International Journal of Innovative Research in Engineering
Volume 3, Issue 6 (November-December 2022), PP: 281-284.
www.theijire.com
ISSN No: 2582-8746

Survey on Smart Trolley Billing System

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How to cite this paper:
Sonali Mortale[1], Shivjeet Kachare[2], Meghraj Satav[3], Mayuri Gavare[4], Riya Sakhare[5], "Survey on Smart Trolley Billing System", IJIRE-V3I06-281-284.

Abstract: *Shopping is really exciting and fascinating, but it becomes tiring dueto standing in long queue for payment of the bills. But due to this Smart Trolley Billing System project, it has become efficient because the customer need not have to wait for his/her turn in the queue , the customer can pay the bills at the trolley itself due to the advanced devices in the trolley. This is not possible in the existing trolley. For this, some devices has been used like RFID reader and tag, Arduino, IR sensor etc. Thus RFID reader is being employed to scan the products for billing, to send the data online to store it in the transaction database for future reference for the shop-owner and for providing customersthe e-bill. Essence of this approach involves using the RFID system to keep the details of each product. Each label in the products are stored with its name, id, and price. So when it comes in contact with the RFID reader, the reader reads out all those information and add it to the cart. Once the products are selected, the customer can proceed to the billing part. Each customer is given with their smart cards, which contain their id and their balance amount in the card.*

Key Word: *Shopping Trolley; RFID Reader; RFID tag; IOT; Smart Cart;e-Billing.*

I.INTRODUCTION

Shopping involves visiting a store, examine the products, take the products, go through the billing section, stand in the long queue, scan the products, calculate the total amount, pay the bill either by cash or credit or debit card. However, sometimes people do not find it enjoying. According to the analysis, people struggle a lot during shopping andit makes them irritable. Only 8% of customers can use smart trolley. The working of smart trolley is so simple that customers can add items one after another and using RFID reader the product is scanned by the RFID tag on the product. And the bill is generated at the trolley itself. The product name and price will get displayed at the LCD screen. Due to this, more customers can be attracted at the shop due to fun and save in time. Our main aim is to alleviate the queue, save time and ease in maintain the shop. Why RFID tag over Barcode scanner? The answer to this question is given below in the table.

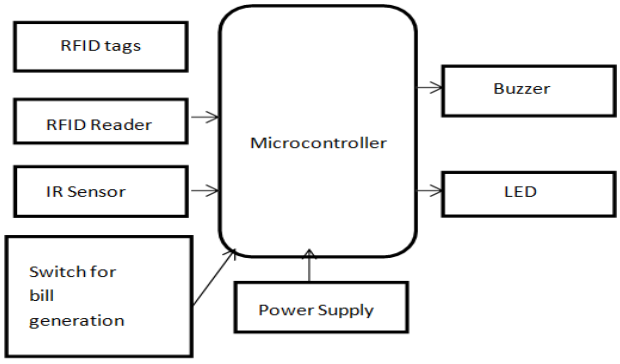
	RFID	Barcode
Rate of reading	More than one tag simultaneously.	One tag at a time
Line of sight	Not needed	Essential
Durability	high	low
Security	high	low

II.LITERATURE REVIEW

Only 8% customers, uses smart trolley, due to complexity in accessing it. In many shopping stores this trolleys are not used due to high cost because of servo motor which requires high maintainance. Another reason for this is due the payment process, it includes only master cards which is not affordable for the customers. Hence, this smart trolley includes easy accessibility options, and various kinds of modes. It uses IR senor which reduces its maintainance, cost ofthe trolley and low consumption of power etc. Due to the above reasons, this Smart trolley can be used efficiently. For more efficient use of the trolley, more options are added in order to reduce uncertainty. More components are added into the trolley to make it flexible.

III.PROCEDURE METHODOLOGY

This trolley is the advanced version of other trolleys with flexible features. When the customers enters theshop, initially the trolley will be placed and the customers will add the items into the trolley one by one. Each product is attached the RFID tag which contains an unique ID. The RFID reader attached to the trolley reads the RFID tag and automatically scans the the product. These Id's of product are fed into the controller, so that when the product is scanned it returns the specified information. The Detailed information of the product is displayed on the LCD screen by scanning. These tags will automatically identify and transmit the information using RFID module that acts as Radio Frequency signal. The IR sensor is used to calculate the total count and product of the item. After completion of shopping the customer will press the button and pays the bill at the cashier side.



