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IoT Based Bill At Your Cart using RFID Technology

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ABSTRACT: In the current world of increasing population there is a huge demand from a variety of domains. Customers who need to purchase different products in Supermarket or Walmart needs lot of time and patience in coordinating among themselves for successful shopping. In this paper, we depict reasonable and cost-effective **Bill at your cart** project which will be placed in shopping trolley itself. Here we use **RFID cards** and RFID readers with NodeMCU to build project. The cart information and total value will be displayed on the webpage as well as on the LCD.

KEYWORDS: Walmart, RFID cards, Shopping Trolley, NodeMCU.

I. INTRODUCTION

According to the survey, in recent times a human spends approximately 2 to 2.5 hours shopping in the mart. As soon as we enter a supermarket or mall customers search for a shopping trolley or cart. When shopping is done customers have to proceed to checkout at the billing counter and this billing process is quite time-consuming. To overcome this problem, we are implementing Bill at your Cart system to minimize the rush, save time and human efforts. Our prototype features will overcome this queue issue.

II. EXISTING SYSTEM

Shopping may be a general activity where a gaggle of individuals purchase a product. Walmart or malls offer facilities for individuals to try and do shopping whereas retail merchants promote their product to customers and customers purchase the merchandise by confirming the merchandise description provided by the retailer. This method of searching is named ancient selling.

Walmart is appropriate for each retail and concrete coming up with and these are the foremost thronged places at the time of the weekend. Here, customers need to pay tons of their time finding the merchandise in Walmart additionally customers have to be compelled to wait in long queues so as to urge a bill. These days barcode technology is enforced and dealing in many supermarkets. Barcode is that the continuous black vertical bars that have some hold on data concerning associate degree objects. Product id holds on in barcode written bars that are joined with backend databases. A barcode scanner scans the written barcode once it became in line of sight. That's a slow method than the RFID sensing element system. Cashiers have to be compelled to scan every single barcode to form bills and to visualize the ingredients or specifications of the merchandise. Barcode will solely browse, not writeable once more, the scanner will browse one barcode at a time and therefore the barcode contains a really little piece of knowledge in it. The barcode is often simply broken because of climate. This will simply be hacked by a third-party user as a result of doesn't support encrypted information kind. The barcode system may be a long method, which causes long queues. In 2009, Arkansas University completes the study to work out the business price of the RFID at the main retail merchant. That proofs the potency of RFID is best than the barcode system.

III. PROPOSED SYSTEM AND MATERIALS USED

A. *Objective:*

The main objective is to make shopping easier by using RFID cards which are attached to each product in the mart.
- User Friendly cart
- Easier Management
- Time consumption for shopping is reduced.

B. *Proposed System:*

Our proposed system is a simple automatic billing system whose main aim is to kill queuing time at billing counter by using RFID Technology. This **smart cart** lets you know the item description just by tapping to reader. This smart cart allows you to:

- Add item to cart
- Delete unnecessary items from cart at any time irrespective of order.
- Lets you know no of items purchased and total bill at any time.
- It facilitates customer to know complete details of their shopping through webpage.

C. *Materials used*:

The hardware elements employed in the building this project area unit

- NodeMCU:
  NodeMCU is associate ASCII text file Lua based Firmware and development board specially targeted for IoT based applications. It includes firmwae that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware that's supported the ESP-12 module.
- EM18 RFID Reader :
  It is a module that reads the ID data keep in RFID cards. This ID data is exclusive for each TAG that can't be derived.
- RFID Cards:
  Passive RFID systems use tags with no internal power supply associated instead area unit hopped-up by the magnetic force energy transmitted from an RFID reader. The cheaper price purpose per tag makes using passive RFID systems economical for several industries.
- I2C Module:
  I2C Module has associate built-in PCF8574 I2C chip that converts I2C serial data to parallel data for the LCD display. These modules area unit presently provided with a default I2C address of either 0x27 or 0x3F. ... With this I2C interface module, you'll be able to understand information show via solely two wires.
- 16x2 LCD:
  A 16x2 LCD can display 16 characters per line and there area unit two such lines. During this alphanumeric display every character is displayed in an exceedingly 5x7 component matrix. This 16x2 intelligent character set matrix show is capable of displaying 224 completely different characters and symbols.

The software used for developing this project is ARDUINO IDE

Arduino IDE is an open platform that allows coding the sensors or some electrical components in order to get required results just by uploading the code into the variety of boards by using the libraries. It also provides many input and output devices.

