INVENTORY MANAGEMENT SYSTEM

PRATHAM BANSAL, PRINCE JHA, SACHIN SHARMA, TUSHAR SINGH Prof. Ms. ROOVI

GOSWAMI

Final Year Students

Department of Computer Science & Engineering Project Guide

Department of Computer Science & Engineering

ABSTRACT

Inventory Management System (IMS) is an essential software solution used for monitoring and controlling product stock levels in stores, warehouses, supermarkets, and businesses where goods are purchased and sold. Traditional stock management performed manually using registers or spreadsheets often results in misplaced records, human errors, slow processing, poor decision-making, and financial loss.

To eliminate these inefficiencies, this research proposes a computerized Inventory Management System using Java and MySQL integrated with Barcode Scanning technology. The system provides automated product registration, stock tracking, purchase and sales monitoring, invoice generation, and detailed reporting modules.

Java enables platform independence and a robust graphical user interface, while MySQL ensures secure and structured storage of large volumes of inventory data. Barcode scanning accelerates the entry and retrieval of product information and improves operational accuracy.

The proposed system increases productivity, reduces human effort, ensures real-time stock visibility, enhances customer satisfaction, and supports data-driven business decisions. This paper presents system architecture, methodology, implementation process, testing, and advantages, demonstrating the scope of automation in modern inventory management.

1. INTRODUCTION

Inventory management plays a vital role in every organization that handles physical goods. Efficient stock handling helps track available quantities, predict demand, optimize purchases, and avoid financial losses caused by understocking or overstocking.

In industries such as retail, pharmacy, logistics, and manufacturing, accurate inventory handling is directly linked to profitability and performance.

Traditional manual inventory systems consume time, require multiple staff members, involve repetitive data entry, and increase the risk of errors such as duplicate entries, misplaced records, or incorrect stock counts. These limitations create delays, reduce customer satisfaction, and negatively affect business intelligence.

To address these challenges, digital inventory solutions are necessary to automate workflows and maintain a centralized system that updates stock levels in real time. The proposed Inventory Management System (IMS) is designed using Java for application interface development and MySQL for backend database management.

Barcode technology enables fast product identification by scanning instead of manual typing. The system maintains categories, suppliers, products, and transactions in a structured relational model and offers functionalities such as adding, updating, and deleting stock items, generating purchase and sales reports, issuing automated low-stock alerts, and printing bills for customers. The objective of this project is to improve business automation, reduce errors, save time, and increase operational efficiency.

2. PROBLEM STATEMENT

Many business organizations struggle with outdated and inefficient stock-handling approaches that depend primarily on manual work. Common issues include:

● Human errors in stock entry, billing numbers, and product details.

● Time-consuming process for retrieving product information.

- Lack of accurate real-time visibility of stock levels.

- No proper tracking of sales history and purchase records.

- Low data security and high risk of losing important stock details.

- Inability to analyze product performance and generate business insights.

Due to these challenges, businesses face difficulties in planning, forecasting, and profitability. To resolve these problems, a computerized inventory system is required that provides real-time automation, centralized database control, and advanced technology like barcode integration.

3. OBJECTIVES

The primary objectives of the proposed system are:

1. To automate inventory operations and eliminate manual error.
2. To provide real-time stock updates for sales and purchase processes.
3. To implement barcode scanning for quick and accurate product identification.
4. To generate invoices, reports, and analytical summaries.
5. To maintain secure data storage with user authentication and authorization.
6. To support better decision-making through accurate historical records.
7. To reduce time consumption, operational cost, and workforce dependency.

4. LITERATURE REVIEW

Existing research shows that automated inventory management significantly improves business efficiency and accuracy as compared to manual systems. Many commercial software solutions implement database-driven inventory control but require high costs, complex setup, or lack barcode support.

Research emphasizes the importance of real-time systems that integrate modern technology for stock management. Studies highlight that barcode systems minimize human input, improve scanning speed, and avoid data duplication. Researchers also conclude that relational database systems provide improved security, scalability, and reliability for inventory data storage.

Based on these findings, integrating barcode technology with Java- based application development and MySQL database can deliver an advanced and practical inventory solution.

5. METHODOLOGY

The development of the Inventory Management System follows a Structured Waterfall Model, consisting of:

1. Requirement Analysis

Understanding end-user requirements including product cataloging, stock control, report generation, billing, barcode support, and multi- user access.

2. System Design

Creating database schema, ER diagrams, use case diagrams, and UI layout to represent data flow and functionality.

3. Database Development

Designing relational database tables such as product, stock, category, purchase, sales, suppliers, and credentials using MySQL.

