RFID BASED SMART TROLLEY

¹Prof. Kirti Mhamunkar, ²Himanshu Saroj, ³Prajakta Katkar, ⁴Akansha Tiwari, ⁵Rahul Jena

¹Professor, 2,3,4,5Students
Department of Information Technology Engineering
Saraswati College of Engineering, Kharghar, Navi Mumbai, India

Abstract: **Now a days shopping at the mall have become a daily routine in big cities. People buy a different product and deposit them in the trolley. After total purchase one need to go to billing counter for the payment which is very time consuming and at times very frustrating. So our main objective for designing this prototype is to reduce the human efforts, eliminate the queue and also eliminate the time taken during billing. Our prototype consist of components such as RFID tags which is used for identification of the product, RFID reader which is used for scanning of product when put in the trolley and it display in the LCD Display. So at the billing counter the data is sent into the server.**

*Keywords***: RFID reader, RFID tag, LCD Display, Buzzer, NodeMCU**

I.INTRODUCTION

 Throughout the century many of the innovations and information technologies are drastically changing and so as our views and expectations. A main thing where human spend maximum time is shopping. According to survey we can say human spend approximately 1 to 1.5 hours for shopping and most of the customers will always tend to walk out of a queue if it is long.In modern world, in every supermarkets and malls have shopping trolley and baskets for customers to store the purchased products. When shopping is done customers have to proceed to checkout at the billing counter. Here this billing process is quite time consuming and have to employ more human resource at the billing section. To overcomes this problem, we are implementing RFID based smart trolley system to minimize the rush, save time and human efforts. Our prototype has some enhanced features which will overcome this queue issue. The smart trolley system is equipped with RFID tag, RFID reader, LCD Display,Arduino Uno ,Buzzer. The RFID tag is attached to a product. When a person puts that product in the trolley the RFID reader automatically scans the products and the details regarding the product name, cost, quantity is displayed on the LCD.When the customer is done with the shopping the details is send to the server and customer have to just pay the amount and leave the counter. Thus,it has the potential to make the shopping more pleasurable, easier and efficient for the customer.

II. SYSTEM DETAILS

Smart Cart using NodeMCU and RFID is an efficient system when it comes to scanning of products, bill generation and payment. It uses an NodeMCU , a RFID reader, an LCD, buzzers, etc. and also RFID tags to be attached on the products. The RFID reader shall be used to scan the RFID tags present on the product and all the information received from the tags shall be stored in the NodeMCU. The product can be directly scanned by the reader and if the customer wishes to remove any product, they just have to again scan the product, then the product should be deleted .Also there is weight machine to calculate the product weight if RFID reader fails to calculate weight. After the purchasing product total amount of bill generated and display on LCD of the trolley and also at the billing section. When customer goes to billing section he has to only pay the amount.LCD screen will show the total bill of the items present in the cart. System does not have a user interface and NodeMCU is used instead of WiFi module.The smart shopping with the trolley application state about creating an automated and centralized billing system that can be used in malls and supermarkets. The customers need not wait in the queue at the billing counters for their bill payment because total amount is generated on the LCD, Customer just have to go at billing counter and pay the payment.

In general, the existing systems have the following features-

1. No more queue for billing hence real customer satisfaction.

2. Bill calculation at trolley itself.

3. Low chance of traffic and mismanagement.

4. Reduction in support staff.

5. Cost efficient.

6. Weight machine to calculate the product weight.

III. PROPOSED SYSTEM

3.1 Design of system

· Design of a web portal using sql,html and php for creating a user friendly interface for paying bills.

· Use of NodeMCU so as to simplify communication as it has inbuilt WiFi module.

· Display of product details on LCD.

· Automatic scanning of product in the trolley using RFID.

3.2 Proposed algorithm:-

The RFID based smart trolley consists of trolley that incorporated with RFID reader. As soon as the customer place the product they want to buy ino the trolley, the RFID reader attach to the trolley detect the RFID tag number of the product to identify it. Each RFID tag number is linked to a product it describes. All the information regarding the product associated with the RFID tag is in database can be retrieved using centralized server. All the activities are coordinated together using a NodeMCU. The product can be directly scanned by the reader and if the customer wishes to remove any product, they just have to again scan the product, then the product should be deleted. After the purchasing product total amount of bill generated and display on LCD of the trolley and also at the billing section. When customer goes to billing section he has to only pay the amount.

Step1: Start

Step 2: Put the product attached with RFID tag into trolley.

Step 3: RFID reader reads the tag information.

Step 4: The NodeMCU sends this information to the server via the WiFi module.

Step 5: The server stores the information in the database.

Step 6: The total amount is calculated into the server.

Step 7: Final amount get displayed in the server.

