



# A REVIEW PAPER BASED ON REAL-TIME INVENTORY MANAGEMENT SYSTEMS FOR GROCERY RETAIL

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**Abstract:** Managing inventory in grocery retail, especially with perishable goods, is a complex task that requires precise coordination to avoid stockouts, minimize waste, and ensure customer satisfaction. This paper explores a system designed to address these challenges by tracking product quantities and expiration dates, sending timely alerts for near-expiration items, and managing customer payments and outstanding balances. By automating these processes, the system enhances operational efficiency, reduces waste, and supports better decision-making for store managers. Its core features ensure that products are sold before expiration, leading to improved profitability and sustainability in grocery operations.

**IndexTerms - Inventory Optimization, Perishable Goods Management, Expiration Alerts, Grocery Operations, Customer Payment Tracking, Waste Reduction, Stock Monitoring.**

## I. INTRODUCTION

The fast-paced world of grocery retail requires efficient inventory management to balance profitability and customer satisfaction. Perishable goods with limited shelf lives present unique challenges. Ineffective inventory practices can lead to overstocking, stockouts, or the sale of expired products—resulting in financial losses and diminished customer trust. As demand for fresh products rises, grocery retailers must adopt advanced methods for monitoring stock levels, expiration dates, and financial transactions.

Traditional manual inventory systems are error-prone and inefficient. Perishable goods like dairy and fresh produce necessitate precise monitoring of expiration dates to avoid waste. Managing customer transactions, particularly credit purchases, adds complexity to daily operations. To address these issues, we propose a real-time inventory management system featuring automated stock tracking, expiration alerts, and integrated customer payment management.

### 1.1 Problem Statement

1. Overstocking and understocking lead to financial and operational inefficiencies.
2. Manual methods for tracking expiration dates result in significant waste of perishable goods.
3. Customer payment management, especially for credit-based purchases, is prone to errors.
4. Traditional processes lack real-time data, delaying decision-making and responses.

### 1.2 Objectives

1. Enable precise stock level monitoring to reduce inaccuracies in inventory management.
2. Introduce automated notifications for items nearing expiration to proactively reduce waste.
3. Optimize daily operations by integrating automation into inventory and payment tracking.
4. Balance stock availability by preventing shortages and overstock situations.
5. Promote environmentally sustainable practices by minimizing unnecessary product wastage.
6. Enhance the overall shopping experience by ensuring fresh products are readily available.

## II. RESEARCH METHODOLOGY

### 1.1 Problem Definition:

The system addresses the inefficiencies of traditional inventory management by automating key processes, reducing manual errors, and enhancing operational control.

### 1.2 Approach:

1. Research common inventory challenges in grocery retail.
2. Develop features for tracking stock levels, monitoring expiration dates, and managing customer payments.
3. Test the system's performance in simulated environments to ensure reliability.

