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Smart Shopping Trolley

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ABSTRACT

Even through E-commence and other online applications are growing rapidly the craze for traditional shopping has never stepped back. One difficulty is to follow up in a queue for the billing process. There, arises a demand for easy and quick payment of bills. The proposed Smart Cart in this paper, is capable of generating bill using IoT along with the mobile cart application. With the use of this mobile application and trolley, customer can make bill payment in no time. The smart cart uses the RFID tag and receiver to scan the product, load cell to prevent theft, LCD display and the Micro controller. Along with this the customer can also log in with the mobile app which will display the list of all the products mentioned and their amount. Once done, the customer can pay the bill through the mobile application.

I. INTRODUCTION

Mall and market is a big corner for customer to purchasing the daily requirement like branded food item, snacks, cloth materials, electric and electronic devices etc. Nowadays, a maximum numbers of shopping mall are available large as well as small in the world. In holidays and weekend time we can see a huge rush at mall. The public was demand & spending more time in shopping mall. After purchasing a long time, the customers waste of unnecessary time at the billing counter for billing the purchased item. Continuously improvement was compulsion in the common billing system to increase the quality of shopping experience to the customers. To overcome these problems and to change and improve the existing system, we have designed a SMART SHOPPING TROLLEY. This can be done by simply attaching using RFID tags to the products and a RFID reader with a LCD display on the shopping trolley. In this system, customer will have to know the price of each and every item that is scanned in with help RFID and LCD, total price of the item will be displayed in LCD and also brief about the product. In this system will save time of customers and manpower required in mall. It is also used to reduce the employee work in the shopping mall.

At present, we are using the process in malls with help of barcode scanner. Vendor scan the product through the barcode scanner. This is to be a slow process and

Customer has to wait for long queues. So, this is a one of the reason for most of the people want to leave the mall for waiting a long queue to buy a few products. To avoid that, we want to buy more products recent years have been introduced new type of technologies. Customer has to put a product into smart shopping trolley. Each and every product has product id. The RFID reader can read the product id. This can have been useful for customers. All such solutions can be useful for customer. Such solutions save the customer time and money etc.

1. LITERATURE SURVEY

K. V. Prasad et al. (2021) proposed a smart trolley system with a mobile application for online payment and real-time bill updates. Customers could scan products, view itemized bills, and complete payment through the app, eliminating long queues. The study highlighted improved customer satisfaction and reduced checkout congestion. Nevertheless, the system depended heavily on user familiarity with smartphones and mobile applications.

S. Anitha et al. (2022) developed an IoT-enabled smart cart using Raspberry Pi, RFID modules, and LCD displays to automate shopping and billing. The system improved shopping speed and reduced human intervention at billing counters. However, the system performance was affected by RFID misreads in densely packed product environments.

D. Mehta et al. (2023) introduced an advanced smart shopping cart with integrated theft detection, mobile payment, and cloud connectivity. The system ensured secure billing and seamless checkout using mobile applications. Although the results showed high efficiency and scalability, the system required significant initial investment, making it less suitable for small retail stores.

2. PROPOSED SYSTEM

T A customer goes into a shopping center then she/he first take a trolley. Every last trolley is joined with a scanner tag per user and a RFID per user. The framework work is the point at which the customer buys a thing, the customer must be examining the thing first with help of standardized tag are available in each item utilizing the RFID per user. At that point that acquired thing can be set into the trolley. While the client is examining the RF tag of the item, a cost of the buying item is taken and spared in the framework's memory/Arduino.

Information put away in framework's memory is contrasted and the query table. In the event that matches are discovered at that point cost, name of individual item gets showed on the LCD an d to send information smart phone through Bluetooth by used external mobile app.

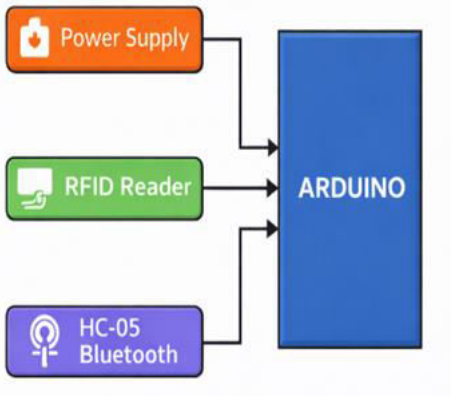

Fig 1: Block Diagram

- Here we have utilized signal for the RFID per user can read the thing effectively. Assuming every single thing will be checked means bell give a sound. The client can without much of a stretch know the thing was perused.
- Counting is specifically performed for security reason. On the off chance that on the off chance that even as meandering round the shopping center a man disposes of the RFID tag and puts the item in trolley, at that point checking the no of things empowers to get measurements of articles obtained. Subsequently, tallying is performed however there is no expansion of cost particular item in receipt. This recommends the blast in wide assortment of stock yet not increment in charge.
- If an unwanted item is expelled from trolley then it diminishes the scope of items notwithstanding bill. It is utilized to subtract the aggregate cost to the expelled specific thing cost.
- After conclusive touch of shopping, a mystery is squeezed showing last charging of the considerable number of items. Appropriately, the last data of all items is transmitted to a PC with the assistance of serial report and the last charging is finished by VB programming on PC.
- There's a scanner tag gadget in our undertaking. it's miles difficult to glue the RFID tag to a couple of items like coconut, vegetables and so on. Subsequently in such

cases regular filtering of scanner tag is additional advanced than RFID strategy.

