# Futuristic Cart For Shopping With Product Inventory Management System

*K.Poornima anuja*[1]
Department of ECE
National Engineering
College kovilpatti, India

*Dr.S.Tamil Selvi,M.E.,PhD*[2]
Head of Department ECE
National Engineering College
kovilpatti, India

***Abstract*— Everyday millions of people purchase grocery items and other household products in shopping malls which leads to huge rush at malls. The rush is even more on special offers and discounts hence the billing counter is always long. The predominant billing system is very time consuming because the cashier has to scan each and every item using barcode technology and enter it into the billing record. To tackle this problem we have developed a system which consists of RFID reader, LCD, ZIGBEE and LPC2148 processor. The description of the system is when the customer takes a product and place it in trolley RFID reader read the tag thus 16x2 LCD displays product name and cost which is stored in microcontroller memory. The total cost is calculated as the items are added one by one. Each and every item in the shopping mall will be equipped with RFID tag which helps to update database hence the product inventory out of stock is loaded with items. ZIGBEE helps to transfer the data on LCD to PC on cash counter. Thus by maintaining and updating database, everyday sales statistics is sent to every single manufacturer via SMS using GSM.**

***Keywords*— *RFID Reader; LPC2148 Microcontroller; RFID tag Radio Frequency Identification (RFID); ZigBee Module.***

## I. INTRODUCTION

Nowadays the grocery industry sector is immensely important in worldwide economy, with its modern advancement in political, technological, social and economic terms making it one of the most appropriate and manifold businesses across the world. Shopping mall is a place where all people get their daily necessities ranging from food product, apparels, gardening tools, electrical appliances, and others. Sometimes customers have problems concerning the partial information about the product on sale and waste of unnecessary time at the billing counters. Continuous enhancement is needed in the conventional billing system to upgrade the quality of shopping experience to the customers.

with product inventory management system". This can be done by attaching RFID tags to the products and a RFID reader with a LCD display on the trolley. With this system, consumer will have the details about cost of every item that is scanned in and total cost of the product. This system will save time of consumers and manpower needed in mall and cost analogous with the product.

## II. SYSTEM ARCHITECTURE

This system consists of ARM7 LPC2148 processor to store the details of product like its name, price and expiry date. A 16×2 LCD is used to display the product detail. RFID tag is given to each and every product in the retailer shop or shopping mall. RFID Reader read the tag number using the stored data on processor. ZigBee is used to send the displayed data on LCD from processor to PC. PC maintains complete database on products inventory. Database on pc is updated once bill is paid by the payee for the purchased items.

International Conference on Emerging Engineering Trends and
Science (ICEETS – 2016)

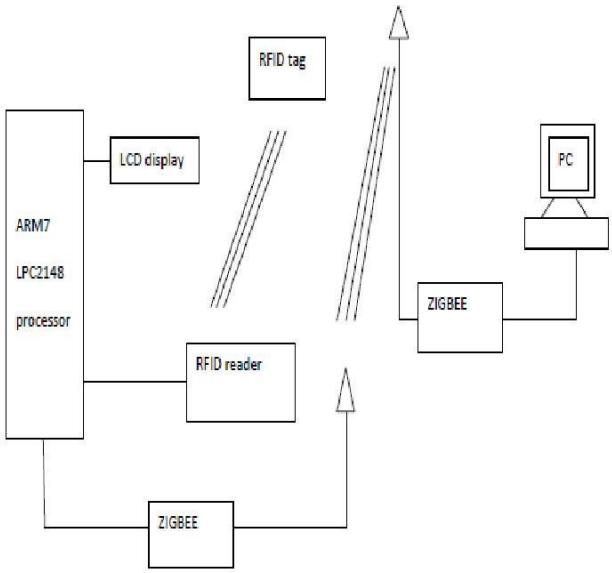



*Fig. 1. General Block Diagram of the system*

### *A. GSM*

GSM modem [sim300] affixed to the receiver section of Module. The microcontroller baud rate is set based on the baud rate of GSM modem. If at any pin any change in the state of particular signal leads to relay activation. This GSM model is used to communicate with manufacturer without any interference to check the product availability.


*Fig. 2. GSM*

### *B. ZIGBEE*

meters. In this system ZigBee is used to transmit the bill from processor to PC.

