Smart Cart with Automated Billing System

A smart cart for the smart world; providing a convenient and reliable shoppingprocess

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• ***Abstract*— Technology has changed so much, so is the rate of people of all ages who are attracted to electronic gadgets. In many industries, electronic devices such as smart card readers, barcodes, and RFID scanners are increasingly used. Supermarkets also need these kinds of gadgets. Currently, every person in the mall purchases the product placed in the trolley. Upon purchase, the person will have to stand in a queue for billing. In the billing process, an employee scans each product's barcode and bills it to the final [5]. This process can take a lot of time and it can be even worse on holidays, special offers or weekends. To overcome this, a smart way to shop in malls has been developed. Each product has an RFID tag instead of a barcode. The Smart Trolley features an RFID reader, LCD module. When a person places any product on the trolley, it is scanned and the product's cost, name, and expiration date are displayed. The total cost will be added to the final check out bill. Utilizing sensors and distance, the trolley autonomously follows the customer throughout the store, maintaining a safe distance and avoiding obstacles. This feature ensures a hands-free shopping experience, allowing customers to focus on selecting products without the need to push or control the trolley.**

Keywords—RFID Tag, RFID Reader, LCD Moule, Arduino IDE Software Tool

I. INTRODUCTION

n the modern era of technology and innovation, it is evident for people to utilize tools to simplify their lives. People are always on a lookout to make their work easier, to have some equipment which would help reduce their burdens. Modern technology is evolving at an exponential rate due to the rapid changes in our world. Most of people in this world use technology to simplify every area of their lives. People are constantly on the lookout for assistance with the heavy lifting and labor-intensive tasks involved in daily life. As a result, trolleys were developed to assist in minimizing the amount of labor required to carry and move large objects from one location to another. Shopping carts, sometimes referred to as shopping trolleys, are useful tools for customers moving items around briefly before checking out. Since its creation, shopping carts have seen very few modifications. Its weight and capacity have been modified in the majority of expansions. Most of people go to shopping malls in a rush to buy food products, clothing, toiletries, gardening equipment, electrical appliances, and other daily requirements. When they shop, customers frequently run into issues and inconveniences. They want a sufficient budget and quick payment. They are concerned that the money they have got will not cover the cost of the things they have purchased. Sometimes, customers were impatient with the wait and wasted time at the counter. They also encounter inadequate information about the products, such as the cost of each item they wish to buy. The purpose of the Smart Shopping Cart is to provide customers with an easy, comfortable and effective shopping experiences. Customers may quickly and easily determine the price of each item by utilizing this trolley. They can also determine the total cost of the products, which helps them estimate how much they will spend.

II. BLOCK DIAGRAM

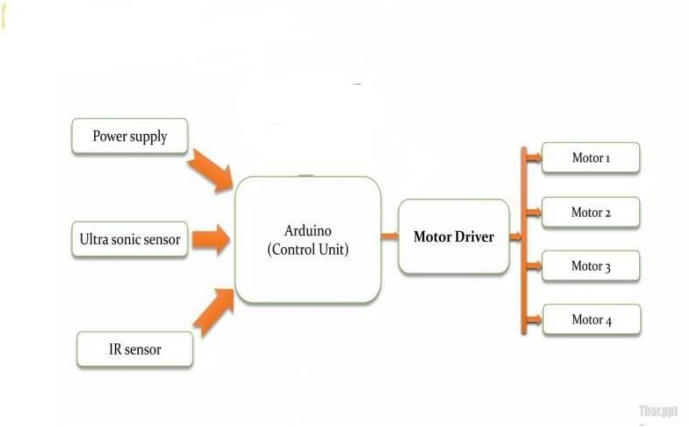

Fig.1: Block Diagram for autonomous mechanism

The block diagram consists of 8 components in total where all of themwill be embedded-attached to the shopping cart.

III. WORKING

As shown in the above block diagram, the Arduino is interfaced with all the remaining components. Once the microcontroller is powered up with the use of a 9v battery it is

initialized and set to the basic settings, now the system is ready to proceed which means the RFID card and the tag can be scanned. Then the RFID card or tag is scanned the RFID reader fetches all the details from the scanned card or tag, and if the scanning process is successful the product details will be transferred to the microcontroller's memory and then will be transferred to the LCD module to be displayed on the LCD screen. Here the RFID module uses the SPI communication technique to transfer or to retrieve the data from the RFID card or tag [4]. After the shopping is completed the entire bill details will be displayed on the LCD screen, each card or tag acts as a product, where the product details are pre early set or dumped into the card. When the bill amount is paid, the shopping details will be sent via the sim900 gsm module to the prescribed customer's mobile number. The entire working process is implemented by the software called Arduino IDE. The Proteus simulation software is used to check the simulation results before the hardware implementations [10] [16].

