Automatic Billing and Self Moving Shopping Trolley in Supermarkets

Laxmi Gupta [1,] Sandhya Yadav [2,] Pankhuri Dwivedi [3,] Shatrughan Mishra[4]

1,2,3-UG scholar,ECE Engg,UCER Prayagraj 4- Assistant Professor , UCER Prayagraj

Abstract

This paper presents the development of an automatic billing shopping trolley for supermarkets. This automatic billing shopping trolley reduces the shopping time of the customer and also the effort required to move the trolley. This project works on a Node MCU micro-controller, RFID tag for scanning the products, Bluetooth(hc-05) module used on the trolley will give instructions to the trolley and Gear DC Motors to move the trolley and trolley will move at the maintained distance and LCD to display the billing. Hence it works with low cost, low power consumption. So that customers can enjoy shopping without pushing the trolley themselves.

Keywords: Node MCU, RFID reader, LCD, I2C, Bluetooth HC- 05 modules, L298N motor, Arduino-Uno.

1- INTRODUCTION

Now a day's human lifestyle has changed and has become more hectic. Time is money. As people don't have much time to spend shopping which is an inevitablething. Hence, they prefer shopping in the malls so that they can get all the products in the same place. This saves them from going into different shops to purchase only limited products. Though shopping in malls gives the benefit of saving time too People have only weekends to visit shopping malls. This makes a problem at the cash counter because of the increasing number of consumers. The customers have to stand in the billing lines for a lot moretime than the actual shopping time sometimes. Seeing the general Indian population and way of thinking, In the existing, mall every person takes product put into the trolley. After the shopping is done, that person has to stand in the queue for billing. In the billing process, a sell person scans the barcode of every product and gives the final bill. This process is very time-consuming and it becomes worst on holidays, special offers, or weekends. And, also it seems hectic to push the trolley till the entire shopping is done. Moving a trolley is a really difficult taskto do in malls and shopping areas. So, to overcome theseproblems we are introducing an idea called "Automatic Electronic Shopping Trolley using RFID, Sensors". Our trolley will move automatically using Bluetooth technology. We are using Bluetooth technology on the trolley which is commanded by our mobile and for the motion we are using DC gear motors. When a customer puts any product in a trolley, its code will be detected using an

RFID reader attached to the trolley. Thus, the Customer can keep track of the total amount. It will be displayed on LCD.

2- Objective

The main objective of our project is to make shopping Easier and more comfortable for each customer and provide less physical effort. Like in a festival time, a large crowd gathers in the shopping mall so the help of this smart shopping trolley reduces the congestion. Once the Shopping is done one has not to wait in the queue as the trolley will have an RFID reader attached. So, with the help of an RFID reader Scan the product price and the last total price displayed in the LCD. And second section is to reduce the physical effort in the shopping mall with the help of the L298N motor and gear DC motor.

