

Smart Shopping with Automated Billing System Using Zigbee and RFID

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Abstract : Future smart cities will be built on the foundation of smart retail. With this technique, even the billing may be done without the assistance of a cashier. At the PICK and drop basket (trolley) in the department shops, a moveable gadget will be installed. A swipe machine or net banking on mobile smartphones might be used for billing. An RFID reader replaces the bar code reader in this instance. In order to streamline the billing process, each item will be assigned its own unique identification number (ID number). In addition, the server will get the product's latest version. The main server or master PC administrator will be notified if any of the product components become null. The bill will be sent to the customer's mobile phone number through GSM. Trolley and the main server communicate through ZIGBEE. The PIC microcontroller we propose to employ in our system is cost and performance efficient. The goal of this article is automated billing and the advancement of Digital India. Using this method, the customer's time and resources may be saved.

Keywords— GSM, RFID, Automatic billing, ZIGBEE, PIC.

1. INTRODUCTION (Heading 1)

As the world is exposed towards the advanced electronic environment we need to utilise it in a smart and efficient manner. This paper discuss about how a shopping can be done wisely with the help of some electronic devices. Many of the authors have come across with their ideas on smart shopping. We have proposed our ideas in this paper by refering and considering their views and also highlighted them below.

Here we are designing a smart trolley or a cart which be a user friendly and must be intractive to customers. The trolley comprises some of the components such as RFID tags on each products and reader on the trolley. We develop a database for every products, in which each have an unique ID. With the help of that the products are scanned and its price will be displayed on the device and also will be helpful for the billing.

To reduce the queue and man power a separate section is dedicated to the billing. The section consist of the system which receives the information from the trolley about what product is purchased and the price of the product read by the RFID. The bill will be displayed at both the ends-the trolley and the system with the help of the ZIGBEE module, for the convenience of the customers, whether to continue or finish the shopping.

The programming is done using the PIC microcontroller. The steps involved are given below.

1) As soon as the customer enters into the super market, he/she must give their customer details which

includes their active mobile number for the security purpose and also for optional billing.

2) The customers can pay their bill amount either through net banking or via their debit cards. The total purchased amount will be received at the server side through wireless transmission (ZIGBEE).

3) With the help of the GSM module the net banking can be implemented and the bill is generated to their mobile number.

4) With the help of the unique ID number of the product, it updates the server about the decrement of the products. Before the product gets nulled the shopper can refill those products and reduce the inconvenience caused for the customers.

5) In our proposed system we use some of the sensors if the product is added or removed into the trolley. The updation is also done correspondingly.

When compared to the old existing system the queues can be avoided in this system and time can be reduced. The theft of the products can be avoided in such a way that the trolley cant move outside the billing section if any of the product is not read. Once the billing is over the message will be received to the customer's mobile and e-mail. It is recommended to the shop owners to motivate the customers to shop them using the smart trolley and give them offers and discounts on the products and based on the amount they purchase. All these details can be sent competely to the customer via

the mobile number or through electronic mail. The automated billing is an advancement in any billing system in shopping malls, and will surely create an impact in reducing time.

2. BLOCK DIAGRAM OF PROPOSED SYSTEM

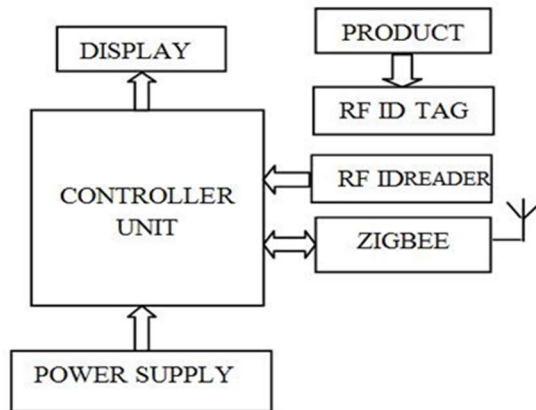


fig 1: Trolley side

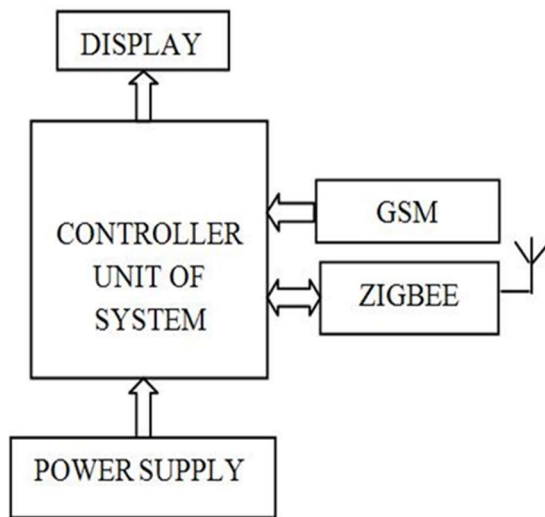


fig 2: System side

In the above block diagram fig.1 represents how the trolley side works. The RFID reader is fitted on the trolley to read the product tag and corresponded bill is added. We use RFID instead of bar code reader since it takes very less time to read. Whereas bar code requires line of sight. With the help of the ZIGBEE, communication is done between the trolley and the main server.

