Synopsis

on

SelfScanX

in partial fulfilment for the award of the degree of

BACHELOR OF ENGINEERING

IN

Branch Name

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1. **Introduction and Literature Review**

INTRODUCTION

Shopping can be frustrating with long lines and slow checkouts. In metropolitan cities, shopping malls get incredibly crowded on weekends and holidays, especially during big sales and discounts. Shoppers fill their trolleys with items and then head to the counter for billing. The cashier uses a barcode reader to generate bills, but this can be time-consuming, leading to long queues at the billing counters.

SelfScanX on carts will let the customers scan items, track prices, and pay instantly, making shopping faster and more convenient with digital payments, loyalty programs and security features.

2.Problem definition and objectives

PROBLEM:

Shopping should be a smooth and enjoyable experience, but long checkout lines often make it frustrating. Customers end up spending more time waiting than actually shopping, especially during busy hours. Cashiers have to scan each item manually, which slows down the process and causes delays at billing counters. This leads to impatience, abandoned carts, and shoppers opting for stores with quicker checkout options. For cashiers, handling large crowds can be exhausting, increasing stress and the chance of errors. Traditional checkout systems also fail to keep up with modern conveniences like digital payments, loyalty programs, and security features, making the whole experience less efficient for today's tech-savvy shoppers.

OBJECTIVES:

Our goal is to create **SelfScanX**, a smart self-checkout system that makes shopping faster and easier. With SelfScanX, customers can scan items, check prices, and pay instantly—all from their shopping carts. This means no more long checkout lines or waiting at the billing counter. It also lightens the workload for cashiers, making the whole shopping experience smoother, more convenient, and hassle-free.

1.No More Long Lines – With SelfScanX, customers can scan and pay for their items directly from their carts, eliminating the frustration of waiting in long checkout queues.
2.Lightening the Load for Cashiers – By handling the scanning and payment process, SelfScanX reduces the pressure on cashiers, helping them avoid stress and mistakes during busy hours.

3.Proposed Solution and Methodology

SOLUTION

- **Scan and Pay in Your Cart** – Customers can scan items as they shop and make instant digital payments, bypassing traditional checkout lines.
- **User-Friendly Interface** – The cart's intuitive touchscreen makes it easy to track the total, apply discounts, and use loyalty rewards.
- **Faster Checkout** – Eliminates long wait times, speeding up the shopping experience for customers and reducing cashier workload.
- **Secure Transactions** – Features encrypted payment processing and anti-theft measures for safe and smooth payments.
- **Effortless Support** – Customers can call for cashier assistance when needed, without disrupting the checkout flow.

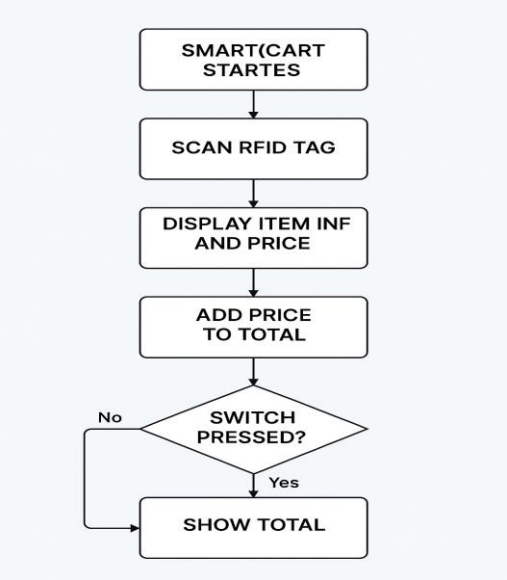
TOOLS/SOFTWARE USED:

1. ESP-32
2. RFID-tag
3. RFID-scanner
4. LCD display
5. Buzzer
6. LED
7. Jumper wires
8. Switch
9. Arduino IDE
10. HTML

METHODS:

1. **Set up ESP32** with Arduino IDE or ESP-IDF.
2. **Connect RFID module** to ESP32 (SPI: SDA→D21, SCK→D18, MOSI→D23, MISO→D19, RST→D22).
3. **Connect LCD** (I2C: SDA→D4, SCL→D5).
4. **Connect Buzzer** to D15, **LED** to D2, and **Switch** to D0.
5. **Program logic**:
    a. Detect RFID tag.
    b. Match tag → show item name & price on LCD.
    c. Sound buzzer, blink LED.
    d. Add price to total.
6. **Press switch** to view final bill or reset.

