

IOT BASED INTELLIGENT CART FOR SHOPPING MALL

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ABSTRACT: This paper is based on the innovative concept of intelligent smart shopping and billing. During shopping there are some difficulties faced by the customers, one difficulty is to follow the queue for the billing process. So, to overcome such problems we work on a shopping cart. It will consist of an RFID reader. All the products in the mall will be equipped with RFID tags. When a person puts any products in the trolley, its code will be detected and the price of those products will be stored in memory. As we put the products, the costs will get added to total bill. If the product is removed from the trolley its bill will be automatically deducted. Thus, the billing will be done in the trolley itself. Item name and its cost will be displayed on LCD. At the billing counter, the total bill will be transferred to PC by Zigbee transmitter. This system will make shopping easy and will reduce time loss.

Keywords: RFID module, IR sensor, LCD, Zigbee module, LCD, Bluetooth.

I. INTRODUCTION

In the today's world the technology has developed too advanced that everything is possible to do with the help of technology. In this research paper we have an innovative idea of an intelligent shopping cart to reduce human efforts is the need for today's world. Human beings have always developed technology to support their needs ever since the beginning of mankind. The basic purpose of innovation and technology, irrespective of the domain has been in simplifying tasks and making everyday chores easier and faster. In this paper, we seem it fit to propose the intelligent shopping basket which aims to reduce, and possibly eliminate the total waiting time of customer manpower requirement for market and increase efficiency overall. [3]

This application is designed in such a way that it can move the shopping cart by the customer with the help of android mobile phone. It contains microcontroller, LCD, RFID module, Zigbee, etc. RFID Reader recognizes the products which are put in the cart by customer. The supermarket's product has the RFID tags which are scanned by the RFID reader. The IR sensor is easy to use and inexpensive wireless communication. Our project consists of IR transmitter and receiver module where it can be used as an alert system which senses the physical quantity, in case if product won't get scanned.

As soon as each item is placed various information like item name, price of the product is displayed in the LCD Display placed in the cart. Along with this total sum is also displayed. The total bill amount will reach the bill counter immediately through Zigbee. Then the user has to pay just the total amount and can walk away.

The RFID reader is a non-contact sensor that can read over a considerable distance. The items are added just by scanning the item over the reader once only. Deleting the item from the cart is just as simple, which can be done by scanning the item over the reader a second time by pressing the cancellation button. Once shopping is complete the user can press the button on the cart to confirm the items, calculate the total cost and send the generated bill to the billing counter.

II. LITERATURE REVIEW

In [1] the research paper "Smart Shopping Cart For Automatic Billing In Supermarket" by authors Prerana Thakur, Shikha Ranjan, Prachi Kaushik, The project consists of RFID reader, motion detector sensor, liquid crystal display, push buttons, switches and Zigbee. If user wants to use smart trolley functions then start button should be pressed. When a user puts some product in trolley then its code will be detected using RFID reader and cost of a product added to the list and sensor will sense the direction of motion of the product for fault detection and buzzer will be on if fault detected. In case, if user wants to remove some product then user should press the remove switch and product code will be detected by RFID reader and again for any false activity buzzer will be on. At last, counter with least number of queues will be detected and displayed on the cart LCD. Then, the final bill will be transferred to the counter having least waiting list using ZigBee. An RFID tag is comprised of an integrated circuit (called an IC or chip) attached to an antenna that has been printed, etched, stamped or vapor-deposited into a mount which is often a paper substrate or polyethylene terephthalate (PET). This chip and antenna combo, called an inlay, is then converted or sandwiched between a printed label and its adhesive backing or inserted into a more durable structure.

In [2] the research paper "Ingenious Shopping Cart: RFID Enabled for Automated Billing" by Tanushree, Siddharth Yadav, Saksham Aggarwal, Sagar Yadav, This cart uses modern and cheap technology like RFID and minicomputer to make it intelligent and time saving. It helps the consumers to utilize the time saved in other fruitful activities instead of wasting their time by standing a long queue at the check out counter. Once the cart system is activated, it keeps checking for any RFID tag that might be entered in the basket. If a product tag is read, entry is made in the current record session. This log is updated with every new entry to the system. Customer can either make a new entry or remove one. After completion of the process, the customer has to select a shopping option on the screen. This updates the status of the user on the internet and generates a bill at the counter which is also stored in the company database.

