

Smart Trolley: An Iot Based Smart Shopping Cart With Automatic Billing System

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Abstract- As we know that that there is a swarm of crowd in shopping malls and supermarkets. Especially on weekends it gets more crowded. People buy different products and put the products in the trolley, after buying all the products the customer goes to the billing counter to pay the bill. At the billing counter each product is scanned using the barcode scanner. The person scans each product one at a time and then the final bill is printed. This process takes lot of time. To avoid such type of problem we develop a new system called as "smart shopping cart with automatic billing system". This system will be using rfid tags instead of barcodes. Every product in the mall will be attached with a rfid tag. Whenever a customer puts the product into the trolley, the product will be scanned and the details of the product will be displayed on the mobile application which will be connected to rfid using Bluetooth and the bill will be generated. When the final bill will be generated the customer can pay the bill using e-wallet system provided on the mobile application.

Index terms: Internet of things(IoT), Rfid tag, Rfid Reader, HC05, Android.

I. INTRODUCTION

Shopping malls, super market is the place where people go for shopping daily necessities ranging from food products, clothing ,home appliances etc.

Nowadays a number of shopping mall has increased around the globe. Sometimes customer have problem regarding the incomplete information about the product on sale and waste of time at the billing counter. Continuous improvement is required in the traditional billing system to improve the quality of shopping experiences to the customers.

To overcome these problems and improve existing systems, This system is designed using RFID based shopping trolley. This can be done by attaching RFID tags to the products and a RFID reader with a touch panel display on the shopping trolley. With this system, customer will have information about the price of every item that is scanned in, and total price of the item. This system will save the time of customers and man power required in mall and cost associated with the product. The advent of newer techniques like RFID technology and wireless networks makes the process of shopping at a faster pace, making it more efficient as well as making it transparent. RFID tags are nothing but small transponders, communicates to a reader wirelessly by transmitting some identifier such as a serial no. The chip represents a dual digit card no. RFID tags have been widely used to track items and label them in various

shopping destinations like supermarkets. They are treated as advanced form of barcode.

In existing system, shopping malls are using barcode standards. The cashier in billing system scan's the items using the barcode scanner and gives us the total bill. And the customer can gather the items they want, put into the container and at the time of billing only they come to know the total cost. Hence they need to stand in a larger queue of billing those items.

RFID and barcode are almost similar. They are both data connection technologies that mean it will automatically process the data. However they differ in many areas. RFID does not require any line of sight, whereas barcode requires a line of sight to read. Barcode scanner requires a manual tracking, whereas RFID can be automatically tracked. In case of barcode scanner, new information can't be updated, whereas in case of RFID, new information can be overwritten.

II. LITERATURE SURVEY

Dr. Suryaprasad J in "A Novel Low-Cost Intelligent Shopping Cart" proposed to develop a low-cost intelligent shopping aid that assists the customer to search and select products and inform the customer on any special deals available on the products as they move around in the shopping complex.

Amine Karmouche in "Aisle-level Scanning for Pervasive RFID-based Shopping Applications" proposed to develop a system that is able to scan dynamic and static products in the shopping space using RFID Reader antennas.

Satish Kamble in "Developing a Multitasking Shopping Trolley Based on RFID Technology" proposed to develop a product to assist a person in everyday shopping in terms of reduced time spent while purchasing. The main aim of this proposed system is to provide a technology oriented, low-cost, easily scalable, and efficient system for assisting shopping in person.

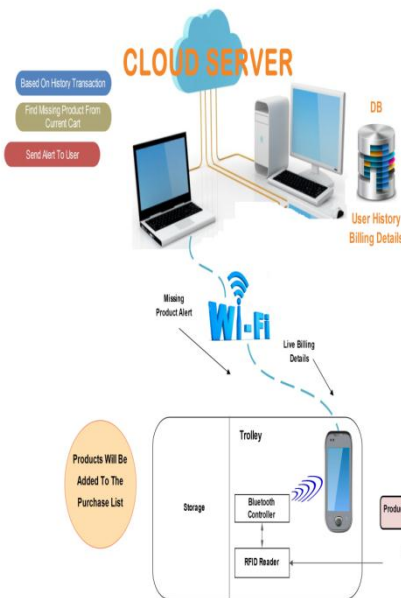
4]Trolley : Trolley is a metal basket used for shopping in malls and super markets.

5]Cloud Server : A cloud server is a powerful physical or virtual infrastructure that performs application and information processing storage.

III. USED HARDWARE COMPONENTS

The following hardware components are used in the proposed system.

