project Goals The aim of this project is to develop a web-based hospital management application, utilizing React for the frontend and MongoDB for the backend. This software aims to streamline processes such as booking doctor appointments, lab tests, pharmacy services, and health programs. It includes an administrative module for managing users, pharmacy systems, and appointments. As hospitals play a crucial role in providing medical care, it's imperative to track day-to-day activities and patient records efficiently. However, manual record-keeping is error-prone and time-consuming, particularly with the increasing population and hospital visits.

C. System Overview A Hospital Management System is a computerized tool designed to aid healthcare practitioners in managing healthcare information effectively. It simplifies tasks across various departments, including user management. The HMS was introduced to address the challenges associated with managing patient paperwork across hospital departments while ensuring confidentiality. Patients can easily schedule appointments and manage their documentation through the system. User authentication is required for access, and administrators can oversee user details and generate reports for management purposes.

USER MANAGEMENT

The introduction of the Hospital Management System (HMS) aims to tackle the complexities associated with handling patient paperwork across different hospital departments while safeguarding patient privacy. With HMS in place, patients can easily schedule appointments as all their documentation is centralized. The system undertakes various tasks for clients. Upon registration, patients receive a confirmation email to their provided email address. Successful registration grants access to the system via valid credentials, ensuring secure login. The administration oversees all user details through the admin panel, facilitating user management by enabling the viewing of all registered users and generating reports for managerial purposes.

