SMART SHOPPING CART WITH AUTOMATIC BILLING SYSTEM USING RFID AND GSM MODULE

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Abstract: A shopping mall is a place where hundreds of customers visit every day to purchase many items. Nowadays shopping malls are increasing rapidly due to the availability of all the items ranging from groceries, clothes, vegetables, fruits, etc., in the commonplace. A trolley is required to collect the items in the shopping mall. The trolley has to be pulled forward or backward while collecting the items. After purchasing the product, the customer has to stand in a long queue for billing their products. To overcome this problem, we are developing intelligent trolleys for shopping malls. Every product in the shopping mall contains an RFID tag and the trolley is fitted with an RFID reader. When the customer drops the product in the trolley the reader reads the tag and displays the item and the amount in LCD which is fitted in the trolley. After the completion of shopping, the customer will press the finish button in the trolley, and the total bill is displayed on the LCD, and the bill is transferred to the main computer. The total bill of the customer will be received as a message through a GSM module.

Index terms – RFID Tags, Reader, LCD, GSM Module, Arduino NANO.

INTRODUCTION

In response to the evolving lifestyle and demands for convenience, shopping malls have become indispensable hubs for acquiring daily necessities. However, the traditional checkout process often entails long queues, leading to customer frustration and time wastage. To address this issue, innovative solutions like the Intelligent Trolley and Smart Shopping Cart have been proposed.

These systems leverage RFID (Radio Frequency Identification) technology to streamline the shopping experience. By affixing RFID tags to products and integrating RFID readers into shopping trolleys, the process of scanning items becomes automated and efficient. As customers add products to their carts, the RFID reader instantly detects each item, displaying its name and price on an LCD screen. This real-time visibility allows shoppers to monitor their purchases and make informed decisions.

As products are scanned, the total bill is dynamically updated, providing transparency throughout the shopping journey. Customers can easily remove items from their carts by rescanning them, ensuring accurate billing.

Once shopping is complete, customers can choose between cash or smart card payment options. The system deducts the bill amount from the customer's account balance, providing a seamless checkout experience. Furthermore, an SMS notification is sent to the customer's mobile phone, confirming the transaction.

These innovative systems not only enhance the efficiency of shopping malls but also improve the overall customer experience. By reducing wait times at checkout counter and it is more efficient and enjoyable shopping experience in malls.

LITERATURE SURVEY

In recent years, Radio-Frequency Identification (RFID) technology has gained significant attention in various domains, particularly in retail and shopping applications. RFID offers a wide range of capabilities, from enhancing product information retrieval to streamlining checkout processes. This literature survey aims to explore the evolving landscape of RFID-based shopping systems, focusing on advancements, applications, and challenges addressed by researchers and practitioners.

METHODOLOGY

The proposed system aims to revolutionize the shopping experience in malls by introducing intelligent trolleys equipped with RFID technology. Each product in the store is embedded with an RFID tag, while the trolley is outfitted with an RFID reader. As customers place items in the trolley, the reader automatically scans the RFID tags, displaying the item details and prices on an LCD screen integrated into the trolley. Upon completing their shopping, customers can press a finish button to view the total bill on the LCD screen. The bill is then transmitted to the main computer system, and customers receive the total bill amount as a message through a GSM module. This system streamlines the checkout process, eliminates the need for traditional billing queues, and enhances overall efficiency and convenience for shoppers in malls.
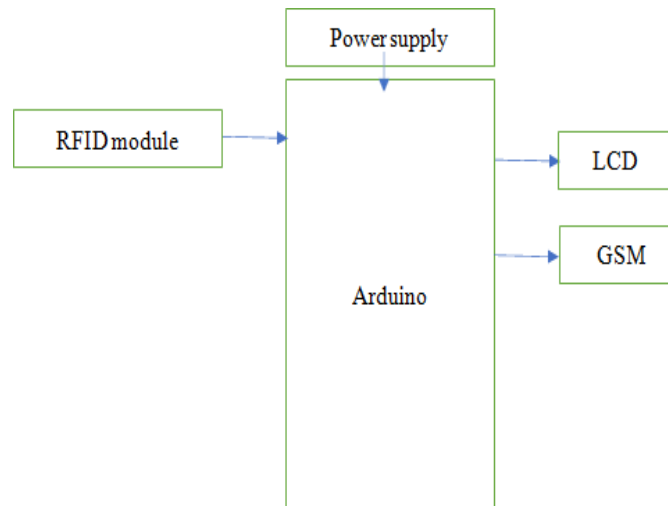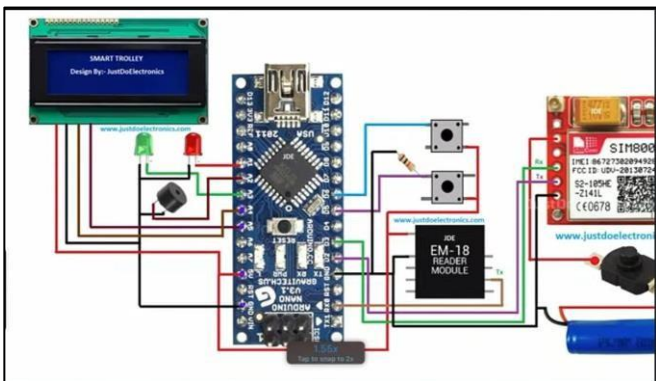
Fig 1 Block Diagram

RESOURCES USED

The materials involved in the smart shopping cart system involve the following electronics components:

1.   RFID Reader
2.   Liquid Crystal Display (LCD)
3.   Push buttons/Switch
4.   Reset button
5.   GSM module
6.   Arduino Nano
7.   LED (Red & Green)

CIRCUIT DIAGRAM

CONCLUSION

An intelligent smart shopping cart system was developed and worked as intended. The system developed can be integrated into grocery stores or shopping malls to create a smart shopping experience for customers.

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