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SOCIAL DISTANCE SHOPPING USING EMBEDDED BASED AUTO CART

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***Abstract*— Coronavirus (COVID-19) is a frighten disease outbreak that has affected more than one hundred and eighty countries worldwide. While vaccines are supplied throughout the world, there is still a need to follow some mandatory rules, including social distance to be maintained during daily activities such as supermarket shopping. In this project, a shopping trolley is proposed as a solution to avoid item scanning at cashiers and long queues at payment counters. This innovation leads, such that the risk of attacked to COVID-19 can be reduced. This is done by integrating a shopping trolley with Raspberry Pi, Web Server using PHP. Radio frequency identification (RFID) tag is attached on products in supermarket and automatically read by RFID reader whenever they are placed in a shopping trolley. As the customer adds things one by one it is detected by the RFID module and the price according to that will be displayed. At the end of shopping the customer will press the total button, which when pressed adds all the product along with their price and gives the total bill. In this process Social distance is maintained by alerting with buzzer sound using Ultrasonic Sensor.**

***Keywords*— RFID, Ultrasonic sensor, PHP, Bluetooth, Buzzer.**

1. INTRODUCTION

Presently days acquiring and shopping at huge shopping centers is turning into a day by day action in metro urban communities. We can see colossal surge at shopping centers on vacations and ends of the week. The surge is much more when there are unique offers and rebate. Individuals buy distinctive things and place them in trolley. After aggregate buy one needs to go to charging counter for installments. At the charging counter the clerk set up the bill utilizing scanner tag per user which is a tedious procedure and results in long lines at charging counters.

Our point is to build up a framework that can be utilized as a part of shopping centers to tackle the previously mentioned challenge. The framework will be put in all the trolleys. It will comprise of a RFID per user. Every one of the items in the shopping center will be outfitted with RFID labels. At the point when a man puts any items in the trolley, its code will be identified and the cost of those items will be put away in memory. As we put the items, the expenses will get added to add up to charge. In this manner the charging will be done in the trolley itself. Thing name and its cost will be shown on LCD. Likewise, the items name and its cost can be declared utilizing headset.

2. EXISTING SYSTEM

The current system involves a large amount of manual handling on the part of the customer. It helps in tracking and identification of trolleys, which is useful for the management of the shop but does nothing for the customer. It does not provide a feasible solution to reduce the time spent by the customer in the store, mainly while standing in line for billing and payment. This is because of a lack of alternative mode of payments and collision issues as signals are easily intercepted.

Drawbacks:

1.It takes too much of time to scan details of each item.

2.Consumers used to estimate total sum to be paid manually to fix in modest.

3.Consumers have to wait in a long row for the transaction purpose.

4.Barcode scanners need a direct line of vision to the barcode to be capable to read.

3. PROPOSED SYSTEM

The RFID Reader, Ultrasonic Sensor are interfaced with Raspberry pi. RFID tags are attached to products. If the tag is swiped then the product will be added to the cart and the price will be sent to the web server and will display on LCD as well as Bluetooth App. At last after completion of shopping the customer has to press one switch so that the total amount will be displayed on LCD, Bluetooth and PHP web server. Ultrasonic sensor is to know when any customer violated his or her social distance rule. Buzzer alert will be given when the rule is break.

3.1 Working

In supermarkets, the shopping trolleys are available to customers in order to select the products and carry them easily. The smart shopping device is attached to the trolley. The products in the supermarket are equipped with RFID tags. The customer starts shopping with maintaining social distance. The ultrasonic sensor helps the customers to be alert by an buzzer sound to maintain social distance. The LCD displays start shopping which enables customers to start their shopping. The products that are selected are added to the cart by pressing add button. The selected products are scanned through tags by the RFID reader, which reads item's name, product id, cost and these details are displayed on the LCD. If the customer wish to remove the item from the trolley, the remove button is pressed and the product is removed from the list. The shopping completes by pressing the total button. After the shopping completed the product details are transferred to the PHP web server at the counter through Bluetooth module. Thus the automatic bill is generated which saves time by avoiding long queues at billing counter. The bill consists of customer name, phone number, product details and total cost, mode of payment. This system saves time by smart and fast shopping to the customers.