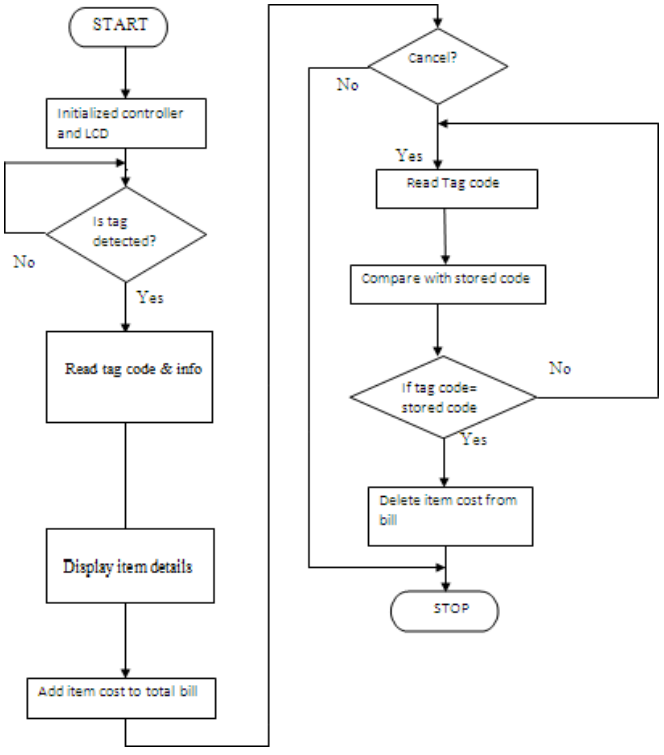

Fig.2: Complete System Flow Diagram.

1V. System Flow diagram

Step 1: Start
Step 2: When the system is powered up, display the initial data.
Step 3: the cart sarts to follow the human
Step 4: the person can scan the product
Step 5: Now the product scanning process is ready. If the scanned product code is detected, display all the product details on the LCD screen. If not, the product has to be scanned until it gets detected. This process applies to each & every product.
Step 6: If a scanned product is scanned once again then that product is removed from the microcontroller's memory & in the ongoing bill [13].
Step 7: Finally, to end the shopping, the shopper has to press the END button, then the complete bill summary is displayed on the LCD.
Step 8: Stop.
Step 9: Repeat the entire process if another membership card is scanned & detected.

V. RESULTS

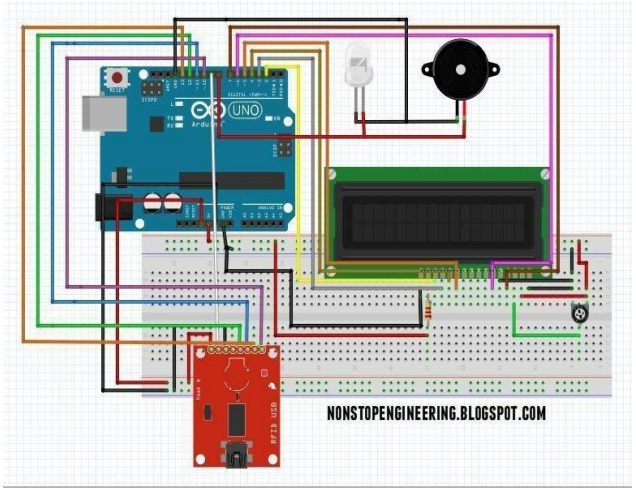

Fig.3: Circuit Diagram for automated billing system.

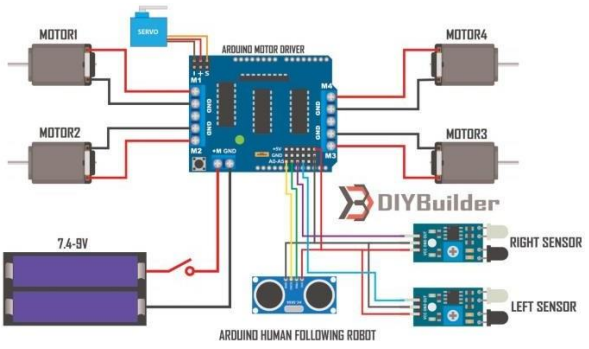

Fig.4: Circuit Diagram for autonomous following Mechanism.

