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DEVELOPMENT AND IMPLEMENTATION OF SMART TROLLEY SYSTEM USING RFID TECHNOLOGY

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Abstract: In the mall every person takes product put into trolley. After the shopping is done that person have to stand in the queue for billing. In the billing process a sell person scan barcode of each and every product and gives final bill. This process is very time consuming and it becomes worst on holidays, special offers or weekends. So far the solution to the problem has been intelligent forklifts with different technologies . There have been a number of methods designed for smart spending carts in order to make shopping easier for the customers in malls and save the time of customers by avoiding the requirements to stand in long billing queues. Here we are using the RFID technology which means the bill payment also done in the shopping trolley at the customer without standing in the queue. Electronic Commerce has become extremely popular with the rise in the wireless technologies and other communication techniques. In this paper we are discussing about the smart trolley system for real time application. RFID reader will read the tag data and the amount and it will sent to the server using the wi-fi module with operating frequency (2.4GHz).Here we are using python language for programming communication with the thing speak..

Index Terms **– RFID Technology, Thing Speak, Embedded.**

I. INTRODUCTION

In the current shopping system ,one of the challenges is guiding the queue through the lengthy checkout process. Therefore this project aims to reduce the average time a customer spends in a mall by implementing an automatic billing system using RFID technology. In the past, people used to write a list when they go shopping for groceries, while today, they use their smart phones to do it. In addition, the advent of Smart phones has significantly changed the experience of retail shopping. Retailers are continually working to enhance their shopping experience to ensure that their customers are delighted with their overall shopping experience. Various efforts have been made to eliminate long shopping lines in department stores in the past. One popular method is implementing self-checkouts, where consumer convenience has been significantly improved. Since then, self-checking has been expected due to low overhead costs; however, shoplifting and lower operational efficiency are considered significant disadvantages in the retail world. The main goal is customer satisfaction and reducing the duration of the billing process. After a quick scan ,customers must add the products to shopping cart and after completing the purchase, the final amount is displayed in shopping cart. Customer could either pay their bill by their pre-recharged customer card provide by the shop. Finally, the whole information will be sent to central PC of the shopping mall.

Initially we used to generate bill in the form of paper and then we are using different technologies .The recent technology is the barcode scanned .it is used to read and scan the barcode in formation present on every product. As the technology is developing now we are focusing on smart trolley system using RFID tag. Where RFID tag is the digital storage device it is used for Indentification and to record the information. From the way we communicate to the way we travel, technology has touched every aspect of our lives. One such technological advancement is the development of the Smart Trolley using Raspberry Pi. This project is a great example of how technology can make our daily lives easier and more efficient. The Smart Trolley is essentially a shopping cart equipped with a Raspberry Pi, which is a small, single-board computer. The Raspberry Pi is a powerful computing device that is capable of running various programs and applications.

By incorporating the Raspberry Pi into the shopping cart, the Smart Trolley is able to perform a variety of functions that are designed to enhance the shopping experience of customers. The primary goal of this project is to create a Smart Trolley that is capable of assisting customers in their shopping journey. The Smart Trolley will be able to provide customers with a range of features that are designed to make their shopping experience more efficient, convenient, and enjoyable. In this project we did the app which is very useful to the buyers for not to stand in the queue for the bill payment. After the shopping is done, the customer has to press the stop button then it will display like “pay the bill”. Then the customer has to pay the bill by using their pre-recharged card provided by the customer or phone. This app displays the name of the person, list of the products, total cost of the products. If the customer wants to clear the products list and cost, clear option is present in the app. If the customer Press the bill-pay option in

the app then the payment process is done. so, the bill is payed by the customer. In the LCD display, it displays like “bill payed”. The details of the customer will be shown in the PC of the shopping mall. If there is any problem with the customer then, the seller will recheck the list of products in the computer and resolve the problem. This smart shopping cart app is very useful for the customer bill payments in the shopping malls.

II. EXISTING METHOD

In the existing model the mainly used technology is the barcode scanner in most of the shopping malls. The barcode represents a series of thick black lines which are of different width in separation between those lines. These lines can be coded into the data or Information. Each product is equipped with the barcode and it is scanned by the barcode scanner. The data is stored in the P.C of the respective barcode will displayed and the total amount will be added and the total bill will be generated. Barcode Scanners are mainly made up of light source, photo diode, camera-based scanners. In this the barcode scanner scans the black and white elements of the barcode by eliminating the code with red light which is then converted into machine language.

III. PROPOSED METHOD

In the proposed system we are using the latest RFID(Radio Frequency Identification) Technology. In this , it is having mainly two components such as RFID tags and RFID reader. The tags are attached to the products for the purpose of the identification using radio waves. The tag used are passive tags are chip based tags which consists of chip and antenna. In this paper we have developed a Smart Trolley System that allows the user to manage their list while shopping and easily pays the bill at the shopping trolley. The cart equipped with the kit that displays the total amount of the products which are placed inside the trolley. By this process it s easier for the customer in knowing of how much bill they should pay and by this way the time will be saved and customer gets faster service. This will be helpful for the shop keeper in reducing the cash counters. Here in our project, for buying products remaining stocks also displayed at the shopping trolley.

