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IoT Based Smart Shopping Cart

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Abstract -

The modern era of technology where most customers need to wait in the store to buy because it is a time consuming process. A large crowd at the store during a discount offer or on the weekends creates the problem of waiting in long lines due to a barcode-based payment process. In this regard, the Internet of Things (IoT)-based Smart Shopping Cart featuring Radio Frequency Identification (RFID) sensors, Arduino microcontroller, Bluetooth module, and mobile app is proposed. RFID sensors rely on wireless communication. One part is the RFID tag attached to each product and the other is the RFID reader who reads the product details successfully. After this, the details of each product appear in the mobile application. Customer can easily manage shopping lists in the Mobile app depending on your preferences. The purchase information then sends to the server wirelessly and automatically charges. This test model is designed to eliminate the time-consuming procurement process and quality of service issues. The proposed system can be easily implemented and tested at a commercial level under real-time scenarios. That is why the proposed model is more competitive compared to the others.

Index Terms: IoT, RFID, Arduino, Android application, Smart shopping cart, Sensors, Liquid Crystal Display etc.

1. Introduction

IoT is a network where all objects are connected to the internet via network devices or routers and data exchange. IoT is a very smart way that minimizes human effort and provides easy access to portable devices. "Things" in the sense of IoT, hardware mix, software, data and services. It also refers to a variety of devices. These devices collect useful data with the help of various available technologies and share that data with other devices. IoT has many applications in various fields such as health care, smart homes, clothing items, etc. In this paper we discuss a smart shopping cart system based on RFID technology. Nowadays, shopping in supermarkets has become a daily chore in the big cities. The best way to help customers is to reduce the time spent on purchases, reduce the cost of items and pay for them automatically. In shopping malls various technologies such as the Barcode program, mobile technology (using the Android App), etc. are used.

In this system customers have to wait in a long line to pay. So, we came up with a new idea using IoT (Internet of Things). In this program RFID (Radio Frequency Identification) is used for Technology. Each item or product is affixed to the RFID tag and the product is scanned using a RFID attached trolley. The customer buys a variety of items and puts them in a cart. The price of those items and names will be displayed on the LCD (Liquid Crystal Display) trollection attached to the trolley. If the customer wants to cancel certain items, he or she must also scan the item that will remove it from the full payment. In this system, customer time is reduced during shopping at supermarkets. This project aims to reduce Line Payment at the store. The Smart Trolley does the same by displaying the price of the product stored inside the cart.

2. Problem Statement

• The currently available route at the mall is a barcode mode. In this process there are barcode labels for every product that can be explored for specially designed barcode readers.

• The cashier inspects the transaction with a barcode scanner and provides credit. But this becomes a slower way when a ton of sales have to be scanned, so creating a payment method is slower. This eventually results in longer lines.

3. Aim and objectives

Aim : Design And Implementation Of IoT Based Smart Shopping Cart.

Objectives:

It eliminates the usual scans of products on the counter and speeds up the entire purchase process, and with this system the customer will know that the amount to be paid so he can properly plan his purchase buying only the essentials that lead to improvement. saving.

4. Related Work

- IOT is a popular topic in recent years. There are many IoT applications; Smart Shopping Cart is one of its apps.

There are some research projects published in recent years about improving customer acquisition knowledge. There was a lot of effort in 2003. Shanmugapriyan [2] proposed a basic design using RFID and barcode reader for product identification using Zig-Bee communication between server and cart.

- MR.P.Chandrasekar on "Smart Shopping Cart With Automatic Billing System through RFID and Zig-Bee" [8] proposed building a Shopping Cart with Product Identification Device (PID) that will contain a microcontroller, LCD, EEPROM, student and zig-bee. In the use of RFID and Zig-Bee. In 2011, Klajan and Pie [3] proposed the idea of tracking customer and knowing customer preferences. The concept of smart cars and smart shelves was also discussed in their work.
- Raju Kumar et. Al. [4] "Intelligent Shopping Cart" explains how to access real-time information about a variety of products within a shopping cart. Ali and Sonkusare [10] have developed a smart navigation system. It included the introduction of smart shelves, which tell when smart cars get in the way and bring product information to the cart. There are many more designs in this area. In all previous designs, the customer had to scan the items individually by hand, which is incorrect. The difference between RFID and barcode technology is that, RFID does not require false reading but barcode depends on it. RFID can learn distance, which intelligently delivers IoT assets.

