



# SMART SHOPPING CART

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**Abstract:** Now a days shopping at the mall have become a daily routine in big cities. People buy a different product and deposit them in the trolley. The modern technology has increased the standard of living for the humans. This resulted in large crowds at shopping malls. To handle the large crowd, we must reduce the process of the billing time. This is done using smart shopping system based on RFID. Items that are put in a smart shopping cart are read one by one and the bill is generated and displayed. After the final bill is generated the customer pays the bill by using their Pre charged cards provided by the shopping mall. The aim is to reduce the time consumption needed for the billing system. After total purchase one need to go to billing counter for the payment which is very time consuming and at times very frustrating. So our main objective for designing this prototype is to reduce the human efforts, eliminate the queue and also eliminate the time taken during billing. Our prototype consist of components such as RFID tags which is used for identification of the product, RFID reader which is used for scanning of product when put in the trolley and it display in the LCD Display. So at the billing counter the data is sent into the server.

## I. INTRODUCTION

Throughout the century many of the innovations and information technologies are drastically changing and so as our views and expectations. A main thing where human spend maximum time is shopping. According to survey we can say human spend approximately 1 to 1.5 hours for shopping and most of the customers will always tend to walk out of a queue if it is long. In modern world, in every supermarkets and malls have shopping trolley and baskets for customers to store the purchased products. When shopping is done customers have to proceed to checkout at the billing counter. Here this billing process is quite time consuming and have to employ more human resource at the billing section. To overcomes this problem, we are implementing RFID based smart trolley system to minimize the rush, save time and human efforts. Our prototype has some enhanced features which will overcome this queue issue. The smart trolley system is equipped with RFID tag, RFID reader, LCD Display, Arduino Uno ,Buzzer. The RFID tag is attached to a product. Time is most important thing in everyone's life, no one wants to waste their time on standing in the queue. But while shopping everyone spends a lot of time on payroll by standing in line. In a festival season, the crowd is usually high and billing time will increase automatically. Therefore, the main aim of this automated trolley is to reduce the shopping time. The customers themselves can make billing without waiting on the queue to make payment, so it is easy for the customer to measure the bill and also different online payment methods are provided by the automated trolley. The shopping centres can lessen the labour supply at charging counters and space occupation which decreases endeavours and ventures. These can be used to improve the quality and consumer experience. More items can be placed to attract customers instead of billing counters. Nowadays, if customer would like to buy something at a shopping mall, customers need to take the particular products from the display shelf and then queue up and wait for their turn to make payment at the billing counter. Problem will surely arise when the size of a shopping mall is big and sometimes consumers don't even know where certain items are placed. Besides, customers need to stand for a long time at the cashier counter for making payment. This condition will surely become worst during the

holidays or during the season of big sales. Lot of improvements is required in the traditional billing system to improve the quality of shopping experience to the customers. And currently barcode technology is used for billing. In this method, there are bar code labels on item. Person should be present here to scan the bar code. The main problem with barcode technology is that only product can be scanned at a time and direct sight of light required between the bar code and bar code reader. When lot of products is to be scanned, it makes billing process slow and results in long queue at billing counters. When a person puts that product in the trolley the RFID reader automatically scans the products and the details regarding the product name, cost is displayed on the LCD. When the customer is done with the shopping the details is sent to the server and customer have to just pay the amount and leave the counter. Thus, it has the potential to make the shopping more pleasurable, easier and efficient for the customer. In Supermarket, Customers come to purchase various products and pay for that. Supermarket needs to generate a bill for customer and after bill generation, customer needs to stand in a long line for billing purchased products. Hence we are trying to develop a Smart Trolley that can generate bill and customer can pay the bill with the help of swapping machine in the smart trolley. So the customers can save their valuable time. The main aim of this project is to provide Smart shopping trolley which will be autonomous in operation. The Smart shopping trolley system consists of three components a) Server Communication Component which contains connection with the cart and the main server. b) User interface and display component. c) Automatic billing component. The implementation of cost effective Smart Shopping cart with the help of wireless sensor networks which is convenient for Supermarket and will reduce the man power. In The Smart Shopping cart we make a use of wireless sensor networks such as internet that will send the information read by the barcode reader to the main server of the Supermarket and to the customers smart phone. Microcontroller based design has received the status of most happening field of electronics. This field has a power of integrating thousands of transistors on a single silicon chip. Thus the Smart Trolley contains barcode scanner and a customer needs to place the product in front of the barcode scanner. The corresponding information will be displayed on the display. Customer can pay and collect the bill at the billing counter. This Smart Shopping trolley contains a barcode scanner and swapping machine so no need to go at billing counter, total bill will be sent to the customers smart phone which also reduce the usage of paper The Smart Shopping trolley has a cart which is fully enclosed which has opening and closing system which will reduce the stealing of products.