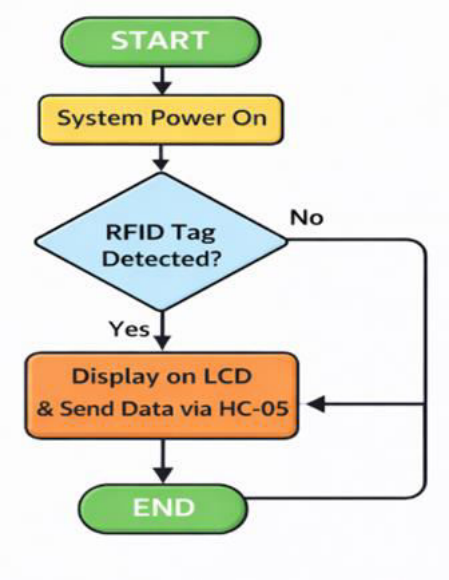

Fig 2: Flow Chart

3. RESULTS AND DISCUSSION

The smart shopping trolley system efficiently enabled automated item tracking, real-time billing, and improved shopping convenience using embedded sensors and microcontroller technology. It reduced manual billing errors and waiting time at checkout counters, enhancing overall customer experience. The system demonstrated reliable performance in item detection, weight measurement, and user-friendly operation in retail environments.

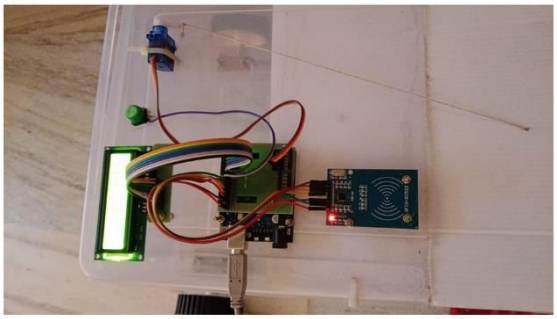

Fig 3: Hardware Implementation

The Smart Shopping Trolley System uses a microcontroller to control movement, sensors, and user interactions. It drives DC motors through a motor driver and displays information on an LCD screen. Powered by rechargeable batteries, the system enables efficient and automated shopping assistance.

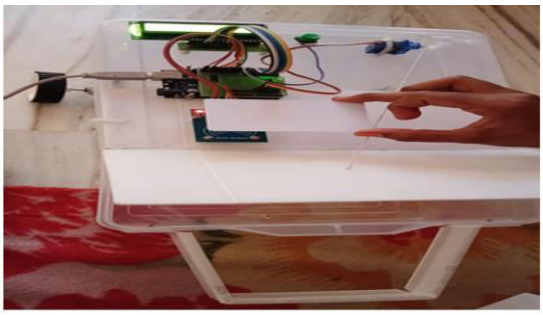

Fig 4: Item Scanning Using RFID In Smart Trolley

The figure shows the process of scanning an item using an RFID card and reader in the smart trolley system. When the card is brought near the reader, the system reads and processes the data using a microcontroller. The item details are then displayed on the LCD, making shopping faster and more convenient.

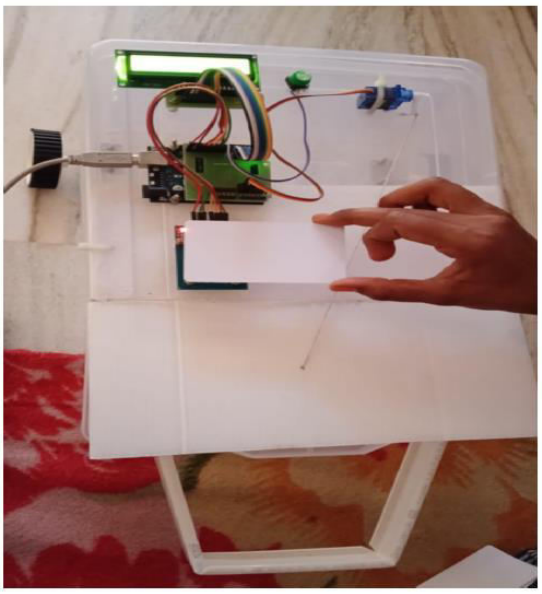

Fig 5: Drop The Product

The Drop-in Product stage shows how the user places the selected product into the trolley after it has been scanned. Once the item is dropped into the trolley container, the system records the product as added to the cart. The microcontroller updates the product information and displays it on the LCD screen. This process helps maintain an accurate list of items inside the smart trolley during shopping.

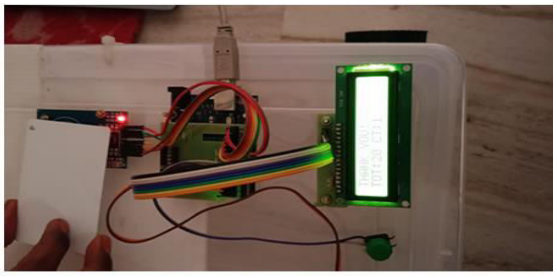

Fig 6: Final Shopping Details Display on LCD

The figure shows the smart trolley system displaying the final shopping details on the LCD screen. It presents the list of scanned items and related information processed by the microcontroller. This helps users easily view their total items and speeds up the checkout process.

4. CONCLUSION

The smart shopping trolley system successfully automates the billing and item tracking process in retail environments. It reduces manual errors and minimizes waiting time at checkout counters. The integration of sensors and microcontroller ensures accurate item detection and smooth operation. The system enhances customer convenience and improves overall shopping efficiency. It provides a modern and intelligent solution for smart retail management.

FUTURE SCOPE

The system can be enhanced by integrating AI-based product recognition and barcode automation for faster billing. It can also be connected with mobile apps and IoT platforms for real-time shopping analytics and smart payment systems.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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