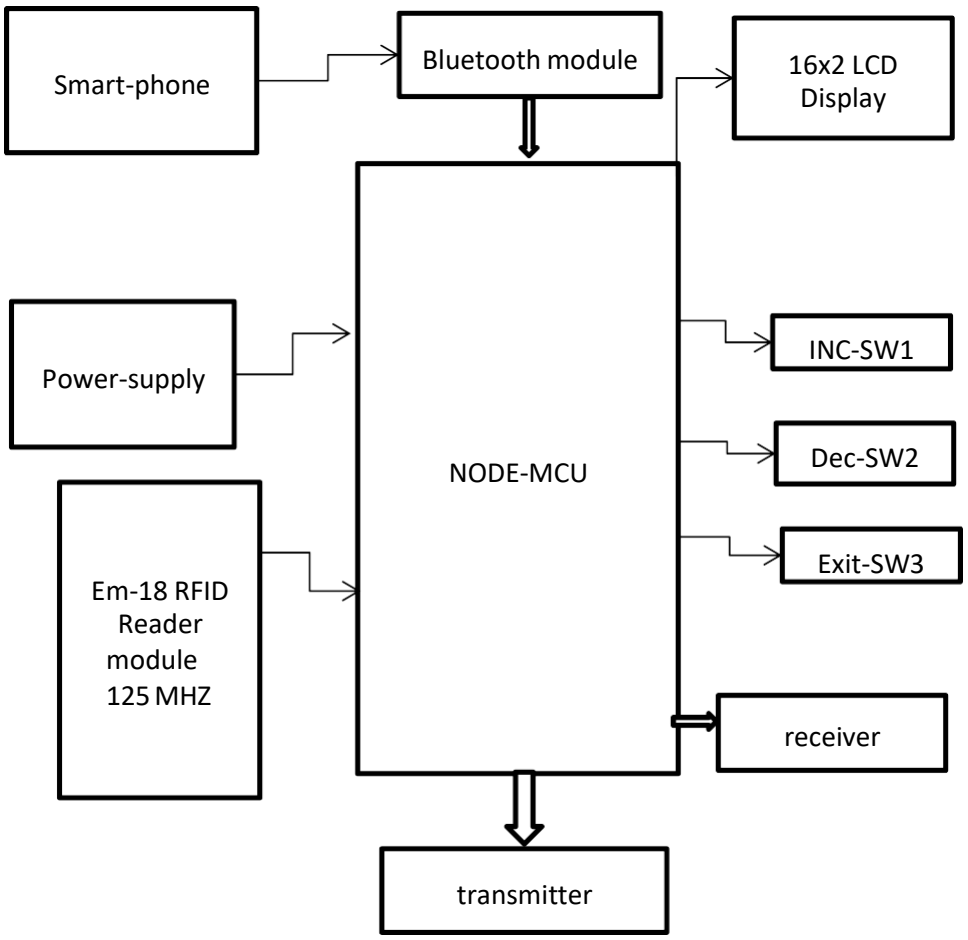
3- Block Diagram

Our project uses an RFID reader, LCD, I2C module, Bluetooth HC- 05, DC gear motor, L298N motor, and Arduino-UNO.

The above figure is the proposed block diagram of our project. The RFID reader scans the product costs one by one and at last total price is displayed on the LCD. When a customer change his/her mind does not buy this product so first clicks the reset button and then scans the RFID tag product cost removal.

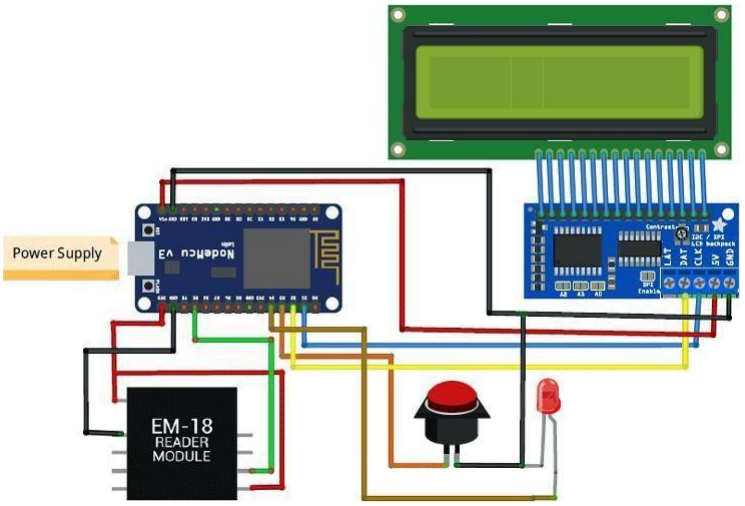
In section using a DC gear motor. A motor is an electrical machine that converts electrical energy into mechanical energy. A Gear motor is an all-in-onecombination of a motor and gearbox. The addition of a gearbox to a motor reduces the speed while increasing the torque output.

In our project, we are using in Bluetooth (hc-05) module with the help of this transmit and receive the data. That allows for the setup of a transparent wireless serial connection.


Smart-phone
Bluetooth module
16x2 LCD Display
Power-supply
NODE-MCU
INC-SW1
Dec-SW2
Exit-SW3
Em-18 RFID Reader module 125 MHZ
receiver
transmitter

