Shopping Trolley with Automated Billing Using Arduino

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Abstract: The utility of trolley will be first one of its kind in the commercial use. This device records and reads the data of different products with the help of the suitable sensors like RFID tags. This recorded data helps the shop owner with the detailed analysis of shopping by the customer & their preferences through computer; printout of the same can be obtained. In Automatic trolley, there is no need to pull heavy trolley, wait in billing queue and thinking about budget. The microcontroller or arduino based trolley will automatically follow the customer. And also it maintains the safe distance between the customer and itself. It gives number of products in trolley and the total cost of the products on the spot

KEYWORDS: Arduino, Em 18 RFID reader module , RFID tags, I2C module, 16*2 lcd display

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INTRODUCTION

We all know that malls have a long queues for billing and this is much time consuming. All over many customers facing problem with their budget or investing their time for billing of shopping. All the shopping malls used barcode system. Barcode system require the barcode on each and every product and it is scanned by scanner. Barcode scans upto few feets. If any damage occurs to the code of product then it is hard to scan the barcode from barcode scanner. Also for scanning purpose man power is required. Smart shopping cart using Arduino and RFID is new concept in this field. This system not only helps to reduce the long queues in malls but also saves lots of time and man power.This system barcodes are replaced by the RFID tag.For scanning purpose RFID are more efficient and powerful . This system is ivented by using Arduino and RFID tag so from this customers are able to scan the products by there own

PROBLEM STATEMENT

As seen in shopping malls barcode system is used for billing of the product. This system makes customers to wait in a long queues for billing of their shoping products. This system is ivented by using Arduino and RFID tag so from this customersare able to scan the products by thereown.and no need to pull heavy trolley upto billing counter

OBJECTIVES

1. To study the existing system.
2. To design the block diagram.
3. To decide the components specification & device in system.
4. To design the circuit diagram and simulate it using suitable software.
5. To design the PCB and implement hardware.
6. To test the circuit and observe the result.
7. To prepare report.

RELATEDWORK

1.Harpreet Bedi,Nikhil Goyal ,Sunil Kumar Journal of Electrical & Electronic Systems January 2017DOI: 10.4172/2332-0796.1000223 In this system , RFID tag is attached to the card of member .RFID Reader is attached to shopping trolley . Billof shopping is displayed on lcd . This smart system works only for those customers which having a membership card in which RFID is attached to it. Otherwise, it will act as a normal trolley.

2. Ankush Yewalkar ,FaizImandar ,Raj singh 7 th International Conference on comm , computing and Virualiazation 2016 DOI:10.1016/j.procs.2016.03.107.This application creates an automated central bill system for the mall . Customers can pay their bill through credit debit cards Zigbee and RFID used for in it. Each product in the shop or a mall will have an RFID tag on it . Each Cart will have an RFID reader and Zigbee.Trans receiver implemented on it . It will also provide anti - theft system for a supermarket

3. SridhinKarjol ,Anusha k. Holla,C.B. Abhilash JSS Academy of Technical Education , Bengluru , India April 2018 DOI : 10.1007/978-981-10-9059-2 33 This Project is IOT Bsed Smart Shopping Cart for shoping . In this system RFID tags are used instead of Barcode. This paper explain about an automated and a time saving system for retail to improve shopping experience . The proposed smart cart is capable of generating a bill from the cart itself.

