

LITERATURE REVIEW

1.DATA TRANSMISSION USING RFID SYSTEM ON SMART SHOPPING CARTS FOR CHECKOUT PROCESS EFFICIENCY IN SUPERMARKET AT INDONESIA

The traditional supermarket checkout process often results in long queues, leading to customer dissatisfaction and reduced store loyalty. This research introduces a Smart Shopping Cart system that leverages RFID technology to streamline the checkout process. The system integrates an RFID-enabled cart, a mobile application, and a centralized database, allowing customers to scan products in real-time as they shop. The RFID system eliminates barcode scanning delays, reducing checkout time significantly. Implemented using Arduino Uno, Flutter, PostgreSQL, REST APIs, and React, the system enables efficient data transmission and real-time transaction updates. Experimental results indicate that checkout efficiency improves as the number of items and customers increases. This innovation presents a scalable solution to enhance the shopping experience while optimizing supermarket operations.

2.SMART SHOPPING CART USING RFID TECHNOLOGY

The increasing limitations of barcode-based shopping systems, such as low range, security concerns, and manual scanning delays, necessitate a more efficient alternative. This research presents an IoT-based Smart Shopping Cart utilizing RFID technology to enhance the shopping experience. Each product is tagged with an RFID chip containing essential details like product ID, brand, price, and expiry date. A RFID reader integrated into the shopping cart detects added or removed items in real-time, displaying updated billing information on an LCD screen. Customers can log in via a mobile application, and the billing process is automated, eliminating checkout queues and reducing manpower requirements. Additional features such as inventory management, stock monitoring, and automated payment processing further enhance operational efficiency. The system is user-friendly, secure, and scalable, making it a promising solution for modernizing the retail sector.

3.IoT-based Smart Shopping Cart using RFID

The traditional shopping experience is often hindered by long checkout queues and manual scanning inefficiencies. This study presents an IoT-based Smart Shopping

Cart equipped with RFID technology, Arduino microcontroller, and Bluetooth connectivity to enhance the shopping process. Each product is embedded with an RFID tag, which is automatically scanned when placed in the cart. The real-time billing system, displayed via a mobile application, eliminates the need for barcode scanning and reduces checkout time. Additionally, the system integrates inventory management, automated billing, and wireless data transmission to a central server for seamless operations. By leveraging RFID-based automation, this approach minimizes human intervention, enhances security, and provides a scalable, user-friendly solution for modern retail environments.

4.RFID BASED SMART SHOPPING CART FOR SMART SHOPPING ENHANCED WITH IOT

In today's fast-paced world, shopping malls and supermarkets often face challenges such as long queues and reduced social distancing, especially during peak times. This project aims to address these issues by implementing an RFID-based smart shopping cart system enhanced with IoT technology. Each product in the mall is tagged with RFID tags, and the shopping carts are equipped with RFID readers and LCD screens. As customers add or remove items from the cart, the system automatically updates the total bill and displays the item details on the screen. This not only streamlines the billing process but also minimizes physical contact, promoting better social distancing. The integration of a Wi-Fi module allows for seamless data transfer to a central billing unit, enabling customers to pay their bills online and save time. This innovative approach leverages IoT to create a more efficient and customer-friendly shopping experience, reducing the need for manual billing and enhancing overall convenience.

5.IOT-BASED SMART SHOPPING CART USING RFID TECHNOLOGY

This paper presents an innovative approach to streamline the shopping experience by introducing an IoT-based smart shopping cart system using RFID technology. The

system aims to reduce the time spent in long queues at billing counters by automatically recognizing products added to the cart and displaying the necessary details on an LCD screen. The smart cart is equipped with an RFID reader, Arduino microcontroller, GSM module, and a keypad, enabling it to generate a bill for each item added. This technology not only enhances the shopping experience by minimizing wait times but also promotes better social distancing, especially during the COVID-19 pandemic. The proposed system is user-friendly and cost-effective, making it accessible to a wide range of consumers. By integrating RFID technology with IoT, the smart shopping cart offers a seamless and efficient solution to the traditional billing process, ultimately improving customer satisfaction and operational efficiency in supermarkets and shopping malls.

6.RESEARCH ON SMART SHOPPING CART

In metropolitan cities, shopping malls often experience significant rushes during holidays and weekends, especially when there are large offers and discounts. Currently, customers purchase a variety of items and place them in a trolley, then proceed to the counter for billing, where a cashier uses a barcode reader to prepare the bill, leading to long queues. This project proposes a framework to address this issue by equipping all merchandise with RFID tags and each trolley with an RFID reader and digital display screen. When an item is placed in the trolley, its code is automatically recognized, and the item name and cost are displayed on the LCD, adding the expense to the total bill. If an item is removed, the amount is deducted from the total, and the information is sent to the central billing unit through a ZigBee module. This system allows billing to be done in the trolley itself, saving customers a significant amount of time. The proposed system enhances the shopping experience by reducing wait times and promoting better social distancing, making it a more efficient and customer-friendly solution for shopping malls.