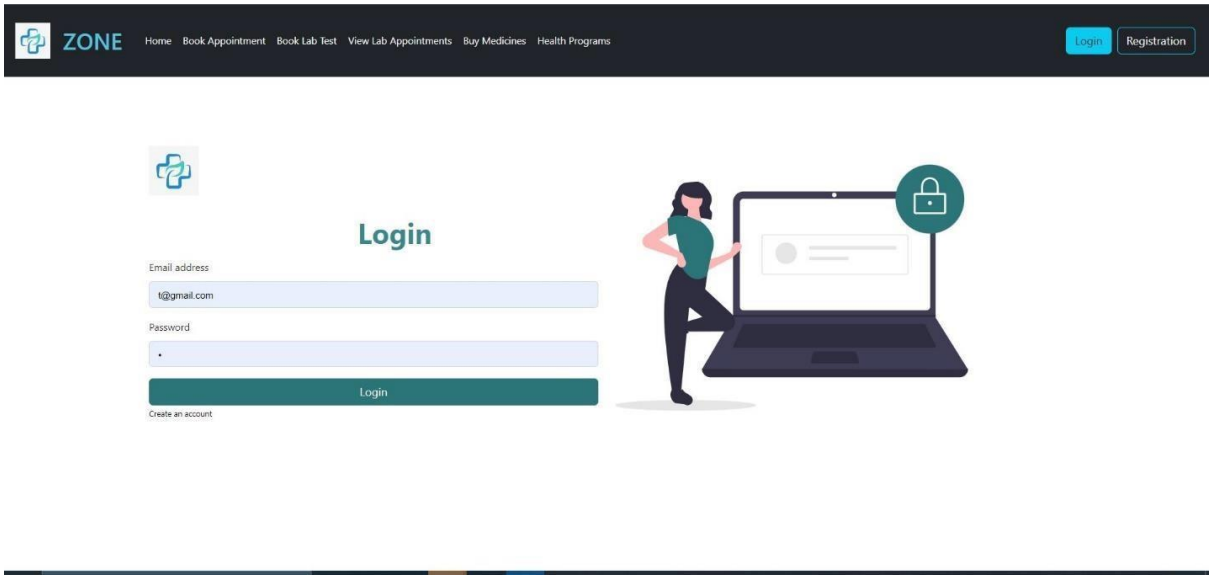

Figure 2: User Login Interface

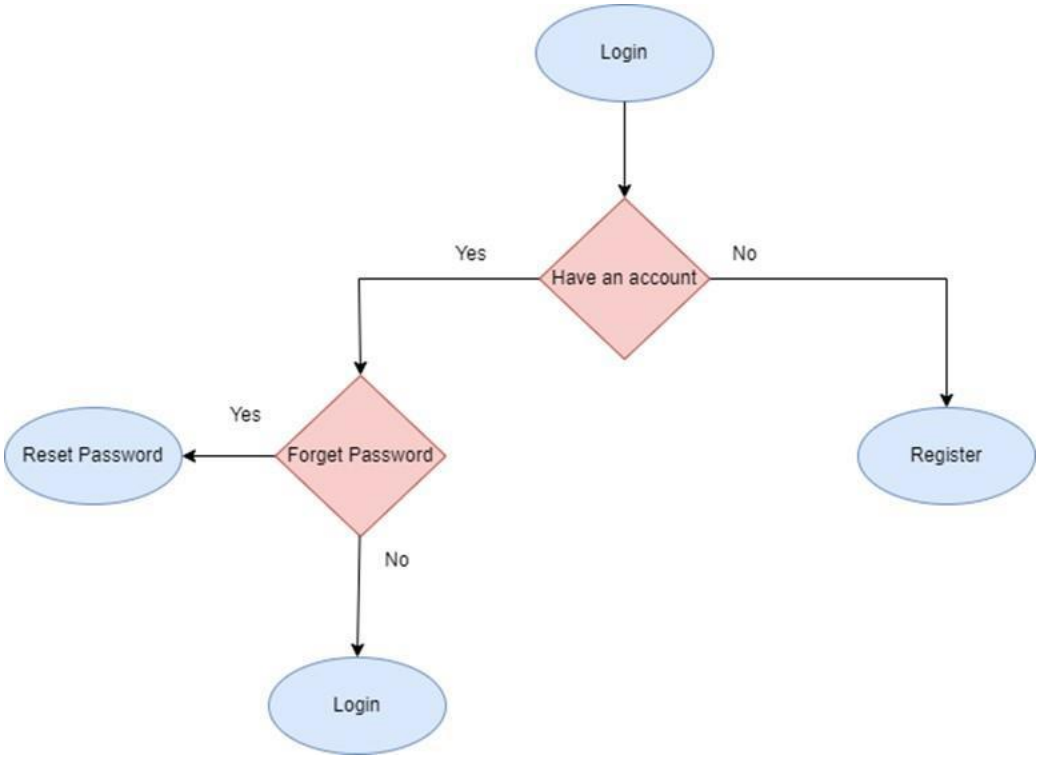

Figure 3: User Management Flow chart

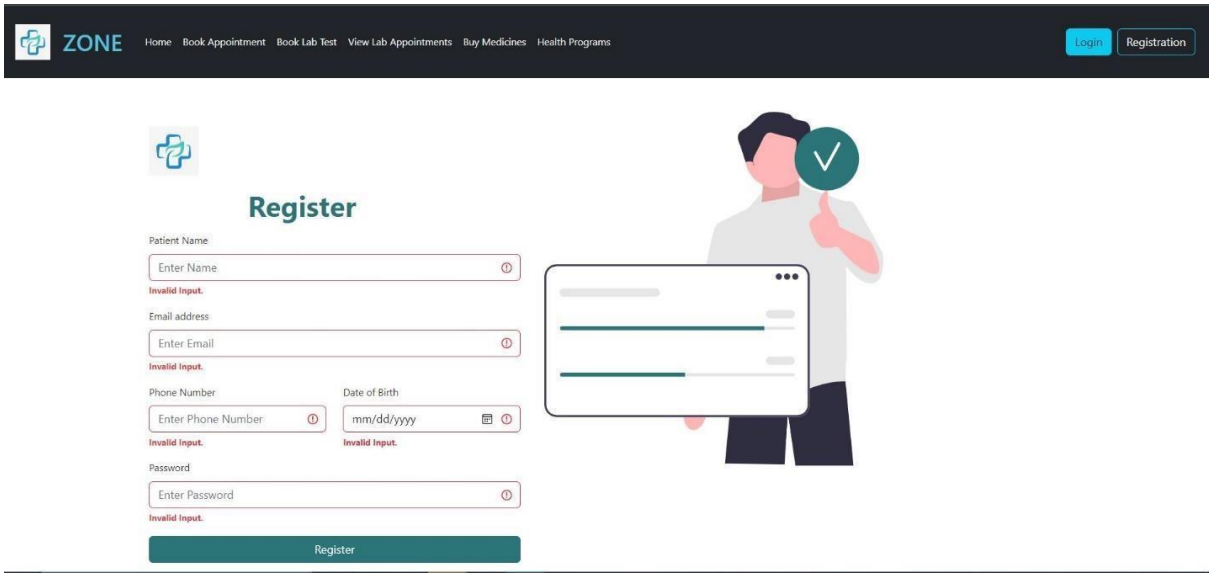

Figure 4: User Register Interface

MEDICAL APPOINTMENT BOOKING SYSTEM

This platform facilitates the acquisition of doctor appointments by customers. To initiate the process, users are prompted to provide personal details such as username, age, and address. Following this, users select their preferred doctor, appointment time, and date, and then proceed by clicking the "Book Now" option.