## II. PROBLEM STATEMENT

1. Inefficient Inventory Management: Traditional retail systems struggle with accurate and real-time inventory tracking. Inefficient inventory management leads to stock outs, overstock situations, and increased operational costs. 2. Limited Customer Engagement: Conventional shopping carts lack interaction and engagement features for customers. Opportunities for personalized promotions, product recommendations, and targeted advertising are not effectively utilized. 3. Loss Prevention: Shoplifting and unauthorized product removal pose a significant challenge for retail stores. Existing security measures are often reactive rather than proactive. 4. Manual Checkout Process: Traditional checkout processes are time-consuming and may lead to long queues. Human errors in scanning and billing contribute to customer dissatisfaction. 5. Data-Driven Decision Making: Retailers lack comprehensive data for making informed decisions. The absence of real-time analytics impedes the ability to adapt quickly to market trends and consumer behaviour.

## III. OBJECTIVES

- ENABLE ITEM SCANNING AND AUTOMATIC PRICE UPDATES.
- PROVIDE REAL-TIME STORE NAVIGATION AND PRODUCT LOCATION GUIDANCE.
- ENSURE PRECISE TRACKING OF ITEMS AND TOTAL COST.
- OFFER PERSONALIZED PRODUCT RECOMMENDATIONS AND PROMOTIONS.

IV. BLOCK DIAGRAM

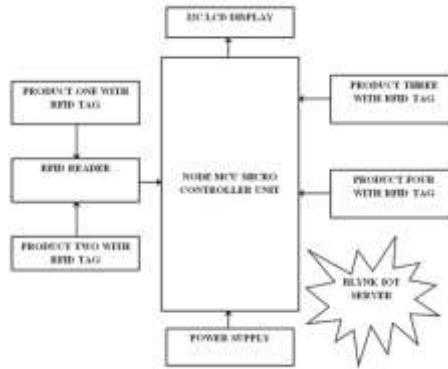


Fig 1: Block diagram

V. COMPONENTS AN DISCRIPTION

- NODE MCU MICROCONTROLLER
- RFID READER
- RFID TAG
- I2C LCD DISPLAY
- POWER SUPPLY SOFTWARE REQUIREMENTS:
- ARDUINO IDE
- BLYNK SERVER

HARDWARE DISCRIPTION:

**1. NODEMCU ESP8266:** This is the main controller board that manages the operation of the smart shopping trolley. It is responsible for interfacing with the RFID reader, I2C LCD, and connecting to the Blynk cloud.

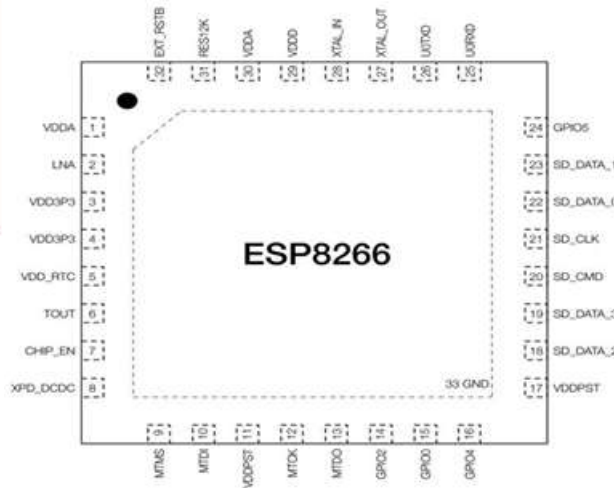


Fig 2: Node MCU ESP8266

**2. RFID READER:** Used for scanning RFID tags on products. It allows users to add or remove items from the shopping trolley.