IV. **MODELING AND WORKING**

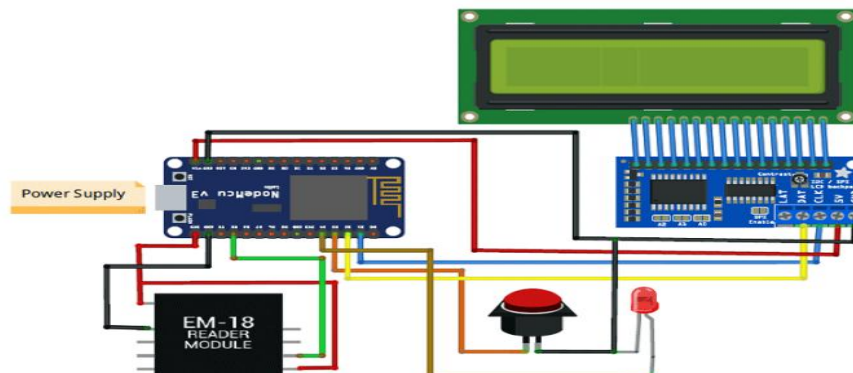Step 1: Connect the Circuit as shown

Figure 1: Circuit diagram

Step 2: Programming NodeMCU

Step 3: Find out distinctive twelve-digit code for RFID card:

First, we want to search out the twelve-digit RFID card distinctive code. RFID cards contain a twelve digit unique code associated they may be decoded by using an RFID reader. Once the RFID card is swiped close to the Reader, the Reader can provide the unique codes via the output port once it's connected to NodeMCU. First, connect

the NodeMCU to the RFID reader as per the circuit diagram so transfer the code below to NodeMCU. When with success uploading the code, open the serial monitor and set the baud to 9600. Then swipe the cardboard close to the Reader and you'll be able to currently see the twelve digit code on the serial monitor as shown below. Try this method for all the used RFID card and note it down for future references.

Step 4: Upload and execute the complete code

Now connect all the modules and components as shown in Figure1.Then start coding the NodeMCU stepwise. Soon after completion of writing code in sketch compile the code for warnings and errors before uploading it to the device. After successful compilation upload the code to NodeMCU.

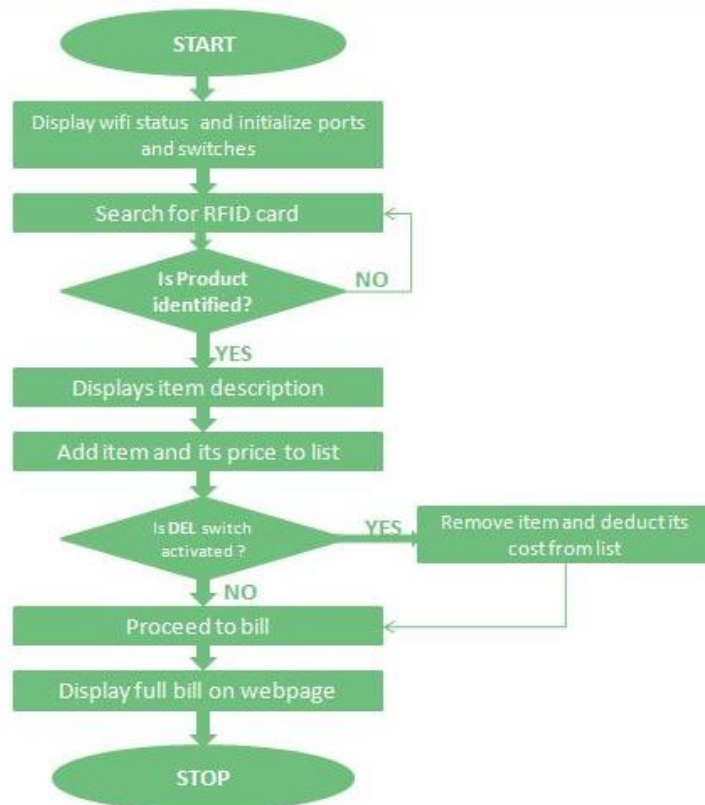This is how the Smart trolley works

Figure2: Flowchart of the project

Connect NodeMCU through a USB cable. The LCD in the hardware displays "welcome to trolley billing" after some delay it displays "Pls add items to cart" then add the items to the cart by keeping RFID card near the RFID reader then product description can be seen on the LCD display. While adding the items we can delete an item by pressing the delete switch. Then LCD displays as "removed the item" then remove the item. After completion of adding items to the cart, swipe the exit card to displays the total bill. The total bill can be seen on the LCD screen and also the complete details of the products shopped are mentioned on the webpage. This is how the smart trolley works.

V. SIMULATION RESULTS

Figure 3: Adding items to cart

Figure 4: Display of bill on webpage

VI. CONCLUSION AND FUTURE WORK

A. *Future Scope*

- Development of projects can be done in many ways, where RFID tags can be replaced by RFID stickers that are small in size, low cost.
- Security is often improved by count the number of things or putting weight sensors among the cart for tallying the load and obtaining all the categories of product names once the cart is more experienced in a selected aisle exploitation camera module..
- Multiple RFID tags can be read using a single RFID reader for more number of products that are added to the cart.

B. *Conclusion*

As soon as the item is tapped near the reader LCD display the item description and stores the data. After the completion of shopping, the total bill can be viewed through the webpage and you can add or remove items from the cart before you clear the bill. Customers can pay the bill via net banking or cash. Thus, using this smart cart makes shopping smoother and easy.

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