

React.Js and Express.Js Based Pharmacy Management System with Expiry Control and Drug Interaction Alerts

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ABSTRACT

A Pharmacy Management System is designed to simplify and automate the daily operations of a pharmacy. The proposed system manages medicine inventory, sales, billing, and supplier information in an organized manner. It provides real-time updates on stock availability, helping pharmacists avoid shortages and overstocking. The application improves accuracy in billing and record maintenance by reducing manual work. Patient and prescription details can be stored securely for easy access and reference. A user-friendly dashboard enables pharmacists to manage stock levels, generate reports, and integrate supplier data seamlessly. Errors caused by manual handling are significantly minimized. Furthermore, a medicine interaction warning system alerts doctors when potentially harmful combinations of medicines are selected together. The system keeps a complete history of patient medications and basic insights into frequently prescribed medicines. It generates automated daily usage reports and audit logs to track system activities.

Keywords: Pharmacy Management System, React.js, Express.js, Expiry Control, Drug Interaction Alert

1. INTRODUCTION

Pharmacies are a vital part of the healthcare system, ensuring that patients obtain safe, effective, and timely access to medications. In addition to dispensing medicines, pharmacies are responsible for maintaining proper records, monitoring drug availability, ensuring suitable storage conditions, and providing important information about drug usage and possible interactions. As healthcare needs continue to grow and the pharmaceutical industry introduces a large variety of medicines, pharmacy operations are becoming increasingly complex and data-driven. Traditionally, many pharmacies still depend on manual or partially automated systems for inventory control

record maintenance, and billing processes. Manual monitoring drug stock often makes it challenging to maintain accurate inventory levels, which can lead to problems such as overstocking, understocking, and delays in restocking medicines. In several situations, expired or nearly expired medicines may remain unnoticed, which increases the possibility of dispensing unsafe drugs to patients. These kinds of errors can negatively impact patient safety and may also cause financial losses and harm the reputation of the pharmacy. Another important issue in traditional pharmacy management is the limited awareness of potential drug interactions. Nowadays, many patients receive multiple prescriptions to treat different health conditions, which increases the chances of harmful drug interactions. Without an automated

system to cross-check medications, pharmacists may unintentionally dispense drugs that interact negatively with each other. This poses serious health risks and highlights the need for intelligent systems that can assist pharmacists in making safer dispensing decisions. With the rapid advancement of information technology, web-based pharmacy management systems have emerged as an effective solution to overcome the limitations of manual processes. These systems enable pharmacies to automate critical operations such as inventory tracking, billing, prescription management, and reporting. Automation improves overall accuracy by minimizing human errors and ensures that all records are maintained and updated instantly in real time.

2.METHODOLOGY

Inventory Control Method : The system continuously monitors medicine stock levels in real time. Each drug entry includes details such as batch number, quantity, supplier information, and expiry date. When stock reaches a minimum threshold, the system automatically generates alerts to prevent shortages and ensure uninterrupted availability of medicines.

Expiry Date Management :- Every medicine is tracked based on its manufacturing and expiry dates. The system identifies expired and near-expiry drugs and provides timely notifications to the pharmacist. **Drug Interaction Monitoring :** The system checks prescribed medicines against a drug interaction database before dispensing. This method significantly enhances patient safety by reducing adverse drug reactions.

Billing and Sales Processing:-The pharmacy management system automates billing by calculating total cost, applicable taxes, and discounts accurately. outputs to ensure safe, accurate, and efficient pharmacy management.

User Authentication and Access Control:- Different access levels are provided for administrators, pharmacists, and staff. This method helps maintain data integrity and prevents unauthorized modifications.

The proposed system is a web-based pharmacy management system developed using React.js for the front-end and Express.js (Node.js) for the back-end. The system automates medicine inventory handling, monitors expiry dates, and provides real-time drug interaction alerts to ensure patient safety.

Table 1. Functional parameters of PMS

PARAMETER	INPUT VALUE	OUTPUT VALUE
Total medicines added	120	120
Expired medicines	15	Blocked from sales
Nearby expiry medicines	20	Alert generated
Prescription processed	60	verified
Drug interaction cases	08	Warning alert
Successful sales	52	Bill generated

The Table presents the key system parameters along with their corresponding input values and output results of the proposed React.js and Express.js based Pharmacy Management System. The table highlights the effectiveness of inventory management, expiry control, drug interaction detection, alert generation, and billing operations. It clearly shows how the system processes inputs and produces appropriate outputs to ensure safe, accurate, and efficient pharmacy management.

