

# AUTOMATIC BILLING TROLLEY

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**Abstract** - The purpose of this project is that as we see nowadays purchasing and shopping at the malls have become a daily routine and essential activity in metro cities. The rush is even more when there are special offers and discounts & also during festivals and it has become a hobby too. The individuals buy different products and deposit them in the trolley, after total purchase one needs to go to billing counter for the payment. At the billing counter the person therein prepares the bill using code reader which will consume a lot of time and this then results in long queues at billing counters.

So our main objective for making this prototype which will be introduced in the trolley and also reduce the labors and eliminate time taken in malls by designing an Automatic Billing Trolley. This will work as when the individual will put any of the product in the trolley, its product code will be stored in the database of the controller, and then the bill i.e. the name of the item and the cost of the product will be displayed on the LCD, which uses a RFID reader, all the products are equipped with the RFID tags. So at the billing counter, the total bill data will be displayed on PC which will be transferred by the RF Transceiver. And also the bill is sent to the mobile phone through the Bluetooth module. And Also we have added one billing method which is by the swiping the card.

**Key Words:** RFID Reader, RF Transmitter, IR Sensor, RFID Tags, RF Receiver, LCD Display, Bluetooth Module.

## 1. INTRODUCTION

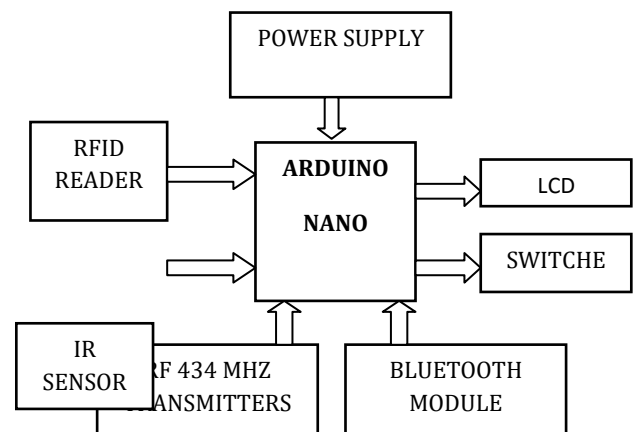
Throughout the 20<sup>th</sup> centuries our views, expectations and methods of doing work have changed drastically. Many of the Innovations and information Technologies have caused a revolution in values, knowledge and perceptions in practically all areas of human understanding. One regular task that human beings spend a considerable amount of time is in Shopping. The customers face the problems regarding the wastage of unnecessary time at the counters for bill.

An improvement is required in the billing system to update the quality of shopping & experience to the customers. To overcome these problems stated above and to improve the existing system, we have designed a AUTOMATIC BILLING TROLLEY. This upgraded system will intend to assist shopping to the individual that will minimize their time spent in shopping.

The Automatic billing trolley is equipped with Radio Frequency Identification for product identification and it also has an LCD display that informs customers about product prices and the total bill. As soon as the object is dropped into or removed from the trolley, the IR Sensor & RFID Reader identifies the product and updates the bill.

When the customer is done with shopping, he can just press the 'RESET' switch and the details will be sent to the LCD display and then to the MASTER PC and the customers will have to just pay the amount and leave the mall. Automatic billing trolley has the potential to make shopping more pleasurable, easier and efficient for the customer.

## 2. IMPLEMENTATION AND BLOCK DIAGRAM



**Fig -1:** Block Diagram of Billing Trolley (transmitter section) This is the block diagram of the AUTOMATIC BILLING TROLLEY. In this system, the ARDUINO NANO is attached to a RFID reader, the LCD, RF Transmitter, IR sensors, Switches and Bluetooth module

As the user puts the items in the trolley the reader on the trolley reads the tag and sends a signal to the ARDUINO NANO Controller. The ARDUINO NANO then stores it in the memory and compares it with the lookup table.

If it will match, then it will display the name of item on LCD & also the total amount of products that will be purchased.

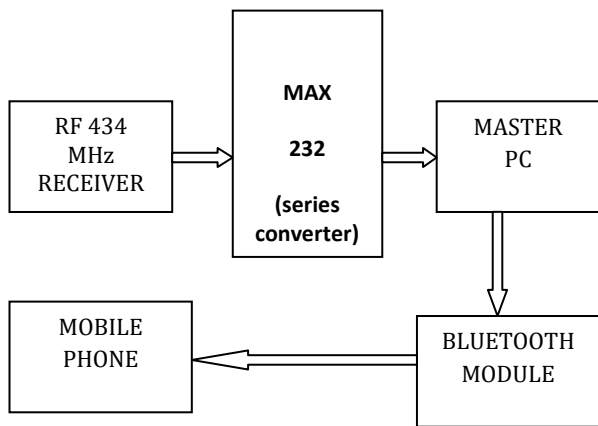


Fig -2: Block Diagram at the PC Side (receiver section)

As the RFID card reader will read the product, details will be displayed on the display unit. The product details of the purchased products will be temporarily stored in the local memory i.e. the database.

