Design and Development of Automatic Billing Trolley

R Monisha[1], N Pavithra[2], S Prakash[3], B Santhiya[4], R Vignesh[5]
[1]Asst. Professor, [2,3,4,5] Bachelor of Engineering, Department of Electronics and Communication Engineering
Karpagam Institute of Technology, Coimbatore, Tamil Nadu, India.

Abstract: *Nowadays, shopping at big malls is become a daily activity in metero cities. So there is a huge rush at malls on holidays and weekends. On purchasing an item, one needs a trolley to move further as it was much more. After purchasing they have to wait in queue for billing process which consumes much of their time. So, in order to avoid such time constraint we are introducing this concept "Automatic Billing Trolley". Here, Microcontroller is the heart of the system. The entire system is fitted in the trolley. When a customer hold the barcode side of the product wrapper in front of barcode scanner, then the corresponding price will be displayed in the display. This process is repeated for all the product. Finally, the bill is generated if the total weight displayed and weighting module measurement synchronizes.*

Keywords -- *Barcode Scanner, Development Board, Microcontroller, Billing printer, weighing sensor*

I. INTRODUCTION

Shopping mall is a place where people get daily necessities from food products, clothing, electrical applications etc. Number of shopping malls are increasing day by day. Hence needs of people have the same growth due to increasing public demands and spending. Sometimes customers have the inadequate information about the product in sale and waste their time at the billing counter. So RFID technique was introduced. It will consist of a RFID reader. All the products in the shopping mall will be equipped with RFID tags. When a person pick any product and put in the trolley, its tag 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. Billing will be done in the trolley itself. Item name and its cost will be displayed on LCD and to cashier pc.

There is certain drawbacks in this technique. Use of RFID tags in each product is cost effective. It is impossible to stick the RFID tag to some products. Multiple products cannot be read by RFID at the time. Hence in such cases, conventional scanning of barcode is more convenient than RFID technique. To overcome this problem stated above and to improve the existing system, we have designed this automatic billing trolley using barcode reader. Once the product's barcode is read, then it is stored in memory. It is continued for all the products. The total bill is generated when weight synchronizes.

II. Proposed Work

Once the product is taken from the rack, then he/she have to read the barcode side of the product wrapper in front of barcode scanner. Then one have to put the product in the trolley. This is repeated for all the product. Followingly, the weight and cost is stored in the memory. The weighting module will sense the weight of the product once it is placed inside the trolley. If both displayed weight and weighting module synchronizes, then the bill will be generated.
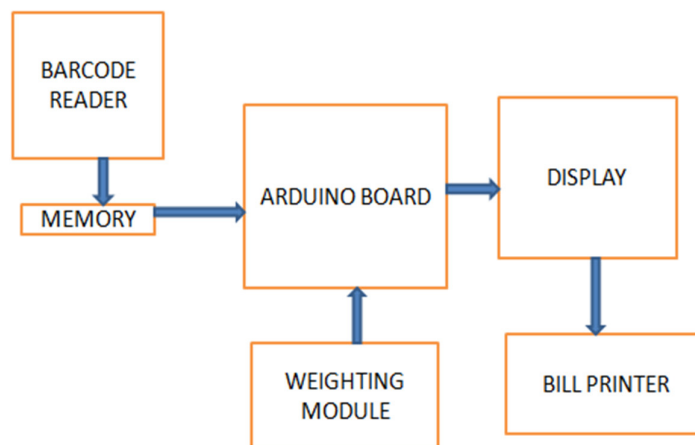
III. Block Diagram

Fig 1 : Block Diagram

IV. System Design

Hardware Design

Trolley Unit

In this unit, the arduino board is attached to a barcode reader. As the user puts the items in the trolley after reading, the reader on the trolley reads the code and sends a signal to the Arduino board. The ATmega8 stores it in the memory and compares it with the previously stored table. If it matches then it shows the name of item on LCD &also the total amount of items purchased.

Fig 2: Arduino Board

Billing Unit

As soon as the shopping is over the customer approaches the billing section .The total bill will display on the billing computer and also total bill is generated and printed using bill printer.

Fig 3: Bill Printer

Power Supply

Power supply is taken from the wheels of the trolley from its motion. Friction between the wheels and the floor creates power. Trolley is made from steel.

Barcode Reader

A barcode reader is used to scan printed barcodes. Every barcode readers consists of decoder circuitry for analyzing the barcode data and sending the barcode content to the output port of reader.