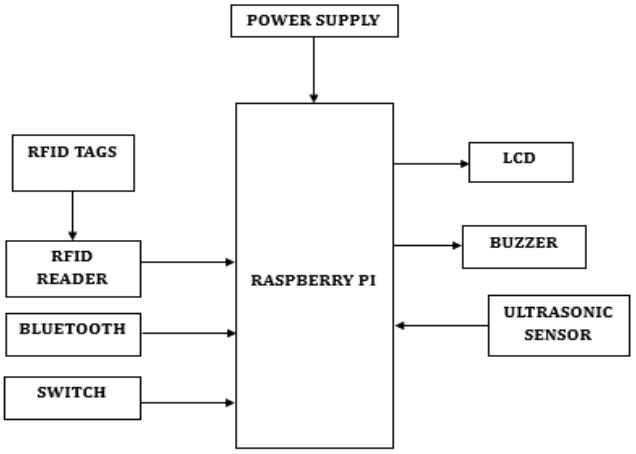

Figure 1: Block Diagram

4. HARDWARE DESCRIPTION

4.1 Raspberry Pi

Raspberry Pi 3 It is a sort of development board which has the modules like WIFI and Bluetooth comes on board, we can connect any form of sensors to raspberry pi3 through the GPIO pins. it has forty GPIO pins 4 USB ports ,1 LAN port ,1 port for electricity supply and it has on board provided with 1gb RAM .The Figure 4.1 shows the example of a Raspberry Pi board

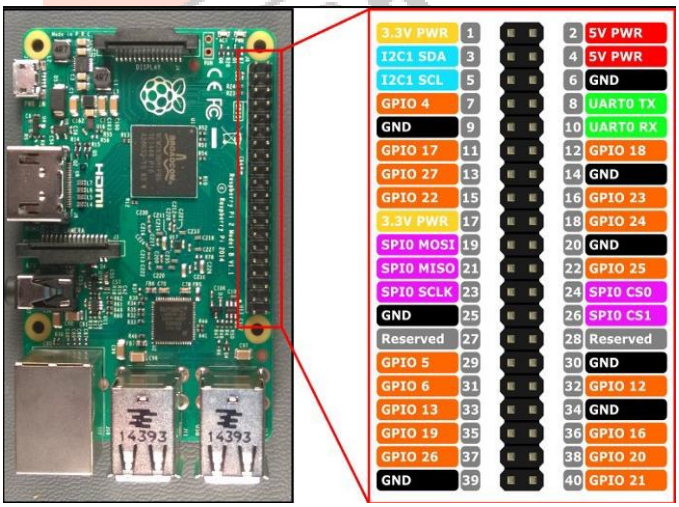

Figure 2 : Raspberry pi

4.2 RFID reader and Tag

A brief note on RFID Technology

RFID represents ID of radio frequencies. RFID labels are little chips (more often than not as a keen card or a meeting card) that are utilized in our day by day lives to open lodgings, enter autos, and so on. These little chips

structure the RFID framework together with a RFID reader.

During the Second World War, RFID technology was first used to identify enemy aircraft. RFID technology has evolved since then and is now being used in many different industries. A clean example is a smart warehouse where RFID technology is used to automate the warehousing process.

Two parts of an RFID system are 1) RFID Reader and 2) RFID Tag. Data is stored electronically in the RFID tag. The reader collects this data using electromagnetic waves. Tags can only store a few kilograms of data bytes.

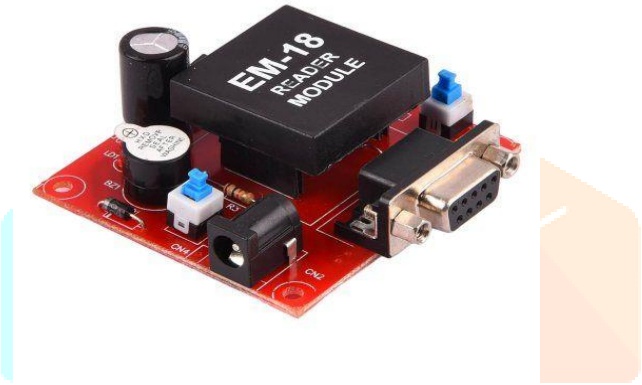

Figure 3: RFID module

What is an RFID Tag

The picture given is that of a RFID tag (brilliant card molded tag). RFID labels are accessible in various sorts of size and shapes. The Tag contains an IC for putting away the information, a reception apparatus for transmitting and accepting, and furthermore a modulator. Tags are very small in size and they can hold only few bits of data.

