ARM7 BASED WEB ENABLED SMART SHOPPING TROLLEY

R.Vinushree[1], S. Rangeetha[2]
[1]*ME-Embedded System Technologies,*
[2]*Assistant Professor Ece,*
Sri Ramakrishna Engineering College, Coimbatore

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 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.At the billing Counter the total bill data will be transferred to PC by wireless ZigBee Module.**

Index terms- **RFID reader, RFID tags, ZigBee Module, GSM**

I INTRODUCTION

Shopping in the real world is likely to involve both handling of real world objects or smart objects and at the same time mobile technologies for enhancing the experience. Products placement and exposure is important for supermarket shopping and promoting products on a trolley screen raises concerns example what products should stores show on the display, when should these products be displayed, and where in the store should certain products be displayed we describe the design and evaluation of a prototype for enhancing the shopping experience in supermarkets by actively acquiring and maintaining the user's attention. 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 as shown in the figure1. 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.

Figure 1 View Of Trolley

II.RELATED WORK

In the existing system Currently available method in shopping malls is barcode method. In this method there are barcode labels on each product. Which is read by a bar code scanner. A barcode reader (or barcode scanner) is an electronic device that consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain decoder circuitry analysing the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port. When we select any product for buying we put it in the trolley and take it to the billing counter. The cashier scans the product through the barcode scanner and gives us the bill. But this becomes a slow process when lot of products is to be Scanned, thus making the billing process slow. This eventually results in long queues.

III. PROPOSED SCHEME

In our Intelligent 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 info like name, price etc. about the product.
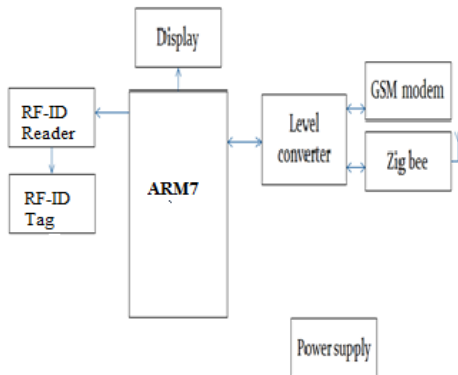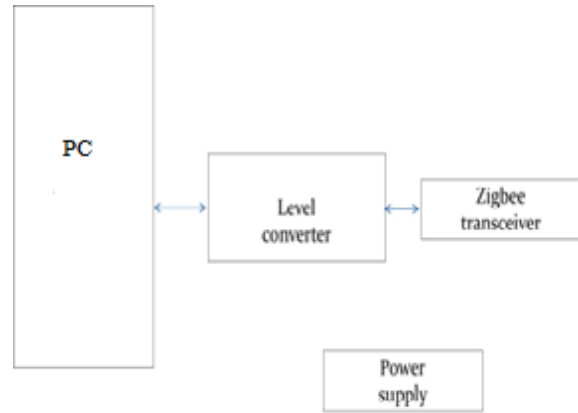

Figure 2 Trolley section

Figure 3 Billing Section

This Electronic Product Code provides the information like name, price etc about the product. When the customer will put the product in the Intelligent Billing Trolley, the Radio Frequency ID scans the tag and the Electronic Product Code number is known by Radio Frequency ID reader. Radio Frequency ID reader passes the Electronic Product Code to the ARM 7 micro-controller where ARM 7 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 ARM gets displayed on the LCD display of the Intelligent Billing Trolley, where user can see the product information. The customer will enter their credit card number and mobile number finally so the billed amount will be debited automatically from the customer account and the debited amount will be intimated to them through SMS. The block diagram of the trolley section and billing section is as shown in the figure 2 and 3.The ARM 7 microcontroller 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 323 interface. Max 323 interface is the interconnection media between the Zigbee receiver and the computer

IV SYSTEM FLOW CHART

1. All the items in the mall will be equipped with RFID tags. When person puts an item in the trolley, its code will be detected by RFID reader which is interfaced with processor.

2. Reader send this code to ARM processor, after matching code with codes stored memory, processor reads item's name, cost & other details. Then it displays on LCD. The item details like name, cost & total bill of items inserted in trolley are displayed on LCD.

3. As we put the items, the costs will get added to total. Thus the billing is done at the trolley itself. Simultaneously all details are displayed on LCD. LCD used is 16X2 character alphanumeric type display. And also if we want to remove some inserted item then we press the delete key and remove a particular item. That item's cost gets subtracted from total bill and item removal message is displayed on LCD.

4. LCD is interfaced with microcontroller in 4bit mode. It is used to indicate the customers the action taken by customer that is inserting of an item, removal of item, item's price and total billing cost of items in the trolley
.
5.When the customer enters the credit card number and mobile number the purchased bill amount will be debited automatically and it is intimated through SMS.

6.At the billing Counter the total bill data will be transferred to PC by wireless ZigBee transmitter interfaced with processor. It is 2.4 GHz RF module which works in free ISM band so does not require licensing.