2.1 PROPOSED SYSTEM

The figures illustrate the architecture and working process of the Pharmacy Management System. The React.js frontend collect inputs from users such as administrators and pharmacists and forwards it to the Express.js backend through API requests. The backend processes the data and stores it in the database. The Expiry Control Module monitors medicine expiry dates, and the Drug Interaction Alert Module checks for possible drug interactions. When an expiry issue or drug interaction is detected, alert notifications are shown to the pharmacist.

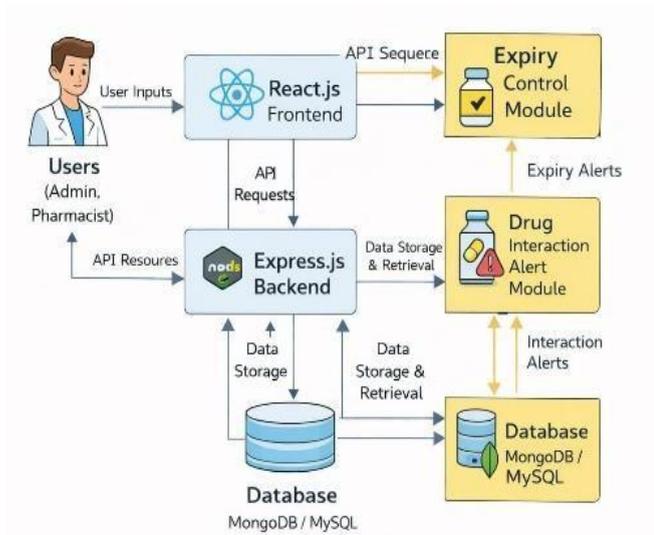


FIGURE 1. Architecture of the Pharmacy Management System

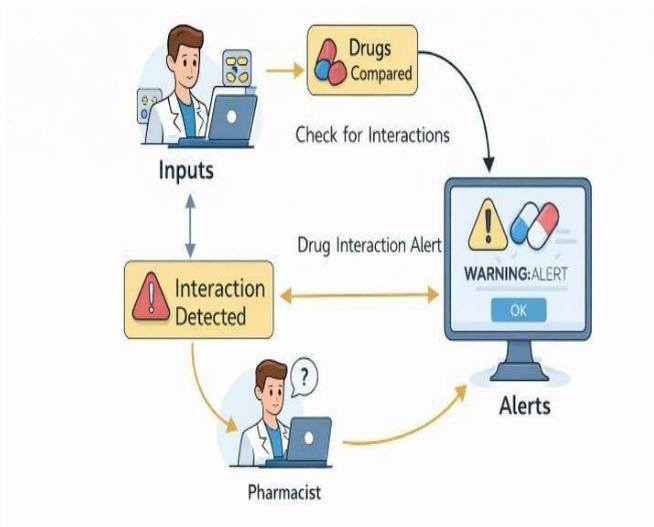
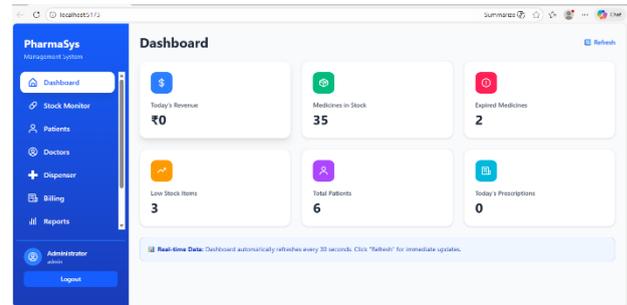


FIGURE 2: Drug Interaction Alert Workflow

3. RESULTS AND DISCUSSION



Login page

MEDICINE	MRP	STOCK	EXPIRY DATE	VENDOR	STATUS
Paracetamol 500mg	₹25	149	31 Dec 2026	PharmaCo	Active
Aspirin 75mg	₹45	80	15 Aug 2026	MediSupply	Active
Amoxicillin 500mg	₹120	60	30 Jun 2026	HealthCare Ltd	Active
Metformin 500mg	₹85	95	20 Mar 2027	DiabetesPharm	Active
Omeprazole 20mg	₹95	110	10 Nov 2026	GastroCare	Active
Ibuprofen 400mg	₹55	75	25 Sept 2026	PainRelief Co	Active
Warfarin 5mg	₹180	40	18 Jul 2026	CardioMed	Active
Lisinopril 10mg	₹145	65	15 Jan 2027	HeartCare	Active