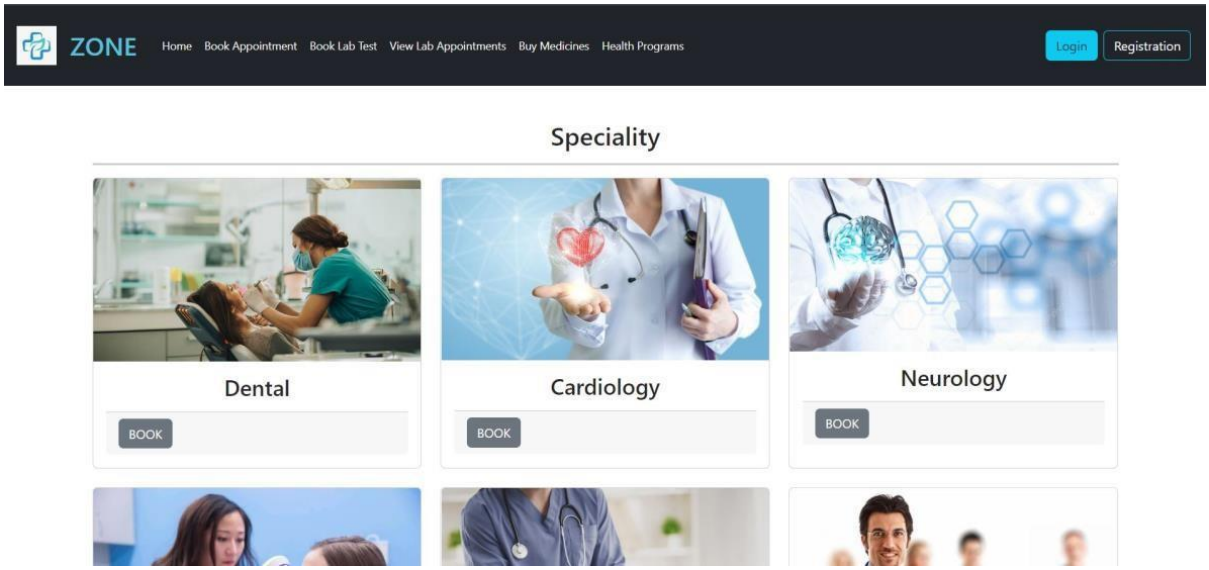

Figure 5: Doctor Appointment Management

LABORATORY TESTING MANAGEMENT

This system facilitates the acquisition of laboratory appointment information from clients. Initially, individuals must input their username, age, and address. It functions as a comprehensive tool for recording, storing, and handling inventory, samples, and testing data. It serves as a valuable resource for physicians to organize various medical tests for their patients. Once users input their requested tests, preferred time, and date, they simply need to click the "Book" button to confirm their appointment.