As soon as the shopping will be over, the same product information on the LCD will be sent to the server to update the inventory by the RF receiver which will send the data to the master PC through the serial converter and RF Transceiver.

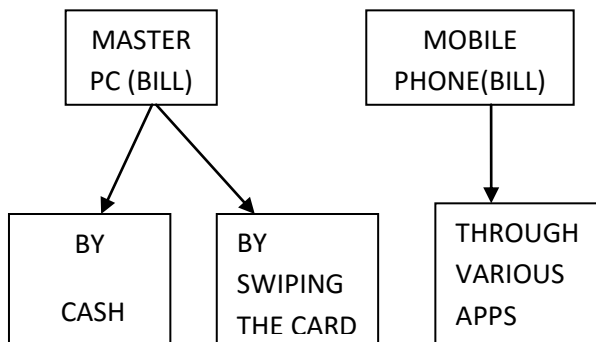


Fig -3: Block Diagram of the Billing Section

The total bill will be displayed on the Master Computer. And then the data will also be sent to the mobile phone through the Bluetooth module and then the person can pay the bill by card also by swiping it as this feature is also be added in this trolley and customer can pay bill by PAYTM and other apps available on the mobile phone.

This is the sample of the product details which will be displayed on the master PC:-

NAME OF PRODUCT 1 : SOAP
COST: Rs.50/-
NAME OF PRODUCT 2 : BISCUIT
COST: Rs.70/-

Table -1: Display of the Products and Cost on LCD and the mobile phone.

### 3. SYSTEM ARCHITECTURE

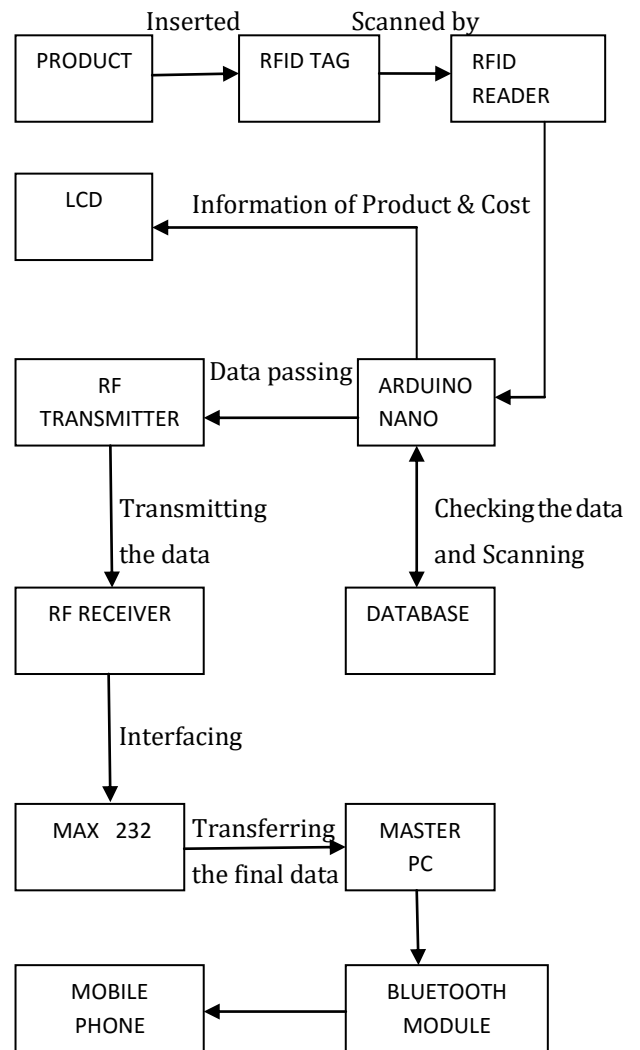


Fig -4: System Architecture of the Trolley

In this Architecture, the process of billing is like each product will have the Radio Frequency ID tag which is a having a unique Product Code. The LCD provides the Information like NAME, COST OF PRODUCT etc about the code.

Whenever the product will be inserted in the trolley, the RFID Reader scans the Tag and RFID reader passes the Product Code to the ARDUINO NANO processor where it compares the various products with the database of the controller system, after that the name and the price will be obtained by the ARDUINO gets displayed on the LCD. The processor also passes the data obtained from the database to RF transmitter and the data is wirelessly transmitted to the billing Master PC .The Master PC receives the data through

the RF receiver using the MAX 232 interface & serial Converter. And then the data is sent to mobile phone and billing is done through Cash, Swiping the card and by various apps available.

