

## A Review on Automatic Billing Trolley

Prof. S. R. Sawalakhe<sup>1</sup>, Mr. Vinod S. Narwade<sup>2</sup>, Mr. Ganesh S. Mudamali<sup>3</sup>, Mr. Pralhad V. Chaudhari<sup>4</sup>, Mr. Kanchan N. Patil<sup>5</sup>

*Dept. of Electrical Engg.<sup>1,2,3,4,5</sup> faculty of Electrical Engg.<sup>1</sup>  
Students of Electrical Engineering<sup>2,3,4,5</sup>*

*Email: srs\_ee@plit.ac.in, [narwadepatil.95@gmail.com](mailto:narwadepatil.95@gmail.com)*

**Abstract-** Now days purchasing and shopping at big malls is becoming a daily activity in metro cities. We can see huge rush at malls on holidays and weekends. The rush is even more when there are special offers and discount. People purchase different items and put them in trolley. After total purchase one needs to go to billing counter for payments. At the billing counter the cashier prepare the bill using bar code reader which is a time consuming process and results in long queues at billing counters. Our aim is to develop a system that can be used in shopping malls to solve the above mentioned challenge. The system will be placed in all the trolleys. It will consist of a Barcode reader. All the products in the mall already

equipped with barcode stickers. When a person puts any products in the trolley, its barcode will be detected and the price of those products will be stored in memory. As we put the products, the costs will get added to total bill. Thus the billing will be done in the trolley itself. Item name and its cost will be displayed on LCD. Also the products name and its cost can be announced using headset. At the billing Counter the total bill data will be transferred to PC by wireless Bluetooth module.

*Index Terms-* AVR Controller, RFID Reader, Barcode Reader, GSM Module, Bluetooth Module, IR Sensor, etc.

### 1. INTRODUCTION:-

In the modern world, every supermarket and hypermarkets employ shopping baskets and shopping trolleys in order to aid customers to select and store the products which they intend to purchase. The customers have to drop every product which they wish to purchase into the shopping cart and then proceed to checkout at the billing counter. The billing process is quite tedious and highly time consuming and has created the need for shops to employ more and more human resource in the billing section, and yet waiting time remains considerably high. In this paper, we seem it fit to propose the "Intelligent Shopping Basket" which aims to reduce ,and possibly eliminate the total waiting time of customers, lower the total manpower requirement and expenses for markets and increase efficiency overall. In a world where technology is replacing the ways we pursue everyday activity, the future of the retail industry also lies in more and more automated devices.



### 2. LITERATURE SURVEY: -

Mohit Kumar, Jaspreet Singh[1] This product is basically an embedded system that uses arm7 lpc2148 microcontroller. The motive of smart and quick billing is achieved by interfacing RFID and ZIGBEE module with the microcontroller.

Janhavi Iyer, Harshad Dhabu[2] The advent of wireless technology along with other communication techniques has helped in making electronic commerce very popular. A modern futuristic product is the one that aids the comfort, convenience and efficiency in everyday life. In this project, we discuss an innovative concept of RFID Based Smart Shopping and Billing System. The main goal is to provide a technology oriented, low-cost, easily scalable, and rugged system for aiding shopping in person.

Anjali Verma, Dr. Namit Gupta[3] The proposed research evaluates various strategies to assist shopping for a consumer to minimize the shopping time in the mall at the same time provides equal opportunity to aid the store management by providing real-time updates on the inventory.

Galande Jayshree, Rutuja Gholap[4] Our aim is to develop a system that can be used in shopping malls. The system will be placed in all the trolleys. It will consist of a RFID reader. All the products in the mall will be equipped with RFID tags. When a person puts any products in the trolley, its code will be detected and the price of those products will be stored in memory. As we put the products, the costs will get added to total bill. Thus the billing will be done in the trolley itself. Item name and its cost will be displayed on LCD. Also the products name and its cost can be announced using headset. At the billing Counter the

total bill data will be transferred to PC by wireless RF modules.

