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Smart Basket Trolley Using IOT

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ABSTRACT: Smart technologies are revolutionizing traditional shopping experiences in the era of the Internet of Things (IoT). One such invention that aims to improve the efficiency and ease of shopping in retail settings is the Arduino-powered Smart Basket Trolley. This abstract describes the basic layout and functioning of the Smart Basket Trolley, emphasizing its main parts, workings, and advantages for customers and retailers alike. The Smart Basket Trolley is an intelligent shopping assistant that combines an Arduino microcontroller with a variety of IoT-enabled sensors and modules. Wireless communication modules, a barcode scanner, and a weight sensor are important parts. Together, these elements automate and simplify the purchasing process. Retailers may lower expenses, increase operational efficiency, and ultimately give their consumers better service by using this innovation. Using Arduino and Internet of Things (IoT) technology, the Smart Basket Trolley is an automated shopping cart that makes shopping easier. Conventional shopping carts can result in lengthy lines and a laborious procedure as consumers must manually track their purchases and continue to checkout counters where products are scanned and paid. In order to solve these problems, the Smart Basket cart has an Arduino microcontroller and a barcode scanner that let users scan things as they add them to the cart. Research and innovation have been actively pursuing the development of smart retail solutions, with several initiatives examining various facets of integrating technology to improve the shopping experience. This section summarizes important discoveries and developments in the fields of Arduino-based projects, barcode scanning systems, smart shopping carts, and retail IoT applications.

KEYWORDS: Barcode Scanner, Wireless communication modules, Power cut-off, Arduino UNO, GSM module.

I. INTRODUCTION

The creative ways that Internet of Things (IoT) technology has been incorporated into daily life have improved customer experiences in retail settings. This project shows how to use Arduino to design and build a Smart Basket Trolley with a barcode scanner. By enabling consumers to scan things as they add them to the cart, automatically calculating the entire cost, and offering a smooth checkout procedure, the technology seeks to expedite the shopping process. An Arduino microcontroller is used by the Smart Basket Trolley to communicate with an LCD display and a barcode scanner. The Arduino analyzes the data once a product's barcode is read, displaying the item details and cumulative total on the LCD panel. Real-time synchronization of product information and price is ensured by the system's connection to a central database using Internet of Things protocols. By giving real-time data on product purchases, this system improves inventory management and cuts down on the amount of time spent in checkout lines and manual pricing checking. Personalized shopping experiences and extensive analytics based on customer behavior are also made possible by the integration of IoT. By giving real-time data on product purchases, this system improves inventory management and cuts down on the amount of time spent in checkout lines and manual pricing checking. Personalized shopping experiences and extensive analytics based on customer behaviour are also made possible by the integration of IoT. With the retail industry still embracing smart technology, the Smart Basket Trolley is a positive development. This project shows how IoT and Arduino may be used to make shopping more effective and pleasurable by examining the design, implementation, and possible effects of such a system. Retailers may lower expenses, increase operational efficiency, and ultimately give their consumers better service by using this innovation. Using Arduino and Internet of Things (IoT) technology, the Smart Basket Trolley is an automated shopping cart that makes shopping easier. Conventional shopping carts can result in lengthy lines and a laborious procedure as consumers must manually track their purchases and continue to checkout counters where products are scanned and paid. In order to solve these problems, the Smart Basket cart has an Arduino microcontroller and a barcode scanner that let users scan things as they add them to the cart. Research and innovation have been actively pursuing the development of smart retail solutions, with several initiatives examining various facets of integrating technology to improve the shopping experience. This section summarizes important discoveries and developments in the fields of Arduino-based projects,

barcode scanning systems, smart shopping carts, and retail IoT applications.

II RELATED WORKS

The goal of developments in smart shopping carts has been to increase customer convenience and expedite the shopping experience. Two notable instances are the "Amazon Dash Cart" and the "Caper Smart Cart." With built-in sensors, touchscreens, and barcode scanners, these smart carts let customers scan products while they browse and get real-time purchase information. In order to eliminate the need for traditional checkout lines and improve the entire shopping experience, they frequently include navigational assistance, computerized shopping lists, and integrated payment systems. The way barcode scanning technologies have developed has had a big influence on retail operations. Mobile and stationary scanners that are incorporated into shopping carts or store infrastructure have replaced traditional handheld scanners. Customers may use their cellphones to scan things with the "Scan-and-Go" devices installed by stores like Walmart and Amazon Go, making shopping more independent and productive. Research has shown that adding barcode scanning to the purchasing process may speed up checkout and increase client happiness.

