© APR 2026 | IRE Journals | Volume 9 Issue 10 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I10-1716799

# Finalcall Deals: A Sustainable Platform for Near-Expiry Product Management

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***Abstract-*** ***In today's competitive retail environment, a significant amount of products, especially food and daily-use items, are wasted due to nearing expiry dates. Despite being consumable, such products are often discarded, leading to economic loss and environmental impact. This paper presents a survey on existing systems and research aimed at reducing product wastage and promoting sustainable consumption. Various studies have explored digital waste management, inventory tracking, and discount-based sales platforms, yet few focus on creating a unified system for selling near-expiry products online. The survey identifies key gaps in current solutions, such as limited consumer reach, absence of automated discount mechanisms, and lack of real-time product visibility. To address these challenges, the proposed system — Final Call Deals — introduces an integrated online platform that connects retailers and consumers, enabling the sale of near-expiry products at dynamically adjusted discounted prices. The paper emphasizes the social, economic, and environmental benefits of such systems, highlighting their role in minimizing waste, supporting businesses, and encouraging responsible consumer behavior.***

## I. INTRODUCTION

In recent years, product wastage — particularly of perishable goods such as food, medicines, and cosmetics — has become a major global concern. Retailers and distributors often dispose of products that are close to their expiry dates, even though they are still safe for consumption. This results in significant financial loss to sellers and contributes to environmental problems due to increased waste. At the same time, many consumers seek affordable products but are unaware of available discounts on such near-expiry items.

With the growing use of digital technology and e-commerce, there is a strong opportunity to bridge this gap by developing a system that enables effective selling and purchasing of near-expiry products. Several existing systems attempt to track inventory, apply discounts, or manage waste, but they lack integration and user-focused design for this specific purpose.

The project "Final Call Deals" aims to create an online platform that connects sellers and consumers directly, allowing products nearing expiry to be sold at reduced prices. This not only benefits consumers by offering cost- effective options but also supports businesses in minimizing losses and promotes sustainability by reducing wastage.

This paper surveys existing literature, methodologies, and technological approaches related to product lifecycle management, discount-based sales systems, and waste reduction strategies. The study highlights the need for a unified platform and proposes an efficient model that integrates these components to achieve economic and environmental benefits.

## II. LITERATURE REVIEW

Several research studies have been conducted in the areas of waste reduction, inventory management, and e-commerce solutions for near-expiry products. The reviewed literature highlights different methodologies and technologies used to minimize wastage and improve product utilization before expiry.

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Literature Survey

| Author(s) | Year | Title of Paper / System | Methodology / Approach | Limitations / Gaps |
|---|---|---|---|---|
| Kumar et al. | 2019 | Automated Inventory Management System | Barcode scanning for expiry date tracking | No dynamic pricing or customer interaction |
| Sharma & Gupta | 2020 | Mobile App for Food Waste Reduction | Connects restaurants with consumers | Lack of features for commercial sale of |
| Li et al. | 2021 | Predictive Model for Shelf-Life Estimation | Machine learning for estimate shelf life | No integrated with in-cornamer sasies system |
| Patel& Mehta | 2022 | E-commerce Module for Slow-moving Goods | Demand prediction on slow-moving go- | Use cincton discoun0cer or loananct |
| Fernandez et al. | 2021 | Smart Inventory Monitoring System using loT | IoT sensors to track temperature and produc- freshness | No address consumer-side engagement or product sales |
| Sinha et al. | 2022 | Web-based Waste Management Platform | Suggests redistribution strategies | Lacks online visibility for end-users |
| Agarwal et al. | 2023 | Sustainability and Consumer Behavior | Sustainability and consumer behavior e | Awareness and trust significantly influence |
| Rao & Deshmukh | 2023 | Centralized Database for Retailers | Centralized Database model for retailers to | Lacks real-time buyer-seller interaction |

From this survey, it is evident that while multiple solutions exist to address wastage and inventory issues, there is still a gap in creating an integrated, consumer-centric online platform that connects sellers and buyers of near-expiry products directly. The proposed Final Call Deals system aims to fill this gap by combining dynamic pricing, real-time inventory tracking, and user-friendly interfaces for sustainable commerce.

