RFID BASED INTELLIGENT TROLLEY SYSTEM USING ZIGBEE

Preethi Sudha[1], Rabiya Basri[2], Shobha[3], Shajahan[4], Thejesh Babu[5]
Asst. Professor, Graduate Student, Graduate Student, Graduate Student, Graduate Student

Department of Electronics and Communication Engineering

Mother Theresa Institute of Engineering and Technology,

MELUMOI POST, PALAMANER, India

ABSTRACT*:*

The Modern technology in electronic is embedded systems Arduino based micro controllers. One of the important aspect of science is to make easier to our lives and Radio Frequency Identification(RFID) an innovative technology concept which is used for the implementation of an Intelligent trolley and smart billings. The issues that can be faced by customers while shopping is:

- **Standing in long queues at the billing counters and Wastage of valuable time.**

People buy the products from a shopping mall or complex for their regular use. So, that the customers visit the shopping malls most of the times and they spend hours together waiting in a queues for paying the bills, this is because of scanning the product with the help of barcode which takes more time at bill counters. As to avoid this problem here we are having a technology called Radio Frequency Identification(RFID). The smart trolley system consists of an Arduino based micro controller, an electronic display i.e., Liquid crystal display(LCD), RFID Reader, RFID tags whether it may be a stickers or it may be a card. Whenever, a customer puts a product in to the trolley the RFID reader reads the code present on a tag or card. After that the product name, price of the product will be displayed on LCD, and this data can be transmitted by ZigBee from trolley to the main server i.e., the PC which is present at the bill counter.

KEYWORDS: **Arduino, Radio Frequency Identification (RFID), Wireless ZigBee Module, LCD, RFID tags, Server database.**

I. INTRODUCTION

1.1 Motivation: -

Reason Behind Choosing the Arduino based Micro Controller System:

Here, we have designed system by using micro controller, because micro controller based system are less bulky and also easily transferable. It requires less power. So the system becomes cheap. It requires less space, easy to install, so can fitted easily in the robot.

Benefits to The Customers

In this project where the customer can view each and every item being scanned and at the same time the total bill generated will also be viewed on the we have included a LCD screen which would help the customer to know the expenditure.

1.2 Generic Approaches (Present Status): -

In modern electronics the Micro controller based designs are acquiring. The Arduino based micro controller is highly specialized fields that has the power of integrating thousands of transistors on single silicon chip. At present days, for purchasing variety of items it requires trolley in mall. Every time customer has to check the cost of each item and match it with his budget in the pocket. After the tedious procedure of shopping, the customer has to wait at bill counter in a queue. So, to avoid this problem like waiting in a queue, thinking about budget etc. We are introducing new concept that is "RFID based Intelligent Trolley system using ZIGBEE".

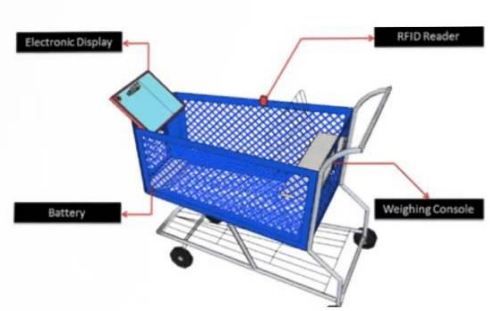


Fig 1: An Intelligent Trolley based on RFID

II. EXISTING SYSTEM:

Before, coming to this technology i.e., radio frequency identification(RFID) Barcode technology is used at shopping malls. The process of barcode technology is that; it reads the barcode present on each product. It takes more time for scanning the products and the main drawback is that hours together, the customers has to stand in a queue for paying the bills. So, as to overcome this headache of billing we are introducing a technology called RADIO FREQUENCY IDENTIFICATION(RFID). By implementing this technology, we can avoid the drawback present in barcode technology. In this existing system only the Cost of the Items with the help of the RFID Reader and IR Sensor that can be displayed on the LCD. The Total is also calculated and displayed on the LCD itself once the User has completed their shopping.