A.BLOCK DIAGRAM

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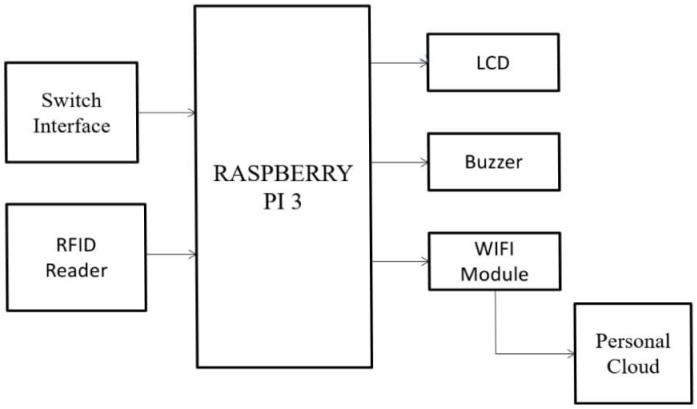
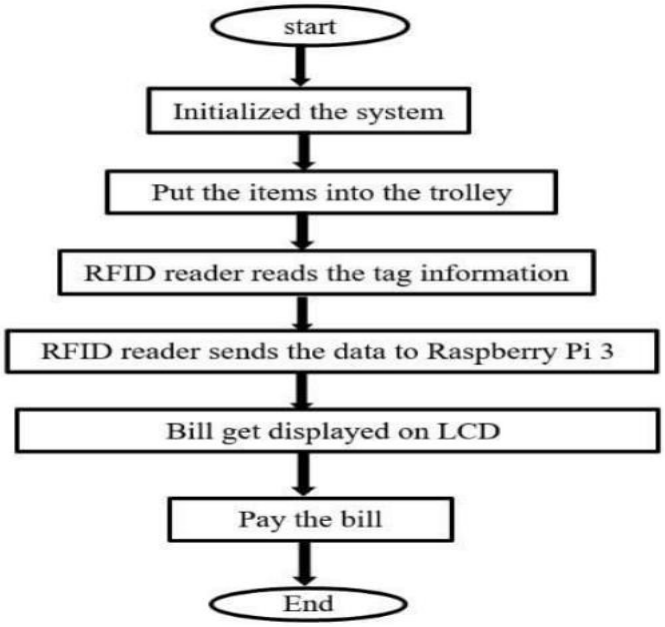


Block diagram of the smart trolley

B.FLOWCHART



C.RASPBERRY PI

It is a third generation Raspberry pi. this is the factor than the previous models such as raspberry pi model B+ and Raspberry pi 2 model B. It is the single board computer can be used further various applications and implementations.The processor used is broadcom BCM2387 chip set with 1.2 GHz quad core ARM cortex-A53 (64 bit) .This is operated with 5.1 volts micro USB supply .Generally it uses 700-1000mA depending on what peripherals are connected to it. This power supply will increase depending on different inerfaces attached to it. The graphical user interface is the 400MHz video core. The ram size is 1GB ram. The network connectivity is 1x10/100 ethernet. There are 4 USB ports and 40 pins out of which there are 26 GPIO pins and each pin uses 16mA. Its is having micro SD port for loading your system and storing the data.

D.IR OBSTACLE SENSOR

On the basis of the simple idea the IR sensor is easy to built, easy to calibrate and provides a detection range up to 10-30cm. the frequency of the IR sensor is more than the microwave and less than the visible light. This is mostly used in the indoor applications where there ambient light is present In this the basic idea is to transmit the infrared light through the IR-LED'S, which are reflected back when it hits an obstacle. The object can be anything which has certain shape and the size. The infrared technology is used widely in wireless applications. Here the IR-LED will transmit the signal and when these are hit by an obstacle they get reflected back and are received by the IR-receiver which may be either the photo diode or photo transistor which is used to decode the signal. In the electromagnetic spectrum the infrared area is mainly divided into the 3 regions such as near, mid and far field regions. These are divided based upon the wavelengths and their applications.

E.RFID SYSTEM

RFID system consists of RFID reader, RFID tag. Information managing host computer. The render consists of An RF transceiver (transmitter and receiver), a signal processor, a ntrol unit, a coupling element and a serial data interface to de host system. The tag used is the passive tag which acts as a grammable data-carrying device. The passive tags which a battery on it has called as battery less tags. The absence of power supply makes them cheaper and reliable. The RFID gems in the market are divided into two categories: near fold systems and far field systems monly known as the "radial sphere" inside which one is ed to be near field and the field outside is the far field region. There is a distance The near field systems are used for the systems operating in and HF bands which are relatively short reading ences In this the coupling technique used is inductive ALF apling.