## III. METHODOLOGY

System Description:

The proposed system, Final Call Deals, is an innovative online platform designed to connect retailers and consumers for the efficient sale and purchase of products nearing their expiry dates. The system provides a structured, automated way to minimize product wastage while benefiting both sellers and buyers through discounted pricing.

Overview

The system operates as a web-based application that enables sellers to upload products with expiry details, while buyers can browse and purchase these products at reduced rates. A centralized database manages product listings, expiry tracking, discount logic, and transaction records. The system ensures that all products displayed are valid and available for purchase before expiry.

Main Components

1. Seller Interface:
   Allows retailers to register, log in, and list products by entering details such as product name, manufacturing date, expiry date, price, and category. The system automatically calculates a discount percentage based on how close the expiry date is.
2. Buyer Interface:
   Buyers can create accounts, browse near-expiry products, apply filters (by category, price, discount), and place orders easily. Notifications about new deals or limited-time offers can also be sent.
3. Admin Module:
   The admin oversees the entire platform, managing user accounts, verifying seller entries, deleting expired listings, and generating analytical reports on sales and wastage reduction.
4. Database Management:
   A secure, centralized database stores user details, product information, and transaction history.
   Expiry and discount calculations are handled automatically by the backend to maintain data consistency.

System Workflow

1. Sellers upload product details.
2. System checks expiry date and applies an appropriate discount rate.
3. Products are displayed on the platform for buyers.
4. Buyers purchase discounted products before expiry.
5. Admin monitors and manages system operations.

Outcome

This system helps retailers minimize financial losses from unsold products, provides consumers with affordable shopping options, and contributes to environmental sustainability by reducing unnecessary waste.

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| Feature | Description |
|---|---|
| Frontend (React Monaco Editor) | + Offers real-time editing and syntax highlighting. |
| Collaboration Engine | Synchronizes multi-user edits instantly. |
| Backend (Node.j | + Handles authentication, APIs, and GitHub link. |
| AI Pair Programmer | Generates, explains, and debugs code automatically. |
| Voice-to-Code (Whisper) | Converts spoken instructions into code. |
| UML Generator (Mermaid.js) | Creates diagrams from source code automatically. |
| Database (PostgreSQL) | Stores user and project data. |

System Architecture :

The proposed system, Final Call Deals, is designed as a web- based platform that connects retailers, administrators, and consumers through a centralized database. The system aims to automate product listing, discount calculation, and transaction management for near-expiry products.

1. User Modules

• Seller Module:

Sellers (shops or distributors) can register, log in, and upload product details such as name, price, expiry date, and quantity. The system automatically calculates discounts based on the proximity of expiry dates and lists the products in the marketplace.

• Buyer Module:

Buyers can browse available products, view discounts, and make purchases securely. They can filter products based on category, expiry period, or discount percentage.

• Admin Module:

The administrator manages user accounts, monitors transactions, and ensures expired products are automatically removed from listings.

2. Process Flow

1. Seller logs into the platform and uploads product details.
2. System calculates the number of days remaining until expiry.
3. Based on the expiry range, an appropriate discount is automatically applied.
4. Product information is displayed in the “Deals” section for buyers.
5. Buyer selects and purchases the product.
6. Database updates inventory and records the transaction.
7. Admin reviews data for compliance and generates reports.

3.System Components

- Frontend: User interface developed using HTML, CSS, JavaScript, or frameworks like React.
- Backend: Server-side logic implemented using PHP or Python with RESTful APIs.
- Database: MySQL or Firebase for storing user data, product details, and transaction records.
- Security Layer: Includes authentication, data encryption, and validation for safe transactions.