2.1 SMART SHOPPING CART:

New degrees of connection and data use have been made possible by the use of IoT technologies in retail settings. Retailers may benefit greatly from the data that IoT devices can provide them by tracking client movements, analyzing shopping trends, and monitoring inventory levels. IoT has the potential to build smart retail settings where networked devices enhance customer service and operational efficiency, according to research by Gubbi et al. (2013). Smart shopping carts with Internet of Things capabilities can improve the whole shopping experience by applying dynamic pricing, synchronizing product information in real-time, and providing targeted promotions.

2.2 SELF CHECKOUT SYSTEM:

Self-checkout systems, which let consumers scan and pay for their purchases on their own, are already commonplace at many retail establishments. Although these systems can still encounter problems like scanning mistakes and the need for customer help, they lower labor expenses and increase checkout efficiency. By incorporating the scanning process straight into the shopping cart, the Smart Basket Trolley expands on the concepts of self-checkout, eliminating the need for separate checkout facilities and giving customers more control over their shopping experience.

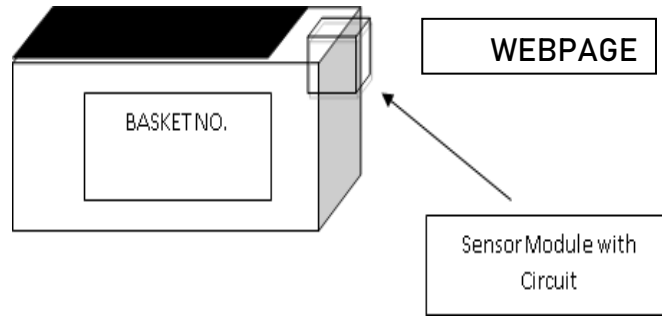
III. METHODOLOGY

The development of an automatic accident detection and rescue system is crucial in minimizing the response time to road accidents, thereby potentially saving lives and reducing the severity of injuries. This system integrates various technologies such as sensors, communication networks, and machine learning algorithms to detect accidents in real-time and promptly alert emergency services. The methodology for developing such a system involves several key components and processes, which are detailed below. These include accelerometers, gyroscopes, GPS, and in-vehicle cameras. Accelerometers and gyroscopes detect sudden changes in velocity and orientation, indicating a potential collision. GPS provides location data, while cameras offer visual confirmation of an accident. These sensors are installed along roadways and can include speed cameras, surveillance cameras, and pressure sensors embedded in the road. They provide external data that complements the vehicle-based sensors.

This technology enables vehicles to communicate with roadside infrastructure, such as traffic lights and road sensors, via wireless communication protocols like Dedicated Short Range Communication (DSRC) or Cellular Vehicle-to-Everything (C-V2X). Vehicles communicate with each other to share data about their speed, location, and trajectory, enhancing situational awareness and aiding in the detection of accidents. Data from sensors is initially processed at the edge (i.e., within the vehicle or roadside units) to quickly identify potential accidents based on predefined thresholds for parameters such as acceleration and orientation. For more complex analysis, data is transmitted to cloud servers where machine learning algorithms further analyze the data to confirm accidents. This layer allows for the use of sophisticated models that can handle large datasets and provide more accurate detections.

