

Vivekanand Education Society's Institute of Technology,

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Medicine Stock System for Health Centers

Submitted in partial fulfillment of the requirements of the Third Year of

**BACHELOR OF ENGINEERING IN COMPUTER
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CERTIFICATE

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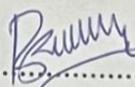
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Mini Project Approval

This Mini Project entitled "Medicine Stock System for Health Centres" by Tisha Jeswani(D12B-21), Jiya Lund(D12A-37), Dinky Khatri(D12A-31), Varsha Makhija(D12C-43) is approved for the degree of Bachelor of Engineering in Computer Engineering.

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Date: 21/10/2023

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Abstract

In India Healthcare service is a challenging task. Considering a dense population it is necessary to provide systematic health related services. Government Hospitals are providing various health services at reasonable cost and some services are absolutely free. Medicines are also provided free of cost to patients and it is necessary to keep the pharmacy of Health centers up to date with adequate stock of medicines and also to keep track of the same. The major Objective in this project To provide a comprehensive solution designed to address the challenges faced by pharmacists and administrators at medical facilities to manage their medicine stock efficiently. This system enables real-time tracking of medicine inventory, ensuring accurate stock availability information and streamlining the supply chain process. The proposed solution aims to enhance medicine management, reduce wastage, and improve patient care. On top of that, the website is easy to use with a simple interface. It helps pharmacy staff and healthcare professionals “quickly find information about medicine availability”, this system makes sure patients get their medicines on time and improves their overall healthcare in rural communities.

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1. Introduction

1.1 Introduction

In healthcare, it's really important to have enough medicines available all the time to take care of patients properly. But sometimes, using traditional or conventional methods to manage medicine stock can cause problems like mistakes and delays in getting new supplies. To overcome the challenges, in this project a medicine management system is under consideration. This system uses various access mechanisms and advanced tools that help to monitor and control the medicine with minimum human efforts. A system will be a facilitator for Hospital staff. By using this , we can assure fast, user-friendly and state of the art systems to save time, and hassle free ,mechanisms to distribute and control the medicinal services. It's a big step forward in taking better care of people's health in hospitals and clinics.

1.2 Motivation

The motivation behind implementing our medical stock system in healthcare is driven by a commitment to enhance patient care, improve safety, and ensure the efficient and cost-effective operation of healthcare facilities. A well-managed stock system not only guarantees that essential supplies and medications are readily available for patient treatment but also reduces costs, minimizes waste, and aids in compliance with regulatory requirements. By automating inventory management and data-driven decision-making, we aim to relieve the administrative burden on healthcare professionals, ensure emergency preparedness, and support the long-term sustainability and satisfaction of both patients and staff.

1.3 Problem Statement & Objectives

Problem Statement

Medical facilities often face many problems when it comes to managing medicine stock. They might run out of important medicines (stockouts), have too much of some medicines (overstocking), or make mistakes when writing down information about the medicines (manual data entry errors). These issues can cause problems like “patients not getting the right treatment”, “increased operational costs”, and “reduced overall efficiency”. To solve these problems, we need a dependable and automatic solution. This solution should help keep track of medicine stock, so medical facilities always have enough of the right medicines. By having such a solution, medical facilities can improve patient care, save money, and work more efficiently. It's essential to find a reliable and easy-to-use system that can handle medicine stock management effectively and help healthcare providers focus on what matters most: taking care of patients.

Objectives

1) Analysis:

- **Inventory Management Issues:** Health centers may face challenges in managing their medicine inventory efficiently, leading to either overstocking or running out of critical medicines.
- **Lack of Data Tracking:** Some health centers might rely on manual record-keeping, making it difficult to track medicine consumption patterns accurately and forecast demand..

2) Solution:

- **Digital Inventory Management System:** Implement a digital inventory management system that tracks medicine stock levels, consumption patterns, and expiration dates. This will provide real-time data for better decision-making.
- **Demand Planning Tools:** Utilize forecasting and demand planning tools to predict medicine requirements accurately, reducing the chances of stock-outs and overstocking.