III. SYSTEM ARCHITECTURE



RFID READER



RFID TAGS

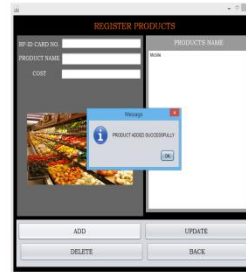
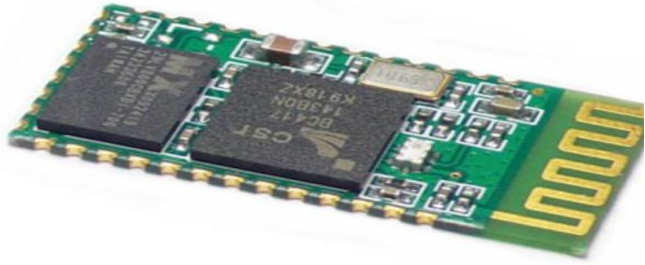


1]Rfid Reader: Radio Frequency Identification reader is a device that is used to gather information through Rfid tags which are used to get track of individual objects.Rfid is similar to barcodes but rfid does not have to scan directly,it does not require line of sight.

2]Rfid tag: Radio Frequency Identification Tag is a electronic tag which exchanges data with rfid reader using radio waves. It is also called Rfid chip.The tags can be attached to any object which will help to get the information of that object.

3] Bluetooth: Bluetooth is a wireless technology which allow devices to communicate data and transmit data or voice over a short distance.

Bluetooth Simulator



V. FINAL PROTOTYPE

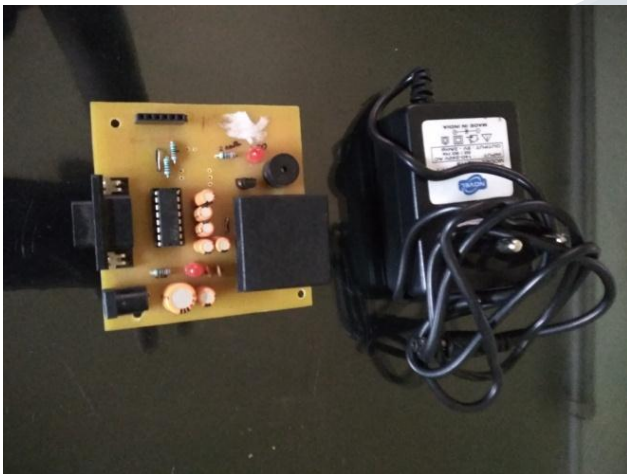
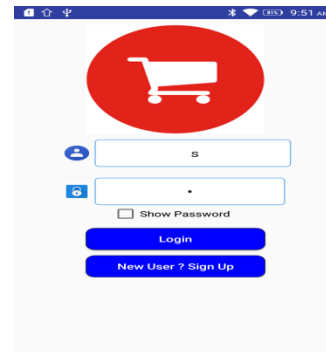
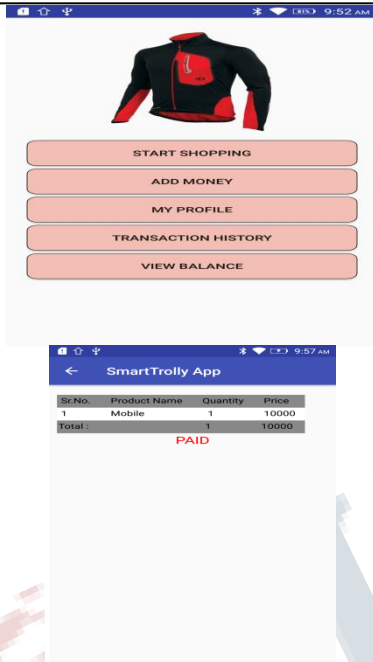


Fig. Final prototype of the hardware



RESULTS



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FUTURE SCOPE

The proposed Smart Shopping Trolley System intends to assist shopping in-person which will minimize the considerable amount of time spent in shopping as well as to time required in locating the desired product with ease. The customer just needs to type the name of the product he wants to search on the Android device, and the cart will automatically guide him/her to the product/s locations. Also different types of wearable devices can be used and sensors can be placed on the trolley, so that wherever the customer will go the trolley will follow him.

CONCLUSION

The proposed model is easy to use, low cost and does not require any special training. This model keeps an account and uses the existing developments and various types of Radio frequency identification and detection technologies which are used for product recognition, and billing. As the whole system is becoming smart , the requirement of manpower will decrease , thus benefitting the retailers. Theft in the mall will be controlled by this system which further adds to cost efficiency. The time efficiency will increase phenomenally since this system will eliminate the waiting queues. More customers can be served in same time thus benefiting the retailers and customers as well.