iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** X **Month of publication:** October 2017

DOI: http://doi.org/10.22214/ijraset.2017.10062

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Jaournal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue X, October 2017- Available at www.ijraset.com

IOT Based Smart Shopping Cart (SSC) With Automated Billing and Customer Relationship Managemant (CRM).

Dr.K.A.Shirsath-Nalavade[1],Aarti Jaiswal[2],Swati Nair[3],Gayatri Sonawane[4],Suchita[5]
[1]*Head Of Department, Computer Engineering, Sandip Institute of Engineering & Management*
[2,3,4,5]*U.G.Students ,Computer Engineering, Sandip Institute of Engineering & Management'*

***Abstract**: A shopping mall or a super market is a place where thousands of customers visit every day to purchase many products.Today purchasing various products in mallsor supermarkets require a trolley.Product procurement represents a complex process. Each time customer has to pull the trolley for getting the items and placing them in the trolley and also he has to take care of expense computation. After shopping the customer has to wait in a long queue for product scanning and bill payment. To overcome this we are developing a smart way for shopping. Each and every product contains RFID tag. The smart trolley will consists of a RFID reader, transmitter. When thecustomerscans and places any product in the trolley, cost and the name of the product will be displayed.The sum total cost of all the products will be added to the final bill, which will be stored in the micro controller memory. It will wirelessly transfer the product information of the items placed in the trolley using a transmitter to the main computer. So, to avoid waiting in billing queue while constantly thinking about the budget.*
***Keywords:Smart shopping cart, RFID, Arduino UNO, Weight sensor, Android**.*

I. INTRODUCTION

Sometimes customers face problems regarding the incomplete information about the product and waiting at the billing counters. Hence improvement is required in the traditional billing system to improve the quality of shopping for the customers. With this system, customer will have the information about price of every scanned items and total price of the item. This system will save time of customers and manpower required in mall.

The smart shopping cart integrates a shopping cart with RFID reader placed at the top of the shopping cart.It facilitates the customer to self-scan the barcode of the purchased products which he intends to purchase.If thecustomer wants to remove any product that can be done by scanning the product again while removing from thecart.A smart phone with an android application is used here.As soon as we are logged in, we are assigned with a trolleyid which we will be using throughout our shopping.An android application facilitates us to set the budget limitbefore we start our shopping.An android application makes note of all the scanned commodities of the particulartrolley and is linked with the Supermarket's backend database which contains details of the products such as CostPrice, Available Stock. If the shopping amount reaches close enough to the budget limit or goes beyond the budgetlimit then the customer is notified through the same application.A customer can also increase the budget limit andset new budget limit once he is notified,or else he can generate the bill.

The scanned products are automaticallybilled in the android application, thereby significantly reducing turnaround time. The scanned products are alsotransmitted to the Shop's central billing program through a wireless network. By using this mechanism, the tediouswork of scanning and billing every single product at the cash counter can be avoided.A weight sensor is also integrated with the shopping cart at the bottom of it.It is just to ensure if any product isadded without getting scanned, so that the extra weight in the cart can be sensed. Finally, after the shopping and bill payment the bill is sent to the customer's registered E-mail through the sameapp mentioned.

II. OBJECTIVES

A. The main objective of our project is to develop smart trolley and android application which is connected through Wi-Fi.
B. To automate the work of counter billing system using mobile application through scanning barcode of products and automatically generate bill.
C. To reduce the time complexity of user's shopping system and make the system user friendly.
D. To facilitate the customer to set their budget limit before starting the shopping, and notify if customer shops beyond limit.

©IJRASET (UGC Approved Journal): All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue X, October 2017- Available at www.ijraset.com