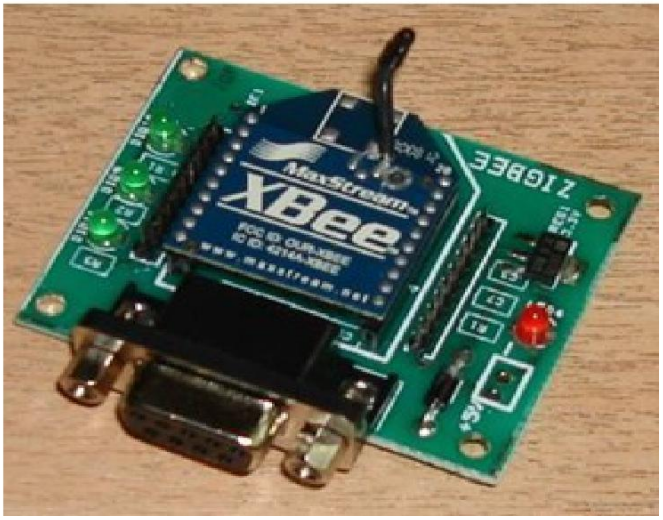



*Fig. 3. Zigbee*

### *C. RFID*

ZigBee is a wireless networking standard which can be applied in all wireless control and monitoring applications. ZigBee is used in low data rate applications which needs long battery life. It transmits data from one end to another upto 70

RFID Reader Module transfigures radio waves reappeared from the RFID tag into a form that can be sent to Controllers, which can use it. RFID tags and readers have to be adapted to the same frequency in order to communicate. RFID systems make use of many different frequencies, but the most common and extensively used & supported Reader is 125 KHz. The reader has been lay out as a Plug & Play Module and can be plugged on a Standard 300 MIL-28 Pin IC socket form factor.


*Fig. 4. RFID*

*D. Trolley unit*

In this unit ARM7 processor is coupled with RFID reader, LCD and ZigBee. As the customer drop the product into the trolley the reader on the trolley reads the tag and transmits the signal to the ARM processor. The ARM processor stores it in the memory and match up to the lookup table. If it matches

International Conference on Emerging Engineering Trends and Science
(ICEETS – 2016)

then it displays the name of item on LCD and also the total amount of items purchased.

*E. Billing unit*

As soon as the purchasing is over the customer comes to the billing section. Then the total bill will be displayed on the billing system. ZigBee helps to send the bill from trolley unit to billing unit.

*F. LCD Display*

LCD has the capability to display numbers, characters & graphics. The display is interfaced to I/O port of LPC2148 processor. In this system it is used to display the product name, price and expiry date when RFID reader reads the product tag. Product details are stored in processor from which reader grasp the data to display it on LCD. LCD used in this system is 16×2 display.

## III. DETAIL DESCRIPTION OF SYSTEM

*A. Features of RFID based trolley*

Bill can be calculated at trolley itself.
Reduce under stock and over stock by retailer and manufacturer.
Staff allotted at billing counter can be reduced.
No more long queues at billing counter.
No need of barcode reader.

*B. System description*

A consumer enters into shopping mall and picks up a trolley. Each trolley contains a RFID reader, LCD and ZigBee and each item is given with a unique RFID tag. The functioning of the system is described below:

When the customer purchases the product its tag is read by the reader from the processor and displays the details of product on LCD.
Products belonging to same manufacturer have the same RFID tag.
LCD displays the name, price and expiry date of the product from the data stored on the processor.
As the customer pick and drop the product on the trolley its price gets added up and provide the overall total amount.
If a product is removed from the trolley then the number of products gets reduced and the bill amount will be reducted.
Once the purchasing is over stop button is pressed to indicate the end of the process and the final bill amount is transmitted to the PC via ZigBee for the ease of customer to pay the bill.
Once the bill is paid the database maintained on PC will be updated.
PC maintains the database of each and every product present in the shopping mall.
If any product gets sold beyond the given limit then an alert message will be sent to shop supervisor to will fill the rack with the product.
Finally at the end of the day each product sales statistics is sent to their corresponding manufacturer which helps the manufacturer to produce the product according to the retailer and wholesaler requirement.
GSM is used to send the message from retailer to wholesaler and manufacturer automatically.
By introducing this system the manufacturer can limit their production based on daily sales statistics.

## IV. RELATED WORK

Mohamad Harris Misran and Mohd Azlishah Othman proposed a model on Shopping Trolley Tracking System via SMS using Ultra High Frequency Application. The main objective of this system is to create a solution that can help the shopping management from missing trolley. By introducing trolley tracking system, trolley theft can be avoided.

T.Shanmugapriyan designed a system named as Smart Cart to Recognize Objects Based on User Intention. In this system the interactive trolley guides and directs customers in handling and finding groceries from the rack. This project comprises of passive RFID tag which is very effective during product sensing from the inventory.

Ashmeet Kaur and Avni Garg presented a project on arduino based smart cart in which the customer make the payment in no time through rechargeable loyalty card. Loyalty card is similar to post paid card which is rechargeable and pay the bill amount using loyalty card. It also contains a cart lock mechanism to avoid cart theft.