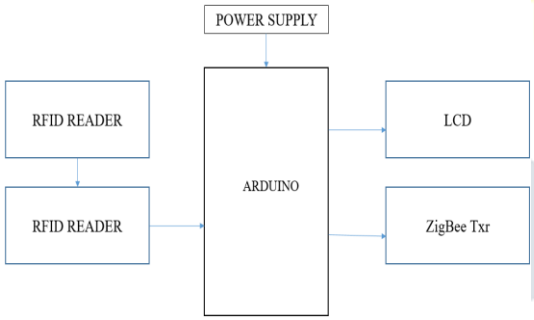
Disadvantages:

- ✓ No Billing is provided.
- ✓ Hard to place the Product in exactly in between Sensors to identify.
- ✓ Difficult to identify the Product.

III. PROPOSED SYSTEM:

In the Proposed System we have implemented the system efficiently to transfer the Data Successfully to the Billing Session. In this System we are using RFID Reader and Zig-Bee for Data Transferring.

Transmitter: **Receiver:**



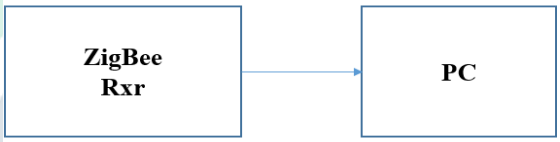


Fig b. Block Diagram Fig c: Billing side

Advantages:

- ❖ Reducing time and it achieving a faster billing system.
- ❖ It can read from long distance.
- ❖ Easy to use and does not need more number of human labor.
- ❖ Done the billing by cash or net banking.

IV. SYSTEM DESCRIPTION

System description consists of

i. Hardware Description &
ii. Software Description

Hardware Description:

Coming to this hardware description the hardware devices or the hardware components are:

- Arduino,
- RFID reader,
- RFID tags,
- ZigBee module,
- Liquid crystal display(LCD).

ARDUINO:

For building of an electronic projects Arduino is used and it is an open source platform. It is consisting of both a physical programmable circuit and a piece of software i.e., IDE (integrated development and environment) which will have used in computers, used for writing and uploading the computer code to the physical board. It doesn't need any separate piece of hardware in order to load new code onto the board and it becomes quite popular. It uses a simplified code of C++ to make to learn the code easier and it provides the standard form that breaks out the functions of a micro controller into a more accessible package.

RFID READER:

The radio frequency identification or RFID is a technology that will be works on radio frequency of radio waves. RFID reader is a device used for gathering the information from an RFID tag used for tracking the individual objects and the radio waves are used to transfers the data from tag to a reader and it is the technology which is similar to bar codes. So, whenever an object is in the range of the reader which has the ability to scan and read the code which is present in the binary form that can be present on an RFID tags which are

Fig: RFID reader

RFID TAGS:

RFID tags are generally classified into two types

1.**Active tags**: The tags that has its own power source like external power supply or a battery. Used for long range transmission.

2.**Passive tags**: The tags that gets power through the transfer of power from a reader antenna to a tag antenna. Used for short range transmission purpose.

It is an electronic tag that has the ability to exchange the data with a RFID reader by means of radio waves. Most of the reader sends the signals to the tag using an antenna in an active RFID system. The tags receive the information along with the information with its memory, the reader receives the signals and for further processing the signals is transmits to the processor.

Fig: RFID tag

ZIGBEE MODULE:

ZigBee is an open global standard for wireless technology which id designed to use low power digital radio signals for personal area networks. ZigBee low power consumption limits transmission distance to 10-100 meters' line of sight and depending upon power output and environmental characteristics, so that ZigBee can transmit data over long distance by passing data through a mesh network to reach the intermediate devices present at distant ones.

