

Automate Billing on Shopping Cart Using RFID

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Abstract - The modern age technology in which most of the customer needs to wait in the supermarket. Among the difficulties faced by the customers, one difficulty is to follow the queue through the billing process. The main aim is to satisfy the customer and also reduce the time spent on the billing process which is to complete the billing process in a trolley rather than waiting in a queue even for one or two products. The customers have to add the products after a short scan in a trolley and when done the finalized amount will be displayed in the trolley. We have ensured security for preventing theft and also facilitated users who unknowingly drop their products into the trolley by cautioning them. We aim to mitigate the time consumption in a purchase by getting rid of queues ensuring customer's comfort and shrinking the tediousness of barcode scanning and eliminating waging of billers, thereby accomplishing both customer and shopkeeper demands. In this regard, the Internet of Things (IoT) based Automate billing on shopping cart is proposed which consists of Radio Frequency Identification (RFID) sensors, ESP8266 microcontroller, RFID sensors depend on wireless communication. One part is the RFID tag attached to each product and the other is an RFID reader that reads the product information efficiently. Then shopping information sends to the server wirelessly and automatically generates billing.

Key Words: ESP8266, Local Server, RFID, Intelligent Cart

1. INTRODUCTION

In the days, shopping at big malls and supermarkets is becoming daily activity. Which makes it a crowded place to buy things. After buying goods one needs to stand in the queue, that is a time-consuming process. Many places they are using bar code to scanning products. At the billing counter, the cashier prepares the bill using a bar code reader which is a time-consuming process and results in long queues at billing counters. The rush is even more when there are special offers and discounts. We are aiming to develop a system that can be used in shopping malls. The system which we are preparing is placed in the trolley. It will consist of RFID (Radio Frequency Identification) reader. All the products in the mall will be equipped with RFID tags. Radio-frequency identification (RFID) uses an electromagnetic field to automatically identify and track tags attached to objects. An RFID tag consists of a tiny radio transponder; a radio receiver and a transmitter. When triggered by an electromagnetic interrogation a pulse from a nearby RFID reader device, the tag transmits digital data, usually an identifying inventory number, back to the reader. This number can be used to inventory goods. By using this

technology. we can reduce the time for scanning products as compared to bar code scanning. After scanning the products, it will show on the display with total numbers of products bought and their cost. If any product is deducted from cart then it will automatically reduce from the list of product buy. The display will show the total number of products with their cost. At the billing counter, the total bill data will be transferred to the PC by wireless RF modules. Then at the billing counter just pay the bill. The system based on the RFID technique is efficient, compact, and shows promising performance. It handles cases of deception if any, thereby making the system attractive not only to the customers but also to the sellers.

2. Purpose

The objectives of the Intelligent shopping cart are abundant, including saving time, providing a better shopping experience, and providing marketing data for retailers. Only in this way, the objectives of an intelligent shopping cart can meet the demand of the customers, the retailers, and the brands at the same time. It will make creates a better shopping experience for the customers by saving their time. It minimizes the manpower required at the shopping mall, as results in load at the check-out counters are eliminated. It handles cases of deception if any, thereby making the system attractive not only to the customers but also to the sellers. We implement to simplify the billing process, make it swift and increase the security using RFID technique. This will take the overall shopping experience to a different level. Automatic billing of products by using the RFID technique will be a more viable option in the future. The system based on the RFID technique is efficient, compact, and shows promising performance.

3. Block Diagram

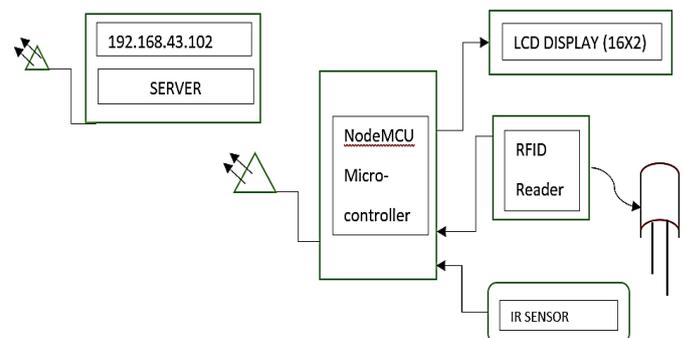


Fig 3.1: Block Diagram

4. Hardware Used

ESP8266: It has an inbuilt WIFI module that will help us to send the data to a server. It is also a microcontroller that will control the RFID reader to scan the tags and IR sensors to act up. The ESP8266 is proficient in either hosting an application or offloading all Wi-Fi networking functions from another application processor.