3) Scope:

- **Digital Inventory Management System:** digital inventory management system allows health centers to monitor medicine stock levels in real-time, enabling proactive stock replenishment and reducing the risk of stockouts.
- **Demand Planning Tools:** By incorporating demand planning tools into the medicine stock system, health centers can enhance their stock management practices, improve patient care, and optimize resource utilization, leading to better healthcare delivery outcomes.

1.4 Organization of Report

This report consists of three chapters. The first chapter deals with the introduction of the topic, problem statement, motivation behind the topic & objectives. The second chapter is the Literature Survey. It includes all the research work related to this topic. The third chapter is about the proposed system which is used in this project. It presents information about the algorithm, methodology, hardware, software, results, etc.

2. Literature Survey

2.1 Survey of Existing System/SRS

2.1.1:Medical management system (Author - Prof. R.A Bharatiya and Others) **Year-2023**

Summary - This paper discusses the development of a Medical Management System, which aims to replace manual-based systems with computerized solutions in pharmacies. The system is designed to be efficient, useful, and affordable, providing various functionalities such as sales management, inventory management, billing, tax calculation, employee salary computation, and generating reports and statistics. The paper describes the motivation behind creating such a system, the methodology used for data collection, design, web-server connection, database connectivity, and backend development. It also discusses the testing phases, including unit testing, performance testing, and system testing. The paper concludes by highlighting the benefits of the system in improving medical store management and customer service.

2.1.2: Modeling and analysis of inventory management systems in healthcare

(Author - Esha saha)

Year-2019

Summary - This paper reviews the importance of efficient 2019 inventory management in healthcare, considering factors like patient condition changes, length-of-stay variations, and demand dependencies. It categorizes inventory problems and discusses various modelling and solution methods. It proposes an integrated research framework for healthcare inventory management. The paper highlights the need for specialized systems and outlines future research directions.

2.1.3 : Management of medical Technology (authors - Assoc. Prof lan brown and others)

Year-2007

Summary - This paper discusses the results of a Capital 2007 Equipment Management Plan conducted at a major acute hospital in Australia. The plan categorized equipment into Major and Minor items based on their replacement value and collected detailed information on 527 Major equipment items, representing 80% of the hospital's total equipment stock. The paper presents various views of the hospital's equipment assets and outlines a prioritization method for future equipment replacement and acquisition over a 5-year planning period. The study highlights the need for funding to maintain and acquire medical technology in modern healthcare facilities.

2.1.4 : Study of Inventory Management in pharmaceuticals (authors- mir mohammed and others) year - 2020

Summary - The paper reviews pharmaceutical inventory 2020 management practices in light of the COVID-19 pandemic. It examines various techniques such as ABC, VED, and their combination (ABC-VED matrix) for inventory classification. The study emphasizes the importance of automated systems and innovative solutions like RFID-based inventory management. It highlights that a combination of these techniques can optimize pharmaceutical inventory and improve patient care. The paper also calls for central pharmacies to be recognized as essential hospital facilities and offers insights for future research in this area.

2.2 Limitation Existing system or Research gap

1. Pharmacy Medicine Store (Rating: 3.9):

Limitation: The application requires users to manually enter details like batch number, Maximum Retail Price (MRP), and purchase rate during the purchasing process. This can be time-consuming and prone to human error. It may also discourage users from making purchases, especially if they have to input a large number of medicines.

2. Stock and Inventory Management (Rating: 4):

Limitation: The application lacks an automatic backup feature for updated stock information. Without this feature, there is a risk of data loss in case of system failure or other unforeseen events. This limitation can lead to disruptions in business operations and affect the accuracy of inventory management.

3. Explain Medicine (Rating: 3.4):

Limitation: The most critical limitation here is that the application automatically shuts down whenever a user is actively using it. Frequent application crashes can be extremely frustrating for users, disrupt their workflow, and may even lead to data loss. This reliability issue needs urgent attention for a better user experience.

4. MediScanner (Rating: 2.7):

Limitation: This application has several issues, including the inability to scan medicine codes, sluggish performance, and inaccurate results. The inability to scan codes limits the application's usefulness, slow performance makes it frustrating to use, and inaccurate results can be harmful if users rely on them for medical information.

