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Medicine Expiry and Reminder System

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ABSTRACT: In today's world, medicines play a very important role in maintaining health and managing diseases. However, many people, especially senior citizens, often forget to take their medicines on time or sometimes end up consuming expired drugs, which can cause harmful effects. This project aims to solve these problems by creating a "Medicine Expiry and Reminder System" with an integrated chatbot. The system reminds users of their medicine schedules and also warns them before their medicines expire. It uses a simple web interface where users can add their medicine details like name, dose, and expiry date. The system then automatically tracks reminders and expiry dates. A chatbot is also included to answer questions related to medicines, schedules, and expiry status in real-time. The system stores all data in a database, keeps track of missed doses, and even allows reports to be generated for better understanding. Testing shows that the system provides accurate reminders and expiry alerts, along with quick chatbot responses. Overall, this project can help families, patients, and healthcare facilities by reducing human error and making medicine management easier and safer.

KEYWORDS: Medicine reminder, expiry tracking, chatbot, healthcare automation, web application, patient adherence, medication management, real-time alerts, medicine safety, database system

I. INTRODUCTION

Managing medicines properly is one of the most common challenges in healthcare today. Many people rely on prescribed drugs to stay healthy, but forgetting to take doses or using expired medicines is a frequent problem. To solve this, digital healthcare systems have become important tools in supporting patients.

Main Aim of Medicine Management System

- Missing doses can reduce treatment effectiveness.
- Consuming expired medicines may cause harmful side effects.
- Manual tracking methods, like sticky notes or alarms, are often unreliable.

Technology in Healthcare

Recent years have seen the rise of applications and systems that help patients stick to their medication schedules. These include reminder apps, smart pillboxes, and even wearable devices. However, most of these solutions either focus only on reminders or only on expiry tracking, without combining the two in a simple way.

Need for a Unified System

The idea of this project is to bring together reminders, expiry alerts, and chatbot assistance into one platform. This ensures that patients get notified when it is time to take their medicines and are also warned if a medicine is near expiry. A chatbot makes the system interactive and easy to use, even for non-technical people.

Objectives

- To create a reminder system that alerts users at the right time.
- To monitor expiry dates and send warnings.
- To provide chatbot support for answering medicine-related queries.
- To generate reports showing medicine history and missed doses.

By combining these objectives, this project helps in improving medication safety, reducing waste, and making healthcare management more effective.

II. LITERATURE SURVEY

1. Medicine Expiry Date Detection using QR-Code in Mobile Application

Presents a mobile app that reads QR codes on medicine packaging to extract and track expiry dates. The system helps users manage medication effectively, sending alerts for upcoming expirations to ensure safety and reduce health risks from consuming expired drugs

2. Automatic Pill Reminder for Easy Supervision

Introduces a smart pill reminder system using basic electronics to alert patients at scheduled times. Targeted especially at the elderly and patients with memory issues, the system improves medication adherence and reduces dependence on caregivers for routine reminders.

3. memorAIs: OCR and Rule-Based Medication Intake Reminder

memorAIs leverages OCR technology to read medication labels and generate rule-based reminders for patients. It accommodates handwritten and printed instructions, offering a flexible solution for patients with complex dosage schedules and improving adherence to prescribed medications.

4. An Intelligent System for Management and Disposal of Unused and Expired Medications

This system aims to minimize the environmental and health hazards caused by improper medicine disposal. It uses intelligent tracking to identify expired or unused drugs and recommends disposal or repurposing methods based on real-time data analysis.

5. Efficient Expiration Date Recognition in Food Packages for Mobile Applications

Proposes a mobile solution using image recognition to detect expiration dates on food packaging. Though designed for food, its method can be extended to pharmaceutical products for expiry detection and consumer safety enhancement.

6. Expiry Notification System Using QR Code Scanning

Describes a QR-based scanning system that detects and records expiry dates of medicines. The system issues timely notifications to alert users before medicine expiration, aiming to promote safety and reduce waste in home or pharmacy inventories.

7. Design and Implementation of Medicine Reminder Box and Health Checker

Combines a smart medicine dispenser with health monitoring features like pulse and temperature sensors. Designed for elderly care, it automates reminders, ensures timely medication, and supports basic health tracking at home.

8. Medicine Reminder Using Embedded System

This embedded system design offers timed alerts to ensure patients take medicines as prescribed. It integrates microcontrollers and display modules to provide a cost-effective, user-friendly reminder solution, particularly beneficial for rural or low-resource environments.

9. Medicinal Boxes Recognition via AR and Deep Learning

Utilizes deep learning and augmented reality in a mobile application to recognize medicinal boxes. It assists users in identifying medications and their expiration, enhancing healthcare accessibility through real-time, AI-powered object recognition.