In [3] the research paper “Intelligent Trolley for Automatic Billing In Mall Using Internet Server” by Gaikwad Payoj Dilip, Sable Manisha Ganpat, Halle Shital Sunil, Bobade Suraj Bhimrao, Mrs.Prof.N.P.Kadale. According to this research paper its aim to develop the system that can be used in shopping malls to avoid the rush and standing in queues while billing, etc, it will consist of RFID reader. All the products in the mall will be equipped with RFID tags. When a person puts any product in the trolley, its code will be detected and price of those product will be stored in memory. As we put the products, the costs will get added to the total bill. If the product is removed from the trolley its bill will be automatically deducted. Thus, the billing will be done in the trolley itself. Item name and its costs will be displayed on LCD. The design of smart shopping cart consists of four main element which are hardware integration, software interface, wireless communication & network data base. The automated shopping cart system integrate a shopping cart with two sets of barcode scanners places at two different check point the entry & exit point respectively. It fascinated the user to self-scan the barcode of the purchased product. A wireless smart device makes note of all the scanned commodities of the particular trolley (with allotment number) and is linked with the super markets backend data base which contains details of the products such as cost price, available stock.

In [4] the research paper “Automated Smart Trolley With Smart Billing Using Arduino” by Suganya.R, Swarnavali.N, Vismitha.S, Mrs.G.M.Rajathi , the trolley is designed with a RFIS tag to identify its type. shopping cart is implemented with a Product Identification Device (PID) that contains microcontroller, LCD, RFID reader. Purchasing product information will read through a RFID reader on shopping cart and it is displayed in LCD which is interfaced to the controller at a billing counter the total bill will transfer to PC by Bluetooth module. In the trolley unit the Arduino microcontroller is attached to the RFID reader and barcode reader. As the user puts the item in the trolley reads the tag and sends a signal to the controller. The controller then stores it in the memory and compare with a lookup table. If it matches then its shows name of item on LCD and also the total amount of item purchased.

In [5] research paper, “Smart Trolley Follower Using Vision Based Technique”, by Monish Lalchandani, Rohit Bhonsle, Aditya Tulpule, Swapnil Satpute, Prof.Seema Udgirkar. This paper introduces a vision based object tracking robot which is driven by wheels and controlled by a computer along with software. The objective of this paper is to design a robot which is automatically controlled by computer to track and follow a colored object. Emphasis is given on precision vision based robotic applications. Image acquisition by the robot is achieved by ANDROID based camera, then it is send to image processing software for further processing. The overall paper describes a visual sensor system used in the field of robotics for identification and tracking of the object.

In [6] research paper, “Automatic Billing Trolley” by paper Mukund Wani, Neha Keswani, Snehal Neel, Smiley Chopade, The purpose of this project is that as we see nowadays purchasing and shopping at the malls have become a daily routine and essential activity in metro cities. The rush is even more when there are special offers and discounts & also during festivals and it has become a hobby too. The individuals buy different products and deposit them in the trolley, after total purchase one needs to go to billing counter for the payment. At the billing counter the person therein prepares the bill using code reader which will consume a lot of time and this then results in long queues at billing counters.

In [7] research paper, “Follow Me Multifunctional Automated Trolleyby L.S.Y.Dehigaspege, M.K.C.Liyanage, N.A.M.Liyanage, M.I.Marzook and Dhishan Dhammearatchi. The purpose of this project is that as we see now a days purchasing and shopping at the malls have become daily routing and essential activity in metro city. The rush is even more when there are special offers and discounts and also during festivals and it has become hobby too. The individuals by different products and deposite then into trolley,after total purchase one need to go to billing counter for the payment.At the billing counter the person therein prepares the billing use code reader which will consume a lot of time and this then result in long queues in billing counter.

In [8] research paper, “Smart Billing Trolley Using RFID and LIFI”, by Gaikwad Prerna, Kalekar Shital, Shete Renuka, Thorat Komal, Nita R. Mhaske, An innovative product with societal acceptance is the one that aids the cNomfort, 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. 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.

III. BLOCK DIAGRAM

In this project we are using Microcontroller ATmega328. Various components are connected to this microcontroller. RFID module has used for scanning the products by RFID tags which contain electronically stored information of that particular product. The information about products like name of product, quantity, and price will be displayed on LCD screen. After confirmation of the purchased products, the billing list will be sent on the counter section with the help of Zigbee transmitter. We have also used IR sensors as an alert system. If someone tries to put the product into the cart without scanning then IR sensor will detect the motion.

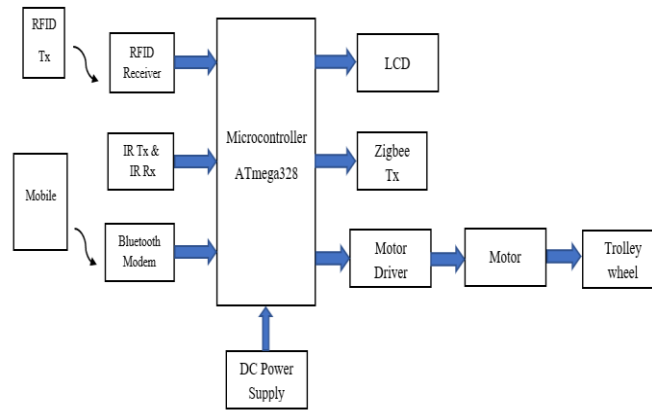


Fig.No.1.1 Block diagram of Shopping Cart

Another concept of this shopping cart is to drive the motor, here motor driver L293D IC used. The Bluetooth modem has placed in the cart. The Bluetooth through android mobile gets connected with the Bluetooth modem. We used Johnson motor which works on 60 revolutions per minute. This motor is drive by a relay which is connected to L293D motor IC.