5. ABHA-National Health Authority (Rating: 3.5):

Limitation: The system frequently crashes when users click on side options like profiles and records of medicines. Application stability is crucial, especially in healthcare-related software. Frequent crashes can lead to data loss, hinder user access to important information, and erode trust in the application's reliability.

In summary, these limitations in the existing applications can lead to a range of issues, from user inconvenience and data loss to potential inaccuracies in medical information. Addressing these limitations is essential to enhance the overall user experience, ensure data integrity, and promote the trustworthiness of these applications in the healthcare and pharmaceutical sectors.

2.3 Mini Project Contribution

Implementing a well-organized and efficient medicine stock system for health centers have several significant contributions to the well-being of people:

- Improved Patient Care.
- Reduced Medicine Shortages.
- Supports emergency preparedness.
- Preventive care.
- Patient outcomes and public health.

In summary, a well-organized medicine stock system is crucial for the effective and efficient functioning of health centers. It directly impacts the quality of healthcare services, patient outcomes, and the overall health of the population. It also aids in financial management, accountability, and public health planning.

3. Proposed System

3.1 Introduction

The proposed solution aims to address the efficient management of medicine stock in healthcare facilities. Managing medicine inventory is a critical task in the healthcare sector to ensure that patients receive the right treatment without facing stock outs or overstocking issues. The proposed solution involves the creation of a website that automates the tracking of medicine stock. It utilizes barcodes to provide customers with essential information about the medicines, such as name, expiry date, and dosage.

By implementing this system, healthcare providers can maintain an accurate record of their medicine inventory. This allows them to promptly replenish stock when necessary, prevent overstocking, and reduce the risk of medication errors. Ultimately, the system streamlines the entire process of managing medicine stock, making it easier for healthcare facilities to focus on delivering top-notch patient care.

