A SURVEY ON PURCHASE AND INVENTORY MANAGEMENT SYSTEMS USING BARCODE MECHANISM

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ABSTRACT

A long wait in the checkout line adds to the hassles in the existing traditional approach of shopping. Many supermarkets currently use the purchasing approach to scan all the items picked by the customer with the use of a handheld barcode scanner. This approach results in long queues for checkout procedures. This survey studies some of these approaches which use both hardware and software. The proposed system optimises the user's shopping experience by introducing a software application with integrated barcode scanning. The system also includes a web-based application which is an Inventory Management System for the retailer, having access to the entire system and database. The primary objective is to streamline the entire purchasing process right from shopping to checkout. A Point of Sales-based inventory management system offers a powerful solution to the challenges associated with traditional inventory management practices. After scanning the required items, the user can proceed for swift payment, and an automated billing number will be generated having all the transaction details.

Keywords: Inventory Management, Barcode Scanner, Software Development, Web-Based Application, Point Of Sales.

I.   INTRODUCTION

In the present era, the majority of consumers find themselves in queues at supermarkets and stores due to the time-consuming nature of shopping. The presence of large crowds during discount events or weekends creates difficulties as long lines form, largely due to the use of the existing Barcode-Scanner-based checkout procedures. Scanning each and every item at the counter during the checkout is the most time-consuming process, so we try to reduce these dependencies on the barcode scanner itself. Due to these reasons, the customers have to wait for a long time in the queue which may lead the business to incur losses.

Our proposed system aims to reduce these dependencies and create an efficient solution to the existing barcode scanner-based procedures. We are integrating the scanner into the application such that the consumer remains in control of the purchase. The consumers will have to install the mobile-based application on their smartphone, with login and logout features. Alongside this application, we also made an UI-based database system, so it is easy to be managed by any retailer. The entire system will be helpful for both consumers and retailers.

A barcode based inventory management system offers a powerful solution to the challenges associated with traditional inventory management practices. Scanning each and every item at the counter during the checkout is the most time-consuming process, so we try to reduce these dependencies on the barcode scanner itself. The traditional practices of barcode management incur large hardware related costs, and these costs often are observed for the handheld barcode scanner. Each store or supermarket often needs to buy a few to many of these scanners.

Such technology can be easily implemented in any stores/markets wherein shelves come in the picture and items are recorded with the use of barcodes. In addition to reducing the waiting queue of customers, the retailer will also experience an increase in sales- as idle waiting time would be changed to more revenue generating selling time. As a result, the customer can save their valuable time and the retailer staff workload is reduced. In this manner, a lot of time and effort is saved for both the customer and the retailer.

II.   LITERATURE SURVEY

Overcrowding at the checkout lanes is observed almost every time when one visits the supermarket. It takes many minutes to scan the items from a customer's cart with the use of the barcode scanner- a hardware device which scans the items one by one and then adds it to the cart. This procedure requires a lot of time and effort from the store staff.

[1] The existing solution adds to this feature by adding more hardware equipment in the trolley such as using a connection between Arduino and an android application using bluetooth. It uses an LCD screen which displays the products' information and offers at the store along with a recommendation system.

[2] Another approach is an IOT-based implementation of a self-controlled shopping cart. This system is equipped with an application along with a billing system. The application is equipped with audio instructions to move the cart.

[3] In many businesses, there is a problem of keeping manual records of incoming and outgoing goods. It introduces an Inventory Management System having a record of each new or returned product as it enters or leaves a warehouse or point of sale. The software solves this problem for Shams Best Technic Sdn Bhd.

[4] This system employs radio-frequency identification (RFID) technology which automates the processes of shopping and billing. It uses RFID tags to identify products selected by customers.

[5] Many grocery stores employ many marketing strategies to achieve their targets and to identify their target customers. To counter this, a real-time inventory and sales management system was established to the grocery point of sale. It uses a barcode system which is integrated with an inventory management system. It is used to keep track of products and to organise the records.

[6] There are many applications in the world where we can use the barcode technology in our smartphones itself without the need of any barcode scanner. For instance, in the industrial sector barcodes are used to identify the product in the manufacturing process. But the barcode systems in the industries have complex barcodes which require high scanning capability. The proposed system explains the use of smartphones to scan the barcodes for the industrial barcode reader system. The smartphone can read the ID barcode as well as the QR code.

[7] In this system, a shopping cart is based on the Internet of Things, and uses the contemporary barcode scanner. The smart cart consists of many components like feedback systems which provide weight and product imaging to avoid any discrepancy. In addition to the Contemporary Barcode Scanner, a Parse cloud based inventory database is also provided.

