Secure and Smart Shopping System - Using of Internet of Things (IoT)

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ABSTRACT

A supermarket is a place where customers come to purchase their daily using products and pay for that. So, there is a need to calculate how many products sold and generate the bill for the customer. When we go to shopping mart for shopping, we have to work for selecting the right product. Also, after that, it is hectic to stand in line for billing all the goods. Hence, we are proposing to develop a smart shopping cart system that will keep the track of purchased products and also online transaction for billing using RFID and ZigBee. In this system, every product in Mart will have an RFID tag, and every cart will be having RFID Reader and ZigBee attached to it. The server has the user purchase history and it makes suggestions to the customer based on previous purchases.

Keywords : RFID, Zig Bee, IoT.

I.INTRODUCTION

In the modern world, every supermarket employs shopping baskets and shopping trolleys in order to aid customers to select and store the products which they intend to purchase. The customers have to drop every product which they wish to purchase into the shopping cart and then proceed to checkout at the billing counter. The billing process is quite tedious and highly time consuming and has created the need for shops to employ more and more human resource in the billing section, and yet waiting time remains considerably high. In this paper, we seem it fit to propose the "smart shopping system" which aims to reduce, and possibly eliminate the total waiting time of customers, lower the total manpower requirement and expenses for markets and increase efficiency overall. In a world where technology is replacing the ways we pursue everyday activity, the future of the retail industry also lies in more and more automated devices.

II. EXISTING AND PROPOSED SYSTEM

In the shopping malls or markets, various items are collected with the help of a trolley for their purchase. The customers then have to stand in a line to get the products billed. The products are scanned using RFID reader in the trolley so that the customer can see the bill on the screen. Then they will to stand in the line for scanning the products and get them billed. The proposed system automatically calculates and bills the items in the cart.

ISSN: 2582 - 6379
Orange Publications
International Journal for Interdisciplinary Sciences and Engineering Applications
IJISEA - An International Peer- Reviewed Journal
2021, March , Volume 2 Issue 1
www.ijisea.org

An easier method is being introduced in which the person has to scan the product with the RFID reader attached to the trolley. This IoT project prevents waste of time in the line and makes things simple. The smart trolley consists of an RFID reader which scans the product and displays its cost and name on LCD. It then automatically transmits the billing information to the counter. If the person wants to put back a certain product into the racks, he has to scan the product again. This would remove the product from the list. The final bill has the total cost and name of the purchased products.

III. LITURATURE SERVEY

In this servay, we will discuss about the information found by study and research that is critical and have an important value in the contribution of the whole project. It also gives some basic knowledge or theoretical base and is used as a foundation to successfully achieve the main objectives. Most of the literatures are from the related articles, journals, books and previous works of the same fields. These literatures are then compiled and use as a guidance to the work of this project.

The barcode system is no longer the best way to business operation. Customers are tired of waiting in long, slowly moving checkout line in departmental stores, especially, in holidays. With the decrease of prices through efficiencies of technology and large-scale production of semiconductor wireless components, there has been a search for new markets in which semiconductor chips can be used. This has led to the use of RFID also known as smart tags. RFID stands for Radio Frequency Identification. In this project we are using RFID technology for making an futuristic billing trolley.

Here the system parameters of a Futuristic Trolley like products name, products amount, company name etc. are continuously recorded. The system displays as well as announces the name of the product and cost. The trolley being wireless consist of ZIGBEE module hence free to move in large area. The system is an efficient means for a commercial purpose as it is less time consuming and easy to control. Shopping mall is a place where people get their daily necessities ranging from food product, clothing, electrical appliances etc. Nowadays number of large as well as small shopping malls is increased throughout the global due to increasing public demand and spending. Sometimes customers have problems regarding the incomplete information about the product on sale and waste of unnecessary time at the billing counters. Continuous improvement is required in the traditional billing system to improve the quality of shopping experience to the customers.

To overcome these problems stated the above and to improve the existing system, we have designed an"Automated Smart Trolley USING zigbee module". This can be done by simply attaching RFID tags to the products and a RFID reader with a LCD display on the shopping trolley. With this system customer will have the information about price of every item that are scanned in, total price of the item and also brief about the product. This system will save time 4 of customers and the man power required in mall and cost associated with the product. In RFID based automatic billing trolley, we intent to simplify the billing process make it shift and increase the security using RFID technique.

This will take the overall shopping experience to a different level. Different parameter such as the system parameters of smart trolley like product name, cost, weight, etc. are continuously displayed. In automatic

ISSN: 2582 - 6379
Orange Publications
International Journal for Interdisciplinary Sciences and Engineering Applications
IJISEA - An International Peer- Reviewed Journal
2021, March , Volume 2 Issue 1
www.ijisea.org

trolley, there is no need to pull heavy trolley, no need to wait in billing queue and no need of thinking about budget. The microcontroller-based trolley automatically follows the customer also it maintains safe distance between customer and itself. It gives number of products in trolley and total cost of the products on the spot.