Udita Gangwal, Sanchita Roy[5] In this paper, we describe the implementation of a reliable, fair and cost efficient Smart Shopping Cart using Wireless Sensor Networks. Such a system is suitable for use in places such as supermarkets, where it can help in reducing man power and in creating a better shopping experience for its customers. Instead of making the customers wait in a long queue for checking-out their shopped items, the system helps in automating the billing process. Along with this ability, the system design also ensures detection of cases of deception invoked by dishonest customers, which makes the smart system fair and attractive to both the buyers and sellers. The results are encouraging and with the use of repeaters at appropriate locations inside the supermarkets, our approach illustrates itself to be conceivable for use outside the laboratory, in real world deployment.

Mr. Mayur Subhash Chaudhari[6] This paper investigates the use of an interactive bracelet that communicates with the RFID system by mean of a database application. This paper focuses on the RFID technology concept, and different ways of its usage for security in areas like shopping malls, employee and student's identification, patient details monitoring system.



### 3. EXISTING SYSTEM:-

Currently available method in shopping malls is the barcode method. The cashier scans the product through the barcode scanner and gives us the total bill. But this becomes a slow process when lots of products are to be scanned which eventually results in long queues, making the billing process slow. While doing survey we found that most of the people prefer to leave the shopping mall instead of waiting in long queues to buy a few products. To try to solve the problems previously identified, recent years have seen the appearance of several technological solutions for hypermarket assistance. All such solutions share the same objectives: save consumers time and money and help the retailers to win loyal clients.

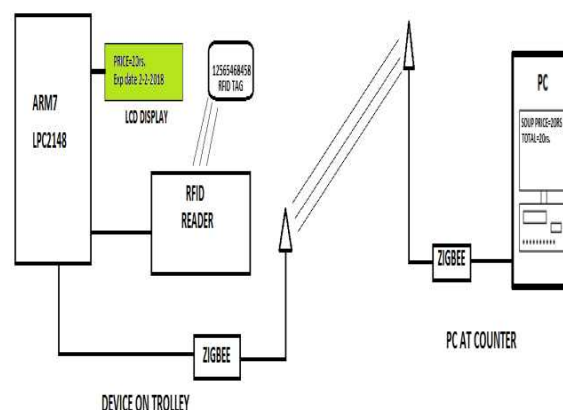
### 4. PROBLEMS ASSOCIATED WITH EXISTING SYSTEM

Today purchasing various items in malls or supermarkets require a trolley. Product procurement represents a complex process. On each occasion customer has to pull the trolley from rack to rack for collecting items and simultaneously customer has to perform estimated expense computation. At the end, customer has to wait in queue for billing and payment.

### 5. REVIEW ON DIFFERENT TECHNOLOGY:-

I. Smart trolley with instant billing to ease Queues at shopping malls using Arm7 lpc2148: a review:-

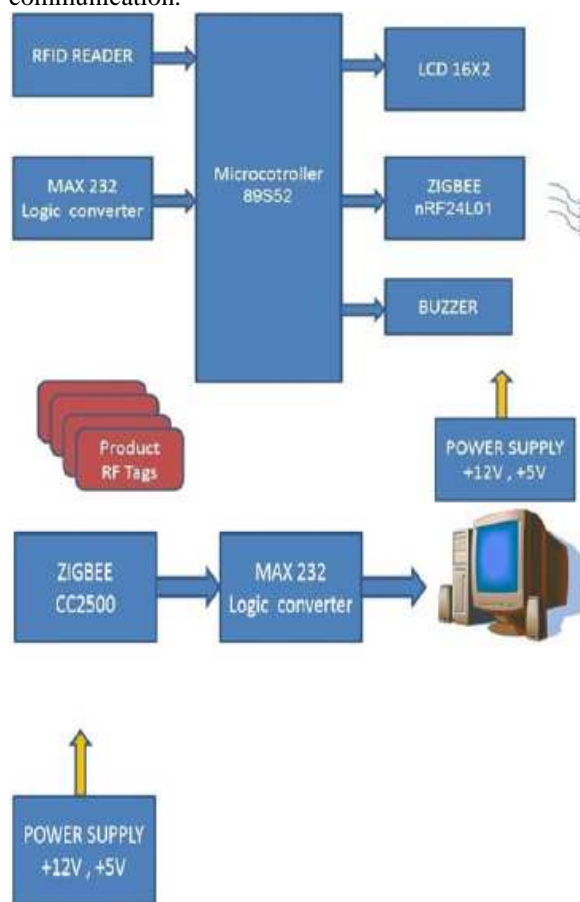
The modern technology has increased the standard of living for the humans. Every one of us craves for a quality in everything we use in our daily lives. So, this has resulted in large crowds at shopping malls which have lead to long lines at the billing counter because the cashier has to scan every product item and then enter it into the billing record. The prevailing billing system is a bit time consuming. So, we thought of inventing a remedial electronic product to catch-up with this problem. We call it "Smart Trolley with Instant Billing to Ease Queues at Shopping Malls using ARM7 LPC2148: A Review". This is based on arm7 microcontroller fitted with a LCD and RFID scanner and a wireless technology called zigbee. The LCD used is a 16x2 and zigbee modules make the wireless network to work even at long distance due to its wide range. The brief description of its operation is, when you pick a product and drop it into the trolley, the RFID scanner scans the product's unique code and its price. And it gets displayed on the LCD screen. So after costumer has finished with the shopping he/she has to visit the counter and pay the bill as displayed on the LCD screen fitted on the trolley. This will save the time that was earlier being consumed to scan each item.