5. Block diagram

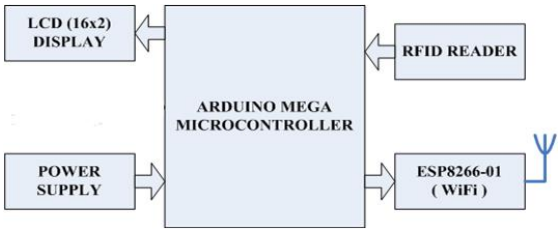


Fig 1: Block Diagram of Transmitter

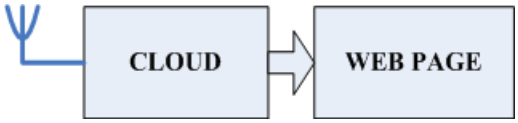


Fig 2: Block Diagram of Receiver

6. Working Principle

• All items in the mall will be fitted with RFID cards. When a person places an object on a trolley, its card will be scanned by an RFID reader.

• Reader send this code to Arduino Uno who continues to read the item name, cost and other details. Then it is displayed on the LCD. Details of an item such as name, price and billing of cart items are displayed on the liquid crystal display.

• As we place items, the cost will be added to the total. Thus, a charge was made. At the same time all the details are displayed on the LCD. The LCD used is a 16x2 character type display. And in addition if we would like to delete an inserted item, that number is automatically deducted from the total value and the output item is displayed on the LCD.

• The RFID student will send this information to the Arduino board for further processing. Arduino performs a variety of functions in the information obtained by the RFID reader by reading the RFID tag attached to the product. With the help of Arduino, the LCD display will display the name and the total cost of the product. If a customer wants to remove any product from the purchased product list that is already in the cart, the customer can remove that product by re-scanning the product tag.

7. Hardware Used In The System

A. RFID Tag: Every product in the store has a RFID tag. The tag not only provides product costs but also provides additional information such as product name, production date, expiration date, product type, etc. The RFID program contains an RFID tag made of microchip note, as well as a reader. by. Data stored inside the RFID tag microchip is waiting to be read. The tag antenna receives electrical power from the RFID reader.

B. RFID Reader: he RFID reader will not only read the tags but also perform many additional functions on the data obtained from the mark. It is therefore called the "smart RFID reader". This is possible because the RFID reader will be connected to the arduino board. RFID reader sends data after reading all tags to arduino. It does not need a line of sight .So it can read multiple tags at a time. This is a great benefit for an RFID.

C. Power supply: The AC supply is applied to the step down transformer.

D. Arduino: Arduino is a microcontroller board. Arduino has its own software for heating systems in it. It uses its own programming language. We will be connecting the

RFID reader output to the seru board of arduino board. And the LCD display will be connected to the arduino board. RFID reader sends data to arduino control. The controller works on this data, sending the effect to the LCD display. Arduino increases the total cost of all items in the cart and transmits this information to the LCD display.

E. LCD Display: Here the LCD display is used to display the bill. The display is connected to arduino I / O port..

F. Transformer: We will use the Step down transformer to convert AC from power to 4V.

G. ESP8266-01 WiFi Module : ESP8266 is a low-cost Wi-Fi microchip, with full TCP / IP capability and microcontroller capability.

8. Software requirements

- **Arduino compiler:**

Arduino IDE is an integrated development platform for software applications embedded in Arduino and developed by Atmega Technology.

- **Proteus 8 Design Suite:**

The software is used to create schematics and electronic printing to produce printed circuit boards.

- **Embedded C-language:**

The PIC configuration is done using embedded C and converted to Hex code for disassembly in the microcontroller IC..

9. Advantages

• Low cost, easy access, and robust real-time support system.
• Offer automated billing to avoid queuing at supermarkets and supermarkets.
• Avoid contact and can keep public distance..

10. Application

• Improved Payment System
• Smart cart with RFID Reader

11. Future Scope

• Fuel consumption is the first of its kind in industrial use.
• This device records various product information about the performance of acceptable sensors such as RFID tags.
• Net Banking can be installed.
• By using the GSM module we are able to transfer the bill to mobile phones instead of printing it.
• Voice support can be installed.
• The ARM robot may be used to select and drop a product.

