NOVATEUR PUBLICATIONS
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY
[IJIERT] ISSN: 2394-3696 Website: ijiert.org
VOLUME 11, ISSUE 02, February -2024

"TECH SAVVY: SMART TROLLEY 2.0 INNOVATION SYSTEM"

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Abstract
The proposed Internet of Things (IoT)-based Smart Shopping Cart aims to eliminate the time-consuming and quality issues associated with waiting in supermarket queues. It consists of RFID sensors, Arduino microcontroller, Wi-Fi module, and a mobile application. RFID tags and readers read product information, which is displayed on the mobile app. The system can be easily implemented and tested on a commercial scale, making it more competitive than other models.

Keyword: RFID sensors, Arduino microcontroller, Wi-Fi module, and a mobile application.

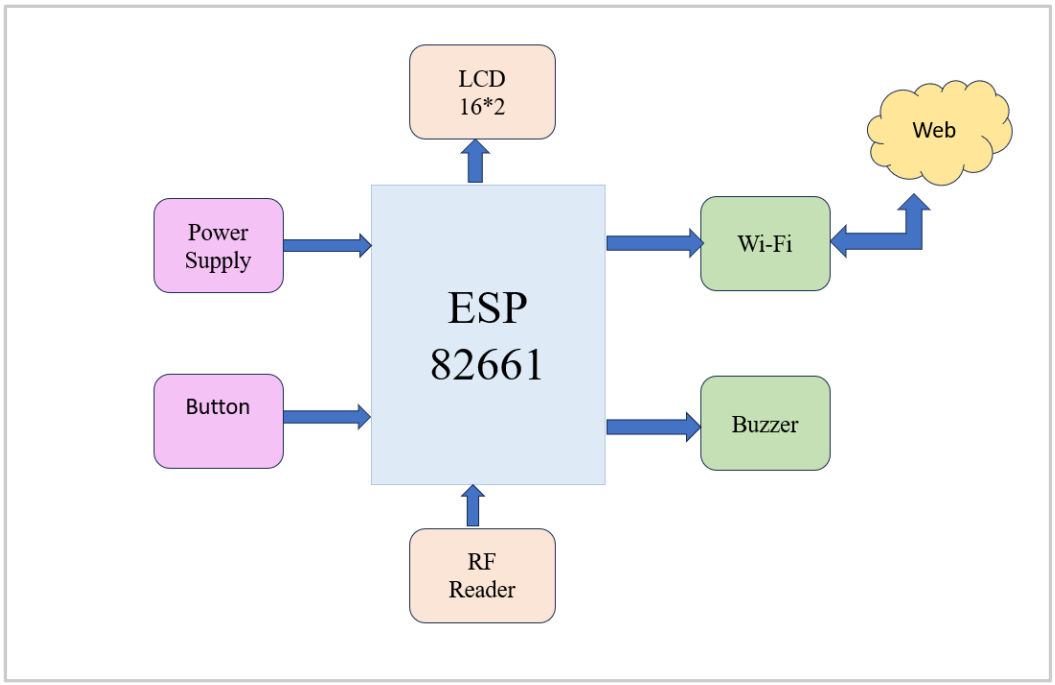
Introduction

Supermarkets now offer convenience for customers, with shopping trolleys being a popular choice. Sylvan Goldman, owner of Standard Food Market in Oklahoma, introduced the first shopping cart in 1909 after receiving complaints about carrying groceries. He patented a modern trolley and began experimenting with baskets to help customers carry their groceries. Today, various shapes of shopping trolleys are found in modern supermarkets.

In 2009, researchers began developing computerized context-aware shopping trolleys by attaching tablet computers to traditional trolleys. These interactive trolleys help customers find desired products and improve the shopping experience. The initial experiments showed that these prototypes could change the shopping experience.

Advanced research began integrating shopping trolleys with mobile robot concepts. The prototype integrated a shopping trolley with a portable mobile robot with human following functions, aiming to improve the shopping experience by carrying heavy loads for customers. The goal is to implement an automated shopping trolley that offers convenience and efficiency, eliminating human labour to push heavy trolleys. The objective is to navigate reachable routes to customers and avoid collisions with barriers.

