Intelligent Shopping Cart System Included With Sanitization

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Abstract— **In our day to day life we have been witnessing supermarkets with long queues during the shopping period. These long queues result in wastage of time for both customers and mall management. Hence, the aim of this paper is to build and implement an Intelligent shopping cart system with an inclusion of sanitization technique with sole objective of minimizing the shopping time and also maximizing the better shopping experience in the supermarkets. This paper presents Intelligent shopping cart system with sanitization where each item that the customer picks has an RFID tag has an assigned price. When the item is dropped into the cart the RFID reader which is embedded in the cart system reads the RFID tag and the amount will be displayed on the LCD screen provided and this repeats for every addition of the item and the amount sums up at each cycle and total updated bill also get displayed on the screen. There is a facility to remove the item from the cart with the help of a remove button system embedded in the cart. And in this paper we are also providing sanitization system by keeping todays pandemic situation in mind. When the item is dropped the sensor senses and the sanitization will be done with the help of the motor attached to the system. At the end of the shopping if the customer wishes to have a cashless payment, then it can be done using amount RFID card which can be recharged whenever we want to same as metro card payment system.**

Keywords—Intelligent shopping cart; RFID tag; RFID reader; Sanitization; Sensor; Motor.

I.   INTRODUCTION

Deemed to offer a centralized and automated billing system using ZIGBEE technology and RFID. Each item is provided with an RFID tag for recognition, each cart is provided with a product identification device (PID) which contains the LCD, RFID reader, EEPROM and ZIGBEE module. The purpose of this paper is to eliminate the challenges witnessed in shopping malls i.e., long queues and time consumption.

It is aimed at solving the challenge of long queues. The research is done using Arduino which was utilized for wireless communication with the server, infrared sensors, RFID tags for product identification or recognition, a web application to display amount to be paid, RFID readers are used to wirelessly read the RFID tags those are attached to the products, LCD, switches, motion detection sensor, push buttons and a ZIGBEE. The start button is used to start when the intelligent shopping cart is to be used. In case if any product is removed from the cart then the amount automatically gets deducted from the developed mini system embedded in the shopping cart and buzzer also beeps to notify.

Intelligent shopping cart has a controller which is used as main control for sanitization of products dropped in the cart automatically using detection sensor and a motor as an actuator that will activate the automatic sanitizing bottle.

When the customer is done with products collection the total will be displayed on the LCD and also the billing information is transmitted to the billing computer or server using ZIGBEE.

A. Overview

In this project, we try to design and operate an Intelligent shopping cart with sanitization which is capable of automatically identify and calculate the amount of products inserted into the cart and have the payment option at the cart using RFID technology. The cart is connected with the IOT, so that the cart can update the status to user and merchant using android application and as an extension the sanitization technique is also added for item sanitization.

II.   HARWARE DESCRIPTION

The main required components for the Intelligent shopping cart system with sanitization involves the following electronic components —

- RFID tags
- RFID reader
- Rechargeable Battery
- Voltage Regulator
- Push buttons
- Arduino
- Transformer
- Sensor
- Wi-Fi module
- Motor
- LCD

RFID tags and reader:

RFID is Radio frequency identification. It uses electromagnetic fields for automatic identification and tracking tags attached to things. RFID consists of radio transponder, radio receiver and transmitter.

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Wi-Fi Module:

Wi-Fi module is a complete Wi-Fi network where we can easily connect as a serving Wi-Fi adapter, wireless internet access through interface to Arduino based design on its simple connectivity through UART interface.

Rechargeable Battery:

A rechargeable battery or a storage battery is a type of electrical battery that can be charged, discharged into a load, and recharged as many times, which is contrary to a normal disposable battery, which is supplied fully charged and cannot be recharged again.

Voltage Regulator:

Voltage regulator is an electronic device which maintains a fixed dc output voltage even if there is any change in supply voltage or any load variations. The ac ripple voltage which are not removed by filter can also be eliminated by the voltage regulator.

Motor:

The immersible motors are specifically designed for operations in which the motors are needed to be immersed in a liquid for the required operation.

LCD:

The LCD is a liquid crystal display. It is a flat panel display that used light modulating properties of liquid crystals combined with polarizers. These do not emit light directly, instead they use backlight or reflector to produce images in color or monochrome.

Transformer:

A transformer is a static device which transmits electrical voltage from one circuit to another circuit by using the principle of electromagnetic induction. An electrical device which increase the voltage from primary windings to the secondary windings is knowns as step up transformer. In the proposed system we use a step-up transformer.

Arduino:

An Arduino is open source microcontroller board. The board is equipped with sets of digital and analog input and output pins that can be interfaced to various other boards and circuits.

Sensor:

Light dependent resistors which are also known as Photo resistors, are devices that are sensitive to light that are mainly used to indicate the presence or absence of light, or to measure the light intensity. During the dark, the resistance is very high and sometimes very high which is nearer to 1MO, but when it is exposed to the light, the resistance drops very sharply, sometimes to a few ohms, which depends on the intensity of light. LDR's sensitivity depends and varies with the wavelengths of applied light and are also nonlinear devices.