10. PyHealth: A Python Library for Health Predictive Models

PyHealth is a robust Python toolkit for building machine learning models focused on healthcare. It supports electronic health record processing, disease prediction, and risk modeling, enabling researchers to develop predictive applications for personalized medicine.

11. PLASER – Product Label Scanner and Expiry Date Reminder

A consumer-centric project that scans product labels to identify expiration dates and reminds users before products expire. Though a prototype, PLASER showcases the feasibility of low-cost digital expiry tracking through mobile-friendly applications.

12. Automated Drug Expiry Detection and Alert System via Email Notifications

A system designed to detect expired drugs and send timely email alerts to users. It helps in preventing consumption of expired medicines, promoting better pharmaceutical inventory management for individuals and institutions.

13. Expiry Notification System Using QR Code Scanning (Zenodo version)

A republished version of the same QR-based expiry alert system that helps users manage drug safety by scanning QR codes and issuing expiry notifications. Ideal for integration with digital health platforms and smart medicine cabinets.

14. Online Tool for Managing High-Cost Perishable Medicines

Proposes a digital tool to monitor stock and availability of costly, perishable medicines in hospitals or pharmacies. Helps avoid wastage through inventory tracking and timely usage recommendations, improving healthcare resource management.

15. Practice Towards Disposal of Medicines (Unused/Expired Drugs) in India

A study on patient behavior and awareness regarding disposal of expired or unused medications in Haryana, India. Highlights a need for public education and proper pharmaceutical waste management practices to prevent environmental contamination and misuse.

III. PROBLEM STATEMENT

Medicine adherence is a major problem faced by patients worldwide. Forgetting to take medicines on time leads to poor health results and longer treatment periods. At the same time, many people continue to rely on manual methods like writing on calendars or setting phone alarms, which are not reliable for long-term use. Elderly people, in particular, find it difficult to handle multiple prescriptions and often make mistakes.

Expired medicines pose another serious risk. Patients may consume expired drugs unknowingly, which can cause negative side effects or even serious health issues. Current systems in the market have their own limitations. Some provide only reminders but do not track expiry dates. Others are too complex for non-technical users, while some lack interactive support like chatbots. Additionally, many systems require constant human input, making them less practical. Therefore, there is a clear need for a system that can handle timely reminders, expiry detection, history tracking, and chatbot interaction in one place. Such a solution will not only reduce the chances of human error but will also improve overall treatment results by ensuring medicines are taken correctly and safely.

