IOT BASED SMART SHOPPING CART

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ABSTRACT

This project proposes the design and implementation of an IoT-based smart shopping cart system. The system will utilize various sensors and devices, such as RFID readers, weight sensors, and barcode scanners, to automatically detect and track the items placed in the cart. The smart shopping cart will also be equipped with a display screen, which will provide real-time information to the shopper, such as the total cost of the items in the cart and the location of items within the store. The system will also allow shoppers to add or remove items from their cart and pay for their purchases directly through the cart. Furthermore, the system will be designed to communicate with the store's inventory management system to ensure that items are always in stock and that the shopper is alerted if an item is out of stock. The system will also allow for personalized promotions and offers to be sent directly to the shopper's mobile device based on their shopping history and preferences. Overall, the proposed IoT-based smart shopping cart system aims to enhance the shopping experience for consumers by making the process more convenient and efficient, while also providing valuable data and insights to store owners to improve their inventory management and customer engagement strategies.

***Keywords*: controller, RFID reader and Tag, LCD module.**

INTRODUCTION

The traditional shopping experience often involves manually selecting items from store shelves, placing them in a cart, and then waiting in line to pay at a checkout counter. This process can be time-consuming and inefficient, leading to frustration for both shoppers and store owners. To address these challenges, the proposed IoT-based smart shopping cart system will utilize various sensors and devices to automate the shopping process and enhance the overall shopping experience. The system will utilize RFID (Radio Frequency Identification) readers to automatically detect and track the items placed in the cart. This will eliminate the need for shoppers to manually scan items at a checkout counter, reducing wait times and improving overall efficiency. Additionally, the system will incorporate a location tracing system to track the location of items within the store. This will allow shoppers to easily find the items they need and reduce the time spent searching for specific products.

The system will also feature an automatic billing system, allowing shoppers to pay for their purchases directly through the smart cart.
This will further enhance the convenience and efficiency of the shopping experience. Overall, the proposed IoT-based smart shopping cart system aims to streamline the shopping process, reduce wait times, and enhance the overall shopping experience for both shoppers and store owners.

OBJECTIVES

- To enable data exchange between trolley and items placed in the rack, is easy to identify the location of items by the purchaser.
- To avoid wait time at the billing counter by developing RFID item scanner with automatic billing mechanism.
- To develop a Quick Shopping Cart with a security unique RFID card for every registered customer.

LITERATURE SURVEY

The steps carried out here are first we need to decide the time factor, financial system and company strength next step is to be finding out the operating system and language which can be used for tool development.

[1] IoT-enabled Smart Shopping Cart with a Personalized Marketing System" by Prakash. (2018). This paper presents an IoT-based smart shopping cart that uses sensors and cameras to automatically detect items placed in the cart and generate personalized marketing messages based on the customer's buying history. The system also includes a mobile app that enables customers to view product information, promotions, and deals in real-time.

[2] "Smart Shopping Cart for Supermarkets using RFID Technology" by Ananthi (2019). This paper describes an RFID-based smart shopping cart that enables supermarkets to track inventory levels in real-time and improve the shopping experience of customers. The system includes an RFID reader mounted on the cart that automatically scans items as they are placed in the cart, eliminating the need for customers to queue up at the checkout counter.

[3] "Smart Shopping Cart with Automated Billing and Inventory Management System" by Ahmed. (2020). This paper presents an IoT-based smart shopping cart that uses sensors and cameras to automatically detect items placed in the cart and generate a bill for the customer. The system also includes an inventory management system that tracks product levels in real-time and alerts the store staff when products are running low.

[4] "A Survey on Internet of Things based Smart Shopping Cart" by Sundari (2021). This survey paper provides an overview of the existing research on IoT-based smart shopping carts and highlights the key features, benefits, and challenges of these systems. The authors identify the main research gaps and propose future directions for research in this area.

METHODOLOGY

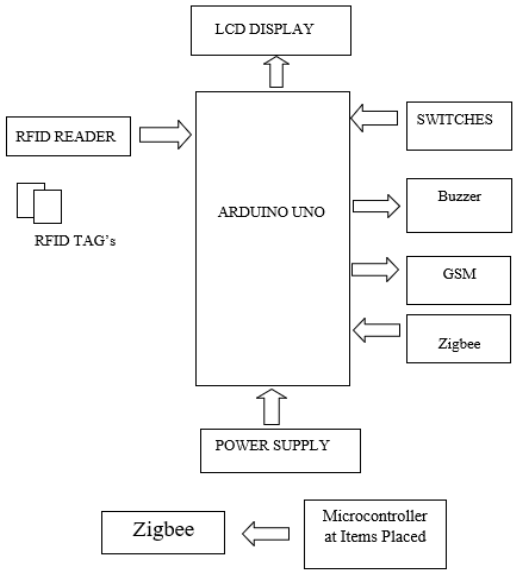

Fig 1: Block diagram of IoT based smart shopping cart.

The system is based on an Arduino UNO microcontroller, which is interfaced with various components such as switches, buzzer, GSM, power supply, LCD display, and RFID reader. The RFID reader is used to scan RFID tags on the products, and the microcontroller retrieves product details from the tag and displays them on the LCD module. The system also calculates the total bill amount based on the products scanned and displays it on the LCD module. The wireless communication system is placed near the items, and the system updates the is near them. This feature can help shoppers easily find the items they are looking for and improve the overall shopping experience. It is worth noting that the overall working process of the system is implemented using the Arduino IDE software. The software is responsible for processing the data from the components and executing the necessary tasks to make the system work as intended. Overall, the proposed IoT-based smart shopping cart system seems to be a promising solution that can improve the shopping experience and increase efficiency in retail stores.