4. Application Development

Developing the graphical user interface using Java Swing/JavaFX and connecting backend using JDBC.

5. Barcode Integration

Using barcode scanner input to retrieve product details instantly during billing and search.

6. Testing & Evaluation

Performing unit testing, integration testing, GUI testing, performance testing, and validation with real sample
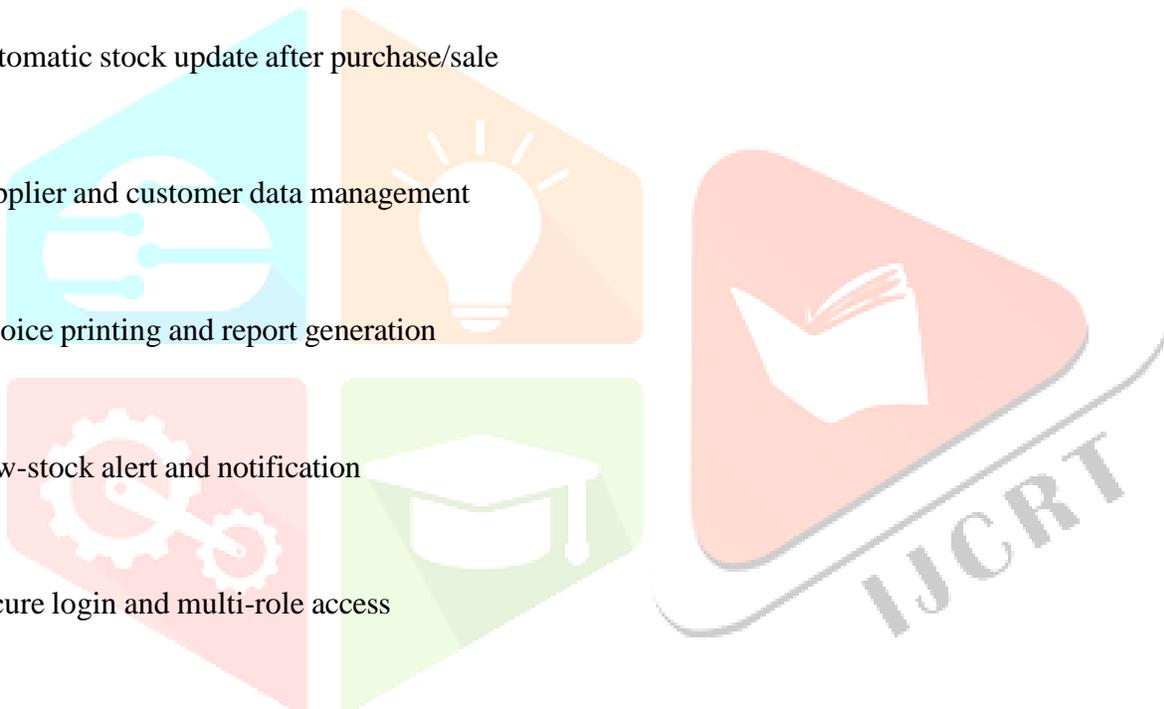
data.

7. Deployment

Installing system in real working environment and collecting feedback for improvement.

6. SYSTEM FEATURES

- Add/Update/Delete/View product inventory

- Barcode-based search and billing

- Automatic stock update after purchase/sale

- Supplier and customer data management

- Invoice printing and report generation

- Low-stock alert and notification

- Secure login and multi-role access

- Backup and recovery support

7. SOFTWARE AND HARDWARE REQUIREMENTS

Software Requirement:-

- Java (JDK 8 or above)
- MySQL Database / XAMPP / Workbench
- JDBC Connector
- IDE: Net Beans / Eclipse / IntelliJ

- Operating System: Windows/Linux

Hardware Requirement:-

- Core i3 processor or above
- 4GB RAM minimum (8GB recommended)
- Barcode Scanner device
- 500GB HDD / SSD

8. CONCLUSION

The Inventory Management System developed using Java, MySQL, and barcode scanning provides an automated and reliable solution for maintaining stock operations. The system increases efficiency by reducing manual work, preventing errors, maintaining accurate stock records, and enabling quick product identification through barcode scanning.

It enhances productivity by providing fast billing, systematic database handling, detailed reports, and secured access. The solution supports better business management, minimizes losses, and improves decision- making through accurate analytics. Future enhancements may include cloud integration, mobile application support, remote access, predictive analytics using AI, and IoT-based live tracking to create an intelligent and scalable inventory ecosystem.

9. ACKNOWLEDGEMENT

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