

Pharmacy Management System

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Abstract

This paper presents the design and development of a desktop based Pharmacy Management System intended to simplify routine operations in small and medium sized pharmacies. In many such setups, manual handling of records and transactions can be time-consuming and may lead to errors, especially when data volume increases. To address this, the proposed system is developed using Java, with MySQL used for efficient data storage and management. A user friendly interface is created using Java Swing, allowing users to interact with the system without requiring advanced technical knowledge. The system supports key functions such as maintaining medicine records, processing sales, and managing user access. Testing results indicate that the application performs reliably and helps reduce manual workload while improving the organization and accuracy of pharmacy data.

Keywords- Pharmacy Management System, Java, MySQL, Inventory Management, Desktop Application, Billing System, Data Flow Diagram

1. Introduction

Pharmacies form a vital part of the healthcare system, as they are responsible for dispensing medicines and ensuring prescriptions are handled correctly. However, in many small and medium scale pharmacies, everyday activities such as stock management, sales recording, and tracking medicine expiry dates are still carried out manually. This often results in errors, delays, and difficulties in maintaining consistent and accurate records.

The use of software systems in such environments can significantly improve efficiency and reliability. Studies in software engineering highlight that automated systems help reduce human error and improve data management practices [1], [2], [5]. In this context, the present work focuses on developing a Pharmacy Management System that automates essential operations such as inventory control, billing, and transaction storage. By minimizing manual effort, the system contributes to improved accuracy and smoother workflow in pharmacy operations.

2. Related Work

A number of pharmacy management systems have been developed to improve the functioning of medical stores by automating routine processes. Most existing solutions concentrate on areas such as inventory tracking and billing, which help in reducing manual errors and improving record accuracy. Pressman [1] discusses how software-based solutions enhance the reliability of system operations, while Sommerville [2] emphasizes the importance of designing systems that are both efficient and user-friendly.

Despite these advancements, many available systems are either too complex or require costly infrastructure, making them less suitable for smaller pharmacies. Additionally, some systems do not provide intuitive interfaces, which can make them difficult for non-technical users to operate. The system proposed in this work addresses these issues by offering a simple, cost-effective solution with essential features such as stock management, billing, and reporting, while maintaining ease of use.

3. Materials and Methods

The system is developed using Java programming language [3], with Java Swing used for designing the graphical user interface [7]. MySQL is used as the backend database for storing and managing pharmacy data [5]. JDBC is utilized to establish connectivity between the application and the database [4]. The system design is represented using UML diagrams to illustrate the structure and workflow of the application [6].

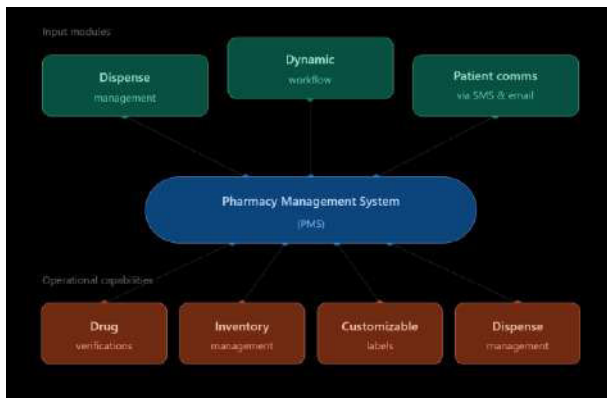


Fig. 3.1 System Architecture design for PMS

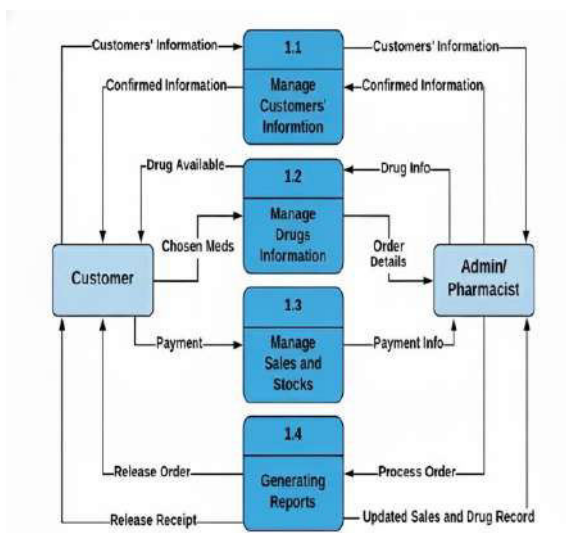


Fig. 3.2 Level-1 DFD for PMS

The system architecture consists of three main layers:

- **User Interface Layer:** Handles user interaction through forms and graphical components.

- **Application Logic Layer:** Processes operations such as inventory updates, billing, and authentication.
- **Database Layer:** Stores data related to medicines, users, sales, and suppliers.

The workflow begins with user authentication, followed by access to modules such as inventory management, sales processing, and report generation.

4. Results and Discussion

The system was tested using sample pharmacy data to evaluate its performance. The application was able to handle common operations such as adding medicines, updating stock, and generating bills without any major issues. The activity diagram illustrates the overall workflow of the Pharmacy Management System and shows how different operations are carried out by the admin user from login to logout.

The process begins with the admin attempting to log into the system. During authentication, the system verifies the entered credentials. If the credentials are incorrect, the user is redirected back to the login step. If the credentials are valid, access is granted to the main system functionalities.

Once logged in, the admin can perform multiple operations such as adding and managing company details, maintaining medicine stock, handling client information, and processing sales. The system allows the admin to add new medicines, update stock levels, and manage company and client records efficiently.

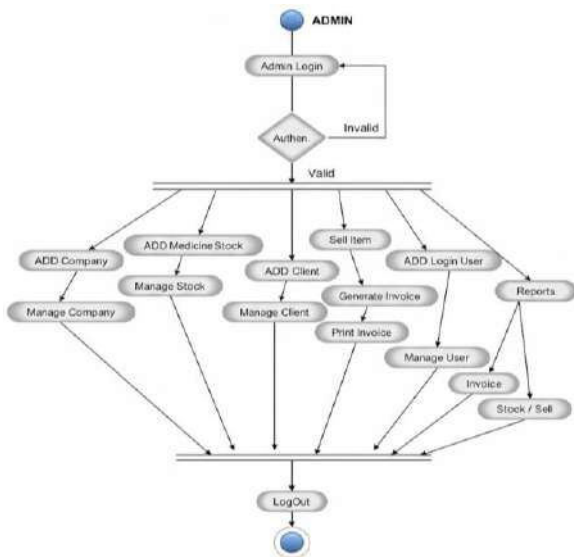


Fig. 4.1 Activity Diagram for PMS

The sales module enables the admin to sell items, generate invoices, and print bills. During each transaction, the system automatically updates the inventory to maintain accurate stock records. In addition, the admin can manage user accounts and generate reports related to sales and stock activities.

After completing the required operations, the workflow leads to the logout process, marking the end of the session. The diagram demonstrates how various modules are interconnected and how the system ensures a smooth and organized flow of operations.

Some key observations from testing include:

- Stock levels are updated automatically after each sale
- The billing process is quick and reduces manual calculation errors
- User authentication helps in restricting unauthorized access
- The system can identify expired medicines based on stored data

Overall, the system performs well for basic pharmacy operations. The user interface is simple, which makes it easy to use even for beginners. Compared to manual methods, the system significantly reduces effort and improves data accuracy.