3.2 Architectural Framework / Conceptual Design

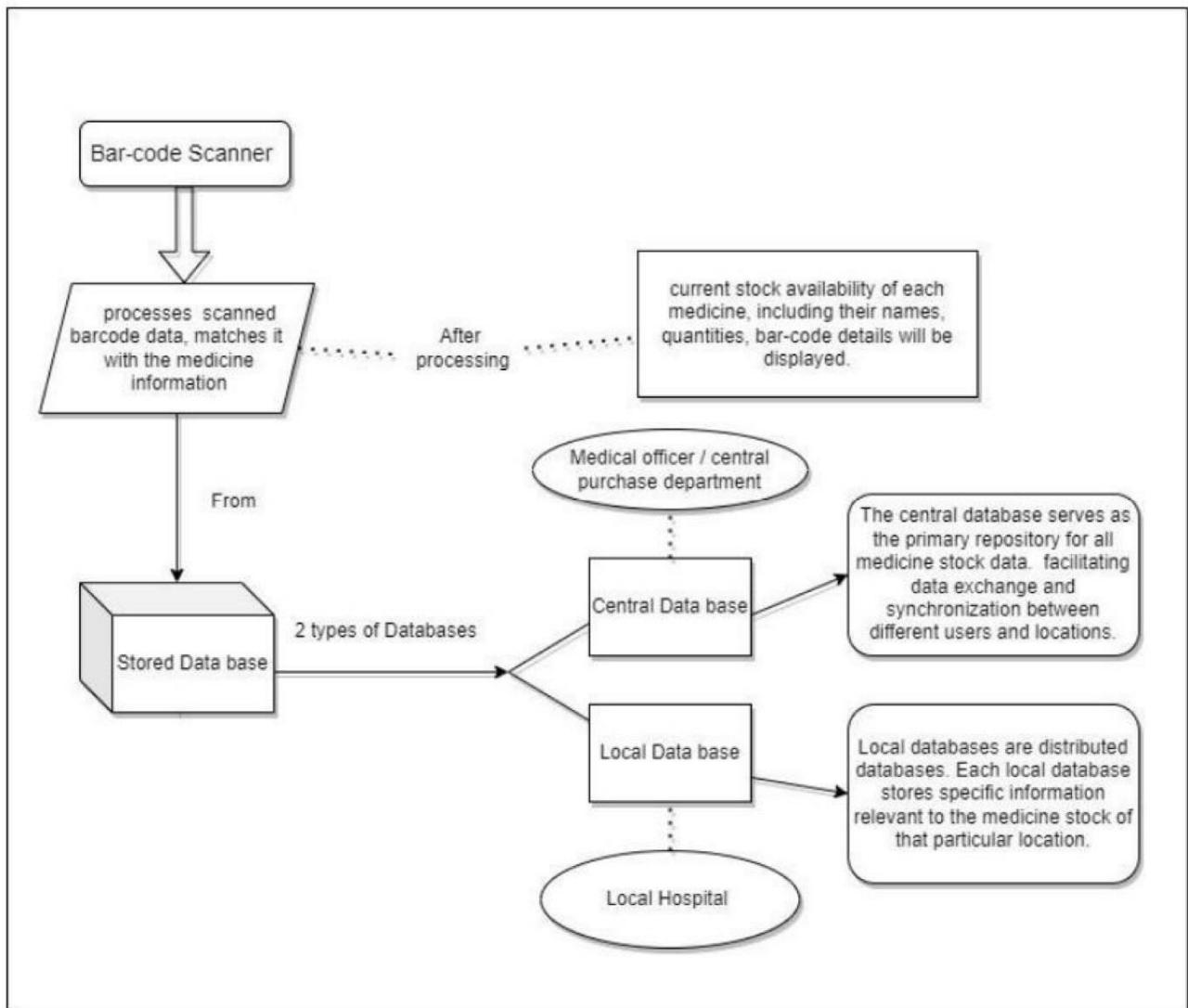


Figure 3(a) Architecture

3.3 Algorithm and Process design

Algorithm:

The algorithm for the proposed medicine stock management system can be broken down into the following key steps:

1.Initialization:

Set up a web-based platform with user authentication for healthcare facility staff.

Create a database to store information about medicines, including their names, quantities, expiry dates, and barcodes.

2.Medicine Arrival/Dispensation:

When a new medicine arrives or is dispensed to a patient, it should be entered into the system.

Scan the barcode on the medicine packaging to automatically input the details.

If the medicine is given to a patient, update the patient's medical record.

3.Database Update:

The system should automatically update the database with the new medicine's information.

Adjust the quantity of the medicine in stock, and record the date of the transaction.

4.Stock Monitoring:

Implement an algorithm to continuously monitor the stock levels.

Set threshold levels for each medicine to trigger alerts when stock is low.

Generate reports on stock levels and expiration dates.

5.Stock Replenishment:

When stock reaches a predefined minimum threshold, the system should automatically notify the responsible personnel to reorder the medicine.

Generate purchase orders based on the stock levels.

6.Customer Information:

Allow customers to scan the barcodes on the medicine packaging using their mobile devices to access information about the medicine.

Provide information such as medicine name, dosage, usage instructions, and expiry date

Process Design:

The process design for the proposed system is as follows:

User Registration and Authentication:

Healthcare facility staff members register and authenticate themselves on the website.

Adding New Medicines:

Dispensing Medicines:

When a medicine is given to a patient, the staff member scans the medicine's barcode to record the dispensation.

The system updates the patient's medical record.

Automatic Stock Monitoring:

The system continuously monitors stock levels and triggers alerts when stock is low.

It generates reports for staff to review.

Stock Replenishment:

When stock is low, the system automatically notifies responsible personnel to reorder the medicine.

Purchase orders can be generated directly from the system.

Customer Access:

Customers can use their mobile devices to scan the barcode on the medicine packaging and access relevant information.

By implementing this process design, healthcare facilities can efficiently manage their medicine stock, ensuring adequate supplies for patient care while reducing the risk of shortages and overstocking.

3.4 Methodology Applied

The methodology applied to develop the proposed medicine stock management system involves several steps to ensure a systematic and successful implementation. Here is an overview of the methodology applied:

1. Project Initiation and Planning:

- Identify Stakeholders: Determine the key stakeholders, including healthcare staff, IT professionals, and customers.