Proposed System



Working

i.ESP 82661:

The ESP8266 is a versatile and affordable Wi-Fi module commonly used in IoT projects. It features a powerful microcontroller unit, making it capable of standalone operation or integration with other microcontrollers. Its low power consumption and built-in Wi-Fi capabilities make it ideal for connecting devices to the internet. With extensive community support and a wide range of libraries and resources available, the ESP8266 is a popular choice for hobbyists and professionals alike in creating connected projects, from home automation to sensor networks.

ii.Power Supply:

A power supply is a crucial component in electronic devices, providing the necessary electrical energy to operate them. It converts input voltage from a power source, such as a wall outlet or battery, into a stable output voltage suitable for the device's requirements. Power supplies come in various forms, including linear and switching types, each with its advantages and applications. Linear power supplies regulate voltage by dissipating excess energy as heat, offering simplicity and low noise but lower efficiency.

iii.Button:

A button is a simple yet fundamental component in electronics and user interfaces, typically used to trigger an action or signal when pressed. It consists of a conductive switch enclosed in a housing, with an exposed surface designed for user interaction. When pressed, the switch completes an electrical circuit, allowing current to flow and activating the associated function, such as turning on a device or sending a command to a microcontroller. Buttons come in various shapes, sizes, and configurations, including momentary and latching types.

iv. RF Readers:

RF readers on smart trolleys are essential components that scan and identify RF tags on products placed in the trolley. These readers enable automatic item tracking and can be used for various purposes, including inventory management, theft prevention, and personalized shopping experiences.

v. LCD 16 x 2:

A smart trolley uses RFID tags to display product information on an LCD screen. When an RFID-tagged item is placed in the trolley, the RFID reader reads the tag, and the LCD screen shows details about the product, such as its name, price, and description. This helps shoppers easily access information about the items they're adding to their cart.

vi. Buzzer:

A buzzer on a smart trolley with RFID tags is used to provide an audible alert when an unauthorized item or an item without an RFID tag is placed in the trolley. When such an item is detected, the buzzer sounds, alerting store personnel or the shopper to the issue, ensuring that only authorized items are added to the trolley.

vii. Web:

Working on the web involves developing, designing, and maintaining digital content accessible via internet browsers. This includes coding websites and applications using languages like HTML, CSS, and JavaScript, creating user-friendly layouts, and optimizing for various devices. It also entails producing engaging content and ensuring ongoing functionality, security, and performance. Working on the web requires a mix of technical expertise and creative skills to deliver seamless online experiences.

viii. Wi-Fi:

Wi-Fi, short for Wireless Fidelity, is a wireless communication technology that allows devices to connect to a local area network (LAN) wirelessly, enabling internet access and data exchange. It operates on radio frequencies, typically 2.4 GHz or 5 GHz, and utilizes IEEE 802.11 standards for communication. Wi-Fi networks consist of a router or access point that acts as a central hub and one or more devices, such as smartphones, laptops, and IoT devices, that connect to the network. Wi-Fi offers convenience and flexibility, enabling users to access the internet and share data without the need for physical cables.

Conclusion

In conclusion, smart trolleys represent a transformative innovation in the retail industry. By integrating technologies like RFID, IoT, and AI, smart trolleys enhance the shopping experience by providing real-time inventory information, personalized recommendations, and streamlined checkout processes. These innovations not only improve customer satisfaction but also enable retailers to optimize operations, reduce costs, and gather valuable data for analytics-driven decision-making. As smart trolley technology continues to evolve, it holds the potential to revolutionize traditional shopping experiences and shape the future of retail. Smart trolleys epitomize the convergence of technology and retail, offering a seamless and efficient shopping experience for consumers while empowering retailers with valuable insights into consumer behaviour and inventory management. With features such as automated checkout, real-time inventory tracking, and personalized recommendations, smart trolleys not only enhance convenience but also drive operational

efficiency and customer satisfaction. As the retail landscape evolves, smart trolleys are poised to play a pivotal role in shaping the industry's future, fostering innovation, and redefining the way we shop.

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