

## Smart Shopping Trolley

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### Abstract

*Microcontroller and RFID based design, has acquired the status of most happening field in shopping market. This is highly specialized field that has the power of integrating large number of components on shopping trolley. Nowadays when we are going to the shopping mall, we have to first take the trolley and then proceed to products lines. Then we put items in the trolley which we intend to purchase. After all the shopping we moved toward the cash counters. And wait in the long queues for payment. After paying money we have to check out the shopping mall. In order to overcome the disadvantage such as waiting for payment as well as reduce wastage of time, we are developing fully automated "SMART SHOPPING TROLLEY" system. In this system, when you take the trolley for shopping and putting the products in the trolley which you wish to purchase, the sensors which are mounted on the trolley read the information of the product and directly send to the main server. And there is no need to waiting in the long queues. You can directly do your payment as your full information is already to the counter.*

**Keywords:** RFID Sensor (Tag and Reader), ZigBee Sensor, Microcontroller, Mechanical Trolley

### INTRODUCTION

In today's world the life of people is becoming complex. The value of the time is increased to the top level. In this project module, we are designing system by using electronics as well as communication based module. It provides user friendly operation i.e. it requires less space, power as well as it operates automatically[1]. Therefore anybody can operate it very easily. This project represents new technology which provides opportunity to customer to reduce time and it improves service. In this design, we are using two important device such as Radio Frequency Identification (RFID) & ZigBee. Radio Frequency Identification (RFID) Uses radio-frequency wave to transfer data between a tag and reader. It fast and does not require any physical contact between a reader and tagged item. It Consist of RFID

tag and RFID Reader. ZigBee is a wireless networking standard that is aimed at remote control and sensor application. The technology defined by ZigBee less expensive than other wireless personal area network (WPAN), Bluetooth and Wi-Fi. Its lower power consumption limits transmission distance to 5-10 meters. Here we are providing ZigBee for transferring the data between RFID processor to main server. Thus by using RFID & ZigBee We have developing wireless fully automated "SMART SHOPPING TROLLEY" which is less time consuming, economical and user friendly

### OBJECTIVE

The main objective of this project is to eliminate the loss of valuable time required for billing and waiting in long queues. This will also help in reducing

the manpower required for the billing purpose.

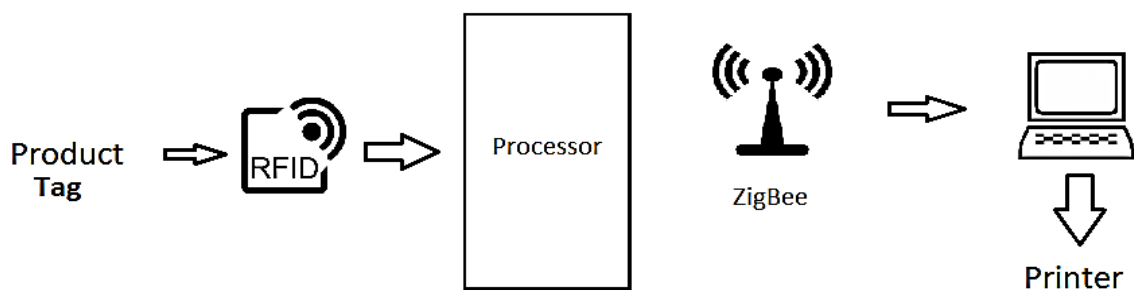
**CONCEPT**

Smart Shopping Trolley consists of RFID (both tag and reader), processor for interfacing, and ZigBee system for transmitting the information of the product which is intended to purchase. Thus the scanning process is done by using RFID reader which is present on the each shopping trolley of shopping mall. RFID Tag is basically wired coil attached with microchip which consist detail information about the product. Information stored in the tag is scan by the reader attached to the shopping trolley[3]. This information is processed and controlled by the microprocessor. And this information is interfaced with the ZigBee transmitter. This transmitter sends the information of the products which are intended to purchase to the receiver of the ZigBee, which is located at the main server. The main server is attached to the computer accounting system. And it ready to print. For example If customer purchased 10 products then the details of that 10 product i.e. prize of that product and

corresponding name provided towards the workstation and total cost of that 10 product is done & Bill of products is ready with less time. Therefore it reduces the human effort as well as time.

