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SMARTSHOPPINGTROLLEYBYUSINGRFIDTAG

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***Abstract*: The Smart Trolley using RFID technology is designed to improve the shopping experience in supermarkets by making it faster and more convenient. Currently, Customers spend a lot of time waiting in long queues at the billing counters, which can be irritating. In this system Radio Frequency Identification (RFID) technology is used. Each item in the store is attached with an RFID tag that stores product information such as the name, quantity and price.**

The trolley is equipped with an RFID reader that scans these tags when items are placed inside. As Customers add items to the trolley, the RFID reader

automatically detects them, and the system updates the total bill in real- time. A display screen on the trolley shows the current bill, allowing the customer to keep track of their purchases easily.

Once the customers are done with shopping, they can directly proceed final bill is transferred to a central system for payment. This reduces the need for manual scanning at the checkout and saves a lot of time. The RFID technology also help sin preventing theft, as the system can alert the store if someone tries to leave with unpaid items. This smart trolley system benefits both customers and store managers. For customers, it offers a simple and quicker shopping experience. For store managers, it improves efficiency and reduces the manpower needed at checkout counters.

Keywords—Real-time monitoring; RFID Tag; Wireless network;

I.INTRODUCTION

Nowadays many people go to shopping malls to purchase FMCG products. But due to growing population in cities shopping places are getting over crowded. As a result, customers have to wait in long queues for billing.

If people have to wait for a long time in queues, it becomes irritating for them and they might lose their interest.

The smart trolley system consists of an, RFID reader and LCD display. Each product is attached with an RFID tag.

A trolley is small transport device used to move significant load from one place to other. The smart trolley system consists of RFID tags which can be attached to the required products. An RFID reader which is used for scanning the products after putting them in the trolley. Generated bill consists of information like serial number, quantity of products and price. With every purchase the same procedure will be followed, customer can see updated total of bill throughout the purchases.

Customer has to give the trolley number displayed on LCD screen to cashier. As and when the bill is ready, the customer simply needs to pay and checkout.

II. OBJECTIVE

The objective of a smart trolley project is to automate the shopping experience and reduce the time spent waiting in long queue at the billing counter.

III. METHODOLOGY

The smart trolley system using RFID technology is developed to make shopping faster and more efficient. This section explains the steps involved in building and implementing the system

requirements. The readers transmit the data captured from the RFID tags to the Arduino unit, which acts as the central processing unit of the system. The Arduino unit processes the received data by retrieving product details from the database server.

A display on the trolley shows the name and price of each item, along with the total bill. If a customer removes a product from the trolley, the RFID reader detects it and updates the bill by removing the item's cost. This ensures that the total amount is always correct.

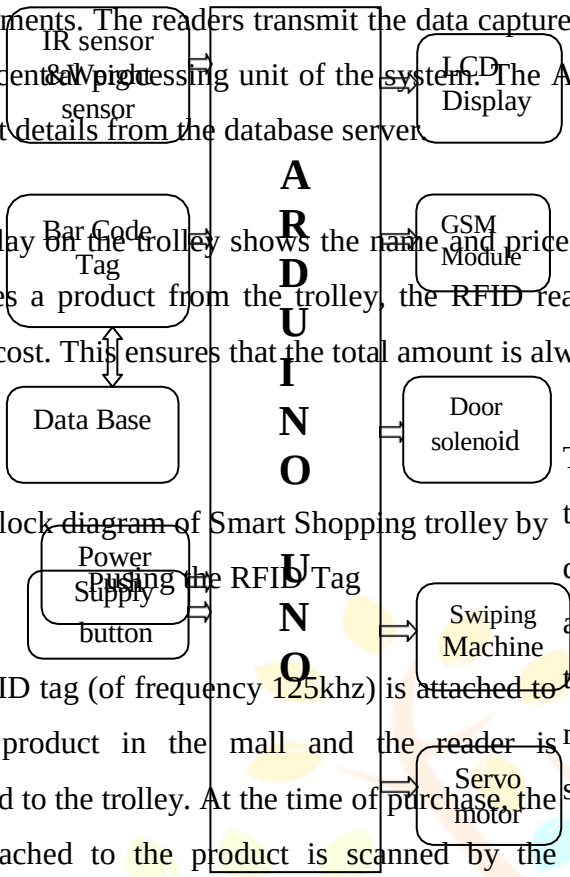


Fig. Block diagram of Smart Shopping trolley by Pushing the RFID Tag

An RFID tag (of frequency 125khz) is attached to every product in the mall and the reader is attached to the trolley. At the time of purchase, the tag attached to the product is scanned by the reader. RFID tags are integrated with product items, where each tag contains essential information such as the product name, price, and expiry date. These tags are strategically placed on the products to ensure accurate detection and reading during the shopping process.

Communication between the RFID readers and the Arduino unit is established through a specific protocol. RFID readers are selected based on their compatibility and performance

The system reduces the need for manual scanning at the checkout counter, saving time and reducing queues. Customer scan directly pay the final amount, as the billing is shown in real-time. By using RFID tags and readers, the smart trolley makes shopping more convenient and efficient for both customers and store managers.

