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Intelligent Shopping Cart

Ms. Srilakshmi Nayaka S.R.[1]

Mr. Arun Raj S.R.[2]

[1] MTech Research Scholar, Department of Electronics and Communication Engineering

[2] Assistant Professor, Department of Electronics and Communication Engineering

University BDT College of Engineering, Davanagere 577004, Karnataka, India

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ABSTRACT: In today's larger cities, going shopping at the mall has become a regular ritual. People make new purchases and place them in the cart. It takes a lot of time and can be quite annoying to go to the billing counter after making the entire transaction in order to make the payment. Therefore, the primary goal of this prototype's design is to minimise human effort, remove the line, and shorten the time required for billing. Our prototype includes elements like RFID tags that are used to identify products, an RFID reader that scans products as they are placed in a cart, and it displays on an LCD display. Therefore, the data is transferred into the server at the billing counter.

Kewwords: NodeMCU, 16 x 2 LCD Display, Buzzer, LED, EM-18 Card Reader, RFID card.

I. INTRODUCTION

Our ideas and expectations are changing significantly as a result of several advancements and information technologies during the course of the century. Shopping is a common activity where people spend the most time. According to a poll, people spend between one and two hours shopping, and most people always have a tendency to leave a lengthy line of people behind them. In the current world, every supermarket and shopping centre includes a shopping cart and baskets for consumers to keep their purchases. Customers must continue to the billing counter for checkout after their purchasing is complete. Here, the billing procedure is time-consuming, necessitating the use of more personnel in the billing area. To solve this issue, we are adopting an RFID-based smart trolley system to reduce traffic, save time, and reduce labor-intensive tasks. Our prototype contains a few improved features that will fix the queue problem. The smart trolley system includes a Nodemcu, Buzzer, LCD Display, RFID Tag, and RFID Reader. A product has an RFID tag connected to it. The RFID reader automatically scans the items as a person places them in the trolley, and the information about the product name, price, and quantity is shown on the LCD. After finishing their purchasing, customers simply pay the balance due and walk away from the counter after sending the server their information. Thus, it has the ability to improve the customer's buying experience by making it more enjoyable, simple, and effective. Fig1 shows the current situation Shopping environment

Fig:1. Current Shopping Environment

II. LITERATURE SURVEY

According to this research, one of the main goals in enhancing shoppers' shopping experiences is to cut down on the amount of time spent standing in long lines at supermarket checkouts. In this study, we suggest using RFID to create a smart shopping system that is integrated with the shopping cart. The mall's shopping carts are all outfitted with RFID chips. The billing information for that cart is updated when a product with an RFID tag is added by reading the information from the associated product. Smart shelves that are connected to RFID scanners are put in the malls. [1]. At contrast to E-commerce, people must purchase a variety of goods solely in supermarkets and shopping centers for their own enjoyment. Customers occasionally experience discomfort, one of which is having to wait in line while having their bills processed.Although the consumers' aim is to purchase one or two things, the time spent waiting in line to have their purchases billed takes up additional time and wears the customers out.[2]. Customer could pay their bill by their ATM cards or through pre-recharged customer card provided by the shop or through cash. The main goal of this work is to diminish the time consumption in purchase by getting rid of queue ensuring customer's comfort and decreasing the tiresomeness of barcode scanning and also eliminating waging of billers, thereby accomplishing both customer and shopkeeper demands.[3]. The trolley follows the consumer while they shop, keeping a certain distance between them, turning left or right or even stopping along with them, alerting them to any obstacles in its path, and adding up the final cost price as soon as items are placed in it. [4-5]. According to their individual purposes, trolleys come in a variety of varieties. The shopping industry's standard trolleys, however, can only assist customers in moving their purchases from one location to another. Although it still falls short of being a perfect match in the retail sector, this conventional kind of trolley. In terms of inconvenience, it does little to assist lessen the numbers and the lengthy line. In order to create a smart trolley with an Arduino NANO, RFID, and a barcode reader, see this project. A WIFI module can also be used to synchronise it with the mobile application. As a result of the existing technology being replaced, customers will be able to retain their social distance throughout the COVID-19 epidemic.[6].

III. PROPOSED SYSTEM

The block diagram of this project as follow and explain system design and the algorithm suggestion

1. System Design

- Creation of an online gateway with a user-friendly interface for paying bills utilising sql, html, and php.
- Use nodemcu, which includes an integrated wifi module, to streamline communication.
- Lcd display of product information
- Rfid-based automatic product scanning of the cart.

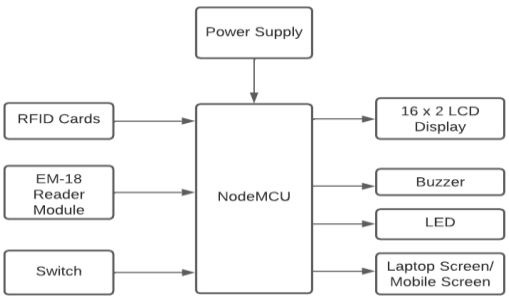

Fig:2. Block diagram

2. Algorithm suggested

The RFID-based smart trolley is made up of a trolley that has an RFID reader built in. When a consumer places the item they wish to purchase in the trolley, the RFID reader attached to the trolley immediately reads the

item's RFID tag number to identify it. Each RFID tag number corresponds to a certain product. Using a centralised server, it is possible to get all the data stored in a database about the product connected to an RFID tag. A NodeMCU is used to organise all the operations. The reader may immediately scan the item, and if the client wants to remove any item, they only need to scan it once more after which the item should be erased. After making a purchase, the complete bill is created and shown both at the billing area and on the trolley's LCD. The consumer simply needs to pay the amount when he visits the billing area.

