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Smart Trolley

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ABSTRACT: A smart shopping cart with innovative RFID technology is suggested to make things easier for customers. It offers a number of advantages, including the ability for users to swiftly search for items without waiting for promoter assistance to locate them, the ability to tell customers how much they have bought, and the ability to manage their shopping budget. Finding out the findings of a market survey conducted among consumers on a smart trolley with creative RFID implementation is the primary goal of this study. The study's participants include suppliers, employees, and consumers of the Giant Hypermarket in Bandar Seri Manjung, Perak. A total of 250 surveys have been given out to suppliers, employees, and customers. 200 surveys were gathered, with copies coming from 50 Giant Hypermarket employees, 10 suppliers, and 140 customers. The study examines three components: product layout, budget control, and time spent on spending. These components were chosen based on feedback from consumers to emphasise the significance of using smart trolleys. According to the mean, budget control received the most positive consumer comments. This is likely because the new smart trolley will help customers manage their money better by assisting with purchases throughout their shopping trips.

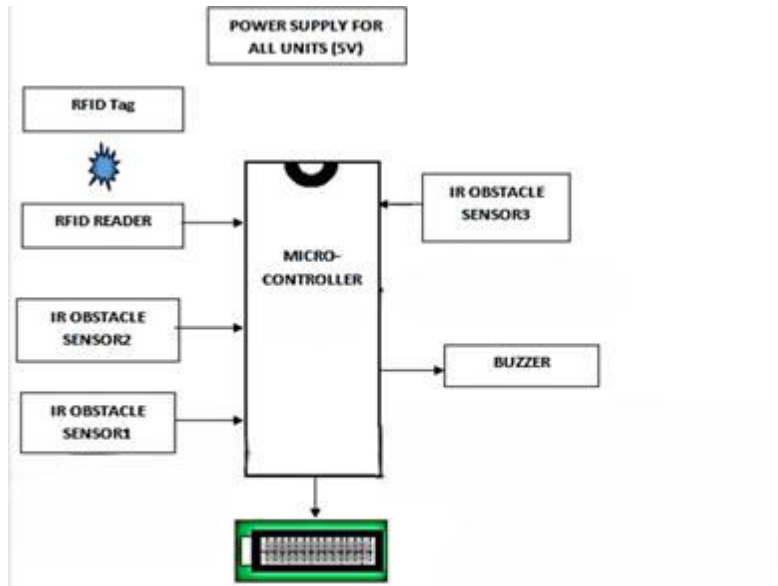
KEYWORDS: Arduino, sensor, Smart Shopping, Smart Trolley

I. INTRODUCTION

With the advent of the Internet of Things and industrial automation, among other modern technologies, technology has opened up new avenues for creative thinking and global connectivity. From the very beginning, the goal of technological breakthroughs has been to lessen needless suffering and boost human productivity. Going shopping in shopping centres, malls, and other establishments is one of the most significant leisure activities in the modern world. Thus, the introduction of smart shopping trolley systems, which only require a user to register with the help of their phone number and enjoy shopping with a personalised billing system that allows them to view their total amount at any time while shopping and helps them stay within their budget, can be considered an innovation in the retail and shopping industries. Automatic billing also helps to alleviate the inconvenience of having to wait in long lines at shopping malls. Our project includes RFID tags that can be attached to the necessary items, an RFID reader that scans the products after they are placed in the trolley (the product will be scanned by EM-18 when it is dropped in the trolley), and an LCD that will display the items that have been added to the trolley along with the total. Additionally, the trolley's movement was automated with the use of motors, Arduino, and ultrasonic sensors. utilising a GSM module, which enables us to link the registered customer's mobile phone to the trolley. Once the billing is completed, a message containing the complete bill description will be delivered to the registered customer's mobile number.



