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Smart Billing Trolley Using RFID & LIFI

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ABSTRACT: An innovative product with societal acceptance is the one that aids the comfort, convenience and efficiency in everyday life. Shopping at mall is becoming daily activity in various cities. We can see huge rush at malls on holidays and weekends. The rush is even more when there are special offers and discount. People purchase different items in the malls and put them in the trolley. They have to find for the product on the list, queue to pay, at the billing counter. It is a time consuming process. To avoid this, we are developing a system which we called as 'LI-FI Based Automated Smart Trolley'. In this system we are using RFID tags instead of barcodes. Each and every product has RFID tag. Whenever the customer puts a product into the trolley, it will get scanned by RFID Reader. The name and cost of the product will be displayed on android application of mobile phone. We are using Visible Light Communication (VLC) technology to transfer the data to the main computer. At the billing counter, LI-FI receiver will be placed, which will receive the data from the LI--FI transmitter connected to the RF reader. RF reader connected to the trolley.

KEYWORDS: LI-FI technology, android application, RFID tag, RFID receiver.

I. INTRODUCTION

Today every supermarket and shopping mall makes use of the shopping baskets and shopping trolleys to collect the items from the racks. The customers have to put every product which they want to purchase into the trolley and they have to wait in the long queue for the billing system. It is a complex process. To overcome that several technological solutions have been developed. But the effectiveness of the developed system should be improvised. So that, we are using visible light communication instead of wireless standards such as ZigBee, Bluetooth etc., and also we are using RFID reader and LI-FI transmitter in the smart trolley. At the billing section, the LIFI receiver is used which is connected to the main computer.

II.LITERATURE SURVEY

1. Smart Shopping Cart with Automatic Billing System through RFID and ZigBee:
This is based on the "ZigBee" technology which is very advanced technology. Every time the mart customers has to take the trolley and roam here there for collecting the items which takes a lot of time. After collecting all the shopping stuff the customer has to wait in the queue for payment at the accountant section. Due to large queue time is wasted, to overcome this they have developed an smart way of shopping. In this particular technology RFID tag is used by replacing the barcode form the product. The trolley will consist of a RFID reader, LCD screen and the ZigBee module. When a person put any product in the trolley it will scan the product and price and the brand of the product. The addition of price of the entire product will be added to generate the bill. This bill is stored in the microcontroller memory, which then transfers to main computer through ZigBee module.
2. Automatic Billing System using LI-FI Module:
In this project data transfer is processed between products and the mobile phone. Each and every product is having LIFI transmitter and it store the encoded data similar to the product id, cost of product and quantity. Here the mobile is integrated with LI-FI receiver via OTG communication in the shopping cart. It can read the commodities' information when the LI-FI transmitter holding goods are chosen by the customers, each information of the goods can be entered by using the mobile LI-FI and when the product is kept into the trolley, which also contains the LI-FI module, double check the product identity. After completing the purchase, the payment is processed in mobile itself via mobile banking system. Finally the cart section will verify the payment and purchase of product which will again cross check the

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products by the trolley module when we come out of the exit section of the shopping center. If the product is mismatched at this stage it immediately alerts the owner. This technology is used in this project for finding out the information of the commodities.

3. LIFI based automated smart trolley using RFID:

In this system we are using RFID tags instead of barcodes. Each and every product has RFID tag. Whenever the customer puts a product into the trolley, it will get scanned by RFID Reader. The name and cost of the product will be displayed on the LCD. We are using Visible Light Communication (VLC) technology to transfer the data to the main computer. At the billing counter, LI-FI receiver will be placed, which will receive the data from the transmitter.

4. Smart Shopping System by Using LI-FI Technology In Supermarkets:

In this system LI-FI technology is used. LI-FI is a new emerging technology in trend which uses light waves to transfer data. In this paper, we propose an automatic billing system which is not only time effective but also reduces human effort. This system uses LI-FI technology to transfer data quickly. The free accessible android application is deployed in mobile using which we get the product details and the payment is processed in the mobile itself. For security, the products are verified in the gate section by checking the products in the trolley. The main objective of this paper is to avoid queues in supermarkets and malls.

5. Futuristic Trolley for Intelligent Billing with Amalgamation of RFID and ZIGBEE:

In this system we are using RFID tags instead of barcodes. This RFID tags will be on the product. Whenever the customer puts a product into trolley it will get scanned by bvgfc RFID reader and product price and cost will be display on LCD display. Like this the process goes on. We are using ZIGBEE transmitter which will be at trolley which is used to transfer data to main computer. At the main computer ZIGBEE receiver will be placed which will receive data from transmitter. .To store the products price and total billing memory used will be Atmel AT24C04. LCD used will be 16X2 alphanumeric display. It will be used to display products names, products cost etc.