II. Smart Trolley System for Automated Billing using RFID and ZIGBEE:-

In our Futuristic Billing Trolley System environment, each product will have the passive Radio Frequency ID tag which is bearing a unique Electronic Product Code. This Electronic Product

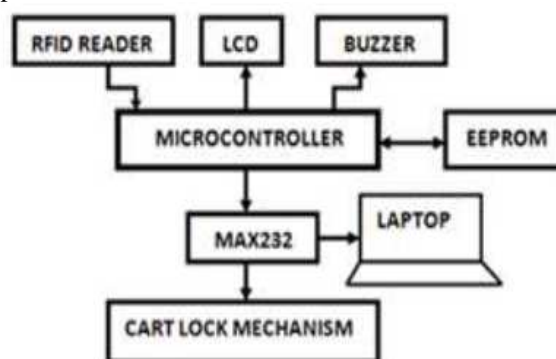
Code provides the information about the product i.e. its name and price. When the customer puts the product in the Smart Trolley, the Radio Frequency ID scans the tag and the Electronic Product Code number is generated that is previously known by Radio Frequency ID reader. Radio Frequency ID reader passes the Electronic Product Code to the microcontroller 89S52 where the controller compares the Electronic Product Code with the database of the system containing various products. After that the name and price of the product obtained by the controller gets displayed on the LCD display of the Smart Trolley, where user can see the product information. The microcontroller 89S52 also passes the data obtained from the database to the ZigBee transmitter from where the data is wirelessly transmitted to the billing computer. The master computer receives this data through ZigBee receiver using Max 232 interface. Thus the final information of all products is transmitted to a computer with the help of serial communication.



### III. RFID based Smart Multitasking Shopping Trolley System:-

The characteristic of an innovative product is measured on the parameter of how much it adds comfort, ease and proficiency to the everyday life at the same time having value addition on the social

aspects. The trend of purchasing even the smallest of the goods from a shopping mall is observed quite casual now a days as seen in the regular advertisements of different cost effective purchases of daily utility goods by different shopping destinations. This strategy and trend has pulled masses towards the shopping mall. Usually after the purchase of variety of items, the customers will have to stand in long queues for bill payments as the billing counters are very limited as compared to the number of shopping items on board. To increase the pace of a billing process, RFID technology has been used significantly since long, thus providing many new services and convenience in the retail environment. The RFID technology provides reading the bar code (RFID tag) at the cashier end to quickly count the number of items purchased, thus reducing time to stand in long queue. In the proposed review paper, different techniques used to design the RFID based smart multitasking shopping trolley system are compared and contrasted. One which makes use of RF module protocol.