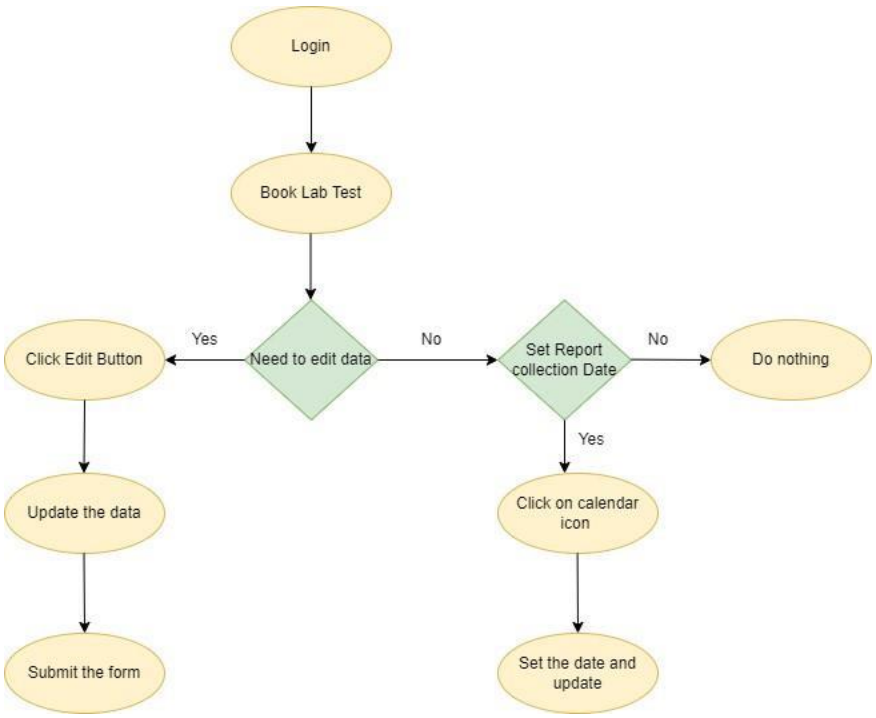

Figure 6: Lab Test Management Flow Chart

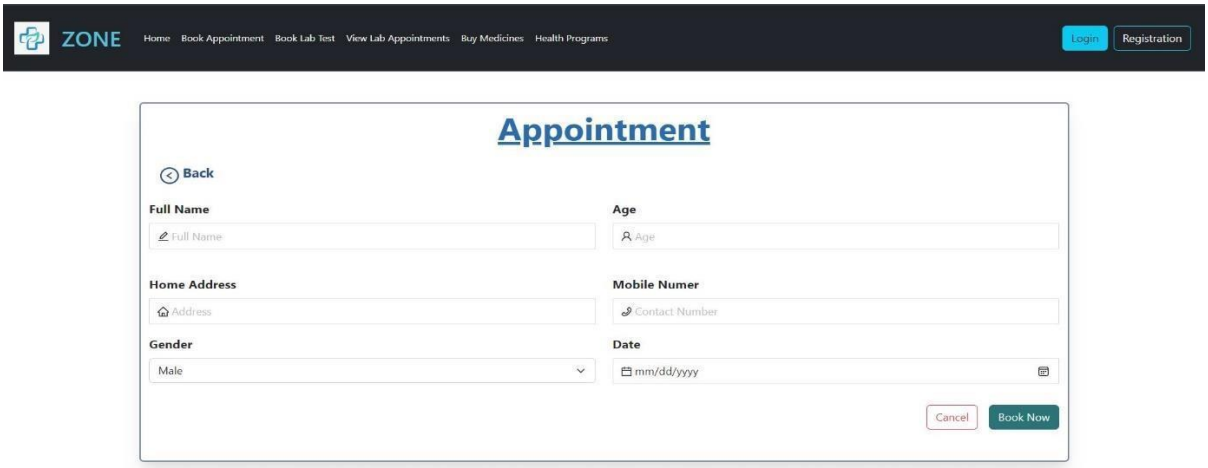

Figure 7: Lab Test Booking Interface

PHARMACY MANAGEMENT

In the pharmacy, the initial step involves the user logging into the system and proceeding to access the Pharmacy section. Subsequently, the user chooses the medication they intend to purchase. Within the user's medicine dashboard page, there exists a search bar facilitating the identification of the desired medication. Upon initial access to the medicine dashboard, if the user encounters difficulty in locating the desired medication, they can effortlessly retrieve medication details by simply inputting the relevant information into the search bar.