Figure 4: RFID tags

4.3 Bluetooth Module

HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration. It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard and many more consumer applications. It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. It is IEEE 802.15.1 standardized protocol, through which one can build wireless Personal Area Network (PAN). It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over air. It uses serial communication to communicate with devices. It communicates with microcontroller using serial port (USART).

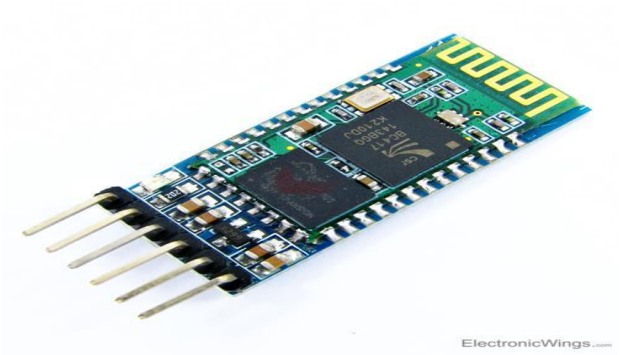

Figure 5: HC-05 Bluetooth Module

4.4 Switch

A Push Button switch is a type of switch which consists of a simple electric mechanism or air switch mechanism to turn something on or off. Push-Buttons are normally-open **tactile switches**. Push buttons allow us to power the circuit or make any particular connection only when we press the button. Simply, it makes the circuit connected when pressed and breaks when released. A push button is also used for triggering of the SCR by gate terminal. These are the most common buttons which we see in our daily life electronic equipment's.

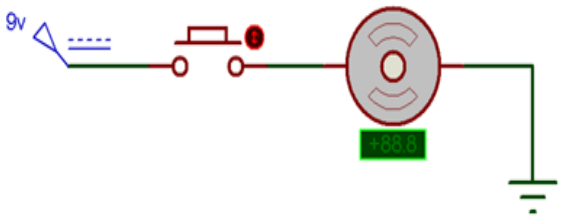

Figure 6: Switch

4.5 Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers and other electronic products for sound devices. Active buzzer 5V Rated power can be directly connected to a continuous sound, this section dedicated sensor expansion module and the board in combination, can complete a simple circuit design, to "plug and play

Figure 7: Buzzer

4.6 Ultrasonic sensor

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e., the sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).

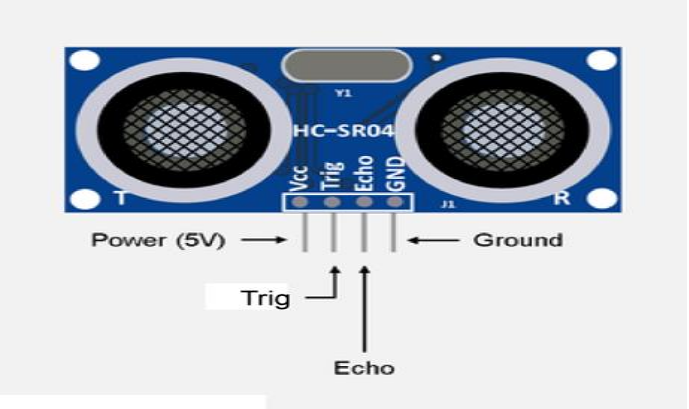

Figure 8: HC-SR04 Ultrasonic sensor

In order to calculate the distance between the sensor and the object, the sensor measures the time it takes between the emission of the sound by the transmitter to its contact with the receiver. The formula for this calculation is D = ½ T x C (where D is the distance, T is the time, and C is the speed of sound ~ 343 meters/second). **HC-SR04 distance sensor** is commonly used with both microcontroller and microprocessor platforms like Arduino, ARM, PIC, Raspberry Pie etc.

4.7 LCD Display:

A 16x2 LCD show is an essential module that is generally utilized in various gadgets and circuits. These modules more than seven sections and other multi fragment LEDs are liked. The reasons being: LCDs are affordable; effectively programmable; have no restriction of showing exceptional and even custom characters (not at all like in seven fragments), movements, etc.

Figure 9: LCD Display

A 16x2 LCD implies 16 characters can be shown per line and 2 such lines exist. Each character is shown in a lattice of 5x7 pixels in this LCD. There are two registers in this LCD, in particular Command and Data.

5. SOFTWARE DESCRIPTION

5.1 Raspbian pi

Raspberry Pi OS (formerly Raspbian) is a Debian-based operating system for Raspberry Pi. Since 2015, it has been officially provided by the Raspberry Pi Foundation as the primary operating system for the Raspberry Pi family of compact single-board computers.Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run. However, Raspbian provides more than a pure OS: it comes with over 35,000 packages, pre-compiled software bundled in a nice format for easy installation on your Raspberry Pi.

