

# Intelligent Shopping Trolley and Billing System Using Raspberry Pi

Sunitha.M<sup>1</sup>, Asst. Professor

Electronics & Communication Engineering Department  
Nagarjuna College of Engineering & Technology  
Bengaluru, India

Sowmyashree P<sup>3</sup>, Student

Electronics & Communication Engineering  
Nagarjuna College of Engineering & Technology  
Bengaluru, India

Vismaya.M<sup>2</sup>, Student

Electronics & Communication Engineering  
Nagarjuna College of Engineering & Technology  
Bengaluru, India

Vaishnavi L M<sup>4</sup>, Student

Electronics & Communication Engineering  
Nagarjuna College of Engineering & Technology  
Bengaluru, India

Pallavi K V<sup>5</sup>, Student

Electronics & Communication Engineering  
Nagarjuna College of Engineering & Technology  
Bengaluru, India

**Abstract:- Shopping at malls is becoming daily activity in various cities . Among the difficulties faced by the customers one difficulty is to follow queue through the billing process. Though their intention is just to buy one or two products, the process of billing would become very difficult and time consuming. As per our survey money and average time spent on each customer is high especially in overcrowded supermarkets. The main aim is to satisfy the customer and also reduce the time spent on the billing process where the billing process will be done in the trolley rather than waiting in a queue even for one or two products. The smart trolley consists of Raspberry pi, LCD display, DC Motor ,IR Sensor ,RFID Reader, Wi-Fi module and ESP32 micro controller. This system would prevent the problem of long queues at the billing counter. For the ease of customer automatic billing system will be proposed in which the cost of each product will be calculated through smart trolley and displayed on LCD. Thus it will not only save the time of the customer but will provide hassle free shopping for the customers.**

**Keywords – Raspberry pi, LCD Display, RFID Reader, Wi-Fi module, ESP32, DC Motor, IR Sensor.**

## I. INTRODUCTION

Today every supermarket and shopping mall makes use of the shopping baskets and trolleys to collect the items. When we are in shopping mall it is easy for us to take trolley and shop but the difficulty lies in billing process. The customers have to wait in a long queue just for billing which is time consuming. To overcome this problem we are designing a smart trolley which has RFID for collecting all the details of product in the trolley. The customer self scans the product and places the product in the trolley and the cost of product will be displayed on LCD. All the details of product would be sent to main server using Wi-Fi module. Raspberry pi is used for controlling all the trolleys in the

super markets. Once the customer finishes the shopping he can use End button to finish shopping and the bill would be generated and it will be sent to the customers mobile number through GSM. Our project also concentrates on inventory management which supervises the flow of goods from manufactures to warehouses and from these facilities to point of sale. The owner of the shop will have access to the application in which he can change the price of the product.

## II. RELATED WORK

Mr. P. Chandrasekhar Assistant Professor, proposed the concept of RFID Reader is stand by Radio- frequency identification .It is use of radio wave to read and capture information store on a tag attached to micro-controller. When the shopper drops any product s in the card then the RFID Reader reads the tag .Shopping trolley is equipped with proposed model with RFID Reader on front panel. An RFID tag is attached to each product in shopping center. After selecting a product , person has to drop the product in trolley. When the product is dropped the RFID Reader scan the RFID tag on product without requirement of line of sight communication[1].

Mr. Tharindu, Juan, Reatailers are often interested in low cost mechanism to maintain stocks. This model is a low cost, robust, passive UHF RFID based shopping trolley system which allows tracing and processing shopping in real time, The UHF antenna mounted shopping trolleys are defined "smart trolleys"[2].

Mr. Surya prasad, Proposed a novel product "A Novel Low Cost Intelligent Shopping Cart(NLISC)" being developed to assist customers. The main objective is low cost, easily scalable and rugged. The system consists of 4 key modules (a) Location detection component (LDC) (b) server communication component(SCC) (c)user interface

and display component (UIDC) and (d) Automatic billing and inventory management component(ABIMC)[3].