7.DESIGN AND DEVELOPMENT OF RFID-BASED SMART SHOPPING CART USING ARDUINO

In the present era of socio-economic development, technologies have been contributing not only to improving supply chain management but also to enhancing customer facilities and satisfaction. Shopping centers and city malls have become essential services in society, where customers can see, choose, and collect items as per their requirements and convenience. However, these places often experience high rush, leading to long queues at billing counters. The proposed system is a smart shopping cart equipped with an RFID reader, on-board buttons, a microcontroller-based Arduino board, and an LCD display. The smart cart detects items, allows customers to add or remove items from the bill, and sends the final billing information to a central server using a Wi-Fi module. This flexible shopping system provides better information, automatic billing generation, and centralized record-keeping, ultimately enhancing the functionality of shopping centers and reducing the workload on employees.

8.ENHANCED SHOPPING EXPERIENCES: THE ROLE OF RFID TECHNOLOGY IN SMART CARTS

This paper explores the integration of RFID technology into smart shopping carts to enhance the shopping experience in supermarkets. The proposed system aims to address common customer issues such as long queues and overspending by automatically calculating the total cost of items in the cart. The smart cart is equipped with an RFID reader, LCD screen, and Arduino device to scan items for price and barcode details, displaying the cost on the screen and updating the total bill. This technology reduces the burden on cashiers, minimizes congestion at checkout counters, and saves time and effort during the billing process. The system's ability to detect and tally items as they are added to the cart streamlines the shopping experience, making it more efficient and customer-friendly. The integration of RFID technology in shopping carts represents a significant advancement in retail innovation, offering benefits such as reduced wait times, improved customer satisfaction, and enhanced operational efficiency in supermarkets.

9.SMART SHOPPING CART USING RFID

Optimizing the shopping experience is essential for both customers and businesses in the dynamic world of retail. This research study offers a revolutionary solution called the "Smart Shopping Cart," which uses Radio-Frequency Identification (RFID) technology to speed up the shopping experience. This ground-breaking solution promises to boost shopping cart functionality, enhance inventory control, and provide customers with a smooth purchasing experience. The Smart Shopping Cart makes use of an integrated RFID reader system and RFID tags that are attached to each product. It enables automatic item tracking, doing away with the requirement for human checkout scanning. This technologically advanced method cuts down on consumers' wait times at the register and minimizes pricing and item recognition mistakes, enhancing their entire shopping experience. Moreover, the system incorporates real-time inventory management features, enabling retailers to monitor product stock levels efficiently. This results in reduced out-of-stock occurrences and optimized supply chain operations, benefiting both retailers and consumers. Additionally, the Smart Shopping Cart can provide personalized shopping recommendations and promotions, enhancing customer engagement and loyalty. This research paper examines the Smart Shopping Cart's technical implementation, RFID integration, data processing, and security. It analyzes potential benefits, environmental impact, and ethical concerns, focusing on efficiency, reduced operational costs, and customer satisfaction. In conclusion, the Smart Shopping Cart, which makes use of RFID technology, presents a solution that has the potential to change the way people shop currently, to the advantage of both customers and businesses. This innovation offers a tremendous chance for shops looking to stay competitive in the digital age to increase productivity, cut costs, and provide a better shopping experience. This study gives helpful advice for the effective implementation of RFID-based Smart Shopping Carts in the retail sector as well as insights into their potential.

10.SMART SHOPPING CART

This paper presents a smart shopping cart system designed to reduce queues at billing counters in shopping complexes. The system displays the total price of products placed inside the cart, allowing customers to directly pay the amount at the billing counter and leave with their purchases. By eliminating the traditional scanning of products at the counter, the system speeds up the shopping process and helps customers plan their shopping more efficiently, buying only essential commodities and enhancing savings. The automated billing process reduces the possibility of human error and includes a feature to delete scanned products, further optimizing the shopping experience. The hardware for the test run is based on the Arduino platform and Xbee modules, popular in small-scale research and wireless automation

solutions. The system is user-friendly, with an interface for scanning products and an LCD display to show the total cost. The smart shopping cart aims to improve customer satisfaction by reducing wait times and operational costs for shopping centers, making it a cost-effective and innovative solution for modern retail environments.

CONCLUSION

In conclusion, the integration of RFID technology into smart shopping carts represents a significant advancement in retail innovation. The various studies and projects discussed highlight the potential of RFID-based smart shopping carts to streamline the shopping experience, reduce wait times at billing counters, and enhance overall customer satisfaction. By automatically recognizing and billing items as they are added to the cart, these systems minimize the need for manual scanning and promote better social distancing, especially in the context of the COVID-19 pandemic. The use of IoT and RFID technology not only improves operational efficiency for retailers but also offers a more convenient and user-friendly shopping experience for customers. As the retail industry continues to evolve, the adoption of smart shopping carts equipped with advanced technologies will likely become a standard practice, driving further innovation and improving the overall shopping experience.