7.The ZigBee receiver is connected to billing PC using RS3232 protocol, it receives billing data & gives it to the PC for printing. This data contains all details of purchased items with total bill of items.. It shows name of every item, its corresponding cost and the total bill of all products.
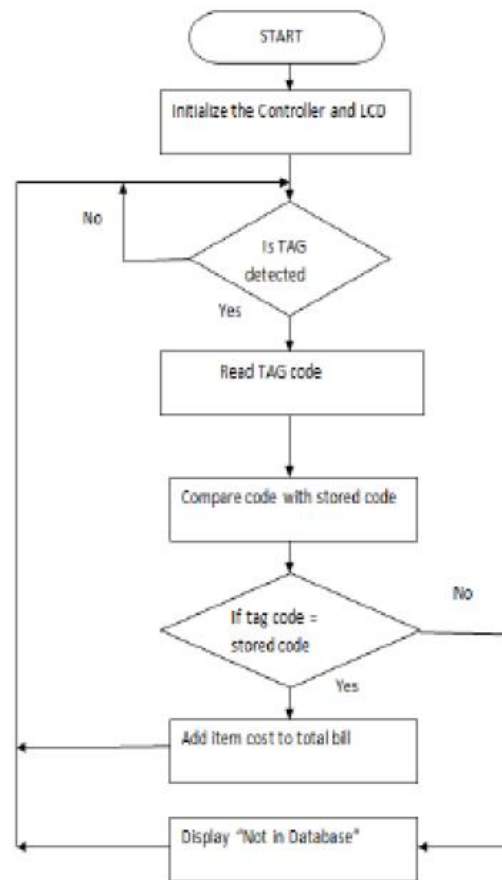

Figure4 :Flow Chart

V. EXPERIMENTAL RESULTS

The hardware module developed for wireless intelligent trolley billing is as shown below. There are two separate sections, trolley section and billing section. Trolley section consist of ARM Processor, RFID Reader, GSM Module, ZigBee module and is connected together as shown in the figure 5.The billing section consist of ZigBee transceiver and Pc as show in the figure 6.when the first product was purchased its corresponding RFID tag was read by the RFID Reader inorder to display the amount and item purchased by the customer. The figure 7 shows how the tag was read and the figure 8 shows the particular product quantity and price.
.

Figure5 : Experiment setup Of Trolley Section

Figure5 : Experiment setup Of Billing Section

Figure6 : RFID Tag Reader

Figure 7 : First Product Purchased Amount

In the above figure it has been shown that 1kg of oil has been purchased for RS.90.
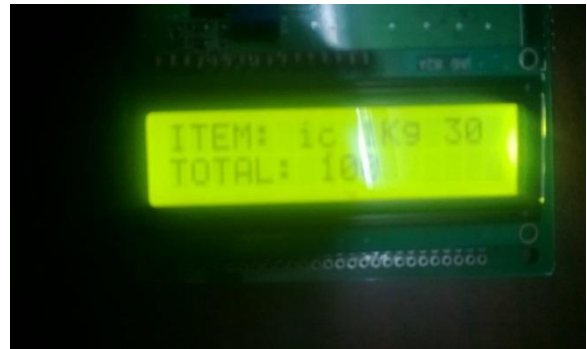

Figure 8 : Second Product Purchased Amount

Figure 8 shows that one kg of rice has been purchased for RS.30

Figure 9 : Third Product Purchased Amount

Figure 9 shows that one kg of sugar has been purchased for RS.70

Figure 10 : Display of user Credit Card Number

After purchasing all the items the customer finally enters his credit card number indorder to pay the bill amount then the debited amount will be intimated to the customer through the SMS.

VI. ADVANTAGES

- The main application of this system is at shopping malls to reduce the billing time and enhancing the shopping joy.
- It can be used anywhere like shopping markets where the barcodes are used to good solution which avoids barcode technology.
- Can also be employed to track items in stock.
- The proposed cart is easy to use and does not need any special training

VII. CONCLUSION

Concluding this paper, we would like to highlight that we drew the inspiration and idea of this paper after observing large queues at the sales and billing counters at the Retail bazaars. While working on this paper we learnt substantially about RFID technology, embedded systems and wireless systems, especially ZigBee modules alike. This system would help in cost saving at the supply chain level. At the same time it would also reduce the required no of salesmen. Thus it is truly time saving method and guarantees the less time consumption out of all present billing methods.

The cart's inbuilt automatic billing system makes shopping a breeze and has other positive spin-offs such as freeing staff from repetitive checkout scanning, reducing pilferage and increasing operational efficiency in stock taking.

REFERENCES

[1]. G. Roussos and B. College, "Enabling RFID in Retail", Computer, IEEE, vol. 39, no. 3, 2011 pp. 25-30.

[2]. P. Nurmi, A. Salovaara, S. Bhattacharya, T. Pulkkinen, and G.Kahl, "Influence of landmark-based navigation instructions on userattention in indoor smart spaces," in Proceedings of the 15th InternationalConference on Intelligent User Interfaces (IUI). ACM Press, 2011, pp. 96– 105..

[3]. Black, D. and Clemmensen, N. J. (2006) Researching Context- Awareness for Supermarket Application –Appendices. Aalborg University.

[4]. Sewon Oh, Park, Yongioon Lee, "RFID-based Middleware System for Automatic Identification", IEEE International Conference on Service Operations and Logistics, and Information, January2005, pp76-87.

[5]. Bohnenberger, T., Jameson, A., Krüger, A., Butz, A. (2002) Location-Aware Shopping Assistance: Evaluation of a Decision-Theoretic Approach. Proc. Mobile HCI 2002. Springer Berlin, 18-20.

[6]. Sachin Bhosaleand Dnyaneshwar Natha Wavhal, "Natural language retrieval of grocery products" CIE42 Proceedings, 16-18 July 2011, Cape Town, pp526-538.

[7]. Pritam Mhatre.C, Parag Ippar.A and Vinod Hingane," Predictive text input in a mobile shopping assistant: Methods and interface design",International journal of Engineering and Technology-Volume4, issue7 July2013 pp387-389.

[8]. M.Vijaya Raju and Mrs. P. SyamalaDevi," Low-Cost Intelligent Shopping Cart," International journal of Engineering Trends and Technology-Volume4, issue7 July2013, pp456-460.