[8] The disadvantage of the existing Point of Sale based purchasing is that it is a very time consuming process. This system proposes an image based discount sticker and barcode system for automation. The system is based on a deep learning classifier designed with many discount rates and barcodes. Since the system is image-based, it uses a webcam or any camera to recognize the discount sticker and barcode.

[9] This Smart trolley system includes many hardware components including ultrasonic sensor, weight scanner, RFID reader, microphone and LCD display. It considers the loyalty card of the customer for identification. The trolley consists of the camera and a load cell which will scan the product and measure its weight, and it can also display this information on the LCD screen.

[10] The applications of electronic sensors have led many developments in the domain of shopping, but it may incur large costs related to hardware devices consisting of camera, sensor, RFID and other IoT technologies. This proposed system integrates sensors and mobile devices into shopping carts to provide intelligent features like personalised shopping experiences. It makes the use of deep learning algorithms hosted on cloud platforms.

[11] The system provides control over the inventory for the retailer, which simplifies the movement of inventory items. It provides useful information for its users like inventory, category, promotion, customer order, and reports. The retailer can update data in the inventory, and the customers can place orders on the application. This helps the retailer to monitor the performance and control over the inventory.

III.   PROPOSED METHODOLOGY

The system architecture diagram is the conceptual model of our project, and it defines the structure, behavior, and more views of the system. The basic system architecture for the proposed system, including both the applications is shown above.
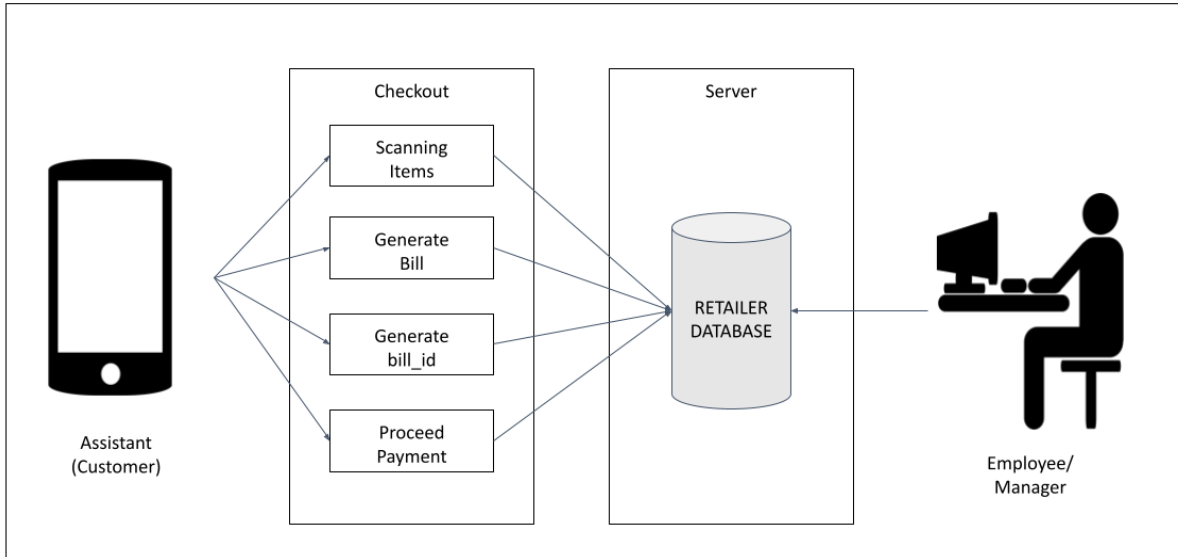

Figure 1: Proposed System Architecture

IV.   FUTURE SCOPE

The future scope of this system is promising. The system has industry wide applicability, as purchase and inventory management are integral to a wide range of industries. Additionally, the project's focus on enhancing efficiency and accuracy through barcode systems will be pivotal, as it minimizes human errors in data entry and tracking, leading to more streamlined operations. The competitive advantage it offers is noteworthy, as companies that adopt barcode enabled purchase and inventory management systems can streamline their operations, reduce costs, and gain an edge in their respective markets. The project can be expanded by including a card reader to the application in the mobile device. This technology will be capable of accepting digital signatures on the device screen.

V.   CONCLUSION

The mobile application with Integrated Barcode Scanning and Inventory Management System represents a significant advancement in streamlining and optimizing inventory control processes. By leveraging barcode technology and mobile software solutions, this system empowers businesses to efficiently track, manage, and monitor their inventory in real-time. The integration of barcodes simplifies data entry, reduces errors, and enhances accuracy, while the mobile aspect grants users the flexibility to access critical inventory information on the go. Ultimately, this system holds the potential to improve operational efficiency, reduce costs, and provide businesses with valuable insights to make informed inventory-related decisions, contributing to overall success and growth.

VI.   REFERENCES

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