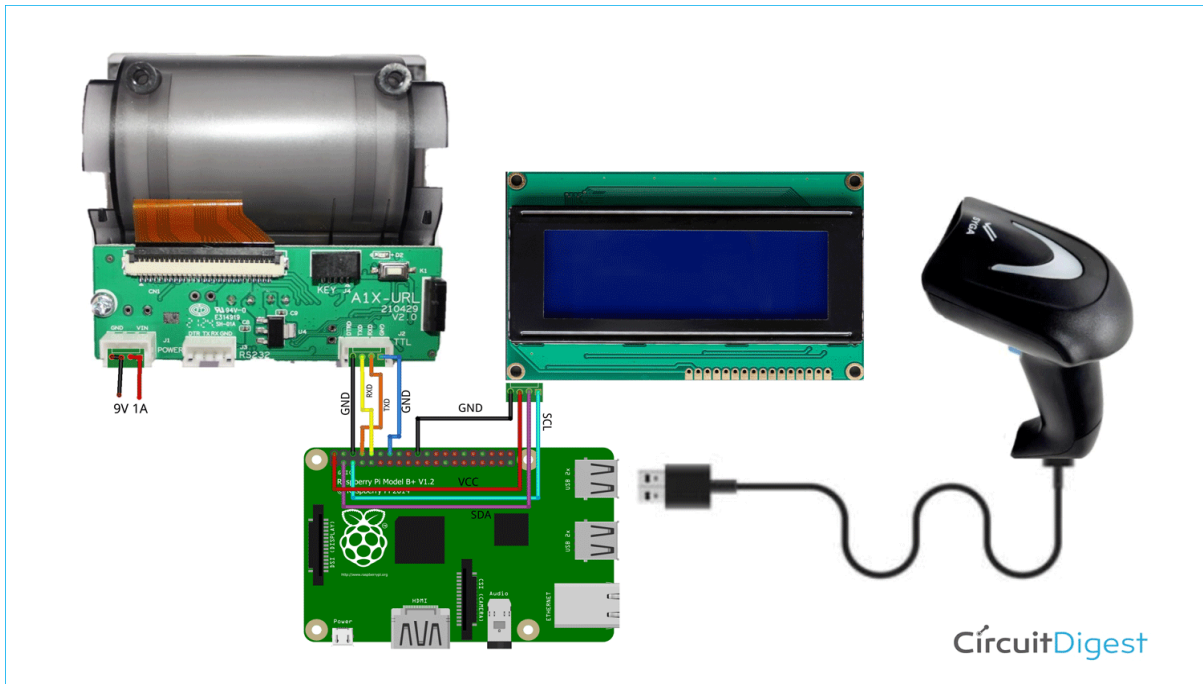
Continuous Improvement and Adaptation: Monitor the performance of the system over time and iterate on the

methodology based on feedback, new data, and evolving disaster scenarios. Incorporate lessons learned from past incidents to enhance the effectiveness and resilience of the system.



3.1 CIRCUIT DIAGRAM:

Once sensors detect an anomaly, the data is transmitted to a central processing unit (CPU) within the vehicle or to a remote server via wireless communication networks. Advanced algorithms analyze this data to confirm the occurrence of an accident. Machine learning models, trained on vast datasets of accident scenarios, can distinguish between false alarms (such as a hard brake) and actual collisions. Real-time processing ensures that legitimate accidents are identified within seconds. Reliable communication is essential for transmitting accident data to emergency responders. The system utilizes Vehicle-to-Everything (V2X) technology, which enables vehicles to communicate with each other (V2V), with infrastructure (V2I), and with pedestrians (V2P). This interconnected network ensures that accident alerts are promptly sent to nearby vehicles, traffic management centers, and emergency services. 5G technology, with its high data transfer rates and low latency, enhances the efficiency of these communications, ensuring rapid and reliable data transmission.



IV. SYSTEM STUDY AND FEASIBILITY

Implementing an automatic accident detection and rescue system involves integrating advanced technologies to enhance road safety and emergency response efficiency. This system primarily relies on sensors, communication

networks, and real-time data processing to identify accidents and promptly alert emergency services. Here's an overview of the key components and their implementation. The backbone of an automatic accident detection system is a network of sensors strategically placed in vehicles and along roadways. These sensors include accelerometers, gyroscopes, GPS modules, and cameras. In vehicles, accelerometers and gyroscopes detect sudden changes in velocity or direction, indicative of a collision. GPS modules provide precise location data, essential for pinpointing accident sites. Cameras, both in vehicles and at traffic intersections, capture real-time visual data, which is crucial for verifying accidents and assessing severity.

Upon detecting an accident, the system automatically generates an emergency alert containing crucial information: the exact location, time, and severity of the accident, along with potential injuries based on the impact force. This alert is sent to the nearest emergency response units—ambulances, fire departments, and police. Integration with Geographic Information Systems (GIS) enables responders to receive precise navigation instructions to the accident site, minimizing response time. Implementing this system requires collaboration between multiple stakeholders, including government agencies, automotive manufacturers, technology providers, and emergency services. Government regulations must mandate the installation of detection sensors in all new vehicles and at critical road infrastructure points. Automotive manufacturers need to ensure that their vehicles are equipped with compatible technologies. Technology providers must develop robust software and communication protocols to facilitate seamless data transmission and analysis. Emergency services require training and infrastructure upgrades to handle automated alerts efficiently.