III.SYSTEM ARCHITECTURE

This system consists of Arduino uno atmega328 microcontroller, RFID Reader and tag, LI-FI transmitter and receiver, android application, server pc. RFID reader and LI-FI Rx are interfaced with trolley unit. Each and Every product containing RFID tag and LI-FI Tx. It have unique id number so, it is used to identify the product. The RFID reader and LiFi Rx get the information about the product from the product using RFID tag and LI-FI Tx. We can switch the scanning of product weather is from LiFi Rx or RFID reader by pressing button. When the customer put the product into the trolley, the details about the products transmitted to server pc through RF Tx and Rx. At that time customer can able to see the product details such as name, price of the product on android application, when the customer want to return the product from the trolley, simply the customer can press the remove button using application and takes off the product from the trolley. So that the quantity and cost of the product will be reduced from the total amount. Also product details from trolley can be transmitted to the main computer in the billing section through RF transmitter. Finally, the computer can receive the data using RF Rx serial communication.

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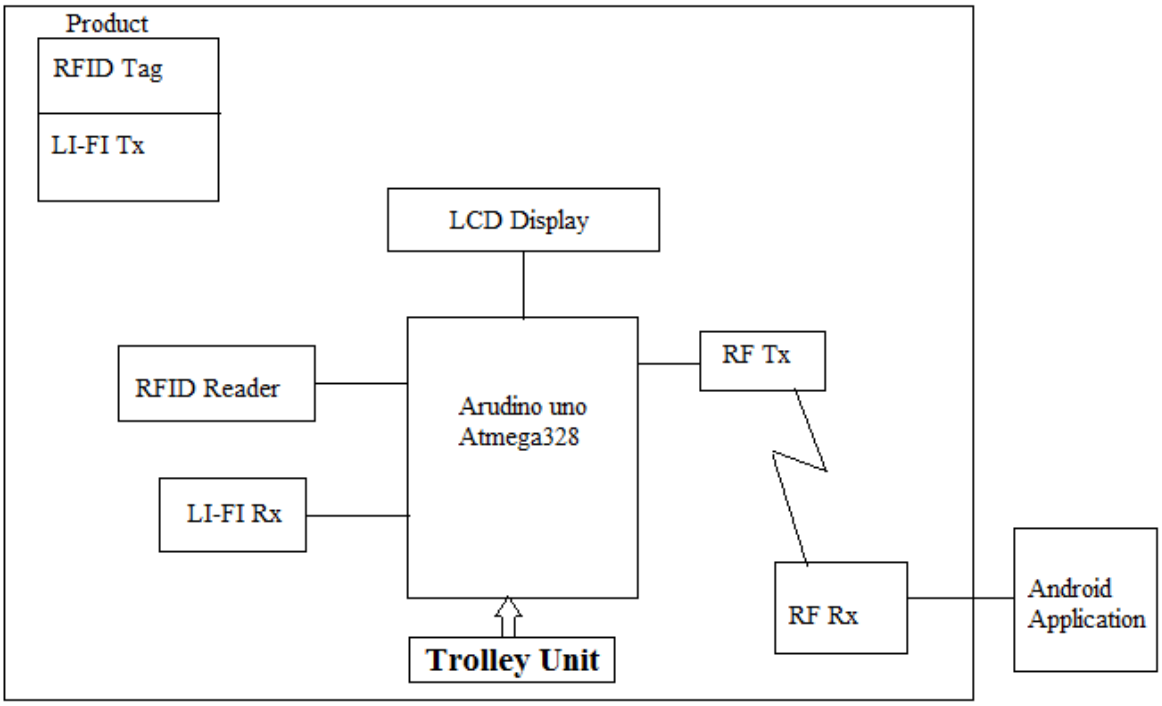

Figure1: Proposed system (Architecture)

System Flow:

A customer enters into a shopping mall. On entering, she/he first picks up a trolley.

Following are the steps of the flowchart

1. Start
2. Initialise the system
3. Then choose RFID or LI-FI for scanning the product.
4. Every product has RFID Tag and LI-FI Transmitter.
5. All details of the product stored into arduino uno and android.
6. If user don't won't any product then user can remove the product from trolley and also product is expired then message show into LCD.
7. Finally, total bill is generated.
8. Then user pays the bill.
9. End

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Associated with a RFID reader and a barcode reader.

