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Smart Shopping Cart with Social Distancing

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ABSTRACT: We can see a large amount rush at malls and supermarket on holidays and weekends. During the offer time or more discounts then it becomes more often. Now a days people purchase a variety of items and put them in the trolley with question mark to social distancing. After the completion of the shopping one should approach for the counter for billing process . By using barcode reader the cashier creates the bill which is a time consuming process in the modern technological world.This results in long queues at the billing counters and reduces the social distancing and leads to spreading of diseases from one person to another. This project is done to overcome the above disadvantages or the situation . To achieve this solution all products in the mall should be tagged with RFID tags and all trolleys should be equipped with a RFID reader and LCD screen.When anyone puts any product in the trolley its code will be detected automatically, the item name and cost will be displayed on the LCD, thereby the cost gets added to the total bill. If you taken any unwanted item or you don't want that product then you can take out the product so the amount of the product will be deducted in the total amount and the ZigBee module helps to transfer the data via wireless to the central billing unit. Due to the above advantage the customers save their time in the billing counter by paying the bill by means of online payment. IOT will more effective this process.The trolly consists of an sensor which detect the object Infront of trolly.If the person or object detected less than social distancing it gives beep sound and alert the person who move the trolley. The cart initially checks the status of module whether online or offline. Online communication requires network communication from user and controller will create bridge among the user.

KEYWORDS: RFID Tag, RFID Reader, Shopping Cart, Social Distancing.

I.INTRODUCTION

RFID is an upgrading innovation which has as of late pulled in light of a legitimate concern for the exploration group in view of the more advantages it offers over the other existing recognizable proof and information detecting improvements. RFID is the abbreviated form thus it uses a radio wave for naturally distinguishing the things.RFID is a technology that permits the exchange of information amongst the tag that has a specific labels and the reader. It transfers the information by contactless without the need of viewable pathway over a separation up to a couple of 10 meters relying upon the sort of label engaged. For this framework the radio waves transfer the information and the distinct tags can be scrutinized or collected normally . This part is designed to survey the current technology writing and probe the problems in the existing RFID organization starting from the transformation to yet in its recognition phase. From past the growth of this technology from 1900's, aside to this expressed reliable perspectives, thus innovations have some new affairs or points. Thus a planned motivation behind part for look at the writing identified with the abovementioned technology additionally develops scholarly analysis with giving an deal into a segment of the outstanding and precious notes where in cases hindering the growth of this alteration. It basically works on the goal to produce a more prominent perceivability and reliability and an enhanced item speed of the RFID innovation. From past 1900's, the evolution of this innovation aside the expressed affirmative viewpoints, thus the existing system has some problems by using the RFID technology.And the anticipated rationale is a part where the writing is related to Radio frequency Identification and further develops scholastic research, and giving a knowledge into a portion of the exceptional information's and urgent issues can block the development of RFID technology. There is emergency need so that the specific end goal to give a more prominent perceivability and an enhanced item speed of the RFID innovation. During world war II, The radio waves are the main utilization for transmitting the signal.when transponder (labels) were put on one plane and it is used to recognize drawing a other nearer plane so that it Interrogators dispatched a signal to the system of the plane and the signal delivered previously to the plane could be deployed to identify amicable and the hostile flying machine.

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The merchandising process is the major part of the supplychain management that promotes the products to the consumersand distributors. Shopping is the only thing where all people used to do this thing.There are some supermarkets or shopping malls where it sells the retailers product and it creates a relationship between the consumer and the consumers purchase. Instead of online shopping,people are used to the supermarkets with family or friends to entertain, enjoy and get the qualityproduct with traditionalshopping. In current age the supermarkets and malls should reinvent so that in critical situations it can be managed .Shopping malls or supermarkets are the place where small business retailer meets their need to sell their product to the consumer and thus where supermarkets acts as a medium for small group organization. In recent times many people not want to waste their time in the traditional shopping and thus it should be reinvented. In the today's world many of the supermarkets use barcode technology for billing the items. The barcode is nothing but a black vertical strips where the data are stored in terms of barcode technology. Thus we implement smart trolley where the barcode is scanned with the help of the reader we attached to it. Whereas in smart trolley the product can be scanned by the userself-scan by using ultrasonic transducer.