III. VISUAL ABSTRACT

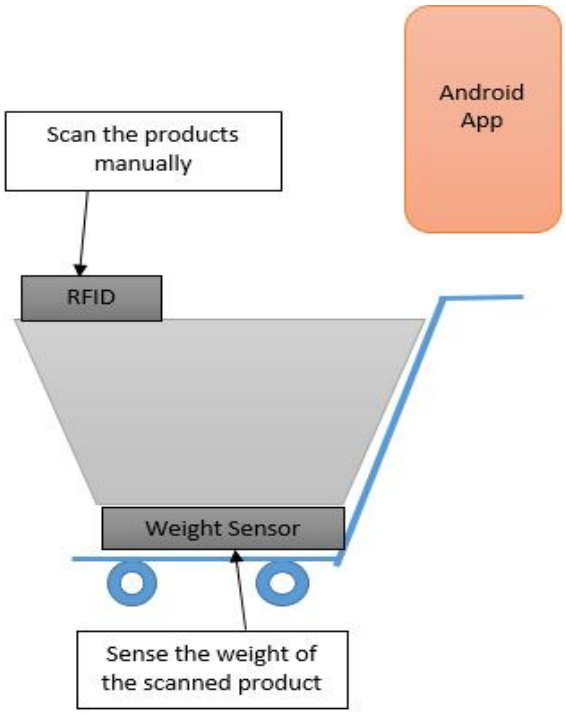


Fig.1 Visual abstract

IV. LITERATURE REVIEW

A. Development of Smart Shopping Carts with Customer-Oriented Service

The system specified here is assisted by the functionality of tablet or embedded computer .The functionality of this system is partially implemented in C language and LabVIEW, in order to provide a smart user interface and also to establish connection between embedded computer and other accessories .The user interface here provides with the map information, product searching and also automated billing .To make the flexible designing of user interface easy the buffered state machine based on a queued message handler (QMH) is adopted .The algorithm used here for the purpose of facial recognition is LBPH(local binary patterns histograms) which mostly used to extract the features of human face. The obtained characteristics data is then transformed into LBP data array, which is obtained from trained images .The face recognition here is basically used for the purpose of login, which would be stored in the database during the customer registration .The automated billing system is also provided here , and also the assistive information to the customers are provided.[1]

B. Smart Trolley: A Fast and Smart Shopping Experience Using Android and Cloud

In this paper, the system database is created on the cloud which holds all the information about all the products.When the product is purchased, since it contains RFID tagand the trolley contains RFID reader which is connected to the android display through Bluetooth, its information gets stored in the database of the particular trolley for which trolley id is assigned by the server.Bill payment can be done through an android application or desktop application. Products purchased are cross-checked at the exit gate and RFID tags of the products get removed there.[2]

C. RFID based smart shopping: an overview

In this paper ,RFID based smart shopping and billing concept is used .The system integrates Cart location detection unit(CLDU) which is used to detect the location of the shopping cart inside the mall or supermarket ,Server communication unit(SCU) which will help in establishing and maintaining the connection of shopping cart with the central or the main server, User interface and display unit(UIDU) which will provide the customers with the user interface, and billing and inventory management unit(BIMU) which will handle and deal with all the shopping bill and inventory management. Shopping area is divided into multiple aisles. Also the IR transmitters are used at both ends of the aisle, to obtain information regarding the entry and exit of the shopping cart in the shopping malls. Including the location of the shopping cart as an attribute ,database is maintained at the central server.[3]

©IJRASET (UGC Approved Journal): All Rights are Reserved

D. Smart Shopping Cart with Automatic Billing System through RFID and ZigBee

The system consists of a microcontroller, display unit (LCD), an EEPROM, RFID reader, ZigBee transceiver and a battery power source. The battery power source increases the efficiency and dynamicity of the device .The data transfer between the microcontroller and EEPROM in this system is carried out through the use I2C serial protocol. Because the EEPROM used in this system is two line serial I2C enabled IC. Every product in the shopping malls or super markets is provided with a RFID tag, to identify it uniquely. Each shopping cart contains Product identification device (PID) which will contains with microcontroller, LCD, an RFID reader, EEPROM, and ZigBee module. When purchasing product ,the product details will be read through a RFID reader on shopping cart, mean while product information will be stored into EEPROM attached to it and EEPROM data will be send to main server(Billing system) through ZigBee module. The cart information and the EEPROM data will be accessed by central billing system and so that the system will obtain the product database and estimates the total bill amount of particular cart. [4]

E. Futuristic Trolley for Intelligent Billing with Amalgamation of RFID and ZIGBEE

Inthis system, each product containing RFID tag which contains unique electronic product id is scanned through RFID reader. This electronic product id contains information such as name ,price .When the customer places the product in the cart the RFID scans the tag and the electronic product code number is obtained by Radio Frequency ID reader. This code is passed to the ARM7 micro-controller by RFID reader which compares the product code with the database of the system containing various items .After which name and price of those products gets displayed on the LCD screen of the trolley ,where customer can find the information. The ARM7 microcontroller also transfers the information to the billing computer through the ZigBee transmitter wirelessly. The Max 323 interface is used for the interconnection media between ZigBee receiver and the computer.[5]