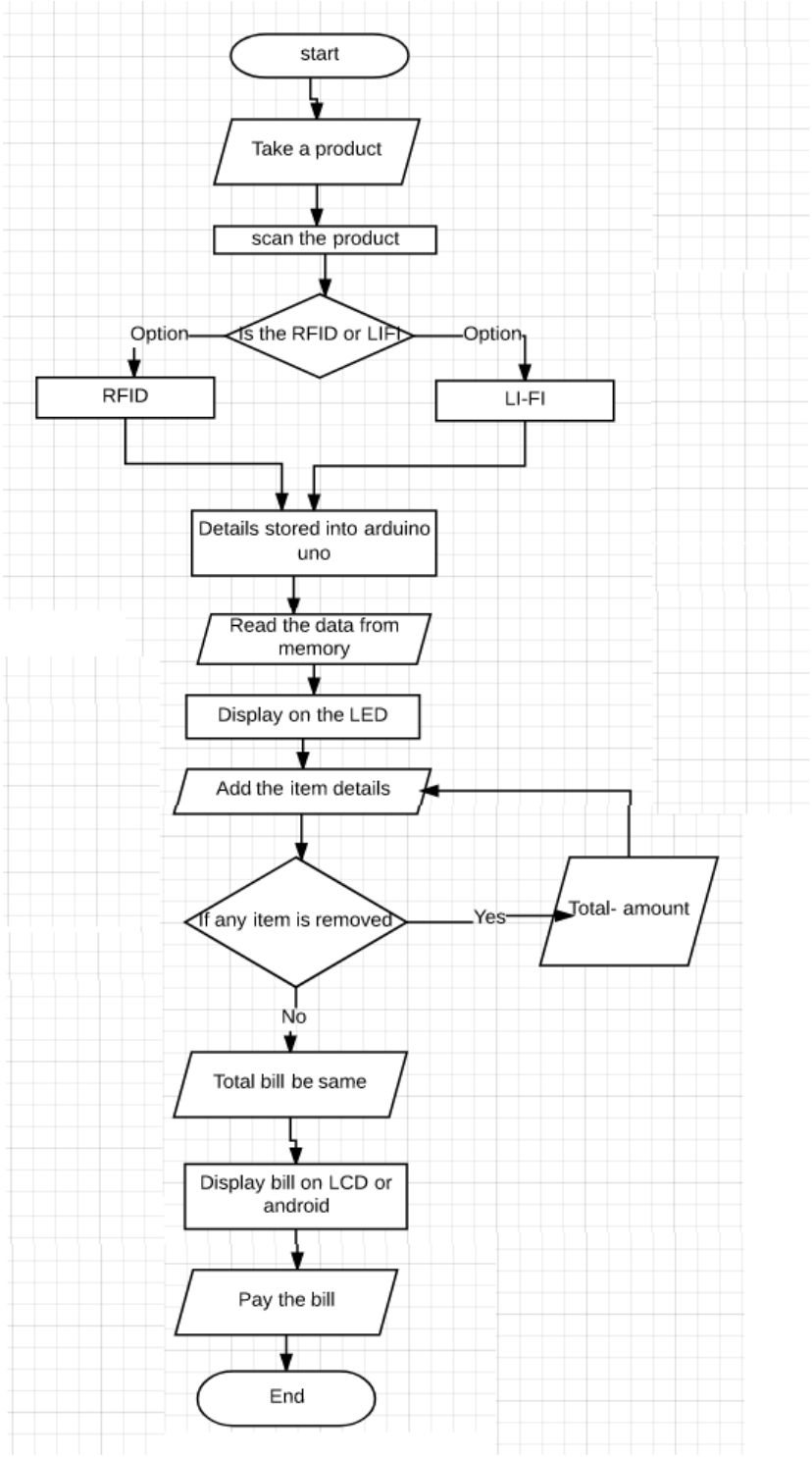

Figure2: System Flow

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Advantages:

- To avoid standing in queues while billing and reduce the time taken for shopping.
- To implement the system for simplifying the billing process and to increase the security using LI-FI technique. This will take the overall shopping experience to a different level.
- Automatic billing of products by using RFID technique will be a more feasible option in the future.

Applications:

- The Billing Trolley explores emerging mobile technologies and automatic identification technologies (such as RFID) as a way to improve the quality of services provided by retailers and to augment the consumer value thus for allowing to save time and money.
- LIFI Smart technology could reorganize the retail experience – pinpointing the location of trolleys within stores and also the users can be aware of the total bill amount during the time of purchase.
- 3. Android application- through android application it is very to remove any product taken by us. Finally we submit the overall bill to the billing unit by application easily.

IV.CONCLUSION

The developed product is easy to use and does not require any specific training. It has the effective usage of LI-FI technology and the smart trolley can minimize the queues in the mall. So that customer's time can be saved. It also uses the android application for seeing the bill on mobile phone.

V. FUTURE WORK

The bandwidth of a single LI-FI light is limited, we use parallel LI-FI wicks with different product current to transmit data simultaneously and with this we could overcome situations where it comes to restock delay etc. and get over with automatic billing and easy tracking of any product.

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