1. Hardware Results:

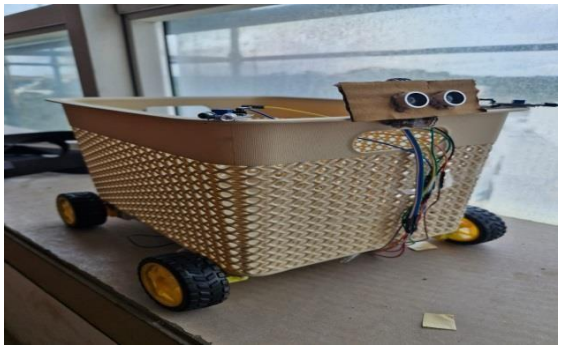

Fig.7: Item details being displayed if the scanning is successful.

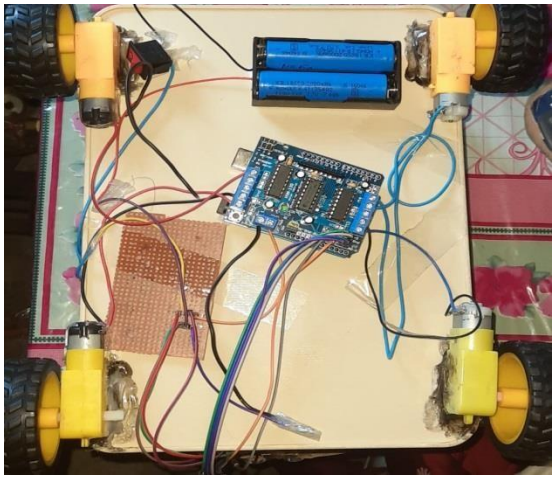

Figure.5: Autonomous Mechanism Setup

Once the system is powered up & initialized a text is displayed saying “Automated Shopping trolley”. This means the system isready for scanning products.

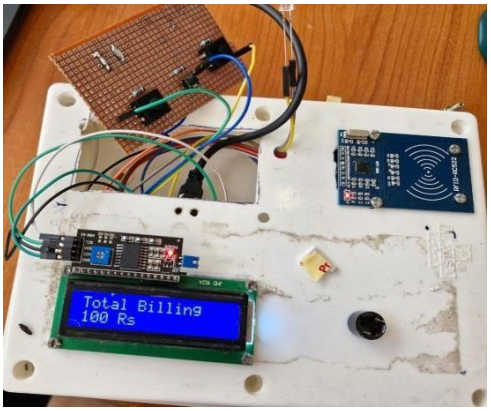

Figure.8: Final bill summary being displayed

When the shopping is completed It displays the final bill amount:

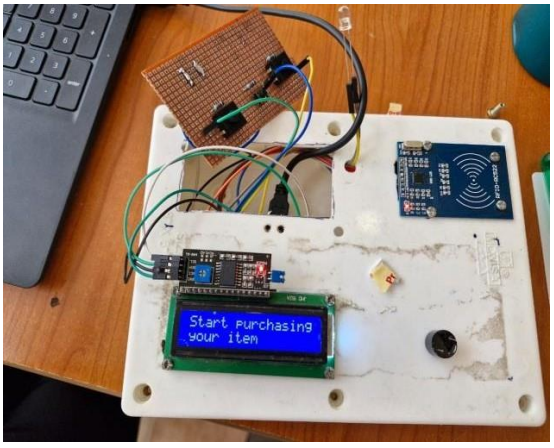

Figure.6: Personal details being displayed on LCD.

VI. DRAWBACKS

1. The Final cross-check of the bill along with the purchased products may be required.
2. The Shopper must get a shopping cart even if he/she wants to purchase a single product from the stores. This may become inconvenient.
3. As it is an electronic smart cart, maintenance and battery replacements must be made regularly.
4. For small scale supermarkets and stores, this technique may be not so cost-efficient.

VII. FUTURE SCOPE

- This system can be also implemented using LI-FI, NFC & other communication systems [1][9].
- This system can be advanced by using Beacon Module instead of RFID Module & including a Load sensor is also a helpful implementation [6][7].

- In addition to the product details, nutrition facts of the eatables can be added.
- Automatic track detection & movement of the cart can be implemented by using various sensor technologies [3].
- Shopping budget limit can be set; when the limit exceedsbuzzer should beep indicating this.

VII.CONCLUSION

The progression in science & technology development is an unstoppable process. Now & then evolution changing technologies are being invented. We can't imagine the upcoming future in which technology may occupy each & every place [2]. This innovative project idea can be used is places like shopping complexes, supermarkets & malls to purchase the products. Here RFID card is used to securely access every product in shopping places. If a product is scanned & put into the cart, all the required details of the product will be displayed on the LCD screen. Therefore, an RFID tag/card is used for accessing the products. hence this project will help in improving the security & also the shopping time can be reduced. It also provides an enjoyable & user- friendly shopping experience to the customers

V1.REFERENCES.

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