III. BLOCK DIAGRAM AND MODEL CIRCUITS
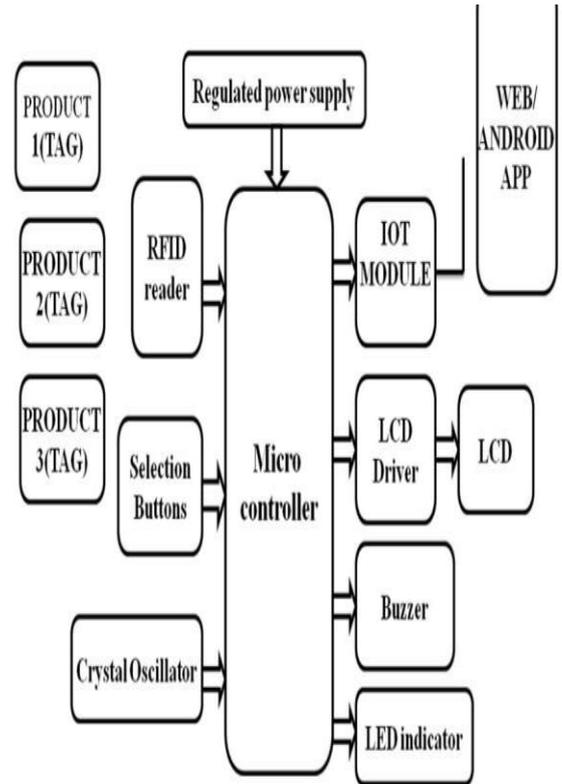
Fig 1. Block Diagram of the proposed model
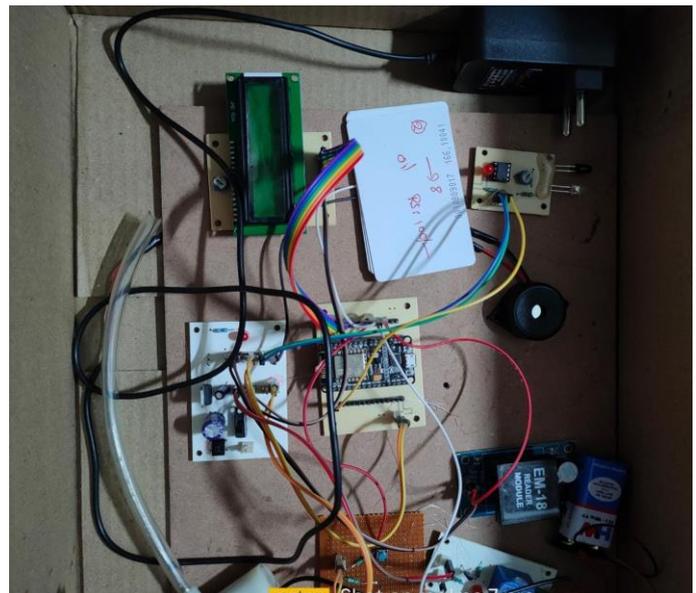
Fig 2. Prototype of proposed model
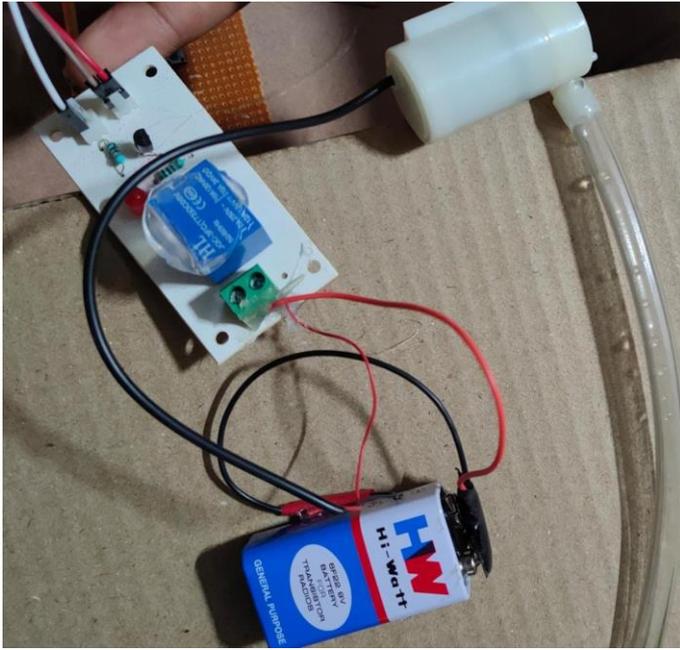
Fig 3. Sanitization circuit

IV. RESULT

By using this project we can design a **"Intelligent shopping cart system with sanitization"** and can be successfully developed. This project proposed the design and architecture of a new concept of adding the sanitization module. The advantage of the system lies in the fact that it helps in reducing the shopping time and improving the shopping experience and also smart payment.

V. CONCLUSION

The intelligent shopping cart system with sanitization was developed and worked as intended. The developed system can be integrated with super markets after testing to create an amazing shopping experience for customers.

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