- Start
- Place the item with the RFID tag in the cart.
- Information on tags is read using an RFID reader.
- This data is transmitted from the NodeMCU to the server using the WiFi module.
- In the database on the server, the data is kept.
- The server calculates the entire amount.
- The server displays the total amount.
- the bill's payment.
- The database gets updated.
- Stop

3. Implementation

The implementation of the smart cart consist of the 2 parts

1. Hardware part
2. Software part

1. Hardware part

The building of trolley frame I have used plastic basket, some wooden pieces and wheels for design of trolley, the following fig 3 shows the trolley frame

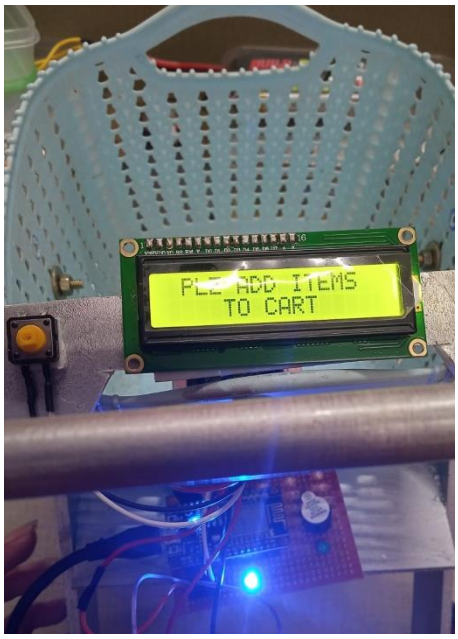

Fig: 3 Trolley Frame

2. Software part

The following fig 4, fig 5, fig 6,fig 7 shows the trolley software part. Here I have used Arduino IDE for run the embedded C program and xammp software for run the server part code.

Fig:4. Intelligent Shopping Cart Front page

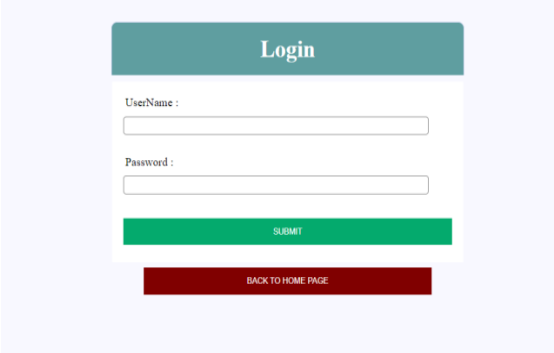

Fig:5. Intelligent Shopping Cart Login page

Fig:6. Intelligent Shopping Cart page

Fig:7. Intelligent Shopping Payment page

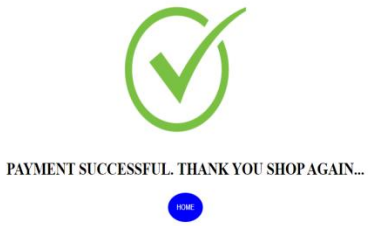

Fig:8. Payment Successful page

IV. Advantages

- Boosts client happiness and cuts down on time spent at the billing counter.
- This might lower the costs paid by management.
- Users can avoid over shopping by being informed of their whole bill at the moment of purchase.
- Improves overall effectiveness
- Quick checkout is possible, and large lines are avoided.

V. Future Update

- The GSM module can be used to transfer the bill to a mobile device without printing.
- For choosing and putting the object down, a robotic arm is also included.
- Voice help is an option as well.

VI. CONCLUSION

Thus, with the aid of the conclusion, we can state that automatic product billing utilising RFID technology will become a more practical alternative in the future. The RFID-based technology is effective, small, and has a solid track record. Barcode scanning requires line of sight, but RFID does not, hence RFID is additionally quicker and superior. This will elevate the entire purchasing experience to a new level. The smart trolley's system parameters, including the product name, price, weight, and so on, show various parameters. some of the following pages show here…

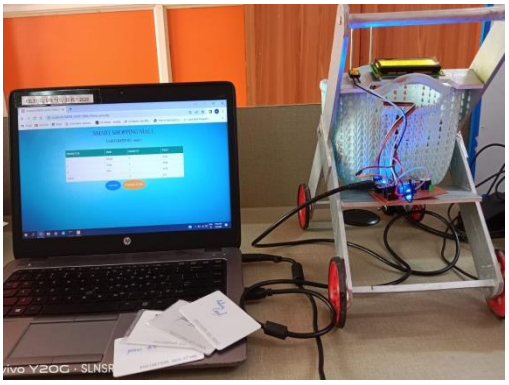

Fig:8. Both software and hardware interface output results

Table 1. Technical Specifications

Component Name	Specifications
Node MCU	Microcontroller 32bit, operating voltage:3.3V
LCD Display	16 x 2, operating voltage:4.7V – 5.3 V,
EM 18 Card Reader	Frequency:120 -150k Hz, Range:5-20 CM perating voltage:4.7V – 5.3 V,
RFID Cards	Operating Frequency: 13.56M hz
Buzzer	Operating Voltage: 5V, Sound Output: 85dB
LED	Green and Red LED

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