V. BLOCK DIAGRAM

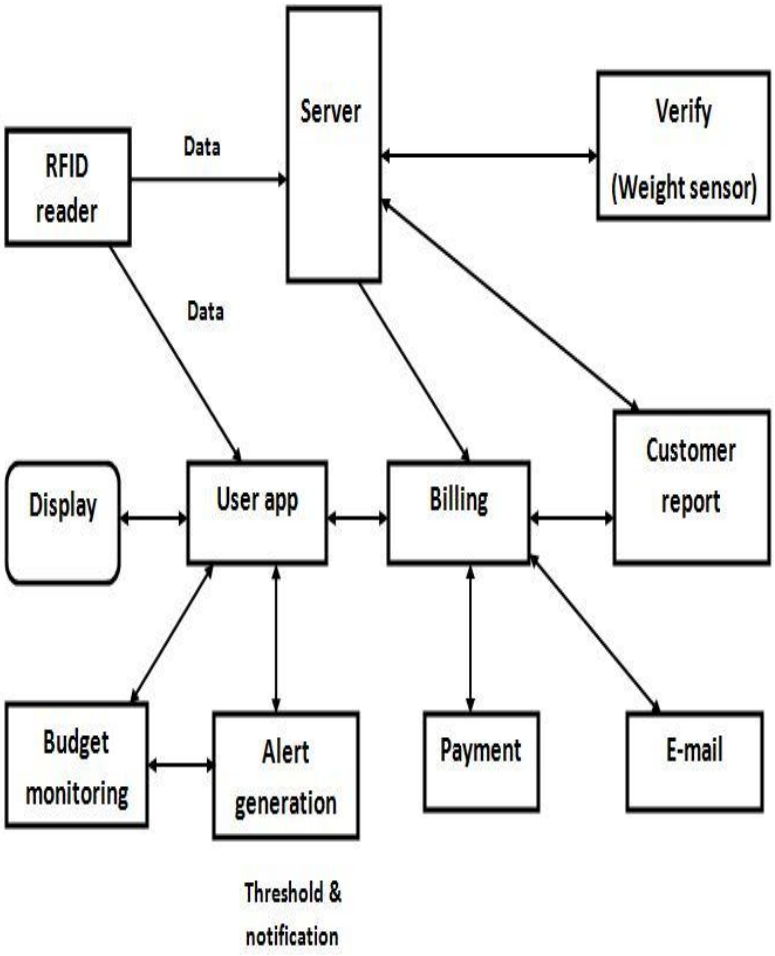


Fig.2 Block diagram

©IJRASET (UGC Approved Journal): All Rights are Reserved

VI. SYSTEM FLOW

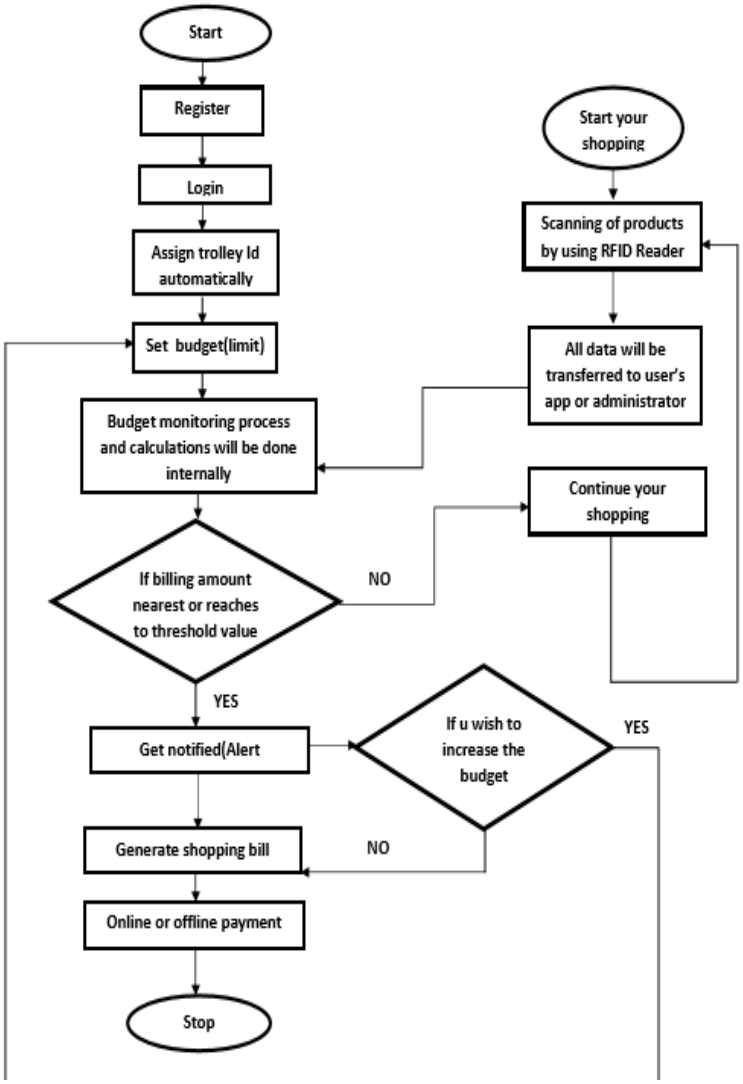


Fig.3Flowchart

VII. MATHEMATICAL MODEL

S={I,O,F}where

I={I1,I2}i.e., set of input.
I1=Set budget Limit.
I2=Scanning the products.
O={O1,O2,O3} set of outputs.
O1=Get notified if budget limit exceeds or reaches the threshold value specified.
O2=Display the price and products lists.
O3=Generate bill after shopping .
F={F1,F2,F3,F4} set of functions.
F1=Assign trolley id.
F2=Increment of budget limit.
F3=Verify weight.

©IJRASET (UGC Approved Journal): All Rights are Reserved

F4=Payment

A. Success condition

Successfully scanned the products using RFID reader and verifying weight of all the products using weight sensor.

B. Failure condition

Failure of wireless connectivity.

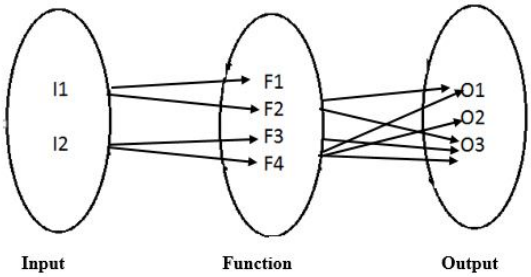


Fig.4 Venn diagram

VIII. ADVANTAGES

A. Reduces manpower required at billing counter which in turn reduces the expenses incurred by the management.
B. Customers will be aware of the total shopping budget during the time of purchase.
C. Reduces time spent at billing counter by avoiding customers to stand in a long queue for bill generation and bill payment.