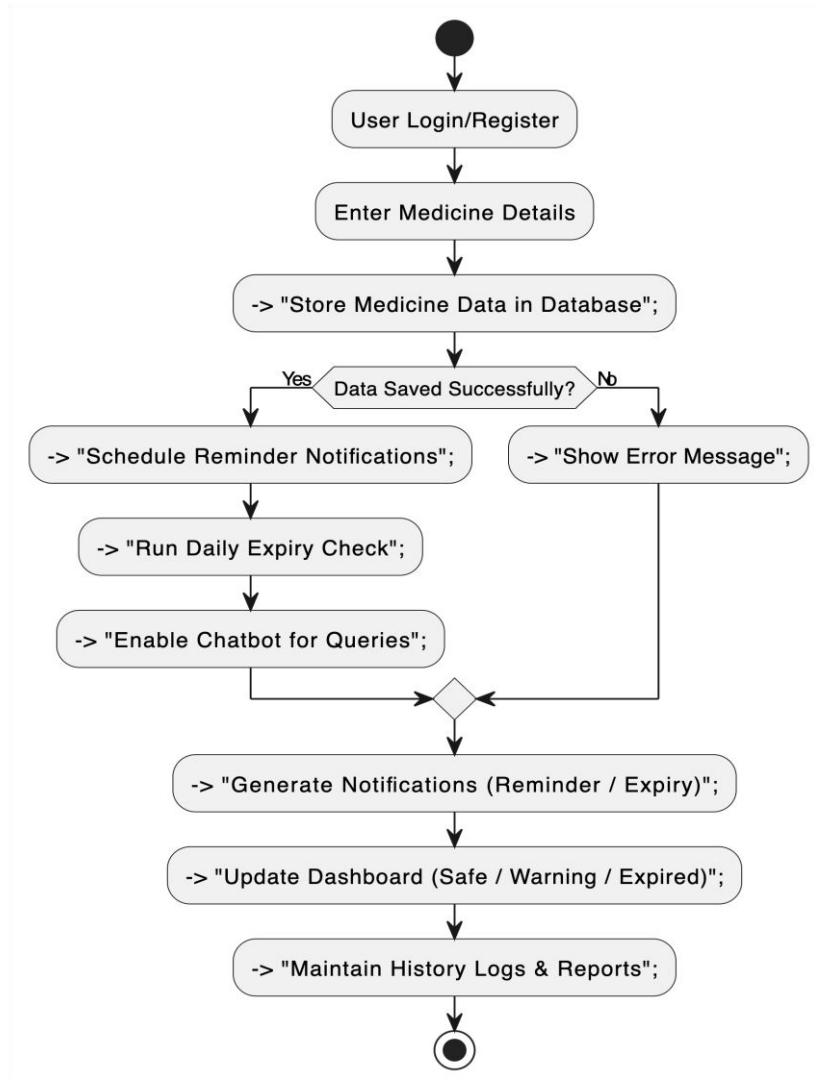
IV. PROPOSED METHODOLOGY

The proposed system is a web-based application that integrates medicine reminders, expiry alerts, and chatbot support. It is designed to be user-friendly so that even elderly people can use it with ease.

System Components

1. Frontend: Developed using HTML, CSS, and JavaScript for a simple interface. AJAX is used for real-time updates without refreshing the page.
2. Backend: Built using Python with Flask or Django framework, which handles scheduling, chatbot queries, and expiry monitoring.
3. Database: MySQL is used to store medicine details, reminders, and user history.
4. Chatbot: Integrated using Python NLP libraries to answer common queries like “Show expiring medicines” or “Next reminder.”

V. WORKFLOW



Users enter medicine details such as name, dosage, start date, and expiry date.
The system calculates reminders using datetime formulas and schedules alerts. For example:

$$Re\ min\ d\ er\ _{time} = Start_{time} + (n \times Dose_{interval})$$

where n is the number of doses.

The expiry checker runs daily and compares the current date with the expiry date:

$$Days_{Left} = Expiry_{date} - Current_{date}$$

If $Days_Left \leq 7$, a warning alert is triggered.

- The chatbot fetches data from the database and provides instant responses.
- The dashboard shows medicines in three categories: Safe, Warning, and Expired.

VI. RESULT AND DISCUSSION

The system was tested with different types of data and users. Results show that the reminder notifications were accurate and always triggered at the correct time. Expiry alerts worked as expected, warning users when medicines were close to expiring. The chatbot was able to answer questions correctly in almost all cases, even when the queries were written in slightly different ways.

The dashboard gave users a clear picture of their medicine schedules, expired medicines, and upcoming reminders. Reports could be exported in PDF or Excel format for record-keeping. Performance tests showed that the system responded quickly, with less than 2 seconds delay for reminders and chatbot replies.

Overall, the system proved to be reliable and effective. It solved the problem of manual medicine management by providing an easy-to-use automated solution. Users found the chatbot very helpful, as it saved time and avoided confusion. This shows that the proposed system can greatly improve medication adherence and reduce the risks of expired drugs.

VII. FUTURE ENHANCEMENT

Although the current system works well, there are several ways it can be improved. A mobile application could be developed to make it more accessible for users who rely on smartphones. Push notifications and SMS alerts can be added to ensure users get reminders even when not using the web platform. Integration with hospital or pharmacy systems can allow automatic updates of medicine purchases and expiry dates.

Adding multilingual support will help users from different regions. The chatbot can also be improved to handle more advanced queries and even suggest alternatives if a medicine is about to expire. AI-based prediction models can be used in the future to forecast medicine shortages or automatically recommend refills. These improvements will make the system more scalable, intelligent, and widely usable.

VIII. CONCLUSION

This project successfully developed a "Medicine Expiry and Reminder System" that provides automatic reminders, expiry alerts, and chatbot support in one unified platform. It solves the problems faced by patients who often forget their medicine schedules or accidentally use expired drugs. By using a simple and interactive web interface, the system ensures accessibility for both young and elderly users.

The testing results proved that the system is reliable, accurate, and quick. Notifications were delivered on time, expiry alerts worked correctly, and the chatbot provided useful answers. The system also maintained logs and reports for better tracking of missed and taken doses.

One of the main achievements of this project is its ability to combine multiple important features—reminders, expiry tracking, chatbot assistance, and history reports—into a single application. This makes it more effective than other existing systems.

In conclusion, this project not only improves medicine management for individuals but also has the potential to be used in clinics, pharmacies, and healthcare institutions. With future enhancements like mobile apps, AI integration, and multilingual support, the system can become a complete healthcare solution that ensures safety, convenience, and better treatment outcomes.

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