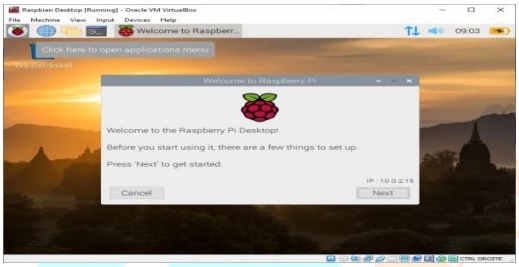

Figure 10: Raspberry Pi OS(Raspbian Pi)

5.2 Raspberry pi desktop

Debian with Raspberry Pi Desktop is our operating system for PC and Mac. It provides the Raspberry Pi OS desktop, as well as most of the recommended software that comes with Raspberry Pi OS, for any PC or Apple Mac computer.

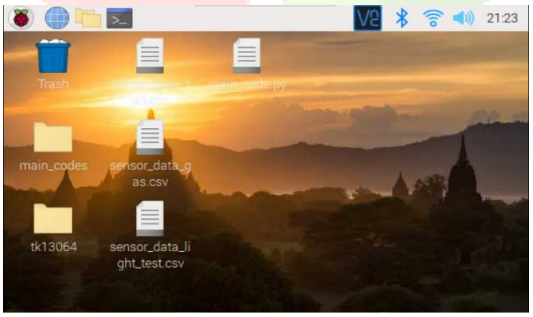

Figure 11: Raspberry pi desktop

The above Figure 4.2 shows how the Raspberry Pi desktop appears to the user.

5.3 Python IDE

The Raspberry Pi (specifically, Raspbian with desktop) comes with a few integrated development environments (IDEs) for writing, running and debugging Python scripts. I'd like to take a look at each of them and offer a comparison. Each of the three - IDLE, Geany and Thonny - seem to offer a similar set of functions, but all seem to be geared toward the beginner.The below Figure 4.3 shows the Python IDE in the Raspberry Pi

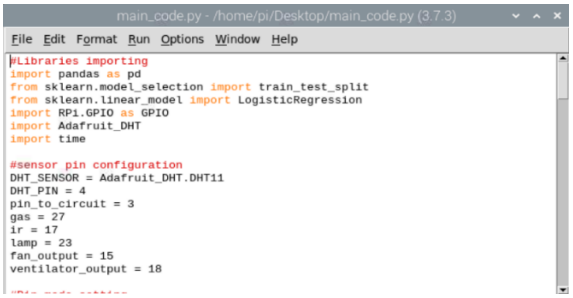

Figure 12: Python IDE

5.4 Setting Up a Raspberry Pi

The Raspberry Pi is an incredible device, but it won't do much of anything without an operating system. Luckily, choosing and installing an appropriate operating system on your Raspberry Pi has never been easier. One simple method is to use NOOBS, or "New Out of Box Software." As the name suggests, NOOBS is perfect for Pi newbies. It lets you choose your preferred operating system and install it right then and there.

- Format the SD card using SD Formatter 4.0
- Download NOOBS
- Extract NOOBS from the zip archive
- Copy all the files to SD card

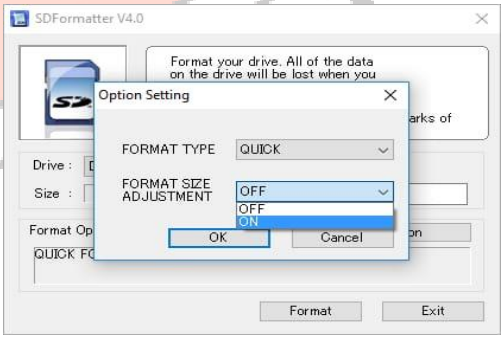

Figure 13: Formatting SD card using SD Formatter 4.0

Stick your SD card into the corresponding slot on your computer. You're going to want to format it as FAT. There are a few ways to do this,On Mac or Windows, use the SD Association's Formatting Tool (Mac users can also just use the disk utility). Make sure the "Format size adjustment" option is set to "on." as shown in th above figure 4.4.1,Then erase it in FAT (or MS-DOS) format.