RFID system can be used for the contactless information transfer thus it is used in our system. When we refer to RFID technology then we should consider with the reader and the tags which has specific labels. This system uses Arduino microcontroller where it access the input data and it responds with the corresponding output. The innovation must be simple and it should be environmental friendly so that it can be understood by the people. In the recent time due to the pandemic, social distancing is the mantra where we used in every space where we go and thus in the super market it is the main disadvantage that people does not follow social distancing. The sensor ultrasonic transducer is implanted in the smart trolly and it helps to maintain social distancing in between people.

BENEFITS OF SMART SHOPPING CART

The advantages of the smart shopping cart are:-

- It reduces the customer time incase of billing since the amount is paid through online
- It also helps to maintain social distancing.
- It limits the queue in the billing counter.
- It is customer friendly.

II. EXISTING SYSTEM

The utilization of ultra high frequency(UHF) RFID technology is proposed in the smart shopping framework where the UHF passive tags have a more drawn out range from 1 to 12 meters. The recent research on the design of smart shopping framework principally placed around utilizing low/high frequency RFID, while the RFID scanner have insufficient ranges and leave clients to physically check items. In the updated framework, where the smart cart is furnished with a RFID reader or scanner and RFID tags , microcontroller, LCD touch screen. This smart is able to automatically read the items put into a cart by using RFID reader. LCD screen acts as the user interface. A RFID reader is kept at the outdoor of the shop while taking the cart it notifies whether the amount is paid for all the products. Thus compared to the existing system the proposed system is more efficient and the system is environmental friendly. Where it uses the barcode technology and shares the information through the radio waves. During the pandemic situation it also helps to maintain social distancing. Existing uses Bluetooth for the connectivity and in the proposed system we use the wi-fi connectivity so that the data transferring will be in high speed when compared to the existing model.

III. PROPOSED SYSTEM

In the recent systems, the bar codes are printed in the product thus these bar codes are used for scanning so they don't want waste their time in queue for paying the amount. At times in the billing counter the bar code of some product can be damaged thus it too take long time for scanning manually. In order to solve the problems identified and to save the customers time and to win the loyalty with the clients by the retailers. In the proposed system each product will have a passive radio frequency ID tag which represents the unique electronic product code. Thus the electronic product code gives the information about the product details (i.e) name and price. When the customer puts the product in the shopping cart, the RFID scanner scans the tag and the electronic product code is generated. The radio frequency ID reader passes the electronic product code the microcontroller. The name and price of the product is processed by the controller and gets displayed on the LCD screen of the smart trolly. Where the customer can see their product details. To store the price of the amount and the billing data information can be stored in the microcontroller memory. The

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LCD acts as the interface with the microcontroller in 4bit mode. Where in the LCD display the customer can see that whether the product us been added or removed from the cart and it also shows the amount of bill the customer should pay. The amount can be payed through the online interface. As we conducted some test so that we infer that when putting an item into the smart cart or expelling a item from the cart is able to precisely read it. In the proposed system, the ultrasonic transducer is implanted so that in shopping malls or the supermarkets social distancing is followed. Thus the block diagram of the proposed system in shown in fig.1.

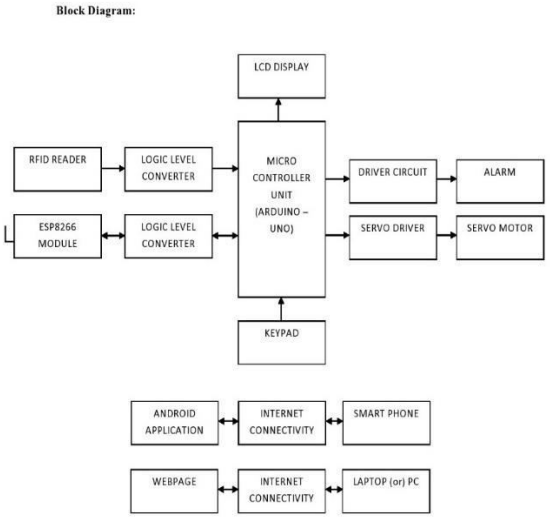

Fig.1.Block Diagram

IV.HARDWARE COMPOENENTS

Hardware components are nothing but they are physical components which are implanted in the proposed system are