RFID: Passive RFID tags comprise 3 key components namely, An inbuilt chip, substrate, and an antenna. General RFID chips are competent of accumulating 96 bits of data but some other chips have a capacity of storing 1000-2000 bits. Every RFID card has a unique ID Number. These RFID tags will be assigned to each product in the market. Whenever the user wants to buy them, they need to scan by using an RFID scanner.

Display: The display will show each product scanned and details of it like, total no products, quantity, and total amount.

IR sensor: IR sensor is used, if somebody trying to put product without scanning into cart IR sensor will detect it and show the message to scanned it before putting it into the cart.

5. Process of Shopping

In the mall, each shopping cart has a particular id. the RFID is controlled by an Esp82666 microcontroller. ES8266 supported the Wi-Fi module which will help us to communicate with the server. Whenever the customer scans the product, then RFID will read that tag and on display, it will show the amount, the quantity of that product. There is an IR sensor for detecting whether the product is inserted into the cart or not. If the person tries to put the product in the cart without scanning it, it will show the message on display to scan it first. After completion of the shopping, the data of that particular cart will be sent to a server. Now the customer has just paid the bill at the counter-side. When a customer needs to remove a product, a push button should be pressed which initiates remove operation such that the door opens and the product is removed by rescanning satisfying the condition that the scanned product id should be already present in the purchased list. During this removal process, the cost of the product removed is subtracted from the total cost, and LCD displays the updated cost. Remove process ends as soon as the push button is released.

6. Flowchart

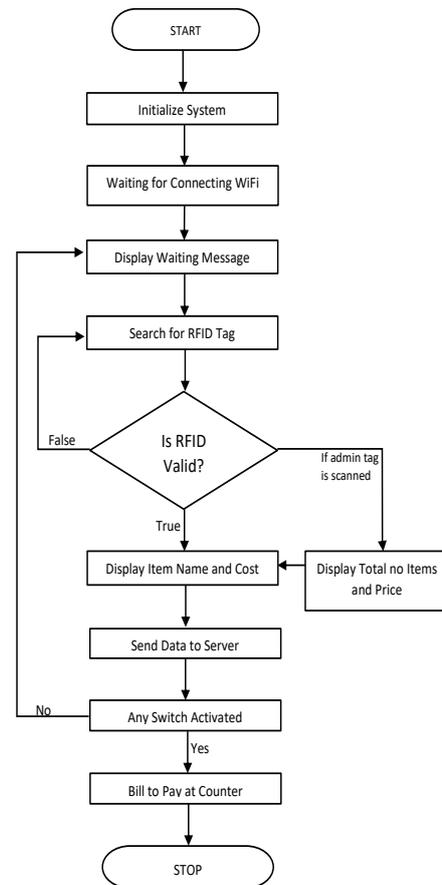


Fig 6.1. Flowchart of process

6. Advantages

- ❖ Our project will increase checkout efficiency in the supermarket.
- ❖ The whole process of billing occurring on the cart itself which results in reduce long queues. Also, customers can locate items efficiently
- ❖ Alternative marketing avenue. enabling business process efficiency through payment methods and inventory management
- ❖ Reduced labor costs

7. Conclusion

The proposed model is easy to use, low-priced and does not require any special training. Through these projects, we intend to modify the billing process, make it simple and increase the protection using the RFID technique. Theft in the mall will be controlled using this smart system, which further adds to the cost-efficiency. Also, the time efficiency will increase phenomenally since this system will eliminate the waiting queues. update. As the whole system is becoming

smart, the requirement of manpower will decrease, thus benefiting the retailers. The payment of the bill by standing in a long queue is a tedious factor when people want to purchase products from marts. Though people can pay instantly using the electronic money facility, they have to wait in the queue for a longer time. The idea which is proposed using RFID technology will overcome the problem and it gets the task easier. The combined effects of easy and flexible implementation, secure transmission of account information, and reduced disputes offer the following benefits for all. It will save time, energy, and manpower for customers, owner, and supplier. Many technologies are currently being used for billing systems in supermarkets. The selection of the technology depends upon the performance, efficiency, and QoS of the technology regarding a particular task and environment. The table contains the comparison of different technologies concerning given parameters.

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