Fig 4 :Barcode Reader

LCD Display

LCD has the ability to display numbers, images, characters & symbols. The display is interfaced to I/O port of microcontroller. The display is in mode of multiplex i.e. only one display remains at a time. Within a second, the next display switches on.

Fig 5 : LCD Display

Weighing Sensor or Load Cell

A weighing sensor is a transducer that is used to create an electrical signal when it detects weight placed over it. The various types of weighing sensor include hydraulic, pneumatic and strain gauge load cells.

Fig 6 : Weighing Sensor
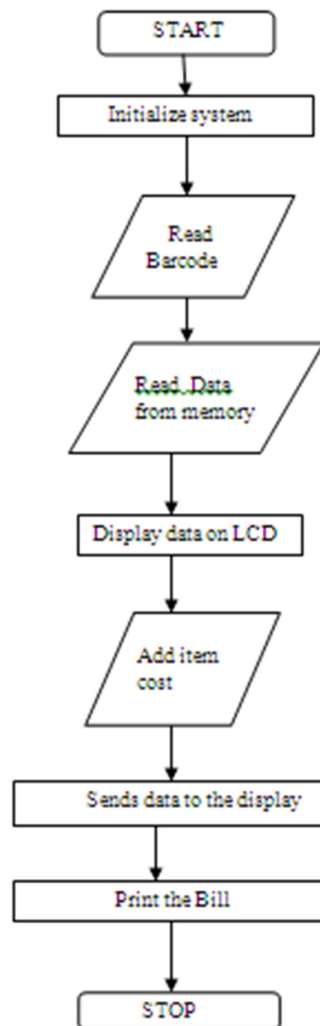
Software Design

The software consists of following segments

1. Embedded c that is used by the hardware that is bill printer, memory, display, weighing sensor that look ups up the specified table of item and maps the product with price.
2. VB is used on the front end to display the final bill amount to the customer on both the display on the trolley and cashier's pc.

VB ensures simpler user interface and embedded C ensures accurate billing.

V. Algorithm

Step1: Start
Step2: Initialize system
Step3: Read the Barcode
Step4: Read data from memory
Step5: Display data in LCD
Step6: Add item cost
Step7: Sends data to the display
Step8: Print the bill
Step9: Stop

Cite this article as: R Monisha, N Pavithra, S Prakash, B Santhiya, R Vignesh. "Design and Development of Automatic Billing Trolley". *International Conference on Systems, Science, Control, Communication, Engineering and Technology 2016*: 490-494. Print.

VI. Conclusion

By means of this paper, we indent to simplify the billing process and to improve customers Comfortability in shopping malls and reducing time consumption. Hence to make shopping experience to different level. Products name, cost, weighting are continuously displayed. This from above conclusion,

1. Automatic billing of the products by this technique will be more visible option in future.
2. This technique makes people to move faster to their work rather than long hold in shopping malls.

References

1. D.K.V.K.K.Prasad "Embedded /Real-Time Systems" deamtech press chapter 20.
2. Control Therory & Informatics ISSN 2224-5774(PRINT) ISSN2225-0492 (Online), VOL1, NO1, 2011 RFID Based Automatic Shopping Cart Saurabh Kumar Sultaina,Gourav Jaiswal, Prateek JAIN, ISBN 978-3-319-05278-6
3. International Journal of Emerging Technology and Advanced Engineering Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 4, Issue 3, March 2014)
4. C.Alippi: Intelligence for Embedded Systems. Springer, 2014, 283pp.
5. Measurment, VOL.44, NO.4, PP.730-737, APRIL 2011 Threshold-Based Identification Of Wireless Saw RFID Tags With Pulse Position Encoding, G.Cerda-Villafana & Y.S.Shmaliy.
6. RFID Journal, 2002-2007, REFFERD 6.8.2007, available http://www.rfidjournal.com.
7. Proceeding of the 2004 IEEE International Conference on Networking, Sensing & Control, 2004 Mobile HealthCare services system Using RFID, L-CHENG-JU, L.LI, C.SHI-ZONG, W.CHI Chen, H.Chunhuang & C.XIN-MEI.
8. IEEE Transactions on System, Man & Cyberneticspar C: Applications&Reviews, VOL.42, March 2012Single RFID tag Ownership Transfer Protocols Gaurav Kapoor & Selyn Piramuthu.