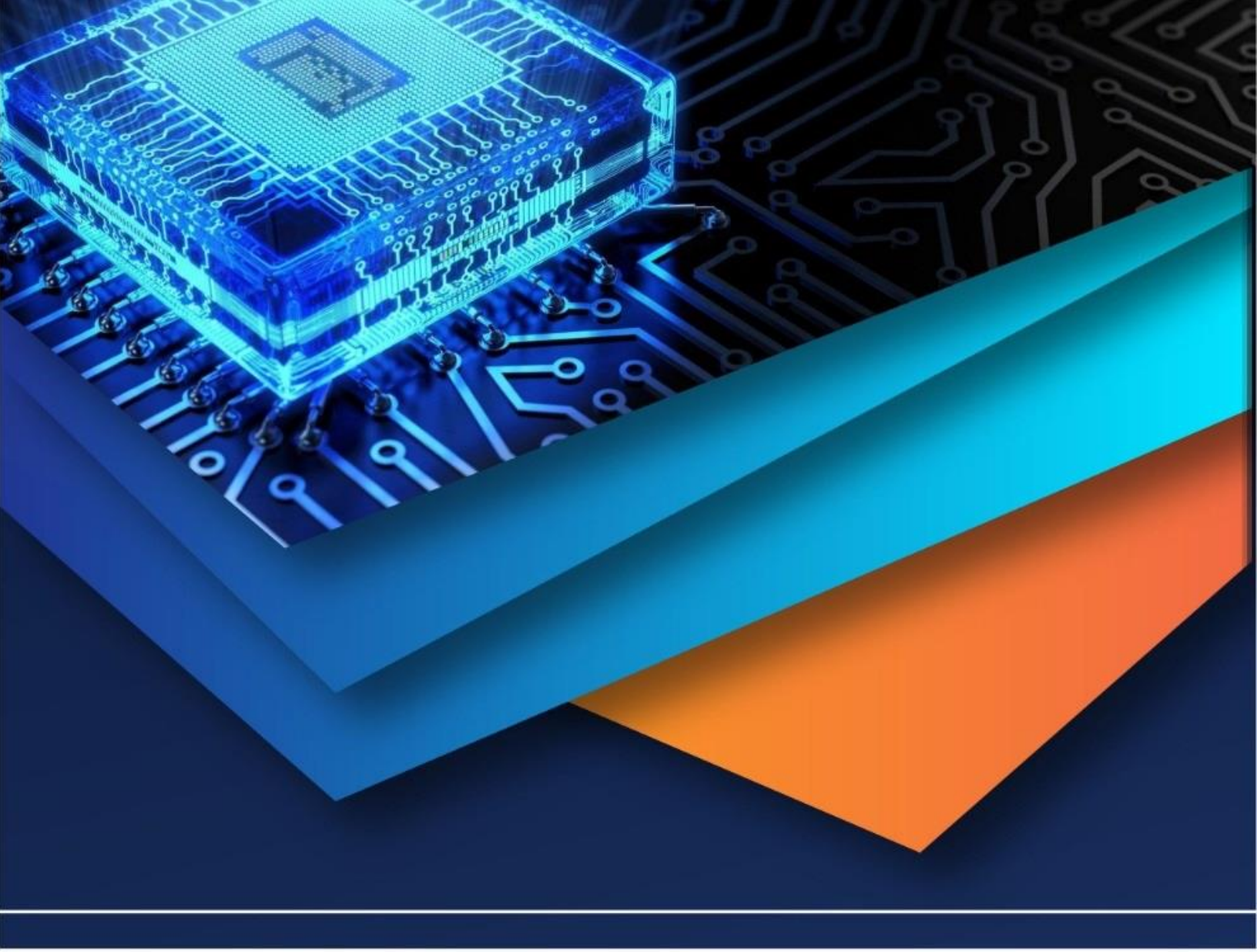
IX. CONCLUSION

This kind of system and application will provide a way for smart shopping. It will be a great way to handle customer inconvenience that are faced during shopping , especially during the festival seasons. Customers , simply by using their own android phone application can manage everything within the shopping environment**.** Since the products are scanned quickly as soon as they are placed into the shopping cart andpaperless bills are generated and sent to the customer's registered E-mail it saves time of waiting in a long queue at the cash counter. Thus it shows a high potential of IOT system to be integrated in super markets or shopping malls.

REFERENCES

[1] Hsin-Han Chiang, Wan-Ting You, Shu-Hsuan Lin, Wei-ChihShih.,"Development of Smart Shopping Carts with Customer-Oriented Service.", International Conference on System Science and Engineering (ICSSE) [2016].
[2] J. D. Jadhav, ShitalGaddime ,KiranHiware,NeetaKhadtsarer. ,"A Fast And Smart Shopping Experience Using Android And Cloud.",International Journal of Innovative Research and Advanced Studies (IJIRAS) [2016].
[3] Zeeshan Ali, ReenaSonkusare.," RFID based Smart Shopping: An Overview.", International Conference on Advances in Communication and Computing Technologies [2014].
[4] Mr.P. Chandrasekar, Ms.T. Sangeetha.," Smart Shopping Cart with Automatic Billing System through RFID and Zigbee." ,IEEE. [2014].
[5] VarshaJalkote ,Alay Patel ,VijayaGawande ,Manish Bharadia. ,"Futuristic Trolley for Intelligent Billing with Amalgamation of RFID and ZIGBEE.",International Conference on Recent Trends in engineering Technology (ICRTET) [2013]

©IJRASET (UGC Approved Journal): All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)