IV. HARDWARE IMPLEMETATION AND PROCEDURE

Block Diagram:

The block diagram of the design is as shown in Figure 1. It consists of power supply unit, Raspberry Pi, Zigbee, RFID module, LCD. The brief description of each unit is explained as follows.
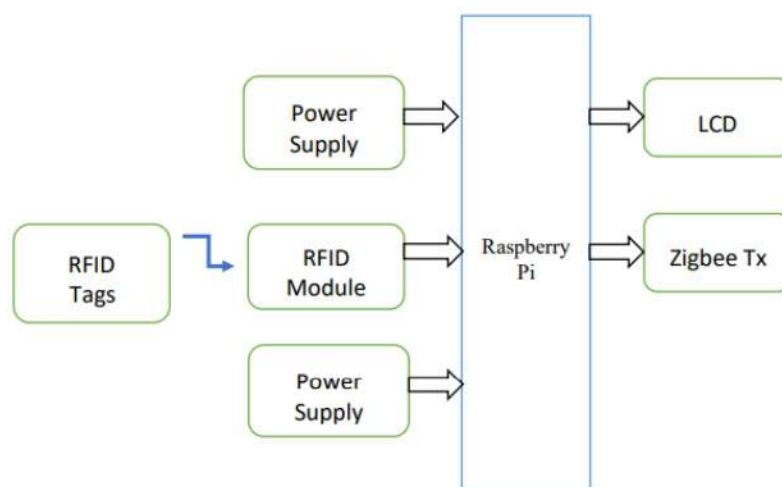

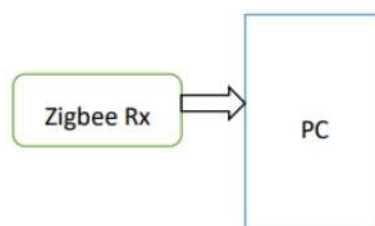**Figure 1 : Shows the Block Diagram of the Secure and Smart System Using of IoT Trolley Side**

Figure 2 : Shows the Block Diagram of the Secure and Smart System Using of IoT Counter Side

INTRODUCTION TO IoT SYSTEM

Benefits of IoT The internet of things offer a number of benefits to organizations, enabling them to:

• Monitor their overall business processes
• Improve the customer experience
• Save time and money
• Enhance employee productivity
• Integrate and adapt business models

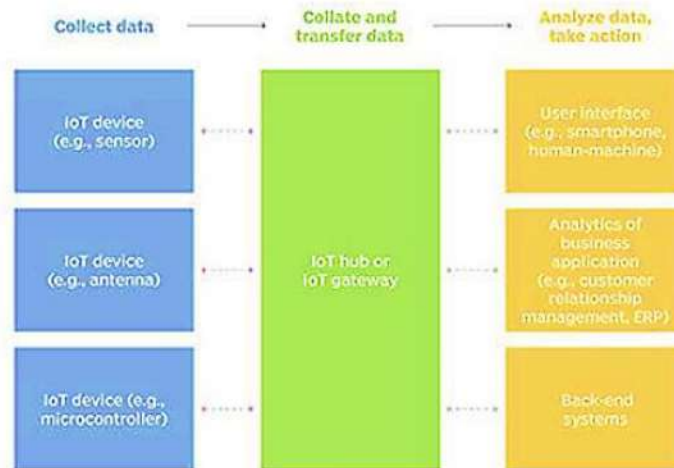• Make better business decisions
• Generate more revenue

Figure 3: Shows the IoT System

Some of the advantages of IoT include:

• Ability to access information from anywhere at any time on any device.

• Improved communication between connected electronic devices.

• Transferring data packets over a connected network saves time and money.

• Automating tasks helps improve the quality of a business' services and reduces the need for human intervention.

Some disadvantages of IoT include:

• As the number of connected devices increases and more information is shared between devices, the potential that a hacker could steal confidential information also increases.

• Enterprises may eventually have to deal with massive numbers of IoT devices and collecting and managing the data from all those devices will be challenging.

• If there's a bug in the system, it's likely that every connected device will become corrupted.

• Since there's no international standard of compatibility for IoT, it's difficult for devices from different manufacturers to communicate with each other.

