Smart Trolley System For Automated Billing Using RFID

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Abstract: *The super shops are the places where people go to buy their daily using products and also pay for that. So the need to calculate the number of products sold and generation of bill for the customer. When people go for the shopping in a shop, we have to select the right product. After that, it's a hectic to stand in line for billing purpose. Hence, we are going to propose the "Smart Shopping Cart System "that will save the track of products which are purchased and calculate the bill using RFID reader and Transmitter and Receiver. The system will also provide suggestions for products to buy based on user purchase history from a centralized system. In "Smart Shopping Cart System" every product in Mart will be attached with RFID tag, and every cart will be having RFID Reader, LCD display and Transmitter and receiver attached to it.*

Keywords: *RFID (Radio Frequency Identification) reader, RFID Tag, Transmitter and receiver*

I.   INTRODUCTION

In metro cities purchasing and shopping at super shops, big malls is a daily activity. We have seen big lines for payment of the bill at malls on holidays and weekends. When are special offers and discount the rush is also even more. Customers will purchase many items and put it into the trolley. After customers done the purchase they needs to go to billing counter for payment. At the billing counter the customer will prepare the bill using bar code reader which is a time consuming process and will creates the long queues at billing counters. All the products in the shop are attached with RFID tags. When a customer put any products in the trolley, its unique code will be detected and the price of those products will be get stored in memory. As we put the products into the trolley then costs will automatically get added to total bill. Thus the billing will be done in the trolley itself. Total bill information will be transferred to PC by wireless Transmitter and receiver modules at the billing counter.

When the customer purchase a product, she/he first scans the RFID tag of the product using the RFID reader and then put it into the trolley. While purchasing the products customer needs to scan the RFID tag of the product, a price of the product is taken and stored into the system.

The advent of wireless technology along with the other communication techniques help in making e-commerce very popular. Modern futuristic product is the one that aids the comfort, convenience and efficiency in everyday life. In this project, we discuss an innovative concept of RFID Based Smart Shopping and Billing System. The main goal is to provide a technology oriented, low-cost, easily scalable, and rugged system for aiding shopping in person. The smart shopping trolley will help shorten the checkout lines thereby helping the customers at retail stores.

Working of RFID: To accomplish this RFID methods utilize radio waves. At a simple level, RFID systems consist of components such as RFID tag or smart label, an RFID reader, and an antenna. RFID tags contain an

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integrated circuit and antennas are used to transmit the information to the RFID reader. A radio device known as a tag is attached to the products that are to be identified. When this tagged products are get in contact with a suitable RFID reader, tag transmits this data to the reader. The RFID reader then reads the data and has the capability to forward it over the channel.

Existing: System While billing by having the barcode scanner we need to detect every barcode attached to every item in item list. When all the items get scanned the price and quantity of items is automatically get into the system and then the bill is get generated. Customers can pay bill through credit/debit cards or by cash. But it is a time consuming process for the billing purpose, so that the waiting time to pay the bill is increased. To overcome on the time consuming process the RFID based smart trolley is proposed.

Proposed System: Each and every product in the shop will have an RFID tag attached to it. Each Cart will be fitted with the RFID reader, LCD display, and Zig-Bee trans-receiver implemented on it. There will be a Centralized Server System. After the payment of cash, the Cart must get reset. If the product is removed, it will get deleted from bill too Display Product Info, Expiry Date and Better Alternative Tracking in India is mainly used by transport systems, taxi companies, traffic operators. Taxi operators use this to estimate how far the vehicle is from a particular area and send this information to call centers and they can inform general public about the distance of the taxi location and time it takes tom come to them. Another use is for traffic police if this system is located in every vehicle they can estimate the traffic by looking on the map and if any accident is detected then they can route the traffic in to another way. This is how tracking is useful because India is one of busy traffic countries and this system can control many of the traffic problems.

Block Diagram:
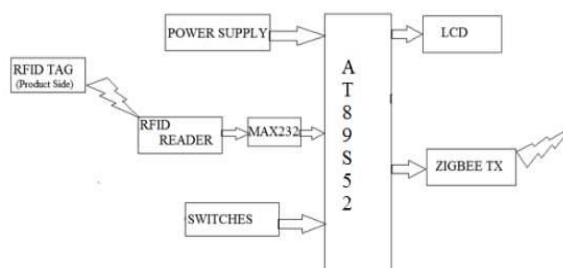
Fig. Smart trolley system

Block Diagram Description:
Power Supply:
 input is given from regulated power supply shown in figure 3.2. The A.C. input (230V) from mains supply is stepped down by the transformer to 12V and is given to a rectifier. The output from the rectifier is a pulsating D.C voltage. To get a pure D.C voltage and to remove any A.C components that are present even after rectification, voltage at the output from the rectifier is fed to the filter. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.
Arduino Nano:
The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P released in 2008. It offers the same connectivity and specs of the Arduino Uno board in a smaller form factor.

RFID Reader:
Radio Frequency Identification (RFID) Card Reader gives a very low-cost solution to read the passive RFID transponder tags that are up to 7 cm away. RFID Card Readers applications include a wide range of hobbyist and commercial applications, including access control, automatic identification, robotics navigation, inventory tracking, payment systems, and car immobilization. The RFID card reader reads the RFID tag in range and outputs unique identification code of the tag at baud rate of 9600.The data from RFID reader is interfaced and read by the microcontroller or Computer terminal.
LCD display:
It nothing but Liquid crystal display, we use 16*2 crystal display to show message for users.

Working Principal:

When a customer with the cart enters a shopping aisle, the cart is brought in rage of the IR Receiver and the microcontroller checks for the aisle information code. The aisle information code is transmitted over the Transmitter and Receiver wireless from the cart to the server. Based on the aisle number received the database is queried and relevant information is retrieved and transmitted to the cart via the Transmitter and Receiver module. The received information is stored in the EEPROM present on the cart. This serves as a temporary database until the customer exits the particular aisle that he/she is in. The relevant products information is displayed on the display unit. Every product has an RFID tag which contains a Unique ID. These ID's are fed in the database assigned to the corresponding products. If there needs to be a purchase done, then that product can be dropped in the cart where the RFID reader reads the tag. The information of the product is extracted and displayed on the LCD screen. At the same time billing information is also updated. Upon exit of the aisle, the aisle info is sent to the server along with details of purchase. Server will store the required information in database. These steps are repeated until and unless the shopping button is pressed at the end. Once the "Complete" button is pressed there's an option provided to end the shopping with the same products or to delete some of the products from the cart. This all process the customer choice. At the end of shopping, the customer can straight way pay the bill and leave. Inventory status of the products is also updated at the end of shopping. Smart carts can be either contact or contactless smart cart. Smart carts can provide personal identification, authentication, data storage, and application processing. Smart carts may provide strong security authentication for single sign-on(SSO) within large organizations.

Advantages:

1.Easy to use and reduces man power.
2.Safe, secured and needs low power.
3.It is echo friendly; with this we can eliminate usage of paper.
4.It very attractive and eye catching.
5.Easy to shop
6.Easy to use
7.Flexible

Applications:

1.Shopping applications.
2.Industrial application, etc.

II. CONCLUSION:

The intended objectives were successfully achieved in the prototype model developed. The developed product is easy to use, economical and does not require any special training. This project simplifies the billing process, makes it swift & increases the security using RFID technique. This will take the overall shopping experience to a different level.

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