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Predictors Medicine Expiry Tracker: A Web-Based System for Medicine Expiry Monitoring and Automated Alerts

Aayushi Mahajan
Department of Computer Science and Engineering, LNCT Indore, RGPV, Madhya Pradesh, India

Abstract

Medicine expiry management is important for patient safety and inventory control. Manual checking of expiry dates can be time-consuming and may lead to missed dates, avoidable wastage, and poor visibility of near-expiry stock. This paper presents the design of Predictors Medicine Expiry Tracker, a proposed web-based system intended to help customers and pharmacies record medicine details, monitor expiry dates, and receive reminders. The project concept combines user login, barcode-based data entry, an expiry calendar, purchase and bill history, and reminders through in-app notifications, SMS, and WhatsApp. The system is intended to reduce dependence on manual tracking and provide a single view of medicine records. This manuscript describes the project scope and proposed design based on the supplied mini-project report, and relates it to published work on pharmaceutical traceability and barcode-based expiry reminders. The supplied report mentions performance figures, but test datasets, protocols, and raw results were not included in the available material; therefore, those figures are not treated here as independently validated experimental findings.

Keywords

Medicine expiry tracking; pharmacy inventory; barcode scanning; expiry alert; web application; medicine safety; pharmaceutical traceability.

1. Introduction

Medicines have labelled expiry dates established using stability data and specified storage conditions. Expiry dates matter because product quality, strength, and purity are expected to remain within applicable standards only through the labelled shelf life and under appropriate storage conditions [1]. In homes and pharmacies, medicine details may be checked manually or recorded in separate systems. Manual methods can be inconvenient and can make it harder to notice items approaching expiry.

Digital tracking can bring medicine details, expiry dates, and reminders into one interface. Research on pharmaceutical track-and-trace systems describes the use of package identifiers such as barcodes or RFID, scanning devices, and central databases to verify and retrieve product information [2]. A 2024 IEEE conference paper also describes a QR-based expiry reminder approach for consumer products and pharmacy use [3]. Building on these ideas, the Predictors Medicine Expiry Tracker project proposes a web application focused on medicine records and expiry notifications for customers and pharmacies.

2. Problem Statement

The supplied mini-project report identifies four practical concerns: expiry dates may be checked manually; near-expiry medicines may go unnoticed; pharmacy stock can result in financial wastage; and customers may not have a simple consolidated way to record purchased medicines and their expiry dates. The project therefore proposes a shared digital interface for recording medicine information and notifying users before recorded expiry dates.

The scope of this paper is a system design based on the submitted project report. It does not claim that every pharmacy or consumer application lacks expiry functions; such a broad market claim would require a systematic comparison of current products.

3. Related Work and Literature Review

Pharmaceutical traceability research explains that barcodes or RFID identifiers can connect medicine packages with information held in a database. Scanning can support verification and help identify discrepancies, including expiry-related issues [2]. This is relevant to the proposed barcode entry and central medicine-record functions.

Naughton and colleagues evaluated medicines-authentication technology in a hospital dispensary setting. Their study used two-dimensional data-matrix codes and database checks to identify conditions including expired or recalled items, illustrating how scanning can support medicine safety workflows [4].

The 2024 paper "A Novel Approach for Seamless Reminder Apps for Expiry date with QR" describes a QR-based expiry reminder application and discusses possible use in household product tracking and pharmacy settings [3]. The US Food and Drug Administration explains that expiry dates are supported by stability testing and that product quality may be affected by expiry or unsuitable storage [1].

Taken together, these sources support the relevance of expiry-date visibility, machine-readable identifiers, and database-supported checks. The proposed project combines these ideas with a customer-facing calendar, purchase/bill history, and multi-channel reminders. A full comparative evaluation against commercial pharmacy applications remains future work.

4. Objectives

The objectives drawn from the supplied project report are:
1. Record medicine details and expiry dates through barcode scanning or manual entry.
2. Maintain a user profile and medicine purchase history.
3. Calculate reminder dates and show in-app, SMS, and WhatsApp alerts according to configured intervals.
4. Display medicine expiry dates in a calendar view.
5. Provide purchase and bill-history features.
6. Present pharmacy and hospital directory information for Indore.
7. Design the application so it can be extended to support pharmacy inventory workflows.

5. Proposed System and Methodology

The project report describes a web-based application for customers and pharmacies. The proposed workflow is:

Step 1 — User access: The user signs in using a mobile number and opens a personal dashboard.

Step 2 — Medicine entry: The user scans a barcode or enters medicine details manually. The record is intended to include medicine name, price, manufacturing date, and expiry date. Barcode scanning alone does not guarantee that an expiry date is encoded in the barcode; the implementation must verify the barcode data source and allow confirmation or manual entry when needed.

Step 3 — Data storage: The application stores medicine records, user details, purchase history, and bill information in a database. The final database choice and data schema should be specified in the implementation chapter.

Step 4 — Expiry calculation: For a recorded expiry date E, reminder dates can be calculated as E − 15 days for an in-app alert, E − 5 days for SMS, and E − 3 days for WhatsApp, as specified in the supplied report. These are project configuration choices, not medical recommendations. Users should not interpret an alert as advice to change a prescribed treatment.