BLOCK SCHEMATIC & WORKING

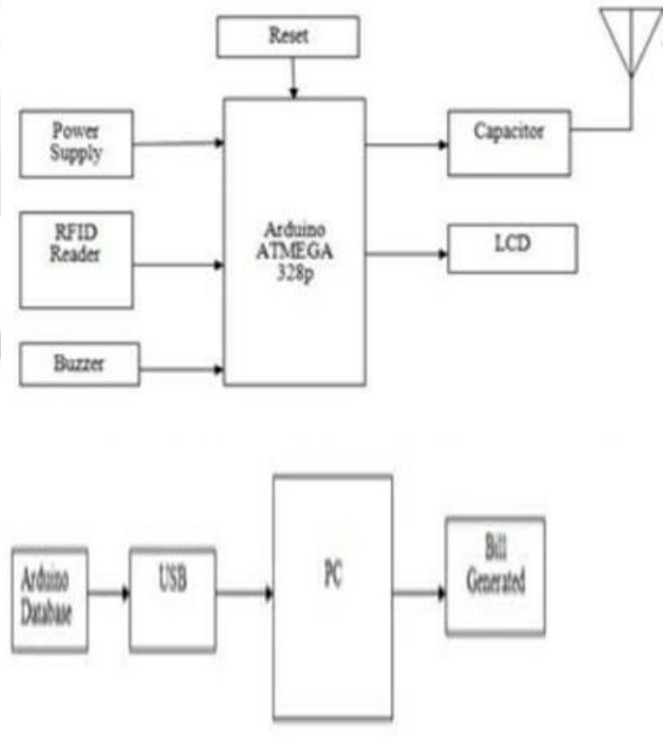


Fig. Block Diagram

As shown in fig. Main part of our project is scanning of RFID tags. Principle of RFID tag is: When RFID comes in contact with RFID Reader then the tag detects the reader signal through a coil present in it which is useful for converting received RF signal intoelectric signal .Then it is transmitted to the Arduino and then after to the LCD for displaying purpose.

COMPONENTS

1.Arduino
2.Em 18 RFID reader module
3.RFID tags
4.I2C module
5.16*2 lcd display

ARDUINO NANO

Arduino nano is a simple,and compatible .It works with mini USB to power the arduino board. Arduino nano has 14 digital pins and 8 analog pins,2 reset pins and 6 power pins. The digital pins can be used as both input and output accordingly whereas analog pins are only input.These pins acts as input when they are connected to sensors and acts as output pins when they are driven by load .

Pin Discription:

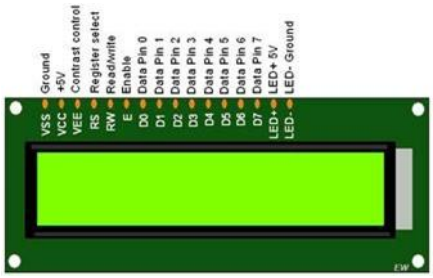
1) Vin: It is a input power supply voltage to the board while using external power of 7 to 12v
2) 5V : It is a regulated power supply volatge of a board that is regularly used to power controller and other components.
3) 3.3V: This is the minimum volatge regulated by the voltage regulator
4) Gnd: There are multiple ground pins on the board .These are the reference Pins.
5) reset: This is used to reset the board.This is very helpful while running the complex programs.Low value of reset will reset the microcontroller.
6) Analog pins: There are 8 analog pins on the board A0-A7. These pins are used to measure the analog voltage ranging 0-5v.
7) Rx,Tx: These pins are used for serial communication where Tx is for transmission and Rx is for receiving the data. 8)AREF: used as a reference voltage
9)PWM: Six pins 3,5,9,6,10,11 can be used to provide 8-bit PWM(pulse width Modulation) output.It is a method of getting analog results from digital data.
10)SP:4PINS10(SS),11(MOSI),12(MISO),13(SCK) are used for SPI(serial peripheral interface).It is mainly used to transfer data between microcontrollers and others like sensors,registers etc.,
11) I2C: I2C communication is developed by using A4 and A5 analog pins where A4 pin represents the serial data line (SDA) which carries the data and A5 pin represents the seial clock line (SCL) which is a clock signal,generated by the master device,which is used for data synchronization between the devices on an I2C bus.`
12) External interrupts: Pin 2 and 3 are the external interrupts which is used to call the important instruction immediately

RFID TAGS

RFID tags are a type of tracking system that usessmart barcodes to identify the items.RFIDis“Radio Frequency Identification” as such RFID tags utilize the radio frequency technology. These radio waves transmit data from the tag to the reader which then transmits the information to an RFID computer program.