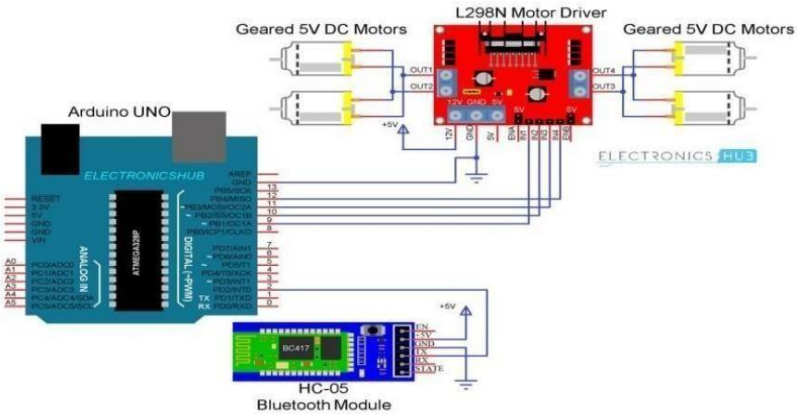
And with the help of L298N allow speed and direction control of two DC gear motors at the same time. A Liquid crystal display (LCD) draws its definition from the name itself.it is the combination of the state of matter, the solid, and the liquid LCD uses a liquid crystal to produce a visible image. And in us, we are using LCD to display the total amount of purchased items.

4- Circuit diagram -



circuit diagram of automatic billing

The billing section consists of Node MCU which has an inbuilt micro-controller [1][2]. So, it stores the instructions and processes accordingly and the purpose of the micro-controller is to control the whole process through the instructions stored. A shopping trolley is installed with an RFID reader to scan and load each product, controlled by a microcontroller. In this paper we use RFID tags, that tag contains information like actual cost, discount, manufacturing date, and expiry date of the product. Whenever the person keeps the products in the trolley, the products have individual tags, these tags are read by the RFID reader [3] which is attached to the trolley And it will be given to the microcontroller and the information will be displayed on the LCD screen. An additional feature Ultrasonic sensor is included to warn the user if they accidentally drop products into the cart without scanning. When the customer is done, shopping he could pay his final bill without bothering the presence of workers, for this, we are using an Ultrasonic sensor and GSM is used to send the message of bill payment to the shopkeeper and customer [4]. And, also if a customer puts any material without scanning then the automatic billing function will not work and a message will be sent to the shopkeeper about the unscanned product.

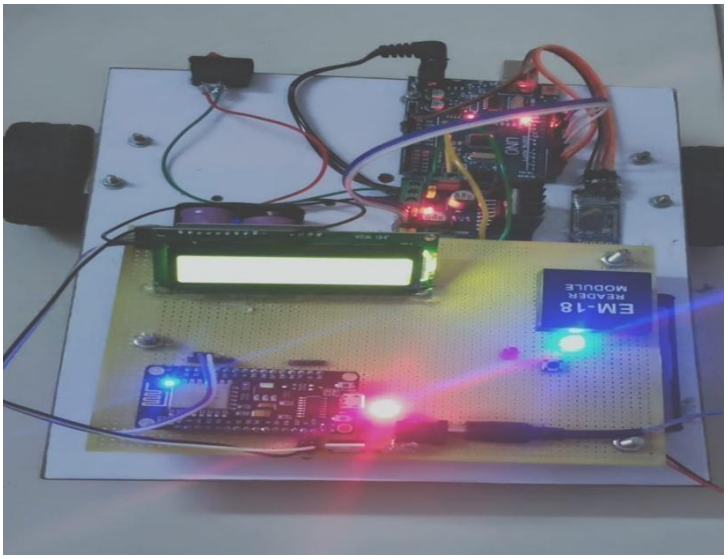


Functional Circuit Diagram of Automatic Movement of Trolley

The moving section consists of Arduino Uno with an inbuilt microcontroller. The microcontroller is the main component of the block diagram as shown above. It operates at 5V. The down part of the trolley consists of a Bluetooth device which is attached to the motor to run the trolley as per the given instruction by mobile.

For the movement, we have used two Gear DC motor which is given direction and instruction. So as per the instruction, it will move forward, backward, left, right, and stop. L2938N motor drivers are used to make the interaction between the motor and microcontroller.

5- Results



6- Conclusion

The project is developed at a low cost with low power consumption. Our project customers can enjoy shopping without pushing shopping trolleysthemselves and no need to stand in line to get the bill, deducted. And with the help of Bluetooth (hc-05) and on mobile using Bluetooth RC controller app can control the trolley. And an RFID reader is fixed on the trolley to keep track of the total amount.

7- Future Scope

1- The movement of the trolley can be made automatic by making useBluetooth module.

2- In this way, there is a need to pull a heavy trolley.

3- A cart with LCD screens can be built which displays discount offers ad totalcounting of the products then and there automatically.

8- Reference

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