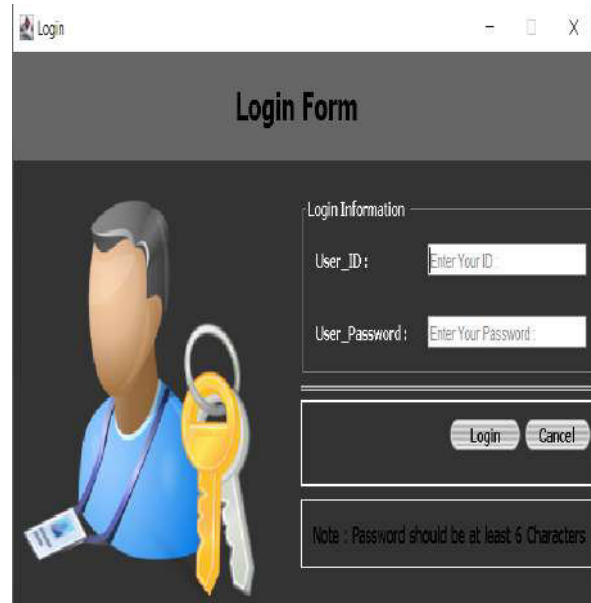


Fig. 4.2 Login Page

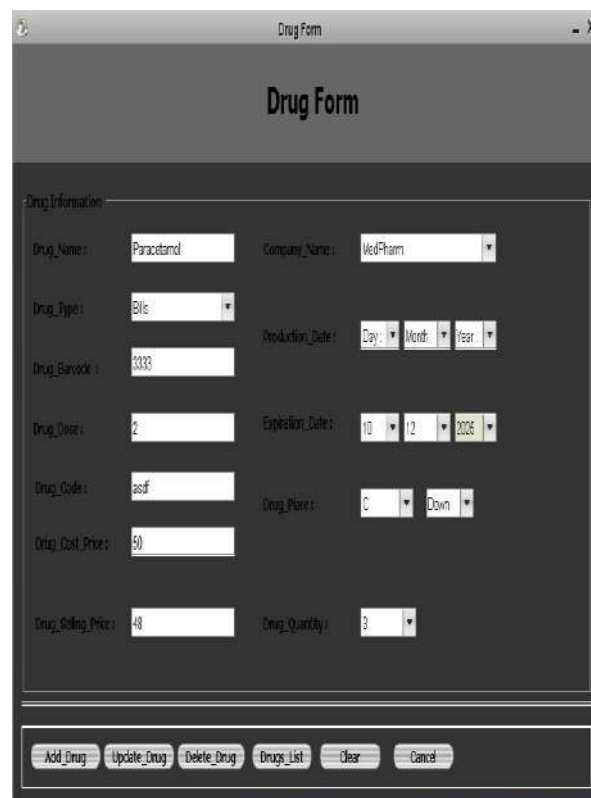


Fig. 4.3 Medicine stock management window

5. Conclusion

The Pharmacy Management System developed in this project offers a practical solution for handling daily pharmacy operations in a more efficient and organized manner. By utilizing Java for application

development and MySQL for data management, the system ensures reliable performance and structured data handling. It reduces dependence on manual record keeping and helps maintain accurate and up-to-date information. These improvements are consistent with established software engineering practices that focus on building reliable and maintainable systems.

There is scope for further enhancement of the system by incorporating features such as barcode scanning, online accessibility, and advanced reporting tools. Even in its current form, the system meets the basic requirements of small and medium scale pharmacies and can serve as a foundation for future development.

References

- [1] R. S. Pressman, *Software Engineering: A Practitioner's Approach*, 7th ed. New York, NY, USA: McGraw-Hill, 2014.
- [2] I. Sommerville, *Software Engineering*, 10th ed. Boston, MA, USA: Pearson, 2015.
- [3] Oracle, "Java Documentation," [Online]. Available: <https://docs.oracle.com/javase/8/docs/>.
- [4] Oracle, "JDBC Tutorial," [Online]. Available: <https://docs.oracle.com/javase/tutorial/jdbc/>.
- [5] MySQL, "MySQL Reference Manual," [Online]. Available: <https://dev.mysql.com/doc/>.
- [6] M. Fowler, *UML Distilled: A Brief Guide to the Standard Object Modeling Language*, 3rd ed. Boston, MA, USA: Addison-Wesley, 2003.
- [7] TutorialsPoint, "Java Swing Tutorial," [Online]. Available: https://www.tutorialspoint.com/java/java_swing.htm.