12. Results and Discussion

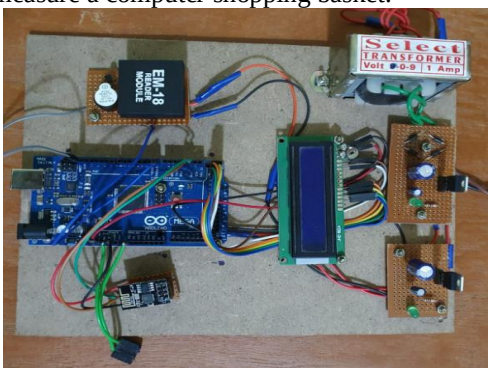
In this project, the program means making interaction purchases by joining various developments (such as Arduino Uno, RFID and various Android apps). It can be neatly divided into two basic classes: gadgets and programs. Among the electronic components, Arduino Uno operates as an intermediary, controlling RFID and new existing inventions, such as the integration between RFID design and system components (such as Android mobile applications) with the IoT module. In the product section, there is android

a flexible application in which the client can use a variety of recommended strategies to fit into the proposed framework, which can ensure client safety. Since the hunting module depends on the transfer of property in the guide, it is easier to look for items in the shopping areas.

The proposed framework keeps clients from getting obsolete or unwanted items by providing a variety of android apps. Clients communicate directly with object data. This data will affect customers' tendencies and help them find better things. Purchased items can be displayed in the current shopping list of clients to assist customers in maintaining their shopping list as indicated by their needs or spending plan. This also helps you to remember the things you have successfully. Similarly, there is an employee in the store as a server farm, which is also associated with a savvy shopping basket. In the event that a flexible android application requires deleting data from employees, check client login data as shown by client RFID card or stabilize object data as per

RFID object tag, then the app can communicate with the remote control. employee.

This remote distribution capacity helps clients move freely and can transfer object data anywhere in the store without taking too long. The new design aims to cooperate and fulfill customer needs effectively. Through the proposed new design, clients can look and find great things. As a function, the proposed framework can be easily used, in fact, to help measure a computer shopping basket.



Project Image

13. Conclusion

In this paper, we focus on the needs of an intelligent procurement system using RFID technology. Give us a brief introduction to how the system will work. This program is very useful compared to the barcode system. We believe that in the future repairing this system in stores will be easier and more efficient. It also provides customers with better services and improves customer self-awareness.

References

[1]. Ruinian Li, Tianyi Song, Nicholas Capurso, Jiguo Yu, Jason Couture, and Xiuzhen Cheng, Fellow, IEEE, "IoT Applications on Secure Smart Shopping System". IEEE Internet of Things Journal, vol. 4, No. 6, December 2017.

[2]. T. Shanmugapriyan, "Smart cart to recognize objects based on user intention," Int. J. Adv. Res. Compt. Com. Eng., vol. 2, no. 5, 2013, pp. 2049–2053.

[3]. D. Klabjan and J. Pei, "In-store one-to-one marketing," J. Retailing Consum. Services, vol. 18, no. 1, pp. 64–73, 2011.

[4]. Raju Kumar, K. Gopalakrishna2, K. Ramesha3," Intelligent Shopping Cart", IJESIT, vol. 2, Issue 4, July 2013.

[5]. Ankit Anil Aggarwal, "RFID Based Automatic Shopping Cart", The International Institute for Science, Technology and Education journal on Control Theory and Informatics ,vol.1, no.1, 2011.

[6]. B. N. Arathi and M. Shona, "An Elegant Shopping using Smart Trolley" India Journal of Science and Technology, Vol. 10, Issue 3, Jan 2017.

[7]. Galande Jayshree, Rutuja Gholap, Preeti Yadav, "RFID Based Automatic Billing Trolley", International Journal of Emerging Technology and Advanced Engineering, Vol. 2, Issue 12, Dec 2013.

[8]. P. Chandrasekar and T. Sangeetha, "Smart shopping cart with automatic billing system through RFID and ZigBee," in Proc. IEEE Int. Conf. Inf.Commun. Embedded Syst. (ICICES), Chennai, India, 2014, pp. 1-4.

[9]. Bala Krishnan , Shiyam Sundaran , Dharun Prasath , Guna Kishore, "RFID Based Smart Shopping Kart", IRJET , Vol. 5 ,Issue 1, Jan 2018.

[10]. Z. Ali and R. Sonkusare, "RFID based smart shopping and billing," Int.J. Adv. Res. Comput. Commun. Eng., vol. 2, no. 12, pp. 4696–4699, 2013.

[11]. Bansi.G.Jain and Divyank Shah, "IoT based retailed shopping system using NFC", IJARIIT, vol. 4, Issue 3.

[12]. Sagar Sojitra and Rahul G. Patel, "A Review of Smart Shopping Systems", IRJET, Vol. 3, Issue 5, May 2016.