BLOCK DIAGRAM



HARDWARE SPECIFICATIONS



1. RFID RC522 MODULE

For less than four dollars, the RC522 RFID module, which is based on the MFRC522 IC from NXP, is among the least expensive RFID alternatives available online. Typically, it includes a key fob tag with 1KB of memory and an RFID card tag. The finest aspect is that it has the ability to write tags, so you may store any kind of message in it. The purpose of the RC522 RFID reader module is to interact with RFID tags (ISO 14443A standard tags) by producing an electromagnetic field at 13.56MHz. A 4-pin SPI interface allows the reader to communicate with a microcontroller at a maximum data rate of 10 Mbps. It is also compatible with UART and I2C protocols for communication. Rather than continually asking, "Is there a card nearby?" the RC522 RFID module can be configured to emit an interrupt, alerting us when a tag approaches it. The good news is that the logic pins on the module are 5-volt tolerant, allowing us to link it to an Arduino or other 5V logic microcontroller without the need for a logic level converter. The module's operational voltage ranges from 2.5 to 3.3V.

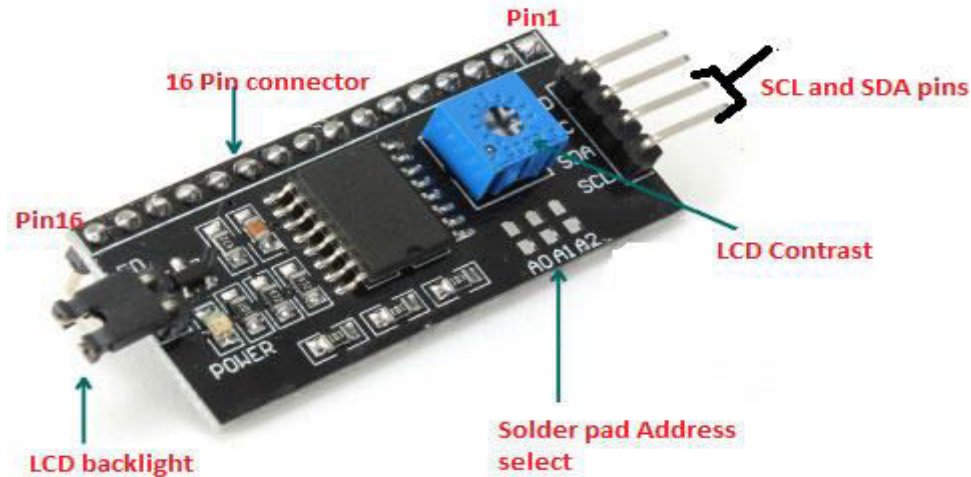


2. RFID Tags

RFID tags are cards which are used to store information about any person or object. RFID reader continuously emits radio waves and when RFID tags are detected in range information in the tag is read by the RFID reader and displayed on display. We are using these tags to store the prices of grocery items for billing.

3. I2C

I2C controller has an IC PCF8574 which provides general-purpose remote I/O expansion via the two-wire bidirectional I2C-bus serial clock (SCL) and serial data (SDA). It is very useful IC and can be used in LED signs boards, displays, Key pads, Industrial control, etc. There are 8 I/O pins, 3 pins (A0, A1, A2) for I2C bus address and SDA, SCL pins.



4. Arduino NANO

Arduino UNO board. It is a micro-controller kit that is used to get data from peripheral devices (IR sensor, RFID reader, etc). The Arduino UNO Microcontroller board is based on the ATmega328P IC. The ATmega328P is a good platform for robotics applications. This makes the robot follow humans and detect objects in its path and Information from the RFID reader is also processed through it. Arduino UNO board consist of sets of digital and analogue pins that may act as an interface to various expansion boards and other circuits. It contains everything needed to support the microcontroller. The operating voltage of Arduino UNO is 5V and it can also be operated between 6V-20V.