Satish Kamble and Sachin Meshram Developed a Multitasking Shopping Trolley Based On RFID Technology. This system consists of 3 key components as server communication component, user interface & display component and automatic billing component. This component helps customers to enjoy shopping without any time delay.

## V. RESULT

International Conference on Emerging Engineering Trends and Science (ICEETS – 2016)

Unique RFID tags given in table I are used to indicate distinctive products being shopped. As RFID reader read the product, its details were displayed on LCD. The product details of the purchased items were temporarily stored in the local memory. Once the shopping "Complete" button was pressed, the memory contents were read and billing was done. The same product information data was sent back to the server to update the inventory.

| RFID TAG ID | PRODCUT NAME | PRICE |
|---|---|---|
| 222801 | SOAP | Rs 10 |
| 257082 | RICE | Rs 20 |
| 168543 | No name assigned | Used for confirmation |

Table 1. Sample database of product details

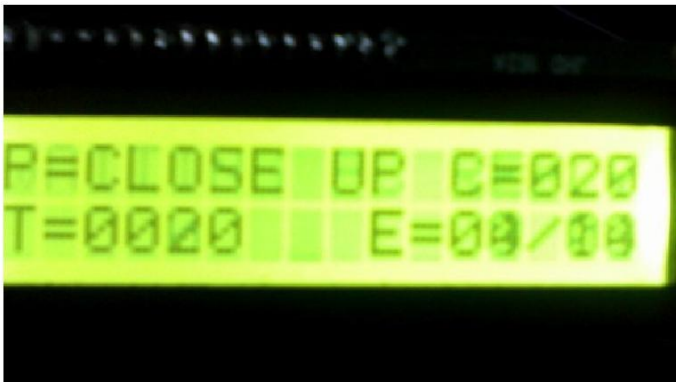
The expected result is same as the practical result obtained. Futuristic cart for shopping with product inventory management system is able perform following operations successfully.

The LCD displays a WELCOME message as the system is switched on


LCD displays drop your product message to alert the customer to start purchasing where the total and expiry date is zero as default value.


The RFID tag number is displayed on LCD when the user drop the product into the trolley.


The RFID tag reads the details of the product from the processor.




If the expiry date of the product is expired the system freezes untill the product is removed and LCD displays "CANCEL PREVIOUS EXPIRED PRODUCT".

International Conference on Emerging Engineering Trends and Science (ICEETS – 2016)


Once the expired product is removed, then the system resumes and displays drop your product indicating that the shopping can be continued.


**CONCLUSION**

The initiation of this electronic product to the supermarkets and shopping malls will be a boon for shopping as it would make shopping facile. Now, the customer needs not to stand in a queue to pay the bill. The creativity and idea of this paper was gaunt from large queues at the shopping mall and the disruption that it causes to the costumers. This new system of billing is rapid as the single product detail gets recorded as it is placed into the trolley. Moreover, this smart trolley will be very favorable as it would decrease the number of salesmen and billing counters and also prove to be time saver for both consumer and the retailer.

## *References*

[1] S Raghupati and V Karthikeyan **,** Implementation of an Efficient Shopping Technique with Automatic Billing Through-CAST, International Journal of Advanced Research in Computer and Communication Engineering Vol. 2, Issue 3, March 2013**.**

\

[2] Satish Kamble, Sachin Meshram, Rahul Thokal, Rosha Gakre. International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-3, Issue-6, January 2014.

[3] Satoru Uehara, Osamu Mizuno and Tohru Kikuno, “An Implementation of Electronic Shopping Cart on the Web System using Component-Object Technology”, Proceedings of IEEE, Sixth International Workshop on Object-Oriented Real-Time Dependable Systems, 2010.

[4] Chihhsiong Shih, Bwo-cheng Liang and Cheng-zu Lin, “An Automatic Smart Shopping Cart Deployment Framework based on Pattern Design”, IEEE 15th International Symposium on Consumer Electronics, 2011.

[5] D.V.S Chandra Babu, “wireless intelligent billing trolley for supermarket”, International Journal of Advanced Research in Technology, vol.3, issue 1, Aug. 2012.

[6] Raju kumar,K gopalkrishna and K ramesha, Intelligent Shopping Cart, International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 2, Issue 4, July 2013.

[7] P.Rohitha, P.RanjeetKumar, Prof.N. Adinarayana and Prof. T. Venkat Narayana Rao, “Wireless Networking Through ZigBee Technology”, published on International Journal of Advanced Research in Computer Science and Software Engineering, Volume 2, Issue 7, July 2012.