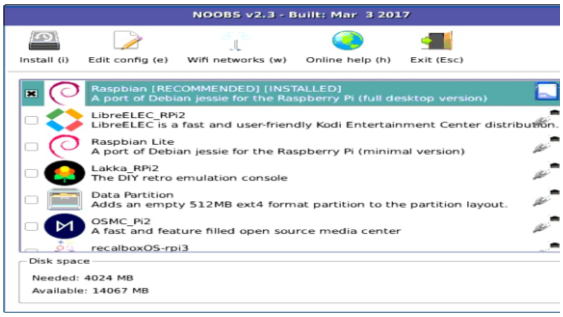

Figure 14: Putting SD card into Raspberry Pi and boot it up

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6. RESULTS

Customers can purchase the products and complete their shopping with in short period of time. The products are scanned with help of RFID tags and reader. The automatic bill is generated which avoids long queue for billing.

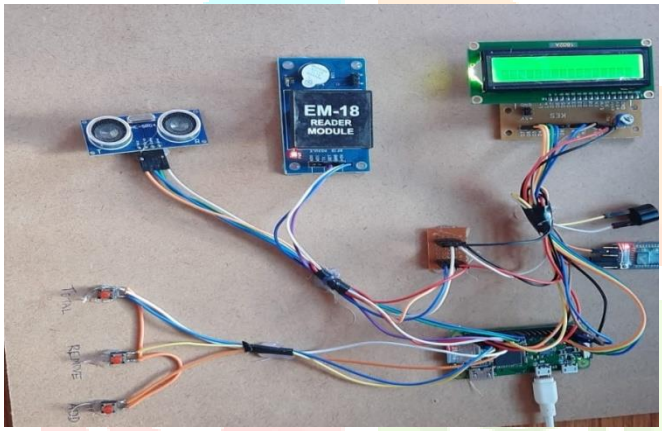

Figure 15: Setup of Raspberry pi and components

The above figure shows connection of components with raspberry pi.

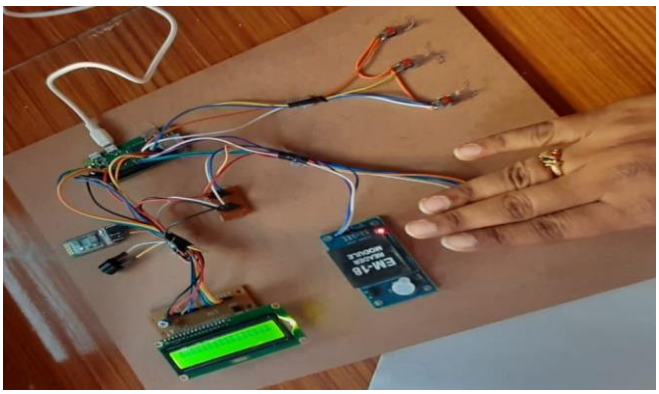

Figure 16: Detection of object

The Figure 16 shows that the ultrasonic sensor detecting the nearest object and giving buzzer sound.

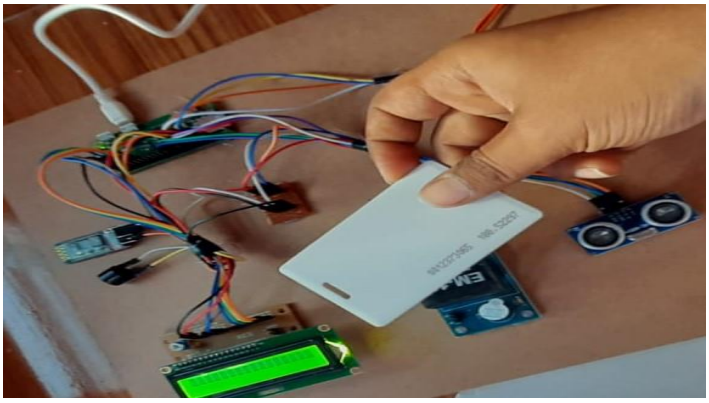

Figure 17: Scanning of RFID tag

The products equipped with RFID tags are scanned through RFID reader.

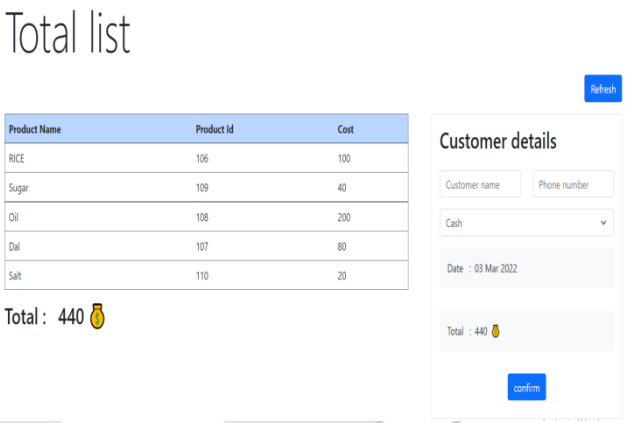

Figure 18: Total list of items

This list shows the all the details of products that are purchased and total cost of items.