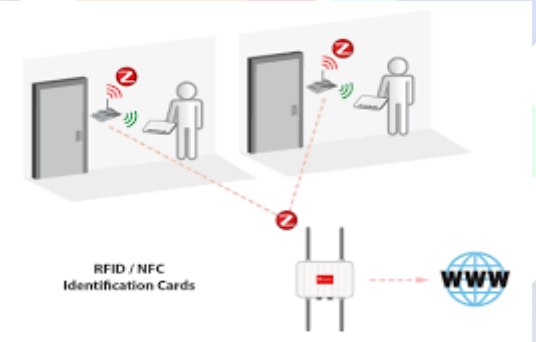


Fig: Performance of ZigBee

Liquid Crystal Display (LCD):

LCD is a technology that can be used for displays in notebook and other computers. It is the combination of two states of matter, the solid and the liquid. In general, the LCDs are used for displaying the output, while this screen utilizes liquid crystals to create a picture. In this intelligent trolley we are making use of an LCD i.e. 16x2 which means it consists of 16 characters per line and there are 2 lines and in LCD each character is display in pixel matrix of 5x7.

Fig: 16x2 LCD

Software description:

We are going to use Arduino IDE software for writing the code for the Arduino Micro controller. At the billing section we have to make a software for getting of the itemized bill, printing the bills and empty the trolley.

ARDUINO IDE (Integrated Development and Environment):

To program the Arduino you also use the Arduino IDE (Integrated Development Environment), which is an open source platform of free software, which enables us to program in the language that the Arduino understands. The Arduino hardware and software are both Open Source, so that the code, the schematics, design, etc., are all open for anyone to take freely and do whatever to design which means it won't create any disturbance to anyone from taking the schematics and PCB designs of the Arduino and making their own and selling them. For this case of the Arduino the language we are making use of C. To write a computer program the IDE enables us, and it is a set of step by step instructions after that we have to upload it to the Arduino. Then the Arduino will carry out those Instructions and which interacts with the world outside. In the Arduino world, programs are known as sketches.

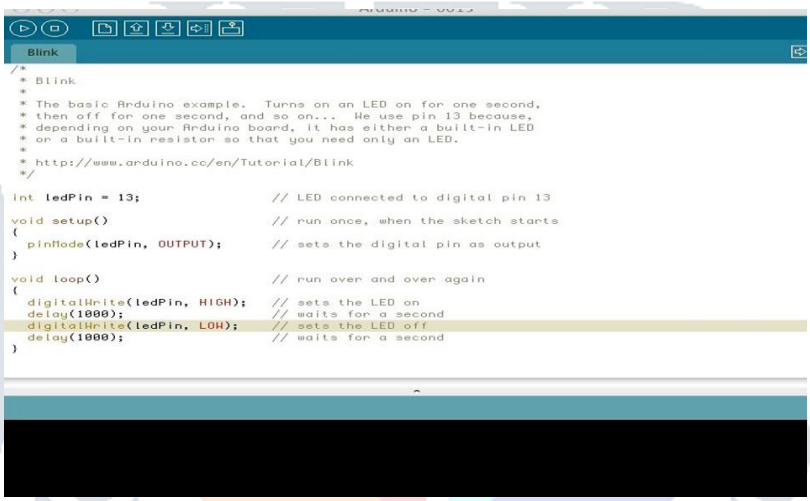


Fig: Code for blinking an LED

WORKING OF THE PROJECT:

The Working of this project is very simple and it can be easily understandable, so that ,whenever we ae dropping any product in to the trolley the reader i.e., RFID reader reads the code present on the product and that can be displayed on LCD(16x2). ZigBee creates a serial communication with the trolley and the PC. Hence, the ZigBee acts as a trans receiver which means the data from the transmitter section will be transferred from trolley to the receiver section and the data will be received by the receiver i.e., PC, Price of the product and Quantity Data is directly transferred to the Serial window by the adding each product the Price is automatically added and if we want to remove any product from the cart then and exit button is available, which you have hold and remove the product then it will automatically decrement the price from the Total. once after the Completing the whole shopping just click on the Completed then the total price is sent to the central server .

APPLICATIONS:

- Easy shopping
- Super markets
- Industries

CONCLUSION:

Thus, from the above proposed method we have described an intelligent Trolley and it's working. With this type of technology, we can easily get the clarity about the shopping which we are doing and it looks Smart during the Usage.

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