- RFID Tag and Reader
- ESP8266 Wi-fi module
- Arduino Uno microcontroller
- Keypad for Arduino
- LCD display
- ZigBee
- Ultrasonic transducer
- Buzzer

RFID TAG AND READER

RFID tags are used to store the electronic codeOf the product and it also has barcode . The tags consists of the integrated circuit and an antenna which is used to transfer the data to the RFID reader. These tags are unique for all the product in the supermarkets or the shopping malls. It is a typing of tracking system where it uses smart barcodes to identify the items. RFID tags utilize the radio frequency technology. There are two types of tags these are battery operated and passive tags. But in the proposed system the passive tags are used.

RFID reader is implanted in the smart cart and it is used to transfer the data wirelessly. It uses radio frequency waves to transfer the data. There are three main types of RFID systems based on the frequencies are low frequency(LF),high frequency(HF) and ultra high frequency (UHF). Thus the reader changes the radio wave into a usable form of data.

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Fig 2.RFID READER

ESP8266 WI-FI MODULE

ESP8266 is low cost wi-fi microchip. This is small module allows the microcontroller to connect with a wi-fi network. It makes the connection to be wireless and it is more fast in transferring the data when compared to the Bluetooth technology. It is also mostly used in the development of IoT(Internet of things) projects. The ESP8266 comes with loaded firmware which can accept the AT commands over the serial interface to do the various functions. The AT commands of the ESP8266 wi-fi module are responsible for the controlling operations such as in module like restart, connect to wi-fi, Change mode of operation.

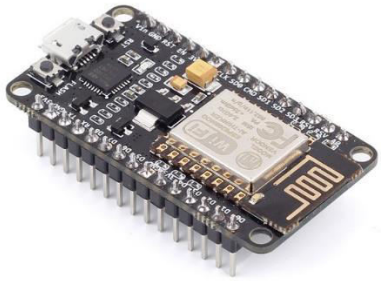

Fig 3.ESP8266

ARDUINO UNO MICROCONTROLLER

Arduino is microcontroller which are destined to play an increasingly most important role in the revolution of various industries and that are influencing our day to day life more strongly one can imagine. Arduino Uno microcontroller used is ATMEGA 328P. It is an 8-bit device which means that it can handle 8 parallel data signals by the data bus architecture and the internal registers. ATmega328P has three types of memory they are flash memory(32KB non volatile memory),SRAM memory(2KB volatile memory),EEPROM(1KB non volatile memory). The flash memory is used for sorting the application. Where you don't need to upload the application again whenever you unplug the Arduino from the power supply. SRAM memory is used for the storing the variables which are used by the application while it's running. EEPROM memory used to store data that will be available even after the board is powered up or powered down. The operating voltage about 1.8v to 5.5v.

Fig 4.ARDUINO

KEYPAD FOR ARDUINO

The keypad is one of the most commonly used input devices for the microcontroller applications. It is standard keypad wired as an X-Y switch matrix where it makes contact with the switches by connecting a row to a column when

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pressed. For example if a keypad has 12 keys then it is wired as 3 columns by 4 rows or in consider to 16 keys then it is made as 4*4 as that of row and column. The keypad is mainly used for the numeric inputs.

LCD DISPLAY

LCD is the liquid crystal displays which have the materials combine the properties of both liquids and crystals. It consist of two glass panels, where the liquid crystal material is sand witched in between the crystal. It displays the input processed by the microcontroller as the output. When there is a sufficient voltage is applied then the electrodes in the LCD then the molecules would be aligned in a specific direction.Changing the display size or the layout size in lcd can be simply changed so that it becomes customer friendly.