The fig.2 the ZIGBEE is used to receive the total bill amount sent from the trolley. The display is used to display the bill amount. We use a GSM module SIM900 to receive the bill amount to the customer's mobile through which they can also pay the amount by netbanking and also recent offers for any of the product can be sent.

In our proposed system the updation of the product is done to the main server once the ID of any product is scanned. This process will be done repeatedly until the shopping is completed. once the bill is paid by the customer the gate will be open and customer can leave the trolley and end their shopping happily.

RFID Tag:

In our proposed system every product will be having a unique ID. As we know, RFID tag comprises of antenna, encapsulation and transceiver. There are two types of RFID such as Active RFID and Passive RFID. Active ID requires a separate battery source and it travels long distance, whereas Passive ID cheaper and it operates at a low frequency of 125Khz and can travel small distance. So here we use Passive RFID.

RFID Reader:

The reader uses 5v power supply here for operation. The RFID reader transmits the electromagnetic signals to the tag. The tag receives that signal and, the tag number is transmitted. This number is interfaced with the controller and sent to the main server.

3. WORKING MODULE OF PROPOSED SYSTEM

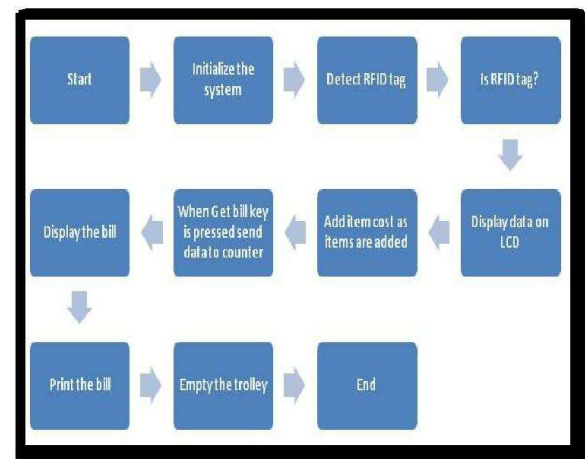


Fig3: System Architecture

The project works on the following process. The first and foremost thing is to create a server or database for

the respective shopping mall. This server contains all the information about the products and their cost, discount and offers for the customers. When the customer enters the shopping mall, he has to PICK up the cart for the shopping purpose.

The power must be switched on in the device which is fitted in the trolley, after which the customer can proceed the shopping. The customer can move the trolley and start to shop the products. We have kept the RFID reader inside the trolley, so when the product is put into the cart the product ID will be read by the reader. Once the product is read the bill will start adding up. Similarly this process is continued for all the purchase of the goods. For eg. If the customer purchases a Hamam soap, the product ID for the soap is 15486464 is attached to the ID. This number is read by the reader once the customer put into the trolley. This ID number is crossed checked with the main server, This process is done through the ZIGBEE.

Once the shopping is completed the customer has to press finish shopping and the confirmation is required. As soon as the confirmation is done, the generated bill will be sent to the main server. After that the customer has to move his trolley to the billing section. There the customer can pay their bill through their debit card. Suppose in the exceptional cases, if the card could not be accessed, the the bill also will be sent to the customer's mobile number, so that he/she can pay their bill through net banking. The final step is to take all the products out of the cart and leave the gate from the shopping mall. If bill has not paid or any product which is unread, will be indicated near the gate. If all the process are completed legally then the gate will be opened and the customer can leave the market.

4. APPLICATIONS

This smart trolley will be customer friendly and also it reduces the precious time of the customers. We can also implement an additional advantage in which the identification of the particular product can be indicated to the customer in the matrix format. i.e, the approximate location of the product will be indicated in the trolley with the help of the led.

1. In our proposed system we communicate through wireless which will be secured.
2. In future the entire shopping can be done automatically with the help of the advanced robots.

5. CONCLUSION

In our proposed system the design will be a user friendly to the customers. This system will make the shopping more exciting. The efficiency is better than any other existing system. Both the cart and the server side are be synchronised so that the output at both the ends coincides without any mess in the product count or the bill amount. This system can be modified and can be used in different areas.

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