- Set Objectives: Clearly define the goals and objectives of the medicine stock management system.
- Scope Definition: Specify the features and functionalities required, including barcode scanning, stock monitoring, and customer access.
- Resource Planning: Allocate necessary resources such as hardware, software, and personnel.

2.Requirement Analysis:

- Gather Requirements: Work closely with healthcare staff to identify their needs, such as how they track medicine stock and patient records.
- Document Requirements: Create a detailed requirements document that outlines the system's features and functionalities.

3.System Design:

- Database Design: Design a robust database structure to store information about medicines, stock levels, and patient records.
- User Interface Design: Create user-friendly interfaces for healthcare staff to input and retrieve information.
- Barcode Integration: Determine the barcode scanning technology and integration method.
- Security Design: Implement security measures to protect patient data and system integrity.

4.Development and Implementation:

- Software Development: Develop the web-based application, database, and barcode scanning functionality.
- Testing: Rigorously test the system for accuracy, reliability, and security.
- Deployment: Roll out the system to healthcare facilities, ensuring proper training for staff.

5.Monitoring and Maintenance:

- Continuous Monitoring: Regularly monitor the system's performance and stock levels.
- System Updates: Provide updates and improvements based on user feedback and changing requirements.

- User Support: Offer ongoing support to healthcare staff for any system-related issues.

6.User Training:

- Staff Training: Provide comprehensive training to healthcare facility staff on how to use the system effectively and efficiently.
- Customer Education: Educate customers on how to access medicine information using the barcode scanning feature.

7.Documentation:

- Create User Manuals: Develop user manuals and documentation for healthcare staff and customers to reference.
- Maintain Documentation: Keep documentation up to date as the system evolves.

8.Quality Assurance:

- Regular Audits: Conduct regular quality audits to ensure that the system is meeting its objectives.
- Compliance: Ensure that the system complies with relevant healthcare regulations and standards.

9.Feedback and Improvement:

- Collect Feedback: Gather feedback from healthcare staff and customers to identify areas for improvement.
- Continuous Enhancement: Continuously enhance the system to meet changing needs and technological advancements.

10.Project Closure:

- Evaluation: Evaluate the system's performance against the initial objectives.
- Final Documentation: Create a final project report that summarizes the project's success and outcomes.
- Transition: Hand over the system for long-term use and support by the healthcare facility.
- This methodology encompasses the entire software development and implementation process, ensuring that the medicine stock management system is not only developed successfully but also maintained and improved to meet the evolving needs of healthcare providers and customers.

3.5 Hardware and software specifications

Languages:HTML,CSS,JAVASCRIPT.

Backend Used: Php.

3.6 Experiment and Results for Validation and Verification

The screenshot shows a registration form titled "Medicine Stock System for Health Centers". It includes fields for "Who are you?" (radio buttons for Pharmacist, Medical Officer, or Administrative Team), "Contact Number" (text input), "Email ID" (text input), "Password" (text input), and a "Sign Up" button. Below the form is a link "Already have an account? [Login](#)".

Figure 3(c): Signup Form

Figure 3(c) :

The registration page is a vital entry point where pharmacists, medical officers, and administrative personnel can access the application by providing their specific credentials. It serves as a secure gateway, ensuring that only authorized individuals can gain access to the system



Figure 3(d): Login Form

Figure 3(d) :

It requires users to enter their specific credentials, typically a username or email and a password, to gain entry into the system. This ensures that only authorized personnel can manage and monitor the stock of medicines, helping maintain security and control over critical healthcare resources.