### IV. RFID Based Automatic Billing Trolley:-

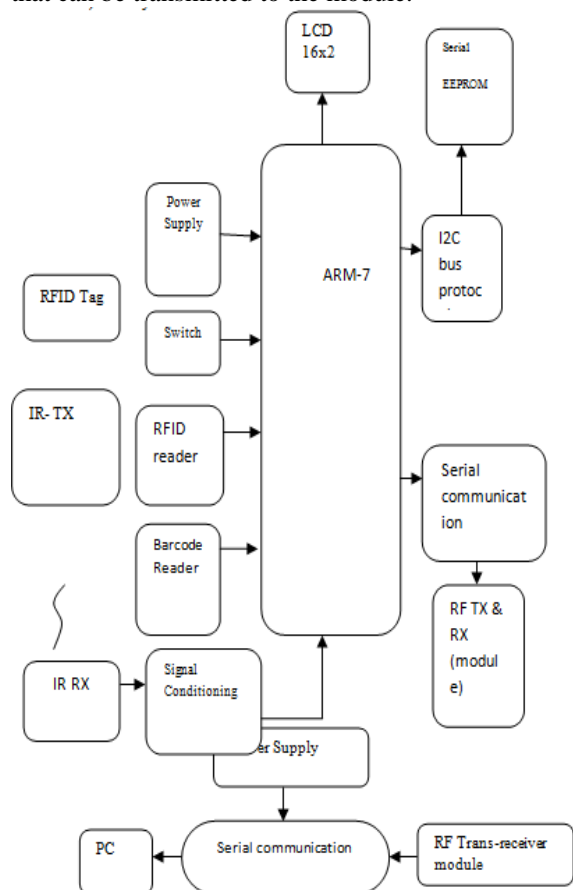
Shopping mall is a place where people get their daily necessities ranging from food products, clothing, electrical appliances etc.

Now day's numbers of large as well as small shopping malls has increased throughout the global due to increasing public demand & spending. Sometimes customers have problems regarding the incomplete information about the product on sale and waste of unnecessary time at the billing counters. Continuous improvement is required in the traditional billing system to improve the quality of shopping experience to the customers.

To overcome these problems stated above and to improve the existing system, we have designed a SMART TROLLEY USING RFID. This can be done by simply attaching RFID tags to the products and a RFID reader with a LCD display on the shopping trolley. With this system customer will have the information about price of every item that are scanned in, total price of the item and also brief about the product. This system will save time of customers and manpower required in mall and cost associated with the product.



In this project we have used Tran receiver type RF module. It is a small PCB sub assembly and is capable of transmitting and modulating a radio wave that carries data. Transmitter modules are implemented alongside a micro controller which will provide data that can be transmitted to the module.



#### V. Smart Shopping Cart for Automated Billing Purpose using Wireless Sensor Networks:-

The design has been focused to tackle all the scenarios which are mentioned above. As the goal of the Smart Shopping System is automation, the first requirement is to have a barcode scanner attached to every shopping cart. Hence, this design includes a camera-based barcode scanner, which is fitted to the cart. The barcode scanner is required to identify a product so that its price can be determined from the database, which stores all the relevant information about all the products. The database in our design is stored in the Base Station, which is located at the payment counter. Some of the information per product that is stored in the database includes its barcode, its name, price and weight. The weight attribute of a product has been chosen for a way to double-check the identity of the product in order to detect deception in the system. A load-cell has been configured as a weight sensor. The output of the load-cell is used in the decision making process at the cart. If the weight of a product estimated by the load-cell is not the same as the actual weight of the product, it is interpreted as

a case of discrepancy. The design involves a third level of check to further enhance the decision-making process, which makes use of Image Processing. While the barcode of the product is being scanned, a picture of the product is taken by the same camera that also works as the barcode scanner. If a person wants to exchange this product with a costlier one, it will be after scanning the barcode that he will do so. There is a slab attached to the top of the cart which is meant to play the role of placing the products into the cart when it is triggered to do so, instead of the customer having to put the product into the cart by himself. The person places the product on this slab once the scanning is over. Another picture of the product is taken just before the slab lets the product into the cart. Both the images are stored locally in the system present at the cart. An image comparison algorithm is run on these two images to find if they are the same products. If they are not found to be the same, it is interpreted as a case of discrepancy. The two images are removed from the memory of the system just after obtaining the result from the algorithm in order to restrict the memory usage of the systems at the cart. The processing is done locally instead of transmitting the image for every product to the Base Station for comparison, in order to reduce the overhead on the wireless communication, which makes it energy-efficient. This also ensures that the system gives the same performance even with a lot of customers in the store shopping at the same time.