Fig 3: RFID Reader

**3. I2C LCD:** An LCD screen that uses the I2C communication protocol for displaying information. In this project, it is used to monitor and display the total amount of the items in the shopping trolley.



Fig 4: I2C LCD

**4. BLYNK CLOUD:** A cloud service that allows the NodeMCU to send data to a mobile app for monitoring and control. The NodeMCU sends the total amount of the items in the shopping trolley to the Blynk cloud.



Fig 5: Blynk cloud

**5. POWER SUPPLY:** A power source, such as a battery or power bank, that provides power to the NodeMCU and other components of the smart shopping trolley.

## VI. LITERATURE SURVEY

[1]. Akshay Kumar, S Balamurugan, S Balaji, Marimuthu R, "Smart Shopping Cart", This project mainly focused on autonomous technology to scan the products and store it in mobile database and payment is through mobile banking, 2017.

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## VII. ADVANTAGES AND APPLICATIONS

### ADVANTAGES

Reduces time spent at billing counter and increases customer satisfaction.

- This can reduce the expenses incurred by the management.
- Users can be aware of the total bill amount during the time of purchase which prevent them from over shopping.
- Increases overall efficiency.
- Allows quick checkout and eliminates waiting in long queues

### APPLICATIONS

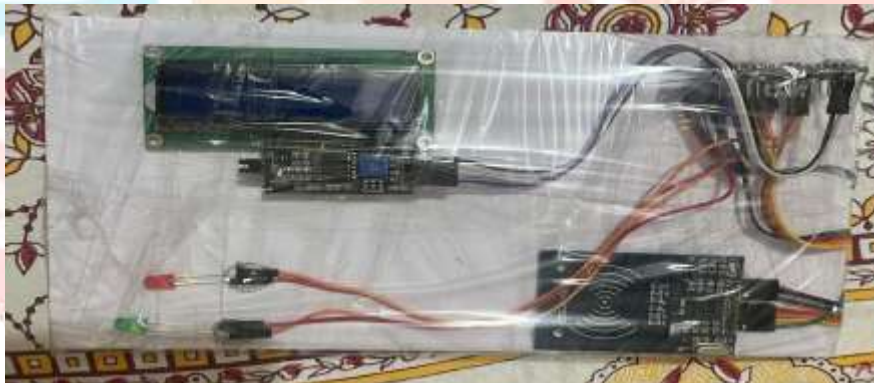
**Automatic Checkout:** Smart carts can scan items as they are placed in the cart, allowing for a seamless checkout process without the need to stand in line.

**Inventory Management:** They can track the items in the cart and provide real-time inventory updates, helping store managers with stock control.

**Navigation and Guidance:** Equipped with GPS or in-store maps, smart carts can guide shoppers to specific products or promotions within the store.

**Personalized Recommendations:** By analyzing shopping history or preferences, they can suggest products or offer personalized discounts.

## VIII. RESULT AND DISCUSSION



It speeds up the checkout process by scanning items as you add them, potentially eliminating the need for a traditional checkout line. Reduces errors in item counts and prices by automating these tasks.

## IX. CONCLUSION

Thus with the help of the conclusion we say that, Automatic billing of products by using RFID technique will be a more viable option in the future. The system based on RFID technique is efficient, compact and has promising performance. Also, RFID is better and faster than barcode reading because the later works on line of sight which is not the case for RFID technique. This will take the overall shopping experience to a different level. Different parameters such as the system parameters of smart trolley like product name, product cost, product weight etc. are display.

## X. ACKNOWLEDGMENT

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