**BLOCK DIAGRAM**

The above figure shows the block diagram of the smart trolley system. It consists of RFID system. In this there are two main part i.e. tag and reader. Tag is attached to each and every product in shopping mall. This tag is basically a wired coil with the microchip, which include all the information of the product. When this product is pass through space near to the reader of the RFID [2]. The information of the product is scanned by this reader through the radio frequency. And this encoded information is now processed and controlled by the micro processor. Now this information is interfaced with the ZigBee device. Basically ZigBee is a device which is used for wireless transmission of data [4]. Due to this the information of the product which is to be purchased is send to the main accounting computer server. And thus billing process is done



*Figure 1: Block Diagram*

**ALGORITHM WITH FLOWCHART**

1. When shoppers with the cart press “start button” the system turns ON and then all the components such as RFID reader, microcontroller and ZigBee start working.
2. Every item has a RFID label which

- contains novel id These Ids are encouraged in the database doled out to the relating items.
3. At the point when the customer drops any item in the truck then the RFID reader peruses the tag. The data of the item is removed and in the meantime

charging data is likewise refreshed.

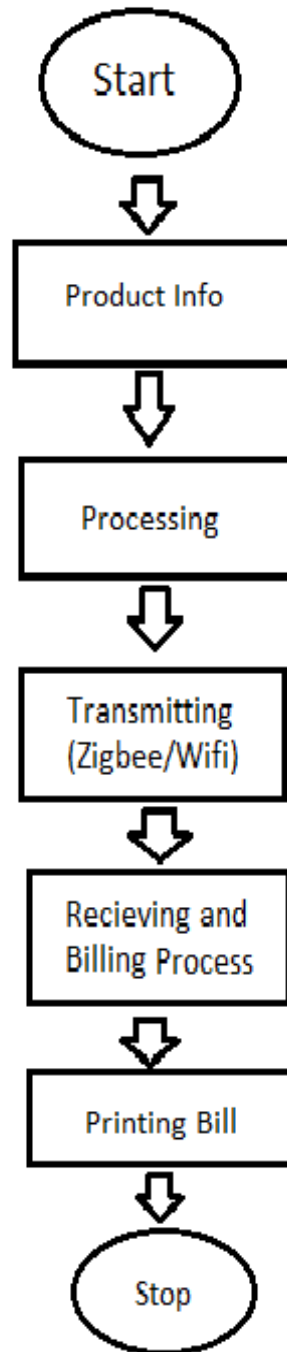
4. These means are rehashed until the finish of shopping catch is squeezed. Once the “End Shopping” button is pressed the total bill is send to main accounting computer server through

**ZigBee.**

5. There is also an option provided to delete some of the products from the

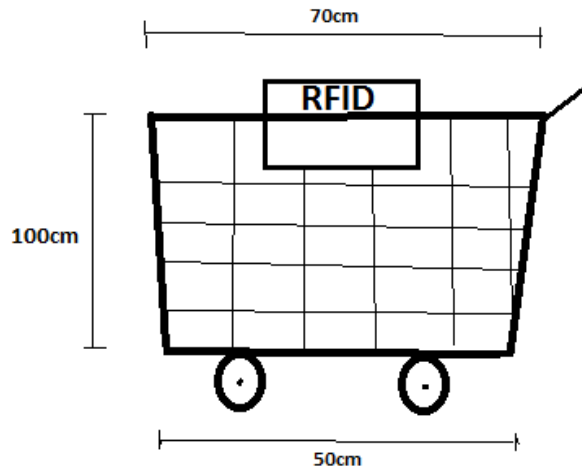
cart and the bill will be updated accordingly, this goes by the customer choice.

6. Toward the finish of shopping, the client can straight away pay the bill and leave.
7. Inventory status of the items is additionally refreshed toward the finish of shopping.