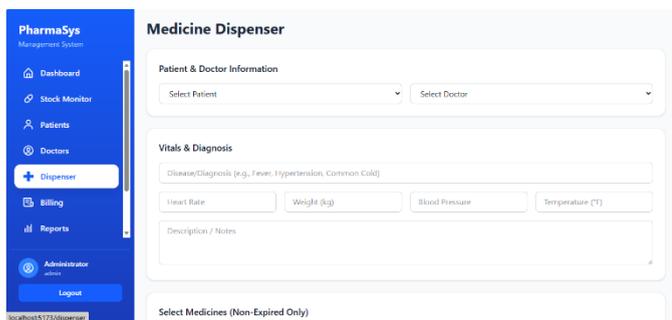
Stock Availability

Patient Name	Age	Contact	Balance	Action
Rajesh Kumar	45	9123456789	₹125.00	View History
Priya Sharma	32	9123456790	₹0.00	View History
Amit Patel	58	9123456791	₹0.00	View History
Sneha Reddy	28	9123456792	₹0.00	View History
Vikram Singh	41	9123456793	₹0.00	View History
Kaviya A	35	1234567890	₹0.00	View History

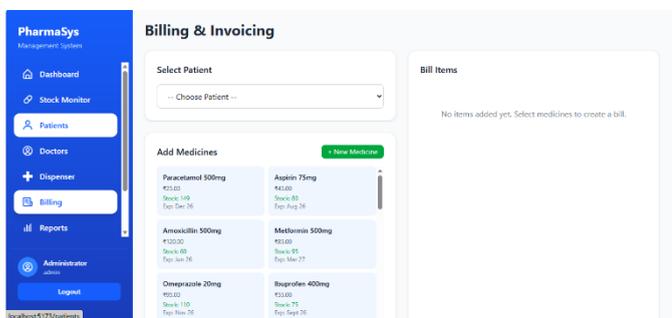
Patient Management

Doctor Name	Specialty	License	Contact	Email
Dr. Rajesh Kumar	General Medicine	MED12345	9988776655	rajesh@hospital.com
Dr. Priya Sharma	Cardiology	MED12346	9988776656	priya@hospital.com
Dr. Amit Patel	Pediatrics	MED12347	9988776657	amit@hospital.com

Doctor Management



Medicine Dispenser



Select Medicine

3.1 RESULTS

The experimental setup of the proposed Pharmacy management system, developed using React.js and Express.js aimed to evaluate the performance of the expiry control and drug interaction alert features in a real time pharmacy environment. To test the system simulated pharmacy data was used, which included information such as drug names, batch numbers, expiry dates, stock quantities and predefined drug interaction rules stored in the database.

3.2 DISCUSSION

The results obtained from the implementation show the practical benefits of integrating expiry control and drug interaction alerts into a web-based pharmacy management system. The accurate detection of expired medicines ensures patient safety and minimizes financial losses caused by selling unusable stock. This demonstrates the effectiveness of automated expiry monitoring over manual tracking methods, which are often error-prone and time-consuming.

The drug interaction alert mechanism also improves prescription safety by assisting pharmacist.

4. CONCLUSION

The results and discussion confirm that manual pharmacy management systems face significant challenges in handling expiry tracking and drug interaction verification. The proposed React.js and Express.js based Pharmacy Management System effectively addresses these problems through automated expiry control and real-time drug interaction alerts. The system helps pharmacists easily

monitor medicine stock and identify expired drugs in advance. It also improves patient safety by providing immediate alerts when potentially harmful drug combinations are detected. Furthermore, the digital management system reduces human errors, saves time, and increases overall efficiency in pharmacy operations. This approach demonstrates that modern web technologies can significantly enhance the reliability and effectiveness of pharmacy management systems. The developed system also provides an organized platform for managing medicine records, sales details, and inventory updates. By maintaining accurate digital records, the system helps in better decision-making and improves pharmacy workflow management. In addition, the system can be further enhanced by integrating features such as online prescription management, automated report generation, and cloud-based data storage.

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