RFID Tag:-

Fig.RFID Tag

RFID Tags on Products: Each item in the store is equipped with an RFID tag. These tags store important in formation about the product, such as its name, price, and unique ID. These tags are small and can be easily attached to any product.

RFID Reader:-

Fig. RFID Reader

RFID Reader on Trolley: The trolley is equipped with an RFID reader. The reader is responsible for detecting the RFID tags on the products when they are placed inside the trolley. It scans the tags automatically without the need of manual swiping or scanning each item.

ARUDINOUNO:-

Fig. Arduino Uno

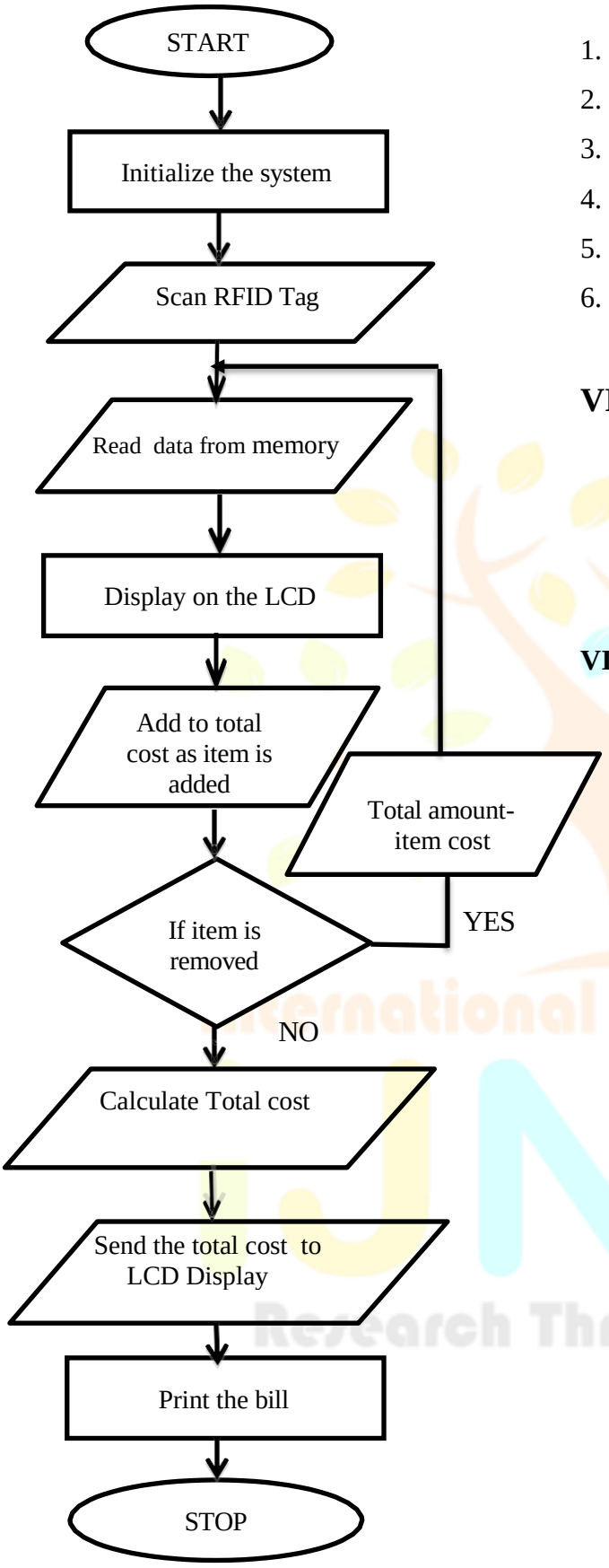
Microcontroller and Display: The trolley is fitted with a microcontroller, which is a small computer that processes the information from the RFID reader. Once an item is detected by the reader, the microcontroller calculates the total price by adding the cost of the scanned item to the over all bill. The updated bill is shown on a display screen attached to the trolley, allowing the customer to see the total cost of their items in real-time.

LCD Display:-

Fig. LCD Display

A 16*2 LCD Display is a liquid Crystal display that can show 16 characters in each of its two rows, providing a total of 32 characters of information. It's commonly used to display alphanumeric information in various electronic devices.

IV. FLOWCHRT



V. Advantages:-

1. Faster Checkout
2. Inventory Management
3. Error Reduction
4. Improve Accuracy
5. Time saving
6. Reduce Manpower

VI. Applications:-

1. It is used for Supermarket
2. It is used in shopping malls

VII. Features and Specifications

Feature	Specification
Frequency Band	215KHz
Arduino	Atmega2560
LCD	16×2LCD
Sensor	IR sensor
GSM module	SIM800L
Voltage	5-12V
RFID	EM-18RFID

VIII. CONCLUSION

The implementation of smart trolley using RFID Technology enhances the shopping experience and it reduces the wait time in queues. It is user-friendly. It reduces the unnecessary human efforts, with shopping and it also improves productivity of customer by reducing the billing queues.

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