Smart Trolley System for Shopping Mall

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Abstract

The smart trolley a good streetcar that uses an embedded chip with a barcode scanner and battery to permit users to self-calculation at the mall. The most theme of the paper is to decrease the time consumption within the request counters at the mall by planning a sensible trolley that permits users to calculation from the shops and increases the time of production. The system that contains the barcode scanner can mechanically detect the merchandise born into the trolley mistreatment supersonic sensing element.

Keywords

Smart Trolley, Sensor, Arduino, Smart Shopping.

1   Introduction

Nowadays, most people go shopping daily for food, electrical product, and others. The number of people who visit the mall is increased every day because of the population. The customer faces so many problems when shopping like wasting a lot of time in the queue at the cashier, the smart trolley system is a device which helps customer and mall to calculate the total amount of all item inside the trolley when shopping in the mall. The smart device will put in the top end of the trolley. Also, the smart trolley will follow the customer with obstacle detection on any side. And give full details of each item like detect the item name, price and create a total price. This project will solve a lot of problem for customer and the moll like Customer doesn't need to push the trolley to move, Reduces manpower required in billing section because the device will calculate total price so Reduces time spent at billing counter and Increases customer satisfaction, customers can see the full details of product, Users can be aware of the total bill amount before going to the cashier for the payment. The factor to be considered for design this project is the size of the device should be small and compatible with trolley size, also should be waterproof to protect from liquid materials, high quality because use by different users, easy setup and maintains because it uses in the mall.

2   Related Study

2.1 Survey of The Existing Solution

1. Pritha, Sahana, etc. (2018) proposed smart shelves can monitor the items on the shelves by reading the RFID signals from the tags. The smart carts can read and retrieve information of the items inside the carts and finally, the checkout points can validate the purchase made by a customer Initially we will work the electric circuit consisting of control, LCD and RFID and be connected in the trolley. The work of the reader is to read the price of the product when added to the trolley. The work of the controller in the collection of total purchases and the price is displayed on the screen. When any product is added in the total price when the product is returned the price is deducted from the total purchases [1].

2. Atchaya.T1, etc. (2018) proposes a system that uses RFID technology for intelligent and secure shopping. This cart makes shopping easy to use and there is an LCD screen that shows the product name, weight, expiration date, and product cost invoice, This Use IoT system will reduce the bursting of bills. Also, provide a missing child alert in that cart itself which is possible by using

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wireless transmitter and receiver. RF receiver is a customer (parents) and a radio transmitter is given to their child [2].

3. K.Gogila Devi (2017) design a system to simplify the billing process, make it fast and increase security using RFID technology. This will bring the overall experience to a different level. Various parameters such as smart cart system parameters are displayed such as product name, product cost, and product weight. Thus, we can say that I. Automatic billing of products using RFID technology will be a more viable option in the future and the RFID based system is effective and compact and shows promising [3].

2.2 Comparative Study

Table-1 Comparative study

Existing System Name	Similarities	Dissimilarities
Smart Trolley System for Automated Billing using RFID and IoT [1]	Hardware and Software: o GSM module Application: Shopping in the moll. Result: This device saves the details of the different products with RFID. The trolley automatically follows the customer.	Hardware and Software: o Arduíno mega o Ultrasonic Sensor o IR sensor o Motor o Buzzer o Barcode Scanner.
IoT Based Smart Trolley with Smart Card Shopping [2].	Hardware and Software: o LCD o pic 16f877a Application: Shopping in the moll. Result: The smart trolley is the most important definite necessity for the make marketing industry for fast billing.	Hardware and Software: o Arduíno mega o GSM Module o Ultrasonic Sensor o IR sensor o Motor o Buzzer o Barcode Scanner
Smart Shopping Trolley Using RFID Based on IoT [3].	Hardware and Software: o LCD display o DC motor o IR sensor. Application: Shopping in the moll. Result: This project will help to reduce the queue of the customers, reduce the manpower requirement.	Hardware and Software: o Arduíno mega o GSM Module o Ultrasonic Sensor o Buzzer o Barcode Scanner