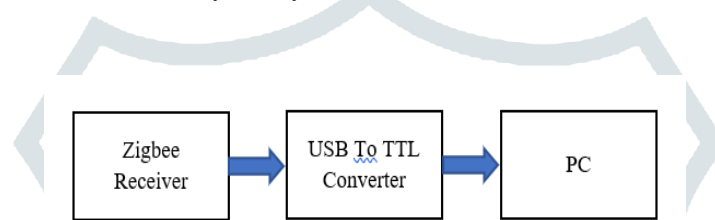


Fig.No.1.2 Block diagram of Counter Section

In the above diagram the signal from the trolley it is taken by the Zigbee receiver and that the signal from Zigbee receiver transfers to the PC using USB To TTL convertor. The working of USB of TTL is that it converts a signal from 0 to 5 volts into -5 to 5 volts. In PC we design a software using dotnet framework. For this system we are using flash magic software.

IV. FLOW CHART

Initially, start the system after that user has to scan the product. The product will get scan by RFID reader and the cost of product, names of product and the quantity will be displayed on the LCD display. After confirmation of the product purchasing the bill will be automatically sent to the counter section PC. In case the user has to cancel the product then the user has to press cancellation button and has to scan that particular product which has to cancel.

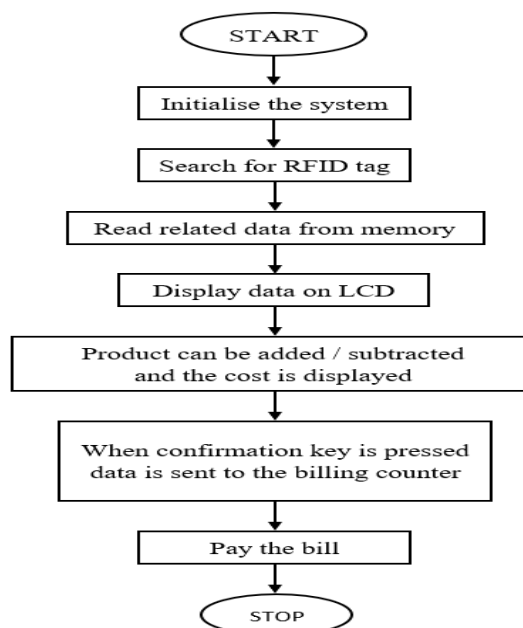
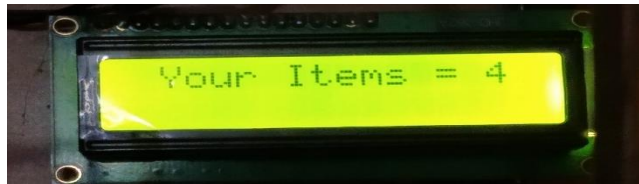


Fig.No.2. Flow chart of cart

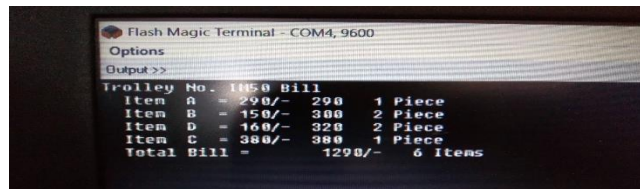
V.RESULT & DISCUSSION

The testing of each module is carried out successfully. After confirmation of billing, the Billing list has been displayed on the counter PC. This has become possible due to Zigbee module and USB TO TTL convertor and the flash magic software.

Step 1: After scanning the product



Step 2: The confirmed list of products



Step 3: If someone tries to steal the product



VII. CONCLUSION

This RFID system has been used in shopping malls and used for security applications by keeping data confidential. In future, card payment facility will be available on the cart itself. There will be information of products that will be displayed such as name of the product, quantity of the product and cost. While billing, to avoid standing in the queues and reduce time taken for shopping, people can take overall shopping experience at different level.

VIII. FUTURE SCOPE

In future this idea can also be used with optional billing i.e. Online or offline and customer will ready to pay the bill payments through the credit cards or debit cards. Cart moving purpose will be possible with remove controller. We can also insert a system into a cart in such a way that it will track the product destination with the navigation.

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