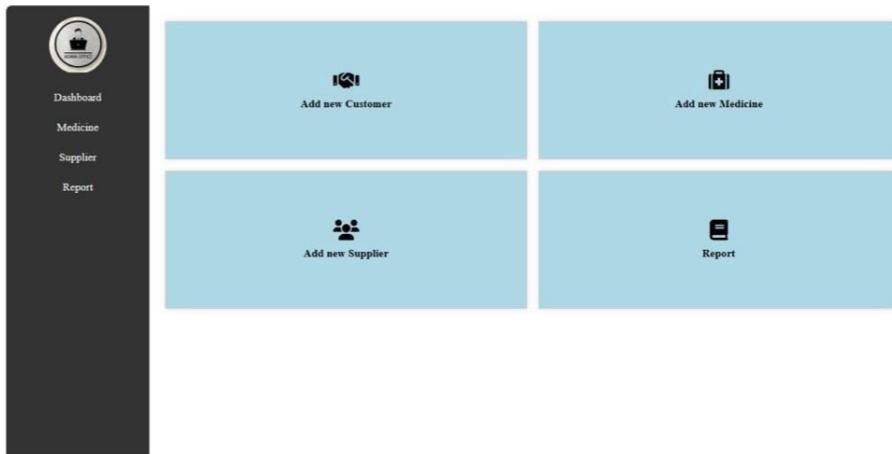


Figure 3(e): Admin HomePage

Figure 3(e):

In the admin page, you have options like "Dashboard" for a quick overview, "Medicine" for inventory management, "Supplier" for supply chain control, and "Report" for data insights. The respective pages allow you to "Add New Customer" for customer management, "Add New Medicine" for inventory updates, "Add New Supplier" to expand your supplier network, and "Report" to access detailed analytics for informed decision-making.



Add New Customer

Name:

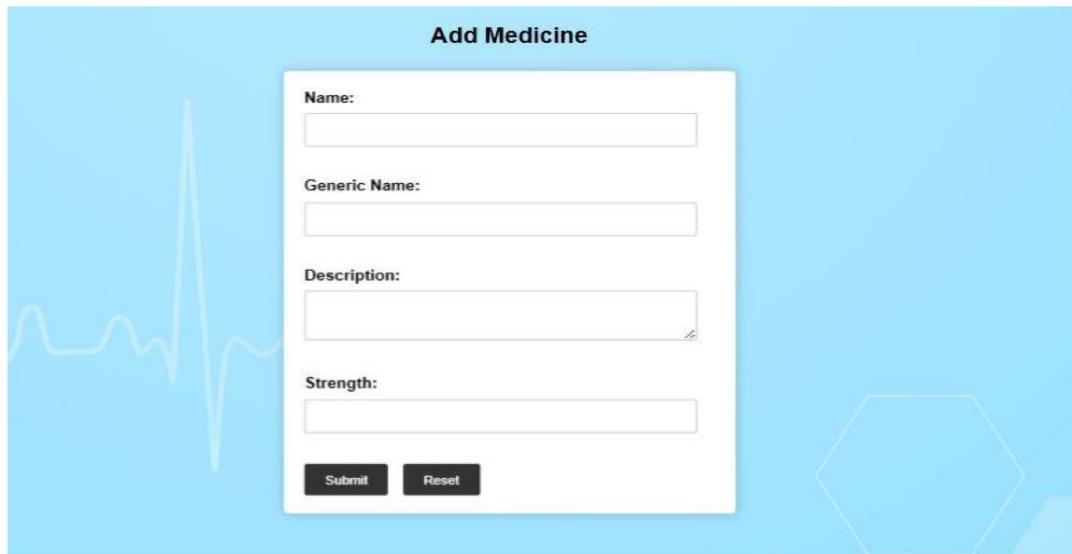
Contact:

Location:

Figure 3(f): Admin- Add customer form

Figure 3(f):

This is the “ add customer page ” which comes under the admin homepage.
In this there are several options like ‘name of customer’, ‘contact’, ‘ Location’



Add Medicine

Name:

Generic Name:

Description:

Strength:

Figure 3(g): Admin- add medicine form

Figure 3(f):This is “ Add medicine page” which comes under the Admin homepage.In this there are several options like ‘name’ , ‘generic name’ , ‘description’ , ‘strength of medicine’ .

Add New Supplier

Name:

Contact:

Payable Amount:

Address:

Submit **Reset**

Figure 3(h): Admin- add supplier form

Figure 3(h):

This is “ Add supplier page” which comes under the Admin homepage.

