

Smart Shopping Trolley with Automatic Billing Using Arduino

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Abstract – A smart shopping trolley aims to eliminate the need for manual billing and reduce waiting time at counter. This project uses Arduino, RFID technology and an LCD display to identify items placed in a shopping cart and automatically calculate the bill in real time. Each item is tagged with an RFID card that is read by an RFID reader attached to the trolley the system adds the item's cost to total and displays it on an LCD screen. The design is low-cost and scalable, making it suitable for smart retail applications.

Key Words: Trolley, RFID, LCD, Display.

1.INTRODUCTION

Introduction: SMART SHOPPING TROLLEY WITH AUTOMATIC BILLING USING ARDUINO

In today's fast-paced world, supermarkets and shopping malls face a common problem of long billing queues. Customers often spend a lot of time waiting at the billing counter after selecting their products. This problem can be solved by using modern technologies such as **RFID and microcontrollers** like Arduino.

The **Smart Shopping Trolley with Automatic Billing using Arduino** is an innovative system designed to simplify the shopping experience. In this system, each product in the supermarket is attached with an RFID tag, and the shopping trolley is equipped with an RFID reader, Arduino controller, display unit, and wireless communication module. When a customer places a product in the trolley, the RFID reader scans the tag and automatically adds the product information and price to the bill.

The total bill is displayed instantly on the LCD screen attached to the trolley. If the customer removes a product, the system automatically updates the bill. At the end of shopping, the final bill can be sent to the billing counter or stored in the system, which reduces waiting time and improves efficiency.

This system helps to:

- Reduce long queues at billing counters
- Save customer time
- Improve shopping convenience
- Provide accurate and automatic billing

Thus, the Smart Shopping Trolley system using Arduino provides a **smart, fast, and efficient shopping solution** for modern supermarkets and malls.

2. Objectives

To design and develop a smart shopping trolley system using Arduino that:

- Automatically detects products via RFID
- Calculates and displays the total bill
- Reduces the checkout time
- Provides a low-cost solution for retail automation

3. System Design

[RFID Tag]

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[RFID Reader]

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[Arduino Controller]

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[LCD Display] [Push Button]

You can also include a properly drawn diagram using tools like **Draw.io**, **Fritzing**, or PowerPoint

Fig -1: Block Diagram

3. CONCLUSIONS

The Smart Shopping Trolley with Automatic Billing is an innovative solution to improve the efficiency of shopping in retail environments. By automating product identification and billing, it reduces the workload of cashiers and enhances the customer experience. With further development, this system can be integrated into large-scale retail environments with advanced features like online payment and inventory tracking.

REFERENCES

- Arduino Documentation: <https://www.arduino.cc/>
- MFRC522 RFID Library: <https://github.com/miguelbalboa/rfid>
- I2C LCD Library: https://github.com/johnrickman/LiquidCrystal_I2C
- Research papers on RFID in retail
- Tutorials from electronics platforms (e.g., CircuitDigest, Electropeak)