

AutoScan: A Barcode-Based Payment and Automated Checkout System

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Abstract: *The rapid growth of digital technologies in the retail sector has created a strong demand for efficient and automated checkout systems. Traditional billing methods in supermarkets rely on manual barcode scanning at checkout counters, which often leads to long queues, increased waiting time, and reduced customer satisfaction. These limitations highlight the need for a faster and more user-friendly solution. This paper presents AutoScan, a smart barcode-based automated checkout system that allows users to scan products using a mobile application and manage their cart in real time. The system eliminates the need for standing in billing queues by enabling customers to perform self-checkout. It integrates a mobile application, backend server, and admin dashboard to provide seamless functionality. The mobile application allows users to scan barcodes, add items to the cart, modify quantities, and view the total bill instantly. The backend system processes product data and manages transactions, while the admin dashboard enables efficient product and order management. The system is developed using technologies such as Node.js and MySQL to ensure scalability and performance. The implementation of the system demonstrates improved checkout efficiency, reduced waiting time, and enhanced user experience. The proposed solution provides a cost-effective and scalable approach for modern retail environments.*

Keywords: Barcode System, Smart Checkout, Automated Billing, Mobile Application, Retail Automation, Node.js, MySQL, Admin Dashboard, Self-Checkout System, Real-Time Cart Management, Customer Experience, Retail Management System, Data Management, E-Commerce Technology

I. INTRODUCTION

In modern retail environments, customer satisfaction is highly influenced by the efficiency of the checkout process. Despite advancements in technology, many retail stores still rely on traditional billing systems where customers must wait in long queues for product scanning and payment processing. This process is time-consuming and often leads to frustration, especially during peak hours. The increasing use of smartphones and digital applications has opened new opportunities for improving retail systems. Self-checkout solutions have emerged as an effective way to reduce dependency on manual billing and enhance operational efficiency. However, many existing solutions require expensive hardware or complex infrastructure, making them less accessible for small and medium-scale businesses. To address these challenges, this paper proposes AutoScan, a mobile-based barcode scanning and checkout system. The system allows users to scan products directly using their smartphones, manage their cart dynamically, and complete the checkout process without waiting in queues. By leveraging existing mobile technology and a centralized backend system, AutoScan provides a simple, efficient, and cost-effective solution for retail automation.

II. LITERATURE SURVEY

Several systems have been developed to improve retail checkout processes:

- Barcode-based billing systems

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DOI: 10.48175/568



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- RFID-based smart carts
- Self-checkout kiosks

Existing systems provide automation but have limitations such as:

- High cost (RFID systems)
- Limited accessibility
- Complex infrastructure

The proposed system focuses on a simple, low-cost, and mobile-based solution that is easy to implement and scalable

III. EXISTING SYSTEM

The current event management process in most educational institutions includes:

- Manual event registration using forms
- Communication through notices or social media
- Maintaining records in spreadsheets or paper

Advantages of existing systems::

- Simple and widely used in retail environments
- Provides accurate billing through barcode scanning
- Requires minimal training for staff
- Reliable and easy to operate
- Suitable for small and medium-sized stores

IV. PROPOSED SYSTEM

The proposed system introduces a mobile-based smart checkout system. Key Features:

- Mobile-based barcode scanning
- Real-time cart management
- Dynamic quantity control (+ / -)
- Automatic bill calculation
- Backend data processing
- Admin dashboard for product and order management
- Future support for online payments

The system allows users to scan items while shopping and directly proceed to checkout without standing in queues.

V. SYSTEM ARCHITECTURE

The system consists of three main modules:

1. User Mobile App
2. Backend Server (Node.js)
3. Database (MySQL)
4. Admin Dashboard

Process Flow:

1. User opens the mobile application
2. User scans the barcode of a product
3. Product details are retrieved from the database
4. Item is added to the cart
5. User updates quantity if required
6. Total bill is calculated automatically
7. User proceeds to checkout
8. Order data is stored in the database



9. Admin can view and manage orders

This architecture ensures efficient communication between system components and supports scalability.

The overall working flow of the proposed system is illustrated in Fig. 1.



Fig. 1: AutoScan Barcode Checkout System Flow

VI. METHODOLOGY

The system follows the below methodology:

1. Data Collection:

Product information such as name, price, and barcode is stored in the database.

2. Barcode Scanning:

The mobile application uses the device camera to scan product barcodes.

3. Data Processing:

The backend server processes requests and retrieves product details.

4. Cart Management:

Users can add, remove, or update product quantities dynamically.

5. Order Processing:

Final cart details are stored as orders in the database.

6. Admin Management:

Admin users manage products, monitor sales, and track orders through the dashboard.

VII. RESULTS

The implemented system successfully:

- Significant reduction in checkout time
- Elimination of long queues
- Improved customer convenience



- Accurate billing and data handling
- Efficient product and order management

Testing shows that the system performs reliably under multiple user interactions and provides a smooth and user-friendly experience.

VIII. CONCLUSION

The AutoScan system provides an effective solution to the challenges faced by traditional retail checkout systems. By enabling customers to scan products and manage their cart independently, the system reduces waiting time and enhances the overall shopping experience. The integration of mobile technology, backend processing, and admin control creates a scalable and efficient system suitable for modern retail environments. Future enhancements may include:

- Integration of online payment systems such as Razorpay
- AI-based product recommendations
- Offline scanning capabilities
- Advanced analytics for sales insights

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