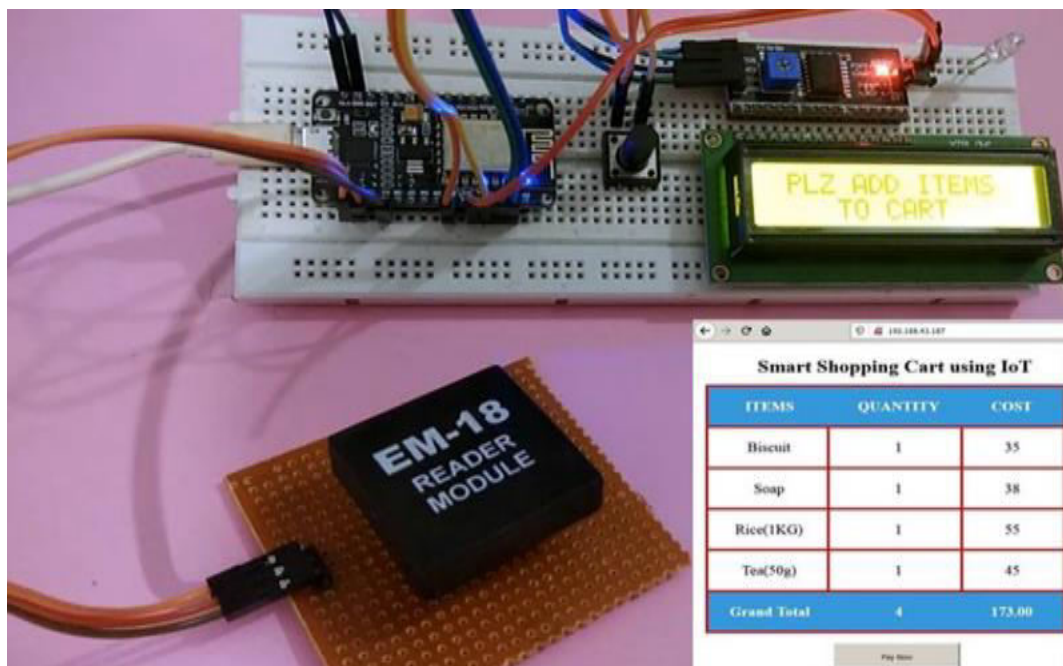
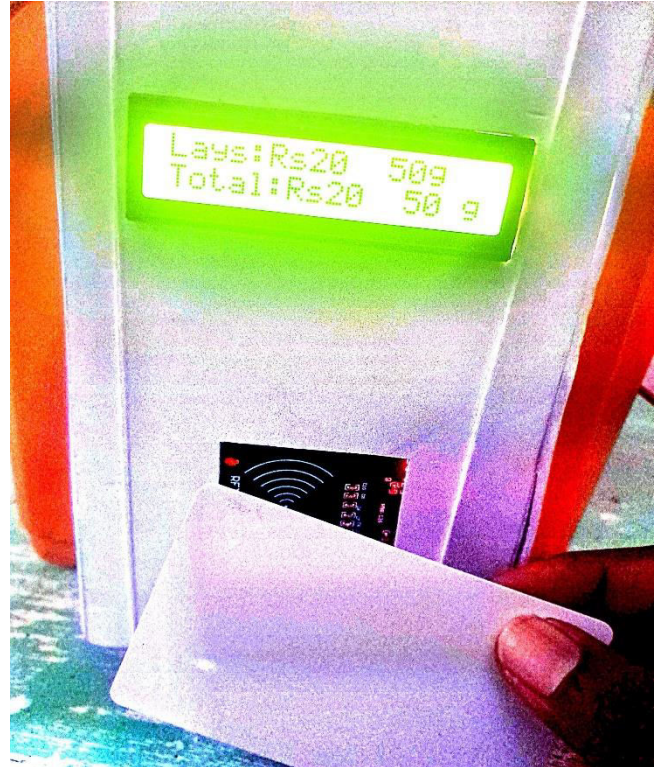