Step 8: Payment of the bill.

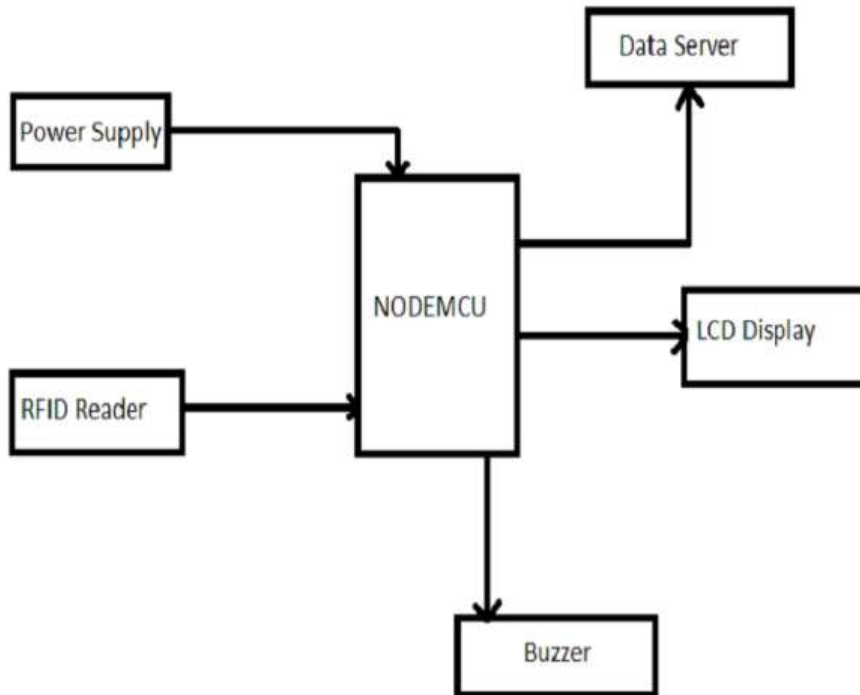Step 9: The database is updated.

Step 10: stop

Figure 1.Block Diagram Of The Smart Trolley

1.   LCD Display:- It displays the product name, weight and cost and the total amount.
2.   Buzzer:- When customer scan the product the buzzer generate the sound.
3.   WiFi Model:- It is in-built in NodeMCU and is used to communicate information between the trolley, and server.
    4.   Server:- all the components are connected together.
    5.   RFID Modules:- It is used for scanning the products.
    6.   NodeMCU:- It control all the system components.
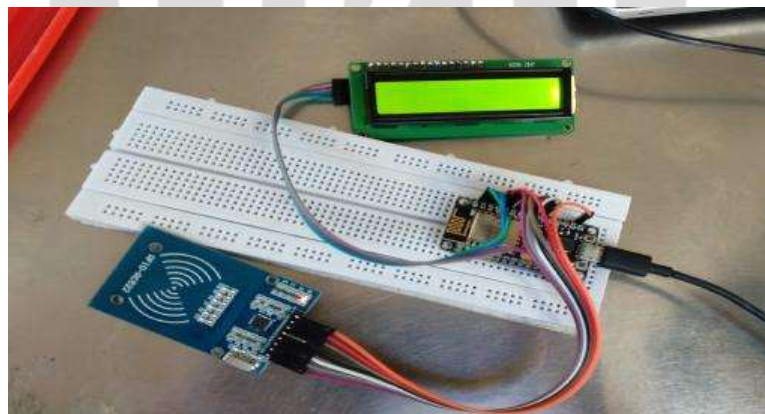