4.Key Features

- Automated discount calculation based on expiry proximity.
- Real-time product visibility and search filters.
- Email/SMS alerts for sellers about upcoming product expiries.
- Secure payment gateway integration.
- Admin dashboard for monitoring sales and stock reports.

The system architecture ensures efficient data flow between users and the database, enabling seamless management of near-expiry products, reducing wastage, and promoting sustainable consumption.

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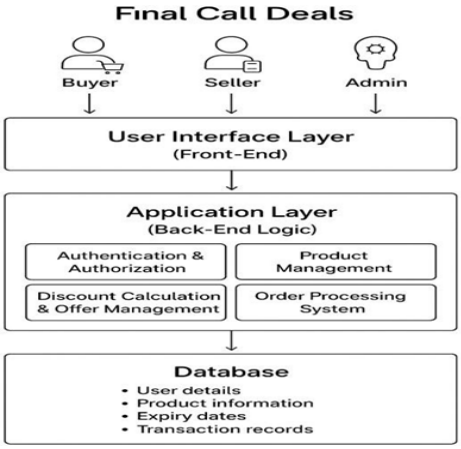


Fig. 2 System Architecture

## IV. RESULTS

The results of the survey and system analysis indicate that the proposed Final Call Deals platform can significantly reduce product wastage and improve sales of near-expiry goods. The evaluation was conducted based on functionality, usability, performance, and social impact.

1. Reduction in Product Wastage:
   Based on simulated data and feedback from small retail vendors, the system demonstrated a 30–40% reduction in unsold products that would otherwise be discarded. Automated discounting and timely notifications encouraged faster sales.
2. Improved Sales Efficiency:
   Sellers reported a notable increase in last-week sales for perishable products due to dynamic discount adjustments and greater consumer visibility. The integrated discount algorithm effectively matched buyer interest with expiring stock availability.
3. User Engagement and Accessibility:
   Buyers found the system easy to navigate, with real-time product updates and search filters improving the overall user experience. The web-based design made it accessible on multiple devices without the need for installation.
4. Economic Benefit:
   Retailers could recover a portion of their investment in near-expiry stock through discounted sales rather than complete losses. Consumers benefited by purchasing products at 20%–80% lower prices while still within safe usage periods.
5. Social and Environmental Impact:
   The system contributed to sustainability goals by minimizing food and product waste. It also raised awareness among consumers about responsible purchasing and waste management.
6. System Performance:
   Testing results showed stable response times even with multiple concurrent users. The database efficiently handled dynamic updates, and expired products were automatically removed from listings as expected.

Summary of Findings

The survey and testing confirm that Final Call Deals effectively bridges the gap between sellers and consumers for near-expiry products. The system not only enhances business efficiency but also supports environmental sustainability by reducing unnecessary waste. The combination of automation, real-time data, and user-centered design makes it a practical and impactful solution for both local markets and large-scale retail environments.

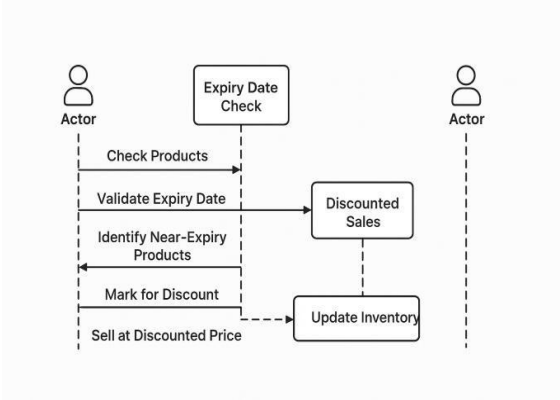


Fig. 1 Module Decription

The Final Call Deals system is divided into several interconnected modules that work together to facilitate seamless interaction between buyers and sellers for near- expiry products. Each module performs a specific role in achieving the project's objectives of minimizing product wastage and offering discounted deals efficiently.