Figure 1. Proposed Block Diagram



Final output

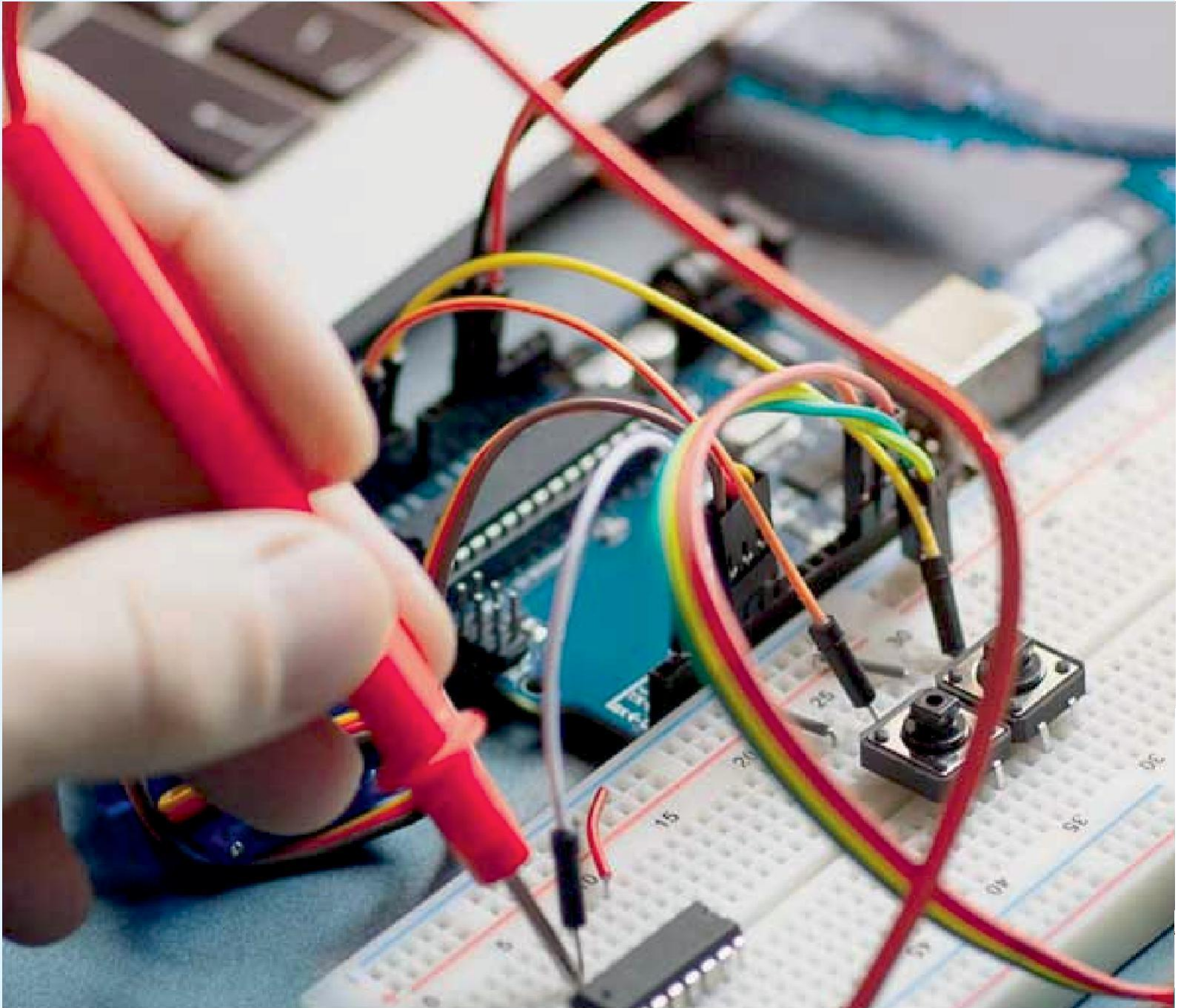


II. CONCLUSION

The project designed in this report is based on the working of a smart shopping trolley, which works in such a manner that the customer needs to just lead the trolley and the trolley will automatically follow the customer with the help of a human following robot which will be attached at the bottom of the trolley. This paper also signifies the inclusion of smart detection circuit so that the products when added to the trolley will be detected using the technique of radio frequency identification, wherein RFID tags will be used to scan the products and the addition of a total amount of the bill will be communicated to the user/customer with the help of GSM module. The work is finally developed with a mission to reduce unnecessary human efforts while shopping and also improve the productivity of customers by reducing the billing queues.

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