### 3.1 SYSTEM COMPONENTS

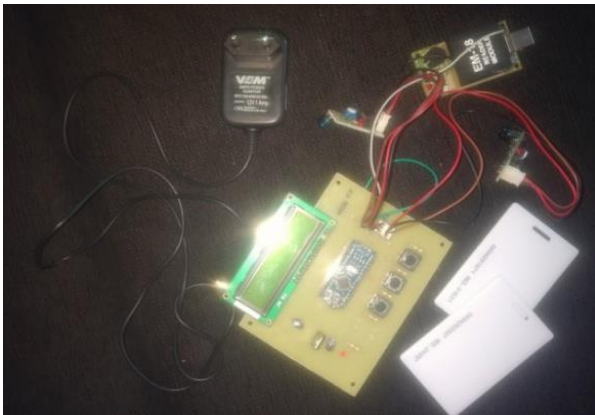


Fig -5: System Components

We have made the system in which the components used are given as:

- A. RFID Reader
- B. RFID Tags
- C. IR Sensors
- D. RF 434 MHz Transmitter
- E. LCD 16\*2 Display
- F. RF Receiver
- G. Switches
- H. Power Supply
- I. Bluetooth module
- J. Swipe machine

### 3.2 CIRCUIT DIAGRAM & LCD INTERFACE

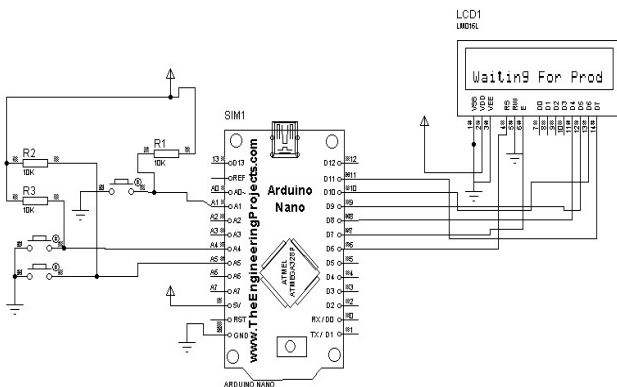


Fig -6: Interfacing Of LCD with ARDUINO NANO

In this circuit, we have interfaced the LCD with the ARDUINO NANO controller and the output i.e. the name of the products which are purchased and the cost of it is displayed on the LCD.

### 4. ALGORITHM

- 1) When the customers will start the purchase, then on the Trolley will press 'Set Switch', the system will turn ON and then all the components such as RFID reader, ARDUINO NANO microcontroller start working.
- 2) Each & every product has an RFID tag which has a unique RFID ID. These ID's of the products is updated in the memory i.e. the database of the controller (EEPROM).
- 3) When the customer will drop any product in the trolley then the RFID reader will read the tag.
- 4) The information of the product will then be displayed on the LCD unit.
- 5) These steps will be repeated until the switch for ending the shopping button is pressed. Once the 'End Shopping' switch will be pressed the total bill is displayed on the LCD.
- 6) There is also a option provided for deleting some of the products from the trolley and the bill will be updated and will be sent to the Master PC.
- 7) At the counter, the customers will just pay the bill and leave the mall.

### 5. ADVANTAGES

1. Bill calculation is done at the trolley itself.
2. Low chance of traffic & mismanagement as less labor work.
3. Staff will also be reduced as its automatic upgrade.
4. It is easy to use and is low of cost.
5. Increases the speed of billing by using RFID.

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### CONCLUSIONS

Our design of AUTOMATIC BILLING TROLLEY uses ARDUINO NANO Processor; the objectives thought are achieved in the

prototype made. This updated product is easy to use, is of low-cost and does not need much hard work. Radio frequency identification technologies which are used for product identification, billing, etc is the key part of this system.

We have also estimated that the architecture of the system that can be used in the trolley systems for smart and easy shopping in the malls to save time, energy and money of the shoppers. There are a few drawbacks that can be resolved to make updated system more robust. A more further upgrade will be like larger display systems, a GPS tracker for tracking the product, also the internet facility to browse the offers can be used to make cart more advance provide better consumer experience.

## REFERENCES

- 1) D.V.S Chandra Babu, "wireless intelligent billing trolley for supermarket", International Journal of Advanced Research in Technology, vol.3, issue 1, Aug. 2012.
- 2) Ankit Anil Aggarwal, "RFID Based Automatic Shopping Cart", The International Institute for Science, Technology and Education journal on Control Theory and Informatics ,vol.1, no.1, 2011.
- 3) Diana S. S. Santos, Antonio M. J. Pereira and Ramiro M. R. M. Goncalves "Intelligent Cart: Architecture of an Innovative System for the Acquisition of Products in Grocery Stores", Communications of International Business Information Management Association journal, vol.8, pp. 80-87, 2009.
- 4) [www.nxp.com/documents/user\\_manual/UM10139](http://www.nxp.com/documents/user_manual/UM10139)
- 5) Kenneth J. Ayala, "The 8051 Microcontroller", Cengage Learning, 3rd Edition, 2004.
- 6) <http://www.rfidjournal.com>