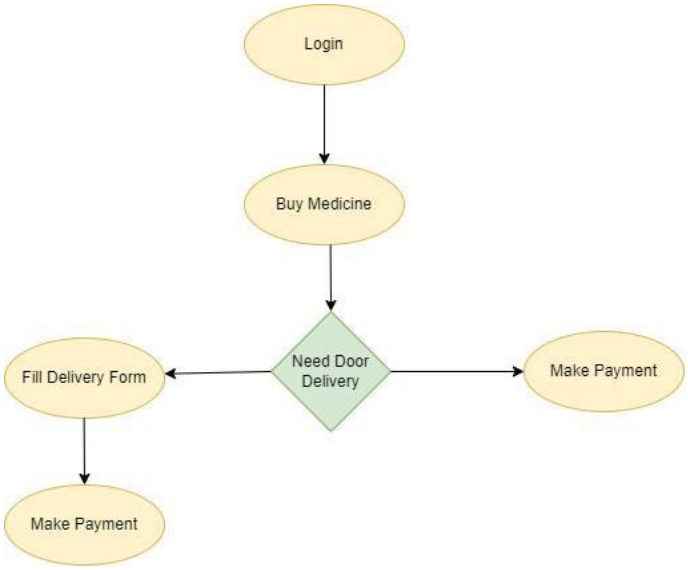

Figure 8: Pharmacy Management Flow chart

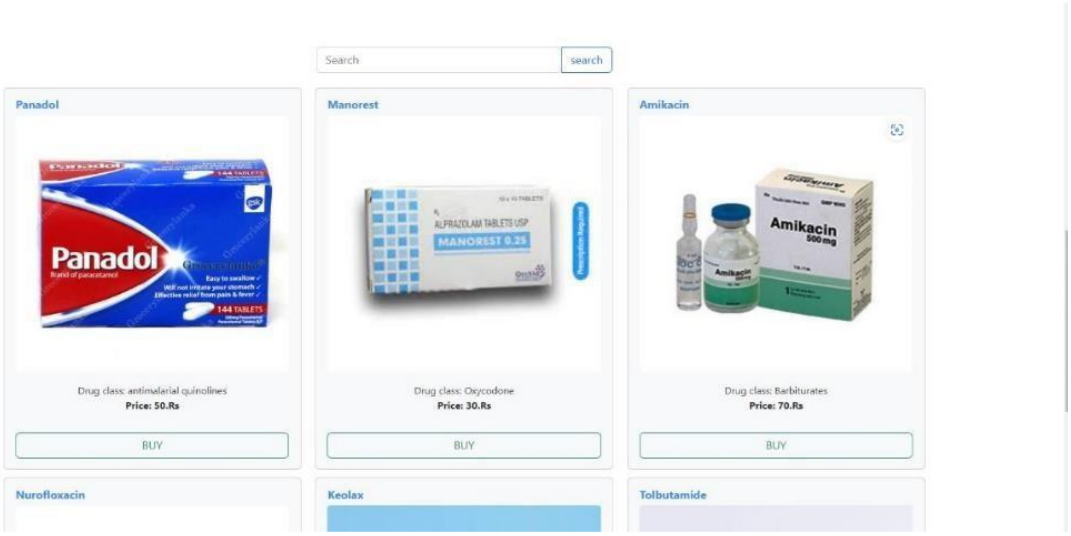

Figure 9: Pharmacy Management Dashboard

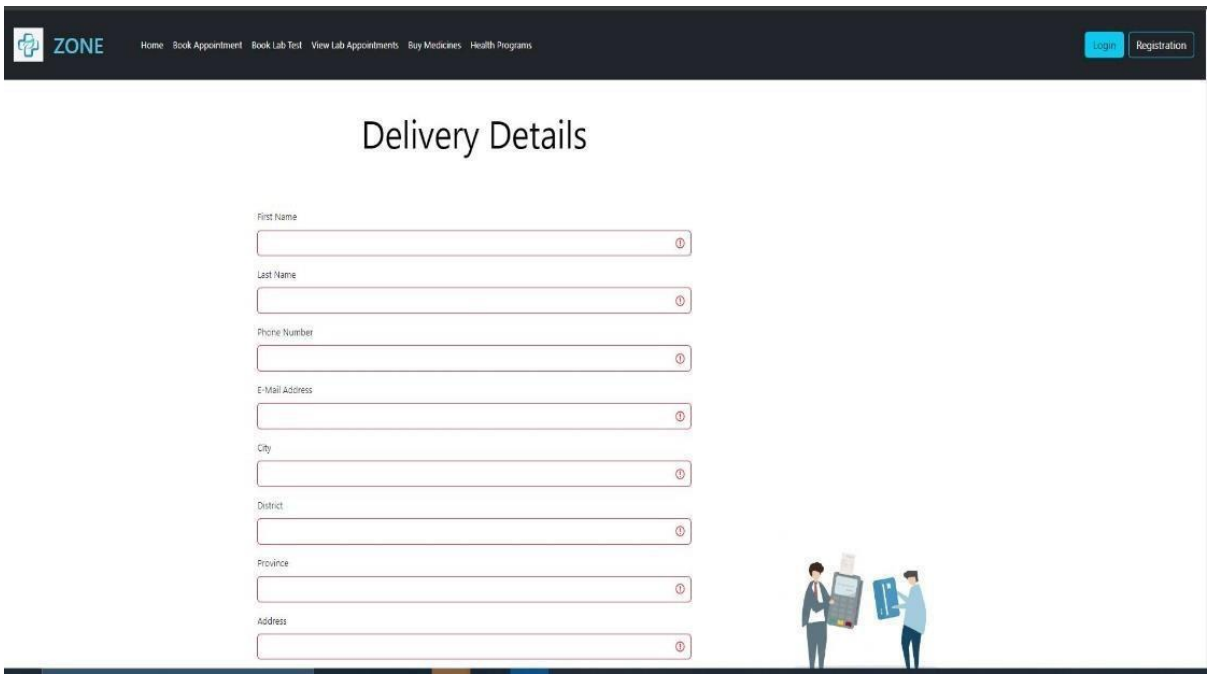

Figure 10: Medicine Delivery Interface

NON – FUNCTIONAL BENEFITS

Ensuring user satisfaction and delivering an optimal user experience stand as paramount considerations in system development. In the realm of healthcare management, this presents a notably challenging task. Today's users exhibit little reluctance in shifting to alternative platforms for accessing services, underscoring the importance of providing high-quality services for both patients and healthcare professionals. The healthcare system under development primarily emphasizes five key quantitative assessments essential for delivering superior services to users. The system's foremost requirement is tangibility, implying a need for simplicity and compatibility with newly incorporated physical components within the organization. Given the continued evolution of the healthcare sector, the system must exhibit enhanced reliability for future utility. Anticipated improvements include heightened capability to execute assigned tasks flawlessly and accurately, ensuring uninterrupted service delivery and improved responsiveness. Additionally, assurance encompasses aspects such as courtesy, credibility, expertise, and understanding of consumer needs, necessitating a more empathetic system design for user comprehension. Furthermore, maintaining open lines of communication with users is imperative.

FUTURE ENHANCEMENT

The potential for further development of this system remains considerable. The system's architecture suggests the possibility of extensive data archiving through support for IoT devices. For instance, implementing QR codes for bookings could significantly streamline patient processes. Digitally tracking medical consultants represents another avenue for advancement. Effective space management utilizing sensors could further bolster industry development. Incorporating a feedback mechanism empowers users to provide suggestions for system enhancement, thereby contributing to ongoing improvement efforts. While the current system comprises five fundamental modules, expansion to include additional modules such as supply management, facility management, billing management, and operating theatre management promises further refinement and effectiveness.

FINDINGS

Aim: Develop a digital management system for hospitals to enhance profitability, administration, and patient care.