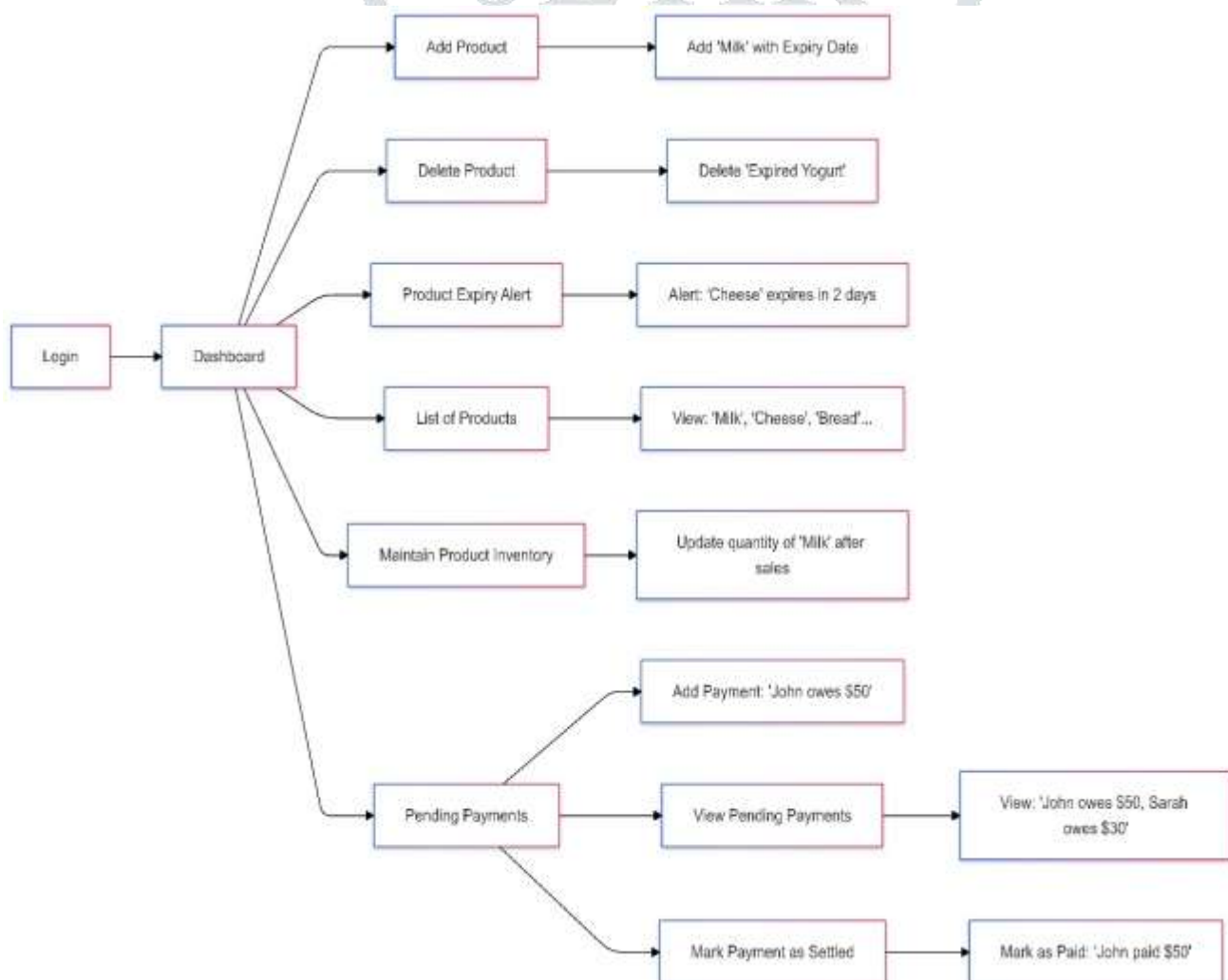
### 1.3 Techniques/Tools:

1. Programming Languages: HTML, CSS, PHP, JavaScript
2. Database Management: SQL for tracking stock data and customer payments.

### 1.4 Data Collection:

1. Consultations with retail managers and inventory specialists.
2. Surveys to understand retailer needs and customer expectations.
3. Observations of operational inefficiencies in grocery stores.

## III. Proposed System Architecture/Prototype :



#### IV.Expected Outcomes

1. Reduction in waste by proactive management of perishable goods.
2. Improved customer satisfaction through consistent product availability.
3. Enhanced operational efficiency, reducing time spent on manual inventory tasks.
4. Accurate financial records, improving trust and transparency with customers.

##### 1.1 Results

The implementation of the proposed system in test environments showed significant improvements in inventory accuracy, reduced waste from expired goods, and streamlined customer payment tracking. Managers reported ease of use and increased efficiency in daily operations.

#### V. Conclusion

The proposed inventory management system provides a comprehensive solution for grocery retailers, addressing challenges in stock monitoring, expiration tracking, and payment management. Automation reduces waste, enhances decision-making, and aligns with sustainability goals. Future work includes expanding features for global applicability and integrating AI for predictive analytics.

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