3 System Implementation

3.1 Block Diagram
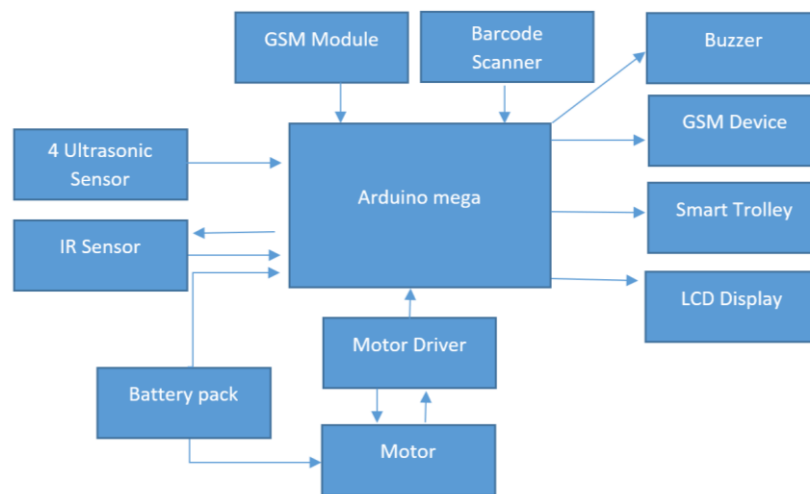
Figure-1: Block diagram

Arduino Mega is the main device in our project which is use to control all the input data from the input device and execute the operation and send it to the output device. A barcode scanner is used to read the barcode of items that gives information about each item and send it to the controller. The ultrasonic sensor is used to sense and measures the distance of the obstacle and send the signal to the controller to find the direction of the trolley. IR sensor is used to sense and measures the distance of the user and send the signal to the controller to follow the user in any direction. DC Motor is used to help trolley to move and follow the user by receiving a signal from the controller. LCD display the details of each item like name, price, and the total price and the controller send SMS to user GSM through the GSM module. A buzzer is used to make an alarm sound when the item can't read by the barcode scanner or not calculated.
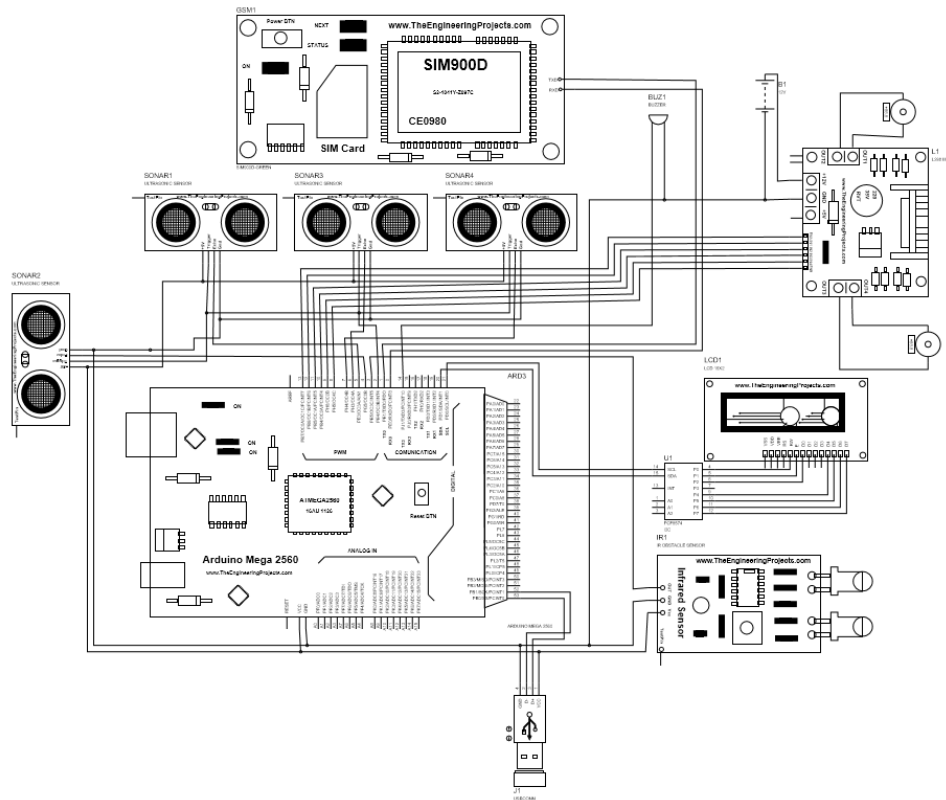
3.2 Functional Circuit Diagram

Figure-2: Circuit diagram

Arduino Mega is the main device for our project which is connected to all the devices to receive and send data, it needs 5v power. Barcode scanner is an input device which is connected to a USB port to send data to the controller, it needs 5v power. An ultrasonic sensor is an input device which is connected to PIN number (4,5,6,7) for "echo" to send a signal to the controller, it needs 3.3v power. IR sensor is an input device which is connected to PIN number (3) to send a signal to the controller, it needs 3.3v power. DC Motor is an output device which is connected to PIN number (8,9,10,11,12,13) to receive a signal from the controller, it needs 12v power. GSM module is an output device that is connected to TDX PIN number (0) to transfer signal and REX PIN number (1) to receive a signal from the controller, it needs 3.3v power. LCD display is an output device that is connected to PIN number (8,9,10,11,12,13) to receive a signal from the controller, it needs 3.3v power. A buzzer it is an output device that is connected to a barcode scanner device to receive signal, it needs 3v power.

3.3 Flow Chart of The Project
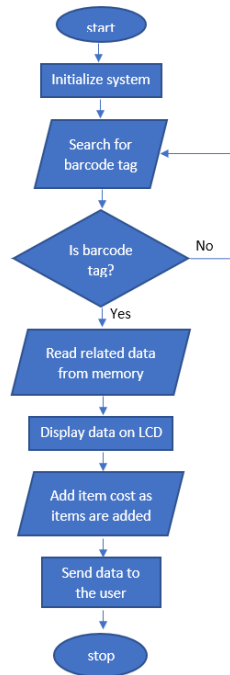
Figure-3: Flowchart

First, start the system work. Second, the controller checks all devices. Also, read the barcode by barcode scanner. Then, checks it is correct barcode if not read again. After that, compare the barcode with related data from memory. Then, display the data on a screen. Next, add the item to the total price, send the bill to the user. Finally, stop the system.

4   Result Discussion

While the customer wants to purchase any product, the trolley will move along with consumer though the support of IR Sensor and Motor. If there is any obstacle arises in the path, ultrasonic sensor will sense the position and move trolley. This helps to reduce the pain of customer for moving the loaded trolley. In the meantime, if the customer places any object in the trolley, QR Code scanner attached with trolley will detect the item cost and added in the trolley. This helps the customer easily calculated the expenses. Once the purchase items are billed, the customer will receive the SMS for the success payment.

5   Conclusion & Future Work

We collect all research information and component required to our project. then we design the circuit diagram using "protous" software and assemble the component in bread board. we test the Arduino kit with Arduino software and also working of LCD and ultrasonic sensor with the support of sketch.

5.1 Future Work
We will implement

- Connection and programming of other sensor and GSM module the purchase product.
- Billing and SMS to customer.

References

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