4.1 HARDWARE REQUIREMENTS:

- Processor : Intel core processor 2.6.0 GHZ
- RAM : 4GB
- Hard disk : 320 GB
- Compact Disk : 650 Mb
- Keyboard : Standard keyboard
- Monitor : 15 inch color monitor

4.2 SOFTWARE REQUIRMENTS:

- Systems of operation : Windows OS
- Front End : ASP.NET (C#)
- Back End : SQL SERVER

V. RESULT



Fig 5.1 Barcode Scanner with Trolley



Fig 5.2 Display in Trolley

VI. CONCLUSION

By means of this paper intent to simplify the billing process, make it swift and increase the security using BARCODE SCANNER technique. This will take the overall shopping experience to a different level. Different parameters such as the system parameters of smart trolley like products name, products cost, product weight etc. are continuously display. Thus with the help of the conclusion we can say that the amalgamation of gas sensors, adept at detecting harmful gases; fire sensors, proficient in identifying fire outbreaks; and acceleration sensors, pivotal in recognizing sudden impacts or collisions, creates a comprehensive safety net. NodeMCU's processing prowess enables realtime data analysis, swiftly identifying anomalies and triggering immediate alerts through MQTT messages. The system's advantages lie in its ability to bridge existing gaps in emergency response systems. It ensures rapid incident detection, precise alert generation, and swift ambulance dispatch, significantly reducing response times and potentially saving lives in critical situations. However, challenges such as sensor limitations, network dependencies, maintenance requirements, and ethical considerations must be addressed. Ensuring sensor accuracy, network reliability, and robust security measures are imperative for the system's effectiveness and user trust. This project serves as a testament to the potential of IoT, sensor technology, and seamless communication protocols in enhancing safety measures. Its success hinges on continuous refinement, validation, and adaptation to evolving safety standards and technological advancements. In conclusion, the proposed system represents a pioneering step towards a safer, more responsive environment. Through the fusion of innovative technologies and intelligent algorithms, it paves the way for more effective accident detection, rapid ambulance alerts, and, ultimately, the preservation of human life

1. Automatic billing of products by using Barcode Scanner technique will be a more viable option in the future.
2. The system based on Barcode Scanner technique is efficient, compact and shows promising performance.

REFERENCES

- [1]. A. Kumar, A. Gupta, S. Balamurugan, S. Balaji, and R. Marimuthu, "Smart shopping cart," in 2017 International Conference on Microelectronic Devices, Circuits, and Systems (ICMDCS), Aug 2017
- [2]. P. Aryan, "Smart shopping cart with automatic billing system through BARCODE SCANNER and Bluetooth," International Journal of Emerging Technology and Computer Science, vol. 1, no. 2, 2016.
- [3]. P. Chandrasekar and T. Sangeetha, "Smart shopping cart with automatic billing system through BARCODE SCANNER and Zigbee," 2014 International Conference on Information Communication.
- [4]. Galande Jayashree, Rutuja Gholap, Priti Yadav on "BARCODE SCANNER based Automatic billing trolley" year - 2015, publication – IJETAE.

- [5]. D. Mohanapriya, R. Mohamed [6]Anas, P. Nandhini, N.M Deepika, "Design and implementation of Smart Basket Cart Using Near Field Communication", Indian Journal of Emerging Electronics in Computer Communications Vol.5, Issue 1-2018, ISSN: 2393-8366
- [6]. K. Lalitha, M. Ismail, Sasi Kumar Gurumurthy, A. Tejaswi, "Design of an Intelligent Shopping Basket using IoT", 2017 International Journal of Pure and Applied Mathematics 151(1):1311- 8080.
- [7]. V. Sharma, S. Malhotra, and M. Hashmi, "An Emerging Application Centric BARCODE SCANNER Framework Based on New Web Technology," 2018 IEEE International Conference on BARCODE SCANNER Technology & Application (BARCODE SCANNER -TA), Macau, 2018, pp. 1-6. doi: 10.1109/BARCODE SCANNER -TA.2018.8552742.
- [8]. Y.A. Badamasi, "The working Principle of an Arduino", in Electronics, computer, and computation (icecco), 11th InternationalConference on INFORMATIONCOMMUNICATION EMBEDDED SYSTEMS, pages 1–4, 2014.
- [9]. Jadhav Rahul, Pradeep, Nandkumar, Tarali Shivkumar "BARCODE SCANNER based Automated billingtrolley", year -2015, publication – IJSRD.
- [10] S. Iyyappan and V. Nandagopal, "Automatic accident detection and ambulance rescue with intelligent traffic light system," International Journal of Advanced Research in Electrical, Electronics and Instrumentation



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