A paper entitled "Arduino based smart cart" here gathering of people designed the smart cart in interesting manner; they likewise implemented the feature of security in it. The design of smart cart was like letter drop when

item is dropped in it the entryway used to get closed consequently they will open only when the measure of the item was paid, yet this system had numerous downsides, for example, once the item is dropped and if the customer don't need purchase it the won't open unless payment is done. This system did not increase much notoriety because of this disadvantage [4].

**III. METHODOLOGY**

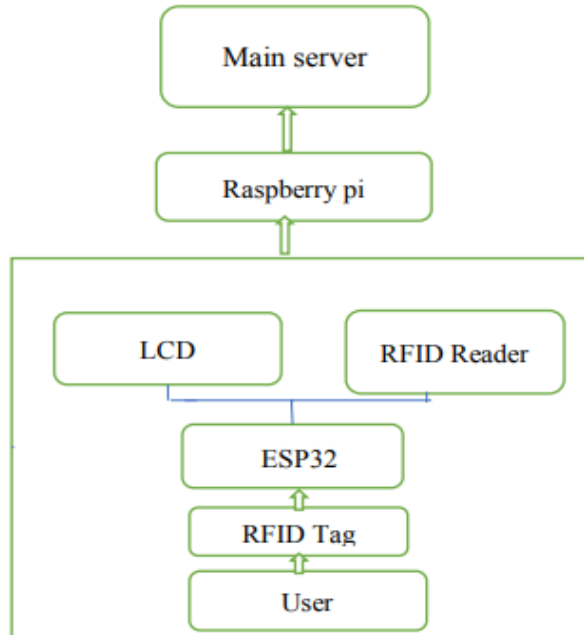


Fig 1:- Layout of Intelligent shopping trolley

The layout of Intelligent shopping trolley in fig 3.1 is the proposed system by the usage of smart trolley that can decrease the queues in the mall. The new technology using RFID, Raspberry pi and an application developed for paying the bills makes shopping easy, faster and efficient. In this shopping system Raspberry pi is used for controlling all the trolleys in the mall and to fetch the data to main server. RFID Reader is for scanning the product and the cost of the product will be displayed on LCD. WiFi module is for connecting main server and the trolley. The smart trolley consists of a door for preventing robbery. The door of the trolley open when the customer bring product near the RFID reader which would be sensed by IR sensor. As the customer finishes shopping the data will be uploaded to the main server and bill will be sent to customers mobile number and the bill can be paid.