V. RESULTS AND DISCUSSION

In this Project embedded spot server is used, and the Link below will give the server address
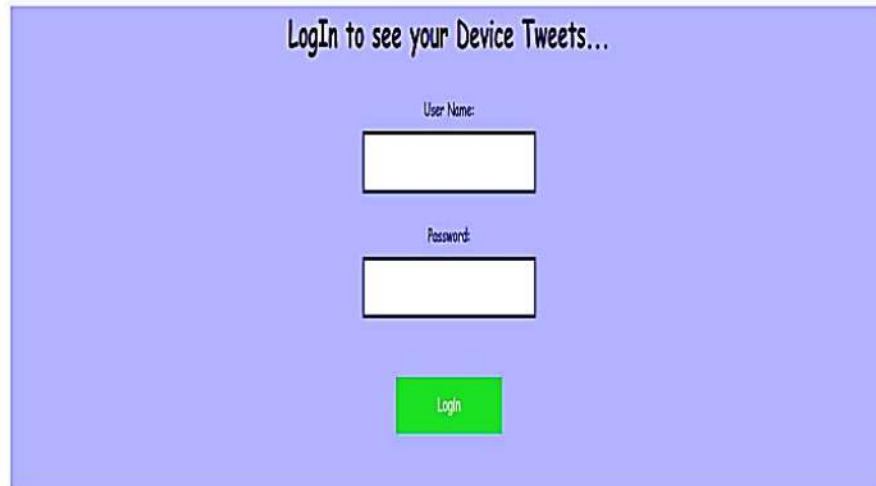http://embeddedspot.top/iot/

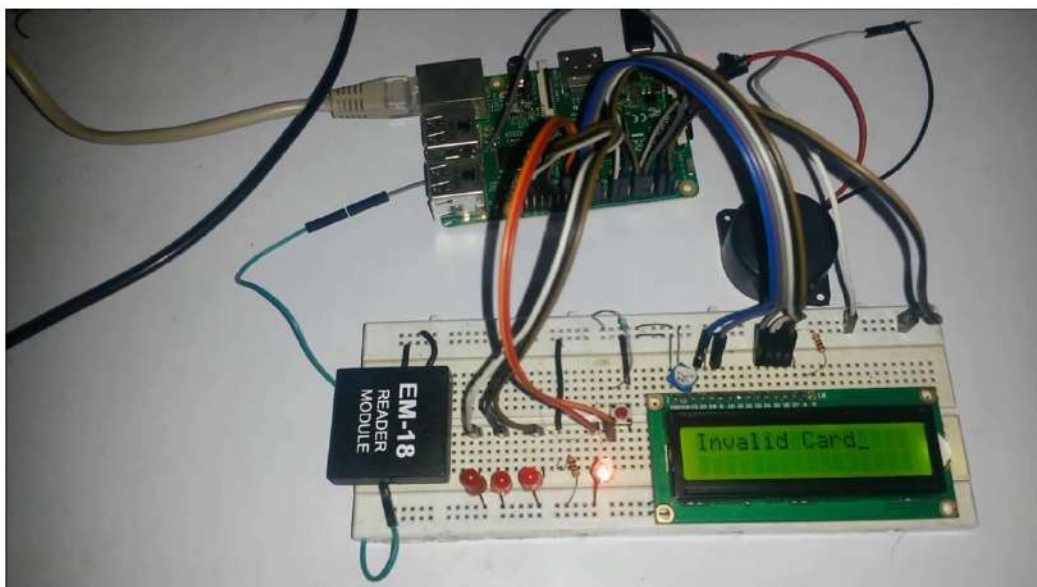**Figure 4: Shows The Server Login Page**

Figure 5: Shows the RFID System using IoT using Raspberry Pi

The proposed system created bill of the purchased items. This project saved the time of customer and also reduced the manpower in the malls. So ultimately it becomes an easiest way of the shopping. The desired objectives were successfully achieved in the prototype model developed. The developed product is easy to use and economical.

Working Procedure: The main aim of this project is to implement more customer friendly shopping trolley using embedded system technology.

The help of RFID reader, The price and information of the product get displayed on the screen. If the person feels that the price is high or the product is irrelevant, he can scan it again to get it removed from the list.

The server has all the previous purchase information of the customer. Such suggestions would get displayed on the trolley's screen. This enables the customer to remember the essential product purchases.

The Zigbee transmitter is attached to the trolley which transmits the data and updates the bill.

The processor at the receiver end is connected to a Zigbee receiver which maintains the billing information. The total bill is made after calculating and including the taxes.

The customer collects the bill and a detailed message is sent to the customer's mobile number. The information of all the products is included in the message.

This way, the customer doesn't have to store the shopping bills for monthly calculations. He can directly check out the messages on the mobile.

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.

FUTURE SCOPE: In future Internet of things is used for spot payment of trolley in super market. And get the soft copy of the bill receipt to check out from the super market.

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How to Site this Article:

Bathula Deepthi,K.Satyanarayana (2021) , Secure and Smart Shopping System - Using of Internet of Things (IoT),International Journal for Interdisciplinary Sciences and Engineering Applications,2(4), (25 - 31).

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