*Figure 2: Flowchart*

**VISUAL CONSTRUCTION**



*Figure 1: Visual construction*

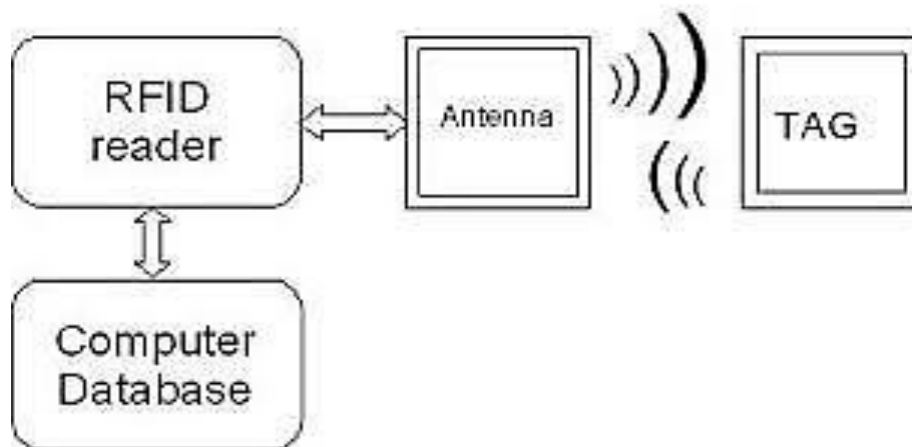
**RFID WORKING**

The RFID innovation has two segments – the reader and the tag. The reader has two sections – a handset and a receiving wire. The handset produces a feeble radio flag that may have a range from a couple of feet to a couple of yards. The flag is important to wake or actuate the tag and is transmitted through the receiving wire [5]. The flag itself is a type of vitality that can be utilized to control the tag.

The transponder is the piece of the RFID label that changes over that radio recurrence into usable power, just as sends and gets messages. At the point when the transponder is hit by the radio

waves, the waves go here and there the length of the handset, wavering. You may realize that when a wire goes through any kind of attractive or electric field, it can change over and direct that field down its length. Like those spotlights, where you shake them and a magnet returns and forward through a copper curl, making electromotive power.

Since the RFID has some capacity to work with, it awakens the transponder [6]. The transponder quickly after being Woken up heaves all the data it has put away on it. This entire procedure can take as meager as a couple of milliseconds.

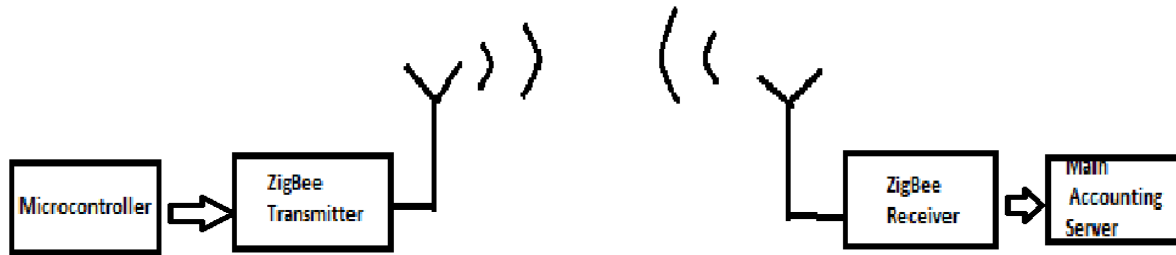


*Figure 4: RFID*

**ZIGBEE**

1. ZigBee is used for Communication purpose.

2. Used for transmitting data from controller to main accounting server



*Figure 5: ZigBee*

**ADVANTAGE**

1. Smart trolley shopping reduces the human efforts as well as it required less man power.
2. It increases accuracy of account section i.e. How many products are purchased by the customer and how many trolleys are currently working in the mall for shopping purpose?
3. It increases loyalty of customer.
4. System allow to self-checkout and increases productive time.
5. Customer can buy large no of product in very less time.
6. It reduces rush in shopping mall.
7. Customer gets on the spot billing facility.
8. It does not require any skilled manpower.

**LIMITATION**

1. Smart trolley shopping requires charging facility for working of whole day.
2. It includes new technology therefore design of system is difficult.

**CONCLUSION AND FUTURE SCOPE**

Thus we have successfully developing the prototype model which helps to shopping in mall. The model will definitely easy to use, low cost. There are few challenges to make a system design in careful manner as

well as make a system reliable.

1. There will be scope to designing Automatic human follower smart trolley by using the sensor.
2. Developing trolley with the LCD display

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