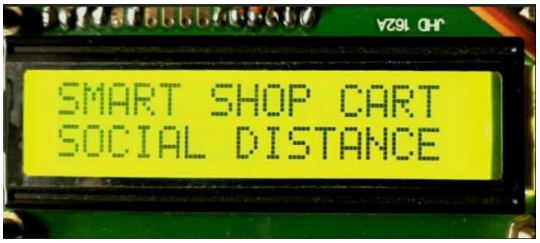

Fig 5.LCD DISPLAY

ZIGBEE

It is a low cost and low power mesh network which is used for transferring the data targeted at low battery in wireless control and monitoring the application. It is mainly used for the broad wireless connectivity and to transfer the data to the system. The ZigBee is targeted at radio frequency(RF).The activation time is about 15 msec or less. The latency is very low and the devices can be more responsive compared to Bluetooth. The power consumed by the Zigbee is very low since most of the time it sleeps. There are three different types of Zigbee devices are ZigBee coordinator(ZC), Zigbee router(ZR) and Zigbee end device(ZED). The data can be passed over long distances by using the mesh network. It is also in low data rate applications.

ULTRASONIC TRANSDUCER

Ultrasonic transducer is a device which converts some other energy into ultrasonic vibrations. It is made up of an active element ,a backing and wear

plate . The piezoelectric or single crystal material can be used as an active element which converts the electrical energy into ultrasonic energy. The ultrasonic waves are sound waves whose frequencies are higher than those of waves which are audible to human ear. It sends electrical signals to the object and once when it strikes the object then it reverts to the transducer. In the proposed system it is mainly used for the social distancing in the supermarkets or malls.

Fig 6.ULTRASONIC TRANSDUCER

BUZZER

The buzzer acts as the alarm in the project. The audio signaling device which considers of mechanical or electromechanical or piezoelectric. It gives the beep sound when social distancing is not followed.

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Fig 7.BUZZER

V.SOFTWARE REQUIREMENTS

The software used in the proposed system are

- **Arduino IDE**
- **GCC**

ARDUINO IDE

The Arduino integrated development environment(IDE). It is used to write and upload programs to Arduino compatible boards.

GCC

GCC stands for GNU compiler collection. It is the complier used for many of the basic programming languages such as c, c ++, objective-c, Fortran, Ada etc.. GCC is used to correct the code and to run the code efficiently.

VI. OUTPUT

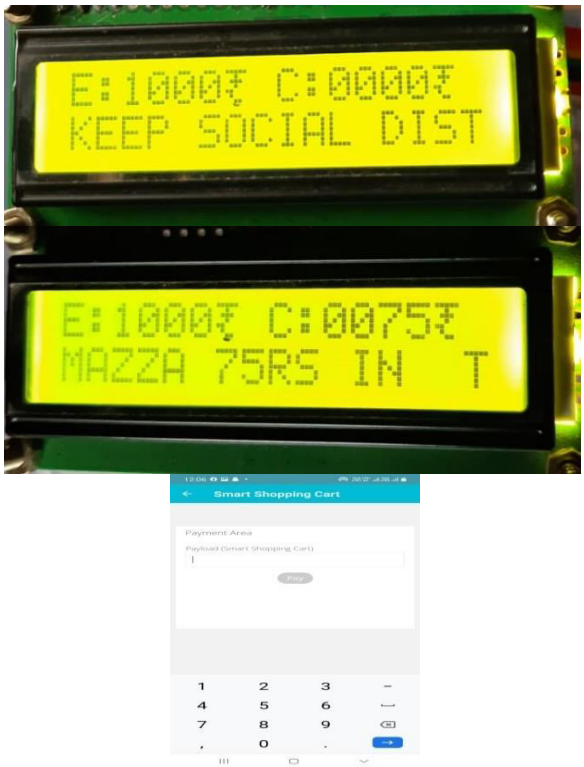

Fig 8.OUTPUT

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FUTURE SCOPE

In future it will be developed that the customer just type the name of the consumer products he/she want to purchase on android device, the trolley will automatically guide them to where the products placed.

VII.CONCLUSION

Smart shopping trolley application creates an automatic central billing system in malls as well as in supermarket with the maintenance of the social distancing . By using the ZigBee, the product information is directly sent to billing system. By using the ESP Module, the total shopping amount is directly sent to the webpage and it can be paid through our mobilephones via app.So that customers not necessary to wait in a long queue with the fear of spreading of diseases. It is trust worthy, highly dependable and time efficiency.It will completely vanish the pay on cart for the product he/she purchased.The proposed smart shopping trolley system with social distance maintaining system will reduce the customer's time in searching the location of the product with safe mode of away from spreading of diseases from one person to another.