An RFID tag works by transmitting and receiving information via antenna and a microchip-also called as an integrated circuit.RFID belongs to a group of technologies referred to as Automatic Identification and Data Capture(AIDC).These directly reads the data into computer with or without human intervention. RFId methods utilize radio waves.There are two major types of RFID tags: 1) battery operated and 2) passive

16*2 LCD DISPLAY



16*2 LCD means it has 16 columns and 2 rows.Thus in total it has 32 characters in total and each character is made with 5*8 pixel dots.Therefore 16*2 Lcd has of 1280 pixels

.Inorder to handle all these pixels ,this LCD display is interfaced with some sort of IC's to control the functionality . Here in our circuit ,it is interfaced with I2C module

Features

•Operating voltage of 4.7V -5.3v

•Current consumption is 1mA without backlight

•Alphanumeric LCD display module means can display both alphabets and numbers.

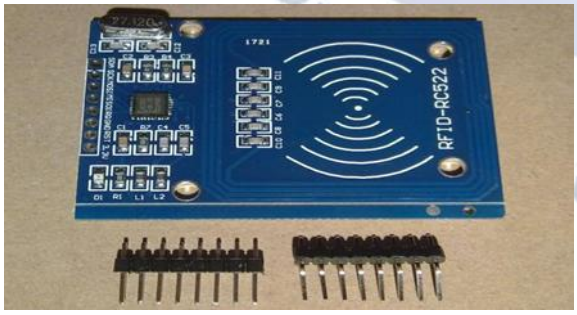
•Consists of 2 rows

•Has 2 LED's

•It is used to either read or write the data

EM 18 RFID READER MODULE:

EM 18 RFID reader is one of the commonly used rfid reader to read 125 KHz tags. General pin diagram of module is given below



Features and specifications of reader module:

•Operating voltage of EM 18 is +4.5 to+5.5V

•Current consumption is 50mA

•Can also operate at LOW power Operating temperature is 0°C to +80°C

•Operating frequency is 125KHz

•Communication parameter is 9600bps

•Reading distance is 10cm (max)

•Integrated antenna

EM 18 can provide output through communication interafce.one is RS232.The output module bit rate is 9600bps.

ALGORITHM

1. Start the system
2. Initialize the system
3. Search for the RFID
4. Scanning the RFID tag and read it RFID reader read the related data from memory
5. After identify RFID transmit in to the arduino then display the data on LCD board
6. Then add or deletion the products name , products quantity and product coast are added and show the LCD screen, and also shows the final bill of both addition or deletion of products
7. After shopping upload the total bill
8. Then total bill printed
9. Stop the system.

ADVANTAGES

1.Major advantage is that we use rfid tags instead of barcodes for scanning which can be scanned upto few cm.

2.Can do self checkout which avoids standing in long queues which is tidious.

APPLICATIONS

1.Student attendance

2.Shopping malls

3.Library management

4) We can make the model much advance by suing technologieslike IoT,deep learningetc.,

FUTURE SCOPE

The present model is not an advanced model but ut can only banish the existing problem.The model can be made much advanced in the following methods:

1)by using the algorithm in such a way that the security is always maintained rather using simple algorithm

2)we can also add the total products bought and cost of each of them to the mobile itself . So that digital transactions can be done easily as such.

3)we can further make it much advanced by weighing the total cart and cross checking with the bill of

productswhich eliminates the human intervention for cross checking.

CONCLUSIONS

We would like to say that there is much enhancement and smarter way to the mode of project we have implemented. The project we have made is cost effective and friendly for the customers to avoid the billing by standing in the long queues for a longer time .By this, customers can themselves scan the products with out any help of manual billing.The total price of the products is displayed accordingly.As the system is becoming smart ,the requirement of man power decreases.

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