In this there are several options like ‘name’ , ‘contact’ , ‘payable amount’ , ‘address’ .

Customer List
Order List
Supplier List

Medistock

Total Medicines [View List](#)

Out of Stock [Resolve Problem](#)

Total customer [View List](#)

Medicine Expired [Resolve problem](#)

Medicine Sales [View Full Report](#)

Medicine Purchased [View Report](#)

Figure 3(i) : Pharmacist- homepage

Figure 3(i):

In the pharmacist's page, the left navbar provides access to "Customer List," "Order List," and "Supplier List." The home page displays key metrics, including "Total Medicines," "Out of Stock Medicines," "Total Customers," "Medicine Expired," "Medicine Sales," and "Medicine Purchased," aiding in inventory management, order tracking, and sales insights.

Database design :

Health Center table:

Healthcenter_id(pk)	Healthcenter_name	Healthcenter_contact	Healthcenter_address
1	Mapusa	983456789	Mumbai west
2	Margao	987654321	Mumbai east
3	Vasco	924567891	Mumbai north

Medicine table:

Medicine_id(pk)	Medicine_name	Medicine_barcode	Medicine_description
1	Paracetamol	Barcode	Early morning
2	Crocin	Barcode	After lunch

Stock table:

Healthcenter_id(fk)	Medicine_id(fk)	stock
2	1	150 units
3	2	400 units
1	2	900 units

Roles table:

Role_id(pk)	Role_name
1	Administrator
2	Pharmacist
3	Medical officer

Users table:

User_id	User_name	Role_id(fk)
1	Admin123	1
2	Pharm456	2
3	Med789	3

Permission table:

Permission_id(pk)	Permission_name
1	Add medicine
2	Change medicine
3	Delete medicine
4	View medicine

Role_permission table:

Role_id(pk)	Permission_id(pk)
1	1
2	4

3.7 Result analysis and discussion

Barcode Scanning Accuracy Test :

Results: The system accurately reads barcodes, providing correct medicine information.

Discussion: High barcode scanning accuracy is crucial for reliable stock management. This result ensures that the system can track medicines accurately, reducing the risk of errors.

Stock Monitoring and Alert Test:

Results: The system successfully generates alerts when stock levels fall below thresholds.

Discussion: Effective stock monitoring and alerting prevent stockouts and help maintain an optimal inventory level.

Stock Replenishment Test:

Results: The system generates purchase orders and tracks stock replenishment effectively. Discussion: This capability streamlines the procurement process, ensuring medicines are restocked in a timely manner.

Customer Barcode Scanning Test:

Results: Customers can easily access accurate medicine information and provide positive feedback.

Discussion: Customer satisfaction with barcode scanning functionality enhances their experience and fosters trust in the healthcare facility.

User Training and Usability Test:

Results: Healthcare staff efficiently use the system for various tasks.

Discussion: Usability is crucial for system adoption. Staff's ability to perform tasks without significant obstacles is a positive sign.

System Performance Test:

Results: The system maintains acceptable performance levels even under high loads.

Discussion: Good system performance guarantees that the system can handle a high volume of transactions without slowdowns or outages.

Regulatory Compliance Test:

Results: The system complies with all relevant healthcare regulations and standards.

Discussion: Regulatory compliance is vital for the system's legality and trustworthiness within the healthcare industry.

3.8 Conclusion and Future Work

A. Conclusion

In conclusion, the medicine stock system website is a smart and helpful system for managing medicines.

The benefits of using this system is as follows :

- Accurate Medicine Stock Tracking.
- Cost Savings through Reduced Wastage.
- Improved Patient Care and Safety.
- Efficient and easy to use.
- Sustaining focus.

Hence, this tool is ideal for maintaining the availability of medicines in rural or other areas.

B. Future Work

Future work is on the medicine stock system's database which include:

- Optimizing the database structure for efficiency.
- Ensuring real-time data updates and security.
- Developing data analytics, mobile access, and integration capabilities.
- Implementing predictive analysis, alerts, and notifications.
- Focusing on scalability and user training.

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