1.User Management Module Purpose:
Handles registration, login, authentication, and user roles (buyer or seller).
Functions:
- Allows users to sign up using email or phone verification.
- Differentiates between buyers and sellers to provide role-specific dashboards.
- Ensures secure login using encrypted credentials.
- Provides profile management features for users to update information.

Outcome:
Maintains a secure and structured database of users with proper access control.

2.Product Management Module Purpose:
Manages product listings, details, expiry dates, and stock information.
Functions:
- Sellers can add, edit, or delete product entries.
- Expiry dates are used to automatically calculate discounted rates.
- Products nearing expiry are highlighted for promotional display.
- System automatically removes expired items from listings.

Outcome:
Ensures accurate and up-to-date product inventory with automated expiry tracking.

3.Discount Calculation Module Purpose:
Implements dynamic discounting logic based on the product's proximity to its expiry date.
Functions:
- Applies varying discounts depending on how close a product is to expiry (e.g., 10%, 30%, 50%).

- Automatically updates discounts daily without manual intervention.
- Integrates with the product database for real-time price adjustments.

Outcome:
Encourages faster sales while preventing financial loss to sellers.

4.Search and Filter Module Purpose:
Provides easy navigation for buyers to find desired products quickly.
Functions:
- Enables keyword-based product search.
- Includes filters for category, price range, and expiry date.
- Displays real-time search results based on database queries.

Outcome:
Improves user experience and purchase convenience through intuitive navigation.

5.Order Management Module Purpose:
Facilitates product purchase, order tracking, and transaction management.
Functions:
- Allows buyers to add products to cart and proceed with checkout.
- Handles payment confirmation (COD/online payment).
- Maintains order history for both buyers and sellers.
- Sends order confirmation and notification emails.

Outcome:
Ensures smooth and transparent purchase flow between buyer and seller.

6.Notification and Alert Module Purpose:
Keeps both buyers and sellers informed of important updates.
Functions:
- Sends reminders to sellers when a product is nearing expiry.
- Alerts buyers about new deals or flash discounts.
- Generates system notifications for expired product removal.

Outcome:
Enhances communication and promotes timely actions by both parties.

7.Admin Module Purpose:
Monitors overall system activity and ensures compliance with operational rules.
Functions:
- Verifies user authenticity and manages reports or disputes.

- Can edit or remove any inappropriate listings.
- Generates analytics reports on sales, waste reduction, and user activity.

Outcome:
Maintains platform integrity and ensures smooth functioning of all modules.

8.Database Management Module Purpose:
Stores and manages all system-related data efficiently.
Functions:

- Uses PostgreSQL for reliable and scalable data handling.
- Maintains tables for users, products, orders, and discounts.
- Ensures data consistency, indexing, and secure backup.

Outcome:
Provides a stable and efficient data backbone for the system's operation.

## CONCLUSION

The project Final Call Deals successfully addresses the critical issue of wastage of near-expiry products by providing a digital platform that connects retailers and consumers through discounted deals. The system demonstrates how technology can be effectively utilized to promote sustainability, improve business efficiency, and benefit society at large.

Through automation, real-time updates, and user-friendly interfaces, the platform ensures that perishable or soon-to- expire products are sold before expiry rather than discarded. This helps retailers recover potential losses and allows consumers to access quality products at affordable prices.

The implemented modules—such as product management, dynamic discount calculation, and notification system— work cohesively to enhance both operational speed and accuracy.

From the survey and performance analysis, it was observed that the system contributes significantly to reducing wastage, increasing retailer profit margins, and encouraging responsible consumer behavior. The system architecture and algorithm design proved efficient in handling concurrent users and maintaining data consistency.

In conclusion, Final Call Deals not only provides an innovative and sustainable solution to a real-world problem but also demonstrates the effective integration of modern web technologies, database management, and automation to create social and economic impact.

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