Step 1: Start the process.

Step 2: The system initialization process takes place when the microcontroller is powered up, and the system displays the initial data on the LCD module.

Step 3: the product scanning process starts using the RFID reader. If the reader successfully scans the RFID tag, the system displays all the product details on the LCD screen. The wireless communication system helps update the shopping cart with the location of the items as the shopper moves around the store. The wireless communication system is placed where the items are kept, once the users is near to the items with trolley, the data exchange between the trolley and items placed in the rack will be updated to trolley what items are near with us.

Step 4: If we want to remove the any product after shopping, then double scan the RFID card, it will remove from ongoing bill.

Step 5: Finally, to end the shopping process, the shopper needs to scan their membership card. If the card is successfully scanned, the system displays the complete bill details on the LCD screen.

Step 6: After deducting the bill amount from the customer's authorized card, the system sends an SMS to the prescribed shopper's mobile number through GSM.

Step 7: Stop.

FLOW CHART

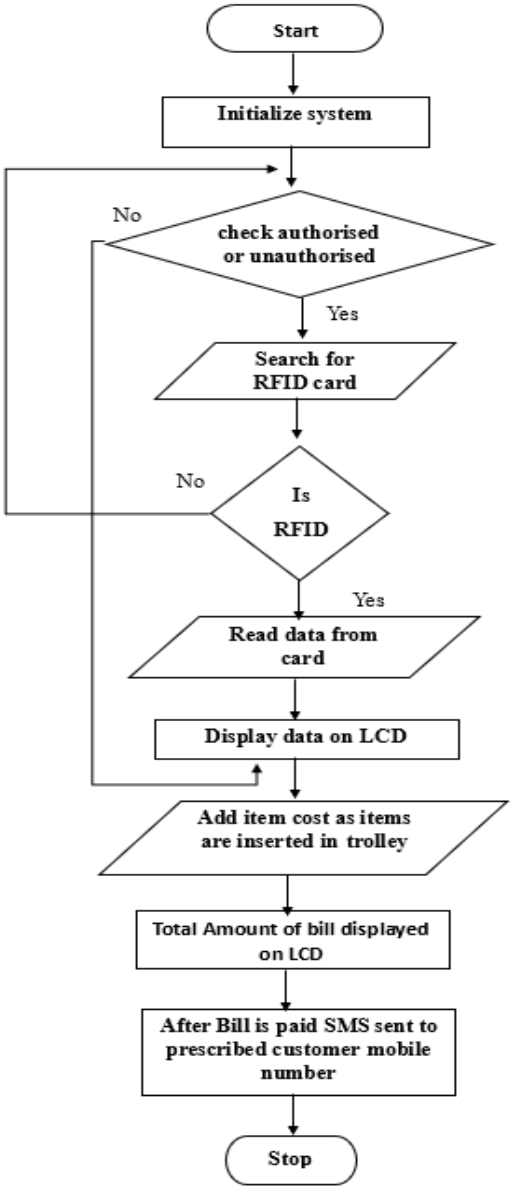

Fig 2: Flow chart representation

Step 1: Start the process.
Step 2: System Initialization takes place.
Step 3: check card is authorized or unauthorized.
Step4: If the card is authorized, data will be displayed on LCD, then place the product with an RFID Tag in front of RFID reader which holds the information of the respective product.
Step 4: It adds the item cost as items are inserted in the trolley.
Step 5: The total amount of bill is then displayed on LCD.
Step 6: After the bill is paid, the system sends an SMS to the prescribed purchaser's phone number.
Step 7: stop.

RESULTS AND DISCUSSION

Fig:2 When system is initialized.

Fig:3 When item is added into the cart.

Fig:4 While making payment.

Fig: balance amount displayed on LCD.

The above figures show the results of smart shopping cart. Smart shopping cart means a shopping trolley or cart in malls that uses the RFID technology to assist the shopper in various ways such as giving exact location of items in Wishlist, giving information about discounted items on nearby shelves. Also, the efficiency of our project is good. Here we are using RFID reader to scan the products ,once the product is scanned , items name and cost of the each items will be displayed on LCD module. After completion of shopping, entire amount of bill is deducted by using the authorised card and remaining balance amount is displayed on LCD. By the communication between Zigbee and microcontroller, the nearby products are displayed on LCD.

CONCLUSION

The IoT-based smart shopping cart with an automatic billing system using an RFID reader and a location tracing system is an innovative solution to simplify the shopping experience for customers. With the use of RFID technology, the system can quickly and accurately identify the products placed in the cart, and the wireless communication system helps update the shopping cart with the location of the items as the shopper moves around the store. The system provides an efficient billing and payment option, where the authorized card can be used to pay for the purchased items. The system also sends an SMS to the customer's mobile number after the bill is paid, providing an additional layer of convenience and security. Overall, this project has demonstrated the potential of IoT-based systems in automating and streamlining various aspects of our daily lives, including shopping.

FUTURE SCOPE

1. Integration with mobile apps: The system can be integrated with mobile apps to provide an enhanced shopping experience. Customers can scan items using their smartphones and add them to their carts. They can also view the total bill amount, make payments, and receive receipts on their mobile devices.
2. Personalization: The system can be customized to provide personalized recommendations to customers based on their previous shopping history and preferences. This will help to improve customer satisfaction and loyalty.
3. Integration with smart payment systems: The system can be integrated with smart payment systems such as digital wallets and cryptocurrencies, allowing customers to make payments using their preferred payment methods.

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