Step 5 — Notifications: A scheduled service checks due reminders and sends them through the configured channels. The implementation should log attempted and delivered notifications, handle failed messages, and avoid duplicate alerts.

Step 6 — Calendar and history: The dashboard displays recorded expiry dates and lets the user review medicines and bills.

Step 7 — Directory: The application presents the pharmacy and hospital directory information included in the project scope. Directory records should be checked for accuracy and kept up to date.

6. System Architecture

The proposed architecture can be described as five logical layers:

• Presentation layer: Responsive web interface for login, dashboard, barcode entry, calendar, purchase history, bills, and directories.
• Application layer: User management, medicine-record management, expiry-date calculation, reminder scheduling, billing, and feedback.

• Data layer: Database tables or collections for users, medicines, expiry records, purchases, bills, reminder status, and directory entries.
• Integration layer: Barcode/QR library and, where configured, SMS and WhatsApp messaging services.
• Monitoring layer: Application logs and notification-status records for debugging and evaluation.

A typical data flow is: user input or barcode scan → validation and confirmation → database record → scheduled expiry check → notification dispatch → status logging → calendar/dashboard update. The project report lists HTML, CSS, JavaScript, Node.js/Express or PHP, Firebase/MySQL, barcode libraries, SMS and WhatsApp APIs, and calendar libraries as possible technologies. The final paper should identify only the technologies actually implemented in the working system.

7. Functional Modules

7.1 Login and profile: Provides access to a personal dashboard and associates medicine records with a user.

7.2 Barcode scan and manual entry: Captures medicine details and allows correction when the barcode does not provide all required fields.

7.3 Expiry tracker and alert engine: Calculates reminder dates and records alert status for each medicine.

7.4 Purchase and billing: Stores purchase details and supports viewing or downloading bill records.

7.5 Calendar and medicine history: Shows upcoming and passed expiry dates and provides a history of stored medicines.

7.6 Pharmacy and hospital directory: Displays directory entries for the intended Indore-area scope.

7.7 Feedback: Collects user feedback to help identify usability and data-quality problems.

8. Implementation and Evaluation Plan

The supplied mini-project report names HTML5, CSS3, JavaScript, possible Node.js/Express or PHP backend options, Firebase/MySQL, barcode libraries, SMS gateway services, WhatsApp Cloud API, and calendar libraries. Because the report lists some technologies as alternatives or future integrations, the final dissertation should state the exact stack used and distinguish completed functions from planned functions.

A reproducible evaluation should include:
1. Test cases for valid, invalid, missing, and corrected expiry dates.
2. Barcode tests across a documented sample of medicine packages, reporting successful reads and failures.
3. Reminder tests for each configured interval, recording scheduled time, dispatch time, delivery status, and duplicate notifications.
4. Usability tests with a defined number and profile of participants, using a stated questionnaire or task-completion measure.
5. Data-integrity tests for login, medicine ownership, bill history, and access control.
6. Performance tests under a documented number of records and concurrent users.

The supplied report states that in-app alerts reached 100%, SMS/WhatsApp success was 80–90%, and barcode scanning made entry 60% faster. However, the provided file does not describe the sample size, test setup, measurement method, or raw data behind these figures. They should be reported as preliminary claims from the project report only until supported by repeatable test evidence.

9. Results and Discussion

At the project-description level, the supplied report indicates that the intended system includes expiry reminders, barcode-based entry, bill history, a calendar, and pharmacy/hospital directories. These functions address the stated problem by consolidating expiry records and providing users with reminders.

No independent experimental result can be concluded from the available mini-project PDF alone because the evaluation protocol and raw test records are not included. For an M.Tech research paper, this section should be updated with measured results from the implemented application. Suggested measures include barcode-read success rate, expiry-date extraction accuracy (if OCR is used), reminder delivery rate, average notification delay, time required

to add a medicine, and user task-completion rate. Each metric should state its numerator, denominator, sample size, and test conditions.

10. Limitations and Future Scope

Potential limitations include incomplete barcode data, incorrectly entered expiry dates, network or messaging-service failures, outdated directory entries, and privacy risks from storing user and purchase information. A barcode may identify a product without containing its manufacturing and expiry dates; the system must therefore validate the source of each field instead of assuming all information can be fetched from the barcode.

Future work can investigate OCR for reading printed expiry labels, stronger audit logs, role-based access for pharmacies, secure data handling, offline entry with later synchronisation, and integration with verified product databases. A larger pilot study could compare manual entry with barcode-assisted entry and assess reminder reliability. Any deployment involving real patient information should include appropriate consent, security controls, and institutional/legal review.

11. Conclusion

This paper presents the design and research context for Predictors Medicine Expiry Tracker, a web-based concept for recording medicine details, monitoring expiry dates, and providing reminders. Prior work on pharmaceutical traceability and QR-based expiry reminders supports the relevance of machine-readable identifiers and database-supported tracking [2–4]. The project's proposed calendar, purchase history, billing, and multi-channel alerts aim to make expiry information easier to manage. To establish research validity at M.Tech level, the implementation stack, system testing, evaluation dataset, and measured results should be documented transparently. The system should complement—not replace—manufacturer labels, pharmacists' professional judgement, and official medicine-safety guidance.