Blocked Diagram of Proposed Model

Step 1: Start the process.
Step 2: Place the products in trolley.
Step 3: Display product's information on LCD.
Step 4: Remove product if not needed.
Step 5: After shopping, press the buzzer.
Step 6: Updates the billing Information.
Step 7: IR sensor will activate.
Step 8: After this, products cannot be taken out from the trolley.
Step 9: Bill can be paid through online or offline.

Requirements:
1. Arduino UNO
2. RFID reader and RFID tag
3. IR sensor
4. Database
5. Liquid Crystal display
6. Buzzer and Switches
7. Power adapter and QR code

1. Arduino UNO

Arduino Uno is an open source microcontroller board, which is low cost, flexible and easy-to-use and can be used in variety of electronics projects. Arduino UNO contains everything which is required to provide support to the controller.It is made to come in connection with the circuit by using an USB cable, battery to initialize or to connect it with an AC to DC adapter.

2. RFID model

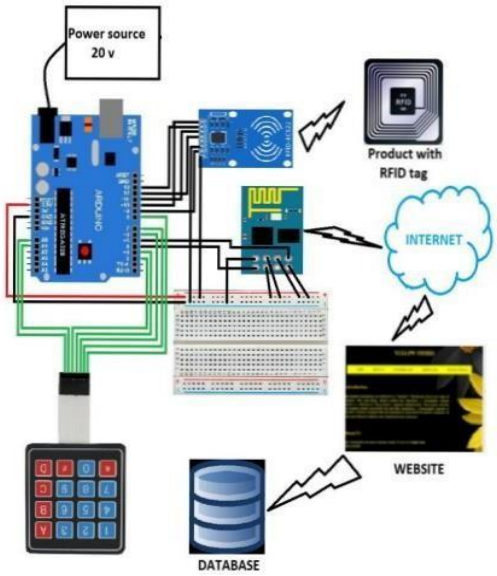
The RFID or Radio Frequency Identification system has two major components, a transponder / tag attached toany of the component, which is to be found, and a Transceiver also known as an interrogator / Reader. Reader contains a Radio Frequency module and antenna that produces a high frequency field. Instead of that it has a microchip which is used to store and process data, as well as an antenna is placed for receiving and transmitting signal. To read the tagged information, it is placed next to the Reader (it does not have to be directly within the line of sight of reader's). The Reader produces an electromagnetic field that causes electrons to move the tag antenna and then to power the chip. The RFID reader act as a transceiver in it. When the signal returns to the tag using an RFID student antenna it is inserted into the demodulator and displayed with a decoder.

3. Liquid Crystal display

Liquid crystal displays (LCD's) contain building materials, which include structures for both beverages and crystals. The molecules almost go as they would in a liquid but are made it as a single group togetherin an orderly manner like crystals. The LCD consists of two glass jars, with crystal sand woven material between them. Within the glass plates it is filled with transparent electrodes describing the character, symbols or patterns that will be displayed by the polymeric layers that exist in the middle of the electrodes and the liquid crystal inside the glass plate, which makes crystal liquid molecules maintain a defined standing angle.

The Software requirements are: Arduino IDE for communication with Arduino, html forwebsite creation,SQL for database collection etc.

IV.SYSTEM ARCHITECTURE



V.ADVANTAGES

a. The system has the provision of sending the billing details to the customer by mail, whichlessen the worries about losing the bill.
b. The task of waiting in queues for scanning and billing the products is alleviated.
c. The customer can check their buying details online.
d. The shop owner can reduce the number of employees in the shop.
e. The shop owner can attract quite a many number of customers to the shop.
f. The system can make managing the shop easier.

VI.CONCLUSION

The smart shopping trolley with new technology allows the customers to shop efficiently. This is designed in such a way that the data of the customer is sent to the counter through wi-fi module, which reduces standing in long queue inthe bill counter, On the other hand admin can monitor the stocks and plan in advance.

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