F.LCD DISPLAY

LCD (Liquid Crystal Display) is an electronic display module the wide range of applications in today's world mies of LCD's in the market. Here we are using LCD which is the very hasic module and commonly webe various devices and circuits. 16x2 means it can Waracters per line and there are 2 such lines.

IV. RESULT AND ANALYSIS

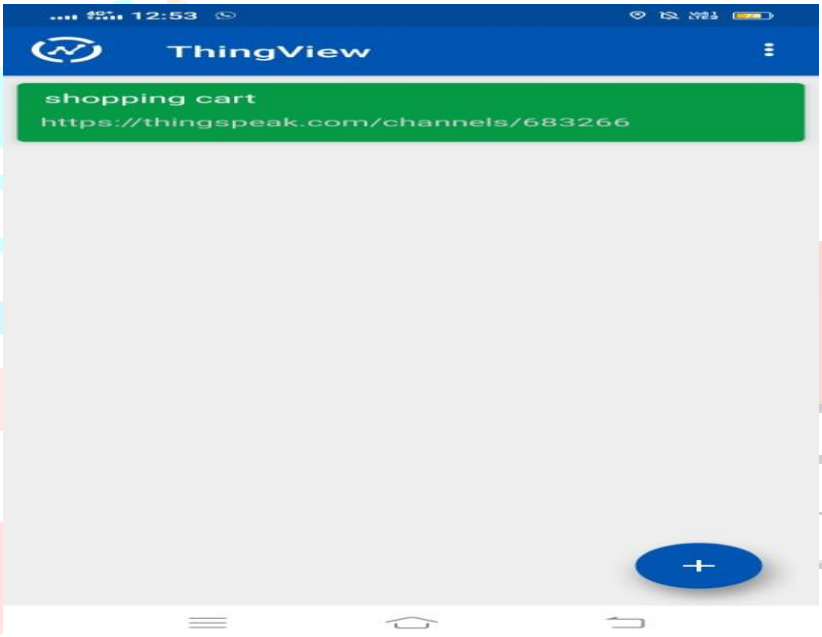
When power supply is on

When we press the start button

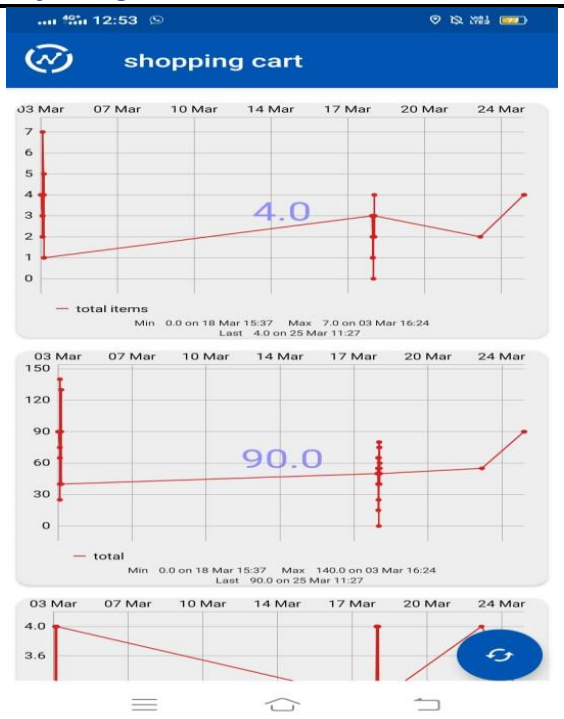
when is item is dropped

bill is payed automatically

THINGSPEAK RESULTS



THIS IS THE CHANNEL CREATED IN THINGSPEAK FOR SHOPPING CART



Graph shows how many items are droppedand bill generated

Graphs shows remaining items that are present in shopping mall

V. CONCLUSION AND FUTURESCOPE

Smart Cart with RASPBERRYPI and RFID was been successfully implemented. This System is not only effectively eliminates the long queues but also manages the customer budget. This system is automated and much better than the existing Barcode system. With new technologies rapidly making every walk of life smart, shopping should be made smarter too. The system also has a very quick and easy billing option. The Work done with the help of RFID technology, EM-18 reader and Arduino. It's aim is to reduce the time of billing in long queues so that the customers gets benefited and the same time inventory management becomes so easy. It can be implemented in shopping malls where there is a large crowd and huge rush into malls. In the world of automation, this automatic billing system plays an important role in the development of the technology. This technology will replace the present barcode system which is present being followed. Hence this technology can help people to make their life's easy and time saving too.

In the memory unit of trolley the details of the product have to be updated time to time. Also, with the help of optical sensor, motors and motor drivers, the trolley will be moving in a way that it fallows the customer when the customer is purchasing items and it also maintain some distance between customer and itself.so that the shopping is done safely with out any interruption

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