Modules developed:

- Facilitation of tasks: doctor appointments, lab test booking, pharmacy services, and accessing health programs.
- Admin handling component: managing users, pharmacy systems, health programs, and appointment scheduling.
- Reports generation: customizable reports for admin requirements.
- Admission bills management, pharmaceutical payments, and pharmacy inventory monitoring.
- Challenges addressed: Time-consuming and error-prone manual handling of records in hospitals.
- Approach: Systematic development approach in each research phase for an organized workflow.

Outcomes:

- Enhanced work progress and employee productivity.
- Improved hospital transactions and patient details retrieval.
- Streamlined processes leading to better administrative efficiency and patient care.
- Invaluable insights into hospital transactions aiding decision-making and resource allocation through generated reports.

Implications: Reduction of workloads through automation fosters improved management practices and operational performance.

Significance: Highlights the transformative impact of digital management systems on hospital operations.

Recommendations: Suggests frontend design enhancements for optimal functionality and user experience.

CONCLUSION

In conclusion, the focal point of this project lies in developing a system tailored for the renowned Zone Hospital. Thanks to this system, the majority of the hospital's daily operations are now automated. Primary users of this system include patients, pharmacists, lab assistants, and HR managers. The hospital's workflow is managed through five modules, encompassing doctor management, reservation management, pharmacy operations, human resources, and healthcare services. These modules effectively automate various tasks such as managing medical records, coordinating lab test schedules, monitoring patient data, overseeing deliveries, and maintaining pharmacy records. Moreover, the system is adept at generating accurate reports for diverse needs, including lab test results, patient appointments, and pharmacy details. It simplifies data retrieval through its search functionality, thereby facilitating efficient information sorting. Essentially, this

system provides solutions for essential hospital functions, primarily serving as an efficient data storage solution to preserve hospital information. Its most notable feature lies in its capability to support data backup for the institution.

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