FLOWCHART:



4.Key Findings/ Results

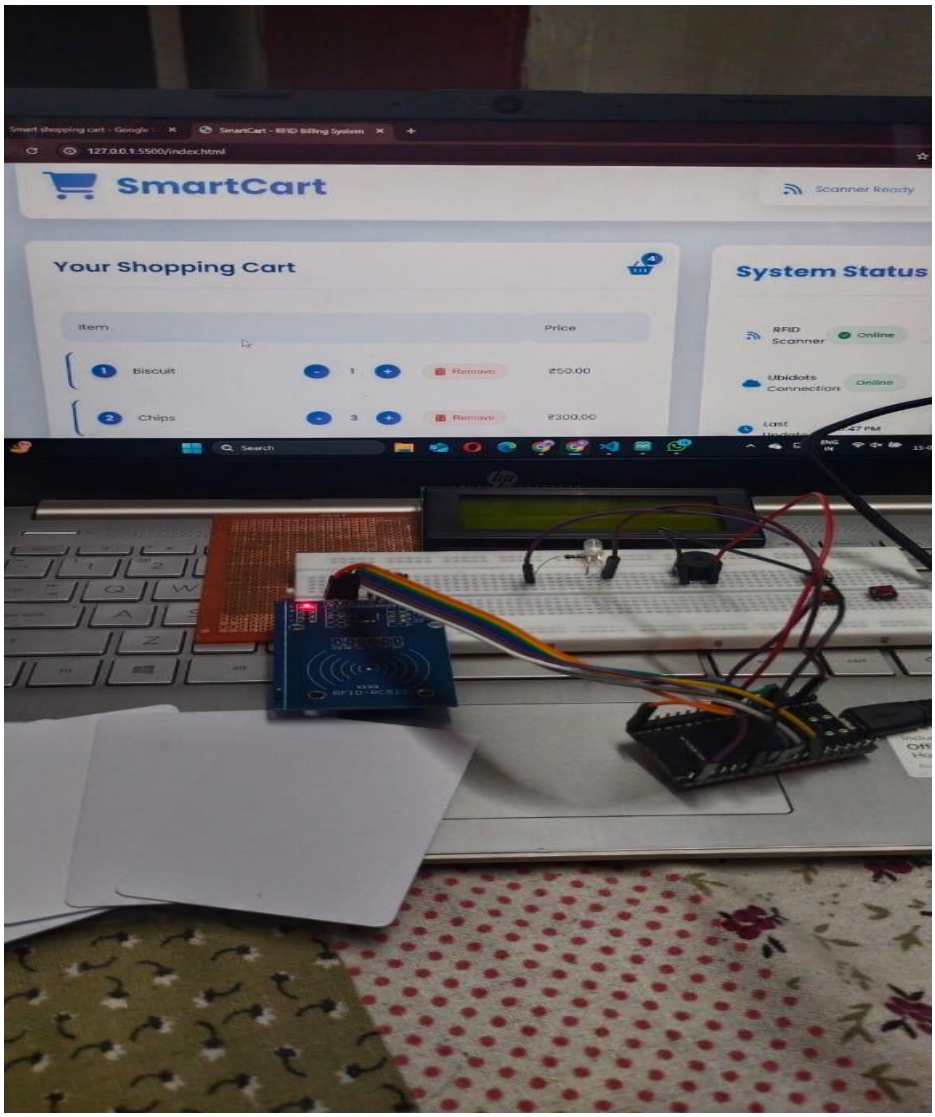
1. Successful RFID-Based Scanning
• The RFID reader accurately detected RFID tags within a range of 2-5cm.
• Each scan took < 2 seconds to register on the LCD display

2. ESP32 Performance
• The ESP32 handled SPI communication (RFID) + I2C (LCD) without lag.
• Power consumption was manageable (~100mA) when active.

3. Basic Checkout Simulation : The system displayed:
• Product ID
• Price
• Running total

4. Cost & Scalability
• **Total prototype cost:** 1400 INR
• Could be expanded with weight sensors, databases, or mobile apps in the future.

IMAGE:


SmartCart
Scanner Ready
Your Shopping Cart
System Status
Item
Price
Biscuit
Chips
₹50.00
₹300.00
RFID Scanner
Online
Ubidots Connection
Online

5.Conclusion & Learning

The **SELFSCANX** project successfully demonstrates the implementation of a smart checkout shopping cart using ESP32, RFID technology, an LCD display, and a breadboard-based circuit. This system eliminates the need for traditional checkout counters by allowing customers to scan products automatically via RFID tags, view their purchases on an LCD, and complete payments seamlessly.

By integrating IoT capabilities with RFID-based identification, the project enhances the shopping experience by reducing waiting times and improving efficiency. The ESP32 serves as the central processing unit, managing data from the RFID reader and displaying real-time information on the LCD.

Future improvements could include cloud-based transaction logging, weight sensors for verification, and mobile app integration for a more robust solution.

In conclusion, **SELFSCANX** presents a cost-effective, scalable, and user-friendly approach to modern retail automation, paving the way for smarter, contactless shopping experiences.

6. REFRENCES:

1. https://justdoelectronics.com/smart-shopping-cart-with-automatic-billing-system-using-arduino/