#### VI. A Review on Electronic Shopping Cart Based on RFID:-

The database system interacts with the RFID tag is attached to each and every good package. When the goods are placed in the trolley the RFID tags attached to the goods are decoded by the RFID reader interfaced to the microcontroller and the information is stored and displayed on LCD. The system automatically sends the selected good number along with cost onto the PC of billing counter using wireless zigbee. The proposed database design and implementation are also discussed to describe the different functionalities of the application. These had greater importance than any other technologies due its user-friendly nature. In nowadays, we must make use of various high-tech tools and equipment's to get our jobs done and make our life secure and comfortable. The controlling device of the whole system is a Microcontroller. The Microcontroller is programmed using Embedded C language.

#### 5. PROPOSED METHODOLOGY:-

Now day's people spend much of time unnecessarily in shopping center for billing. Some of the product such that grocery items packed without price tag so people dose not know the related product price. To overcome these problems we can use RFID based shopping system using smart trolley. Here

microcontroller is used to display the product price and weight in the LCD display. Currently available method in shopping malls is the barcode method. The cashier scans the product through the barcode scanner and gives us the total bill.

But this becomes a slow process when lots of products are to be scanned which eventually results in long queues, making the billing process slow. While doing survey we found that most of the people prefer to leave the shopping mall instead of waiting in long queues to buy a few products. To try to solve the problems previously identified, recent years have seen the appearance of several technological solutions for hypermarket assistance.

All such solutions share the same objectives: save consumers time. RFID and barcodes are similar in that they are both data collection technologies, meaning they automate the process of collecting data. However, they also differ significantly in many areas. If compared, RFID technology is found to be more comprehensive than barcode technology. Barcode scanner requires line of sight whereas RFID can be read without the line of sight. It is possible to read RFID tags from a greater distance. An RFID reader can access the information of the tag.

## **6. CONCLUSION:-**

By means of this paper we intent to simplify the billing process, make it swift & increase the security using Barcode technique. This will take the overall shopping experience to a different level.

Different parameters such as the system parameters of smart trolley like products name, products cost, product weight etc. Are continuously display Thus with the help of the conclusion we can say that

1. Automatic billing of products by using barcode technique will be a more viable option in the future.
2. The system based on barcode technique is efficient, compact and shows promising performance.

## **7. REFERENCES:-**

- [1] Mohit Kumar, Jaspreet Singh, Anju, Varun Sanduja (2015) “Smart trolley with instant billing to ease Queues at shopping malls using Arm7 lpc2148: a review” International Journal of Advanced Research in Computer and Communication Engineering (Vol. 4, Issue 8, August 2015)
- [2] Janhavi Iyer, Harshad Dhabu, Sudeep K. Mohanty (2015) “Smart Trolley System for Automated Billing using RFID and ZIGBEE” International Journal of Emerging Technology and Advanced Engineering (Volume 5, Issue 10, October 2015)
- [3] Anjali Verma, Dr. Namit Gupta (2015) “RFID based Smart Multitasking Shopping Trolley System” International Journal for Scientific Research & Development (Vol. 3, Issue 06, 2015)
- [4] Galande Jayshree, Rutuja Gholap, Preeti Yadav (2014) “RFID Based Automatic Billing Trolley”

International Journal of Emerging Technology and Advanced Engineering (Volume 4, Issue 3, March 2014)

[5] Udit Gangwal, Sanchita Roy, Jyotsna Bapat (2013) “Smart Shopping Cart for Automated Billing Purpose using Wireless Sensor Networks” The Seventh International Conference on Sensor Technologies and Applications

[6] Mr. Mayur Subhash Chaudhari (2015) “A Review on Electronic Shopping Cart Based on RFID”