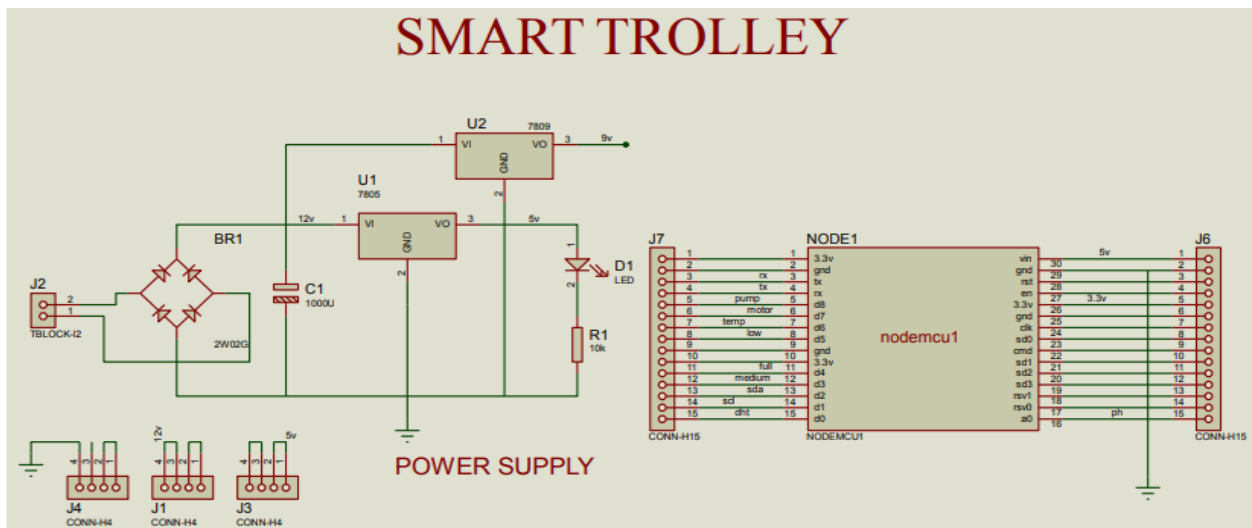


Fig 2:- Circuit Diagram

The fig 2 shows the circuit diagram of intelligent shopping trolley which consists of ESP32 chip microcontroller which has inbuilt wi-fi module. Our project uses RFID Tags over barcodes because the RFID do not require Line of Sight .RFID tags have high durability. RFID tags uses radio frequencies to read from and write to the chip. They have increased data capture and security. They are more difficult to duplicate and can be encrypted .

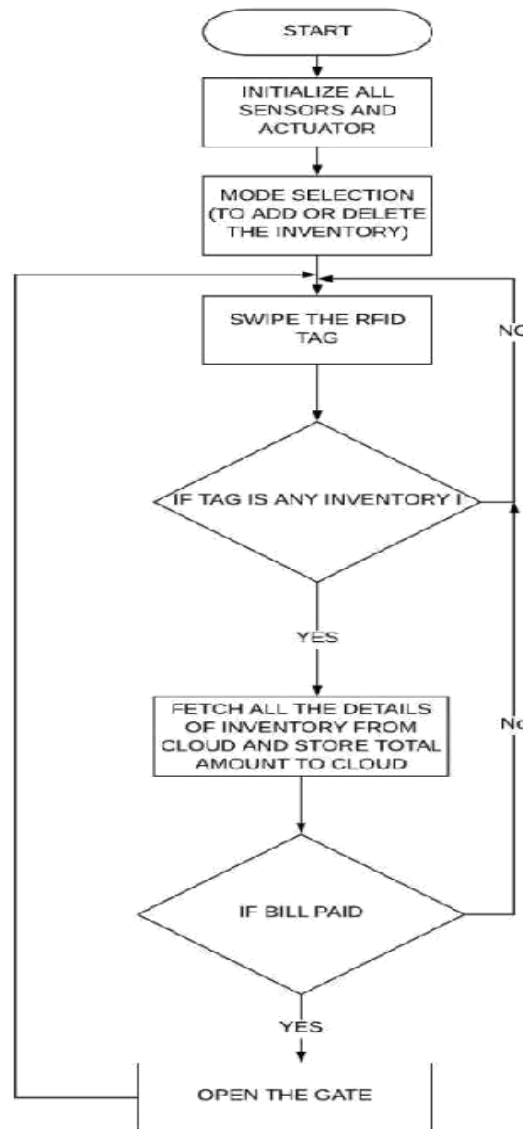


Fig 3:- Data flow diagram

#### IV. WORKING

The smart shopping system consists of trolleys includes RFID readers and RFID card is separately attached to different commodity with distinct RFID numbers. As the customer takes the product he has to scan the product by himself and place it in trolley. The cost of the product will be displayed on LCD .If the customer wishes to remove the product he can use remove button on the trolley and take out the product and the cost of the product will be subtracted automatically .All the information regarding the product with distinct card number will be stored in firebase cloud using raspberry pi controller. To avoid robbery the smart trolley is incorporated with a door. When the customer scans the product the door opens using DC motor

and IR Sensor. The owner of the super market will have access to the dynamic application where he can change the cost of the product as required. Our project also involves inventory management where the owner gets to know the flow of goods .After the customer finishes shopping he can use end button and the bill will be sent to the customers mobile number and he can pay the bill online. If in case the customer is not able to pay the bill online he can pay at the main counter.

## V. CONCLUSION

Thus the system creates the automatic bill of the purchased items from the trolley using RFID technique. Using this technique increases the security and also managed by checking the products on the trolley. With the usage of Raspberry pi, the billing process takes place automatically. This will take the overall shopping. The main goal of this system is truly time saving out of all billing methods. This process saves time of the customer and reduce the staff requirements in the supermarket.

## REFERENCES

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