IV.RESULT

Figure 2: Hardware implementation of the system
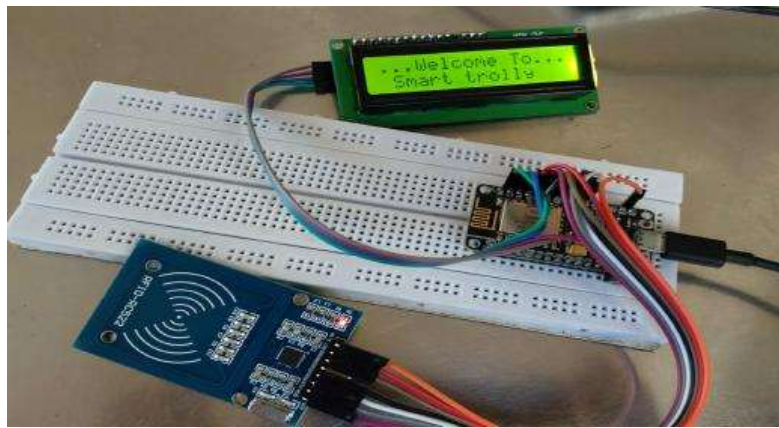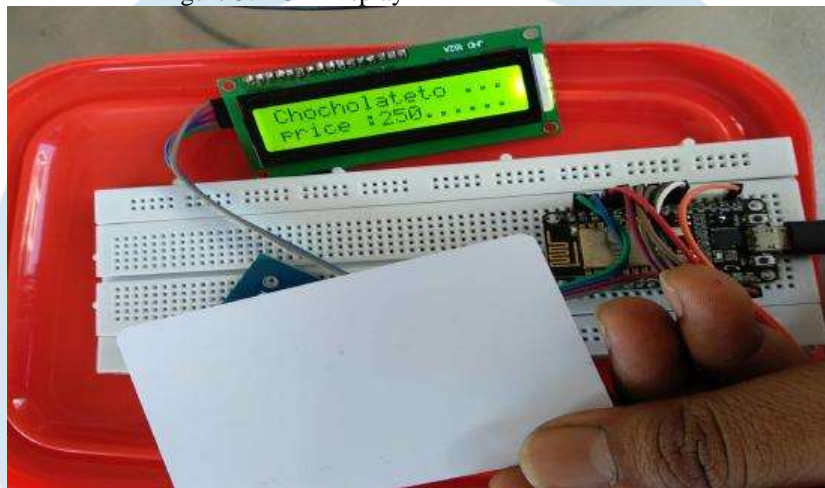
Figure 3: LCD Display

Figure 4: After scanning the product

Figure 5: Software implementation of product

V. ADVANTAGES

1.   Reduces time spent at billing counter and increases customer satisfaction.
2.   This can reduce the expenses incurred by the management.
3.   Users can be aware of the total bill amount during the time of purchase which prevent them from overshopping.
4.   Increases overall efficiency.
5.   Allows quick checkout and eliminates waiting in long queues.

VI. FUTURE SCOPE

1. Transfer the bill to mobile without printing we can use the GSM module.
2. The trolley itself contain an swapping machine for online transaction of payment.
3. Robotics arm also include in it for the picking and dropping of the product.
4. We can also include voice assistance.

VII. CONCLUSION

Thus with the help of the conclusion we say that, Automatic billing of products by using RFID technique will be a more viable option in the future. The system based on RFID technique is efficient, compact and has promising performance. Also, RFID is better and faster than barcode reading because the later works on line of sight which is not the case for RFID technique.This will take the overall shopping experience to a different level. Different parameters such as the system parameters of smart trolley like product name, product cost, product weight etc. are display.

References

[1] Zeeshan Ali,Reena Sonkusare,"RFID based Smart Shopping: An Overview" in International Conference on Advances in "Communication and Computing " Technologies ,Issue in 2014.

[2] Prasiddhi K. Khairnar,Dhanashri H. Gawali,"Innovative Shopping Cart For Smart Cities " in IEEE International Conference On Recent Trends in Electronics Information & Communication Technology (RTEICT), May 19-20, 2017, India.

[3] Mr.P. Chandrasekar,Ms.T. Sangeetha,"Smart Shopping Cart with Automatic Billing System through RFID and ZigBee" in IEEE S.A.Engineering College, Chennai, Tamil Nadu, 2014,India.

[4] Akshay Kumar, Abhinav Gupta, S. Balamurugan, S. Balaji and Marimuthu R., "Smart Shopping Cart" in School of Electrical Engineering, VIT University,Vellore IEEE,2017.

[5] Ruinian Li, Tianyi Song, Nicholas Capurso,"IoT Applications on Secure Smart Shopping" in International Conference on Identification, Information and Knowledge in the Internet of Things,2017.

[6] Tharindu Athauda, Juan Carlos Lugo Marin, Jonathan Lee, Nemai Karmakar,"Robust low-cost passive UHF RFID based smart shopping trolley" in IEEE Journal of Radio Frequency Identification,Issue in 2018.

[7] Rajlakshmi Badi, Bashirahamad Momin,"SISC: Sensor-based Intelligent Shopping Cart" in 3rd International Conference for Convergence in Technology (I2CT),Apr 06-08, 2018 India.

[8] https://www.youtube.com/watch?v=dXZiFx6RP6s&t=276s

[9] https://www.instructables.com/id/ESP8266-Building-Blocks-Send-Data-to-a-Web-Server-/

[10] https://www.instructables.com/id/ESP8266-Communication-With-Server-and-ESP8266/

[11] http://forum.arduino.cc/index.php?topic=544342.0

[12] https://electrosome.com/em-18-rfid-reader-arduino-uno/

[13] https://circuits4you.com/2018/10/03/rfid-reader-rc522-interface-with-nodemcu-using-arduino-ide/