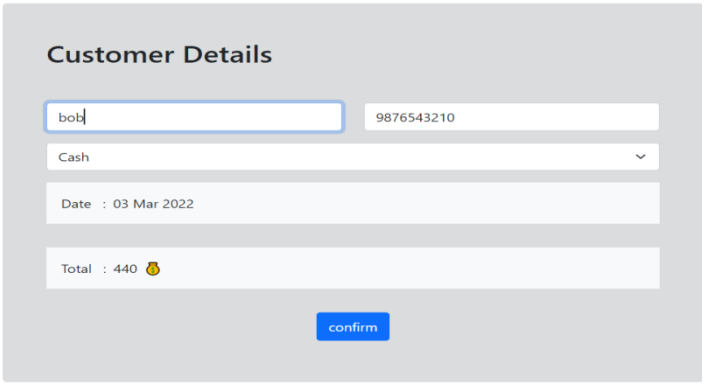

Figure 19: Entry of customer details

The details of customer such as name, phone no., mode of payment are entered.

Figure 20: Smart Billing

The bill is generated and the shopping completes. Thus the customer experience smart shopping.

CONCLUSION

The heavy crowd at shopping marts can be avoided by the smart shopping system. Many obstacles during shopping can be removed and everything becomes customer friendly. The shopping made easier by attaching this system to trolley. Raspberry pi is used to implement this smart shopping device, which is easy to interface with the other components. The size of the device is not complex and easy to attach to the trolley. The python software is executed for better and fast performance of the device. Hence this project reduces a huge cost which is spent on many modules to connect it with servers to transfer the information to the server.

REFERENCES

[1] Mr.P. Chandrasekar and Ms.T. Sangeetha "Smart Shopping Cart with Automatic Billing System through RFID and ZigBee ", IEEE,2014.

[2] Ms. Vrinda, Niharika, "Novel Model for Automating Purchases using Intelligent Cart," e-ISSN: 2278-0661, p- ISSN: 2278-8727Volume16,Issue 1, Ver. VII (Feb. 2014), PP 23- 30.

[3] Ms. Rupali Sawant, Kripa Krishnan, Shweta Bhokre, Priyanka Bhosale "The RFID Based Smart Shopping Cart", International Journal of Engineering Research and General Science Volume 3, Issue 2 pp 275-280, March-April, 2015.

[4] Kalyani Dawkhar, Shraddha Dhomase, Samruddhi Mahabaleshwarkar "Electronic Shopping Cart For Effective Shopping based on RFID", International Journal of Innovative Research In Electrical, Electronic, Instrumentation And Control Engineering Vol. 3, Iss ue 1 pp 84-86, January 2015.

[5] Satish Kamble, Sachin Meshram, Rahul Thokal, Roshan Gakre "Developing Multitasking Shopping Trolley Based On RFID Technology", International Journal of Soft Computing and Engineering (IJSCE), Volume-3, Issue-6, January 2014.

[6] Raju Kumar, K. Gopalakrishna, K. Ramesha, "Intelligent Shopping Cart," International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 2, Issue 4, July 2013.

[7] Zeeshan Ali, Reena Sonkusare, " RFID Based Smart Shopping and Billing ", International Journal of Advanced Research in Computer and Communication Engineering, Vol. 2, Issue 12, December 2013.

[8] Galande Jayshree, Rutuja Gholap, Preeti Yadav "RFID Based Automatic Billing Trolley, International Journal of Emerging Technology and Advanced Engineering Volume 4, Issue 3, March 2014.

[9] Rahmani.E, "Zigbee/IEEE 802.15.4", University of Tehran, 2005.

[10] Ekta Maini and Jyoti Shettar " Wireless Intelligent Billing Trolley for Malls, International Journal of Scientific Engineering and Technology Volume No.3 Issue No.9, pp: 1175-1178.

[11] Ergen, S. C., "ZigBee/IEEE 802.15.4 Summary," EECS Berkely, September 2004.