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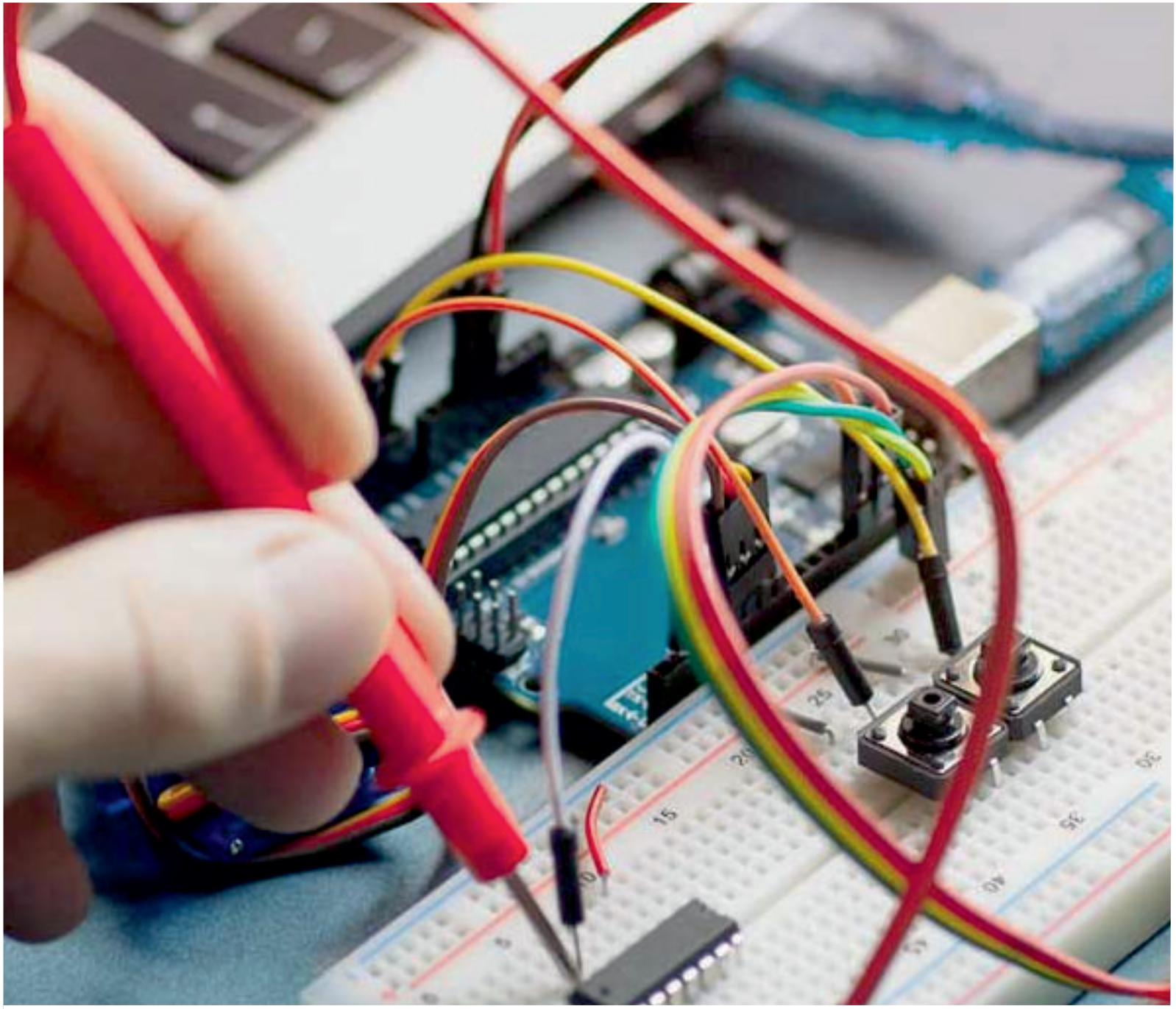

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