



REMINDAX

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Abstract

In retail shops, supermarkets, and medical stores, managing product expiry dates manually is challenging due to the large volume of inventory. Failure to monitor expiry dates can lead to health risks for customers and financial losses for businesses. This paper presents **Remindax**, a web-based Product Expiry Alert System designed to automate the tracking and monitoring of product expiry dates.

The system is developed using Python and the Flask framework for backend processing, with HTML, CSS, and JavaScript for the frontend interface. Users can securely register and log in to manage product details including product name, category, manufacture date, expiry date, and quantity. The system continuously evaluates expiry timelines and provides clear visual indicators for expired and soon-to-expire products.

A real-time dashboard displays inventory statistics such as total products, expired items, and products nearing expiration. Additionally, an automated email notification feature alerts users about critical expiry updates even when they are not actively using the system. The proposed solution improves inventory efficiency, reduces wastage, enhances customer safety, and provides a simple yet effective tool for small and medium-sized businesses.

Keywords: Product expiry tracking, inventory management, Flask, Python, email alerts, web application.



1. Introduction

Inventory management is a critical task in retail businesses, supermarkets, and medical stores where products often have limited shelf lives. Monitoring expiry dates manually becomes difficult as inventory size increases, which may result in expired products remaining on shelves. This not only affects customer health but also leads to financial and reputational losses for businesses.

Traditional methods such as manual checking and spreadsheet tracking are time-consuming, error-prone, and inefficient. With the growth of digital solutions, automated web-based systems can significantly improve expiry monitoring and inventory control.

The **Product Expiry Alert System (Remindax)** is designed to provide a smart and user-friendly platform that helps businesses track product expiry dates efficiently. The system focuses on three major goals:

1. **Automation:** Automatically monitor product expiry status.
2. **Usability:** Provide a simple dashboard for easy management.
3. **Alert Mechanism:** Notify users about expired and soon-to-expire products via email.

The system aims to minimize human error, reduce wastage, and improve overall inventory safety.

2. Literature Review

2.1 Traditional Inventory Monitoring

Earlier inventory systems relied heavily on manual inspection or spreadsheet-based tracking. These approaches suffer from several limitations:

- High chances of human error
- Time-consuming verification
- Lack of real-time alerts
- Poor scalability for large inventories

Barcode-based systems improved tracking but still required manual expiry verification.

2.2 Automated Inventory Systems

Modern inventory systems incorporate databases and web interfaces to manage stock. Some solutions provide stock-level alerts but often lack dedicated expiry monitoring features. Many small businesses still avoid complex ERP systems due to cost and complexity.



2.3 Web-Based Alert Systems

Web applications have become popular due to accessibility and ease of deployment. Email notification systems further enhance usability by providing proactive alerts. However, many existing tools are either overly complex or do not focus specifically on expiry management for small and medium businesses.

3. System Architecture

3.1 Overview

The Remindax system consists of three main components:

1. **Frontend** – User interface for interaction
2. **Backend** – Business logic and expiry analysis
3. **Database** – Storage of user and product data

3.2 Frontend

The frontend is developed using HTML, CSS, and JavaScript. It provides:

- User registration and login pages
- Product entry and management forms
- Dashboard with expiry status
- Visual indicators for product condition

The interface is designed to be simple and responsive.

3.3 Backend

The backend is implemented using Python with the Flask framework. Its responsibilities include:

- User authentication and session management
- Product data processing
- Expiry date calculation
- Email notification handling
- Dashboard data aggregation

3.4 Database

The system uses SQLite/MySQL to store:

- User credentials
- Product details
- Category information
- Notification records

Security is ensured through password hashing and controlled access.



4. Methodology

4.1 Expiry Monitoring Logic

The system continuously compares the current date with the product expiry date and classifies products into:

- Expired
- Near Expiry (within few days)
- Safe

This classification is updated dynamically whenever the dashboard loads.

4.2 Email Notification

The email module sends automated alerts when:

- A product has expired
- A product is about to expire soon

This ensures users remain informed even when offline.

4.3 User Management

Secure authentication is implemented with:

- User registration
- Login/logout
- Session protection
- Password hashing

5. Results

5.1 Functional Testing

The system was tested with multiple product entries and demonstrated:

- Accurate expiry detection
- Correct dashboard statistics
- Successful email delivery
- Smooth CRUD operations

5.2 Performance Evaluation

- Dashboard loads quickly
- Handles multiple products efficiently
- Email alerts triggered correctly
- User interface found easy to use

6. Discussion

The Product Expiry Alert System provides an effective solution for expiry monitoring in retail environments.

Advantages:

- Reduces manual checking effort
- Prevents sale of expired products
- Improves customer safety
- Provides real-time inventory visibility
- Simple and cost-effective



Limitations:

- Requires internet for email alerts
- Currently designed for small/medium scale
- No barcode scanning in current version

7. Future Work

Future enhancements may include:

- Barcode/QR code integration
- Mobile application support
- SMS/WhatsApp alerts
- AI-based demand prediction
- Cloud deployment for scalability
- Multi-store inventory management

8. Advantages of the Proposed System

The Product Expiry Alert System (Remindax) offers several important advantages over traditional manual tracking methods.

- **Automated Monitoring:** The system continuously checks product expiry dates, reducing the need for manual inspection.
- **Time Saving:** Shop owners and staff can quickly identify expiring products without checking each item physically.

- **Improved Safety:** Prevents the sale of expired food items and medicines, protecting customer health.
- **Reduced Financial Loss:** Early alerts help businesses take action such as discounts or removal of near-expiry items.
- **User-Friendly Interface:** Simple forms and dashboard make the system easy to use even for non-technical users.
- **Email Notifications:** Users receive alerts even when they are not logged into the system.
- **Better Inventory Visibility:** Dashboard provides a clear overview of stock status at a glance.
- **Secure Access:** Authentication ensures that only authorized users can manage product data.

9. Limitations of the System

Although the system performs effectively, certain limitations exist in the current version.

- The system depends on manual product entry by users.
- Email alerts require an active internet connection.
- Barcode or QR code scanning is not yet implemented.
- The system currently supports single-store management only.



- No mobile application version is available at present.
- Prediction of demand or automatic stock replenishment is not included.

These limitations provide opportunities for future enhancement and system expansion.

10. System Maintenance

Proper maintenance is essential to ensure the long-term performance and reliability of the Product Expiry Alert System.

Maintenance activities include:

- Regular database backup
- Updating product records
- Monitoring email service functionality
- Fixing bugs and improving performance
- Updating security patches
- Periodic server health checks

The modular design of the system makes maintenance simple and manageable.

Conclusion

The **Remindax Product Expiry Alert System** successfully addresses the critical problem of managing product expiry in retail and medical stores. By automating expiry tracking and providing timely alerts, the system reduces wastage, improves

operational efficiency, and enhances customer safety.

The web-based architecture ensures accessibility and ease of use, making it especially suitable for small and medium-sized businesses. With further enhancements such as mobile support and barcode integration, the system has strong potential to evolve into a comprehensive smart inventory management platform.

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