Design and Implementation of IOT Based Smart Trolley for Supermarket

K.Sarathkumar[1], N.Tamilarasan[2], S.Vasanth[3], G.Dineshkumar[4], Dr.S.Saravanan[5]
[1,2,3] *UG Students, Department of Electrical and Electronics Engineering, Muthayammal Engineering College, Tamil Nadu, India*
[4]*Assistant Professor, Department of Electrical and Electronics Engineering, Muthayammal Engineering College, Tamil Nadu, India*
[5]*Professor, Department of Electrical and Electronics Engineering, Muthayammal Engineering College, Tamil Nadu, India*

***Abstract*- In the modern world, every supermarket and hypermarkets employ shopping baskets and shopping trolleys in order to aid customers to select and store the products which they intend to purchase. The customers have to drop every product which they wish to purchase into the shopping cart and then proceed to checkout at the billing counter. The billing process is quite tedious and highly time consuming and has created the need for shops to employ more and more human resource in the billing section, and yet waiting time remains considerably high. In this paper, we seem it fit to propose the "Intelligent Shopping Basket" which aims to reduce ,and possibly eliminate the total waiting time of customers, lower the total manpower requirement and expenses for markets and increase efficiency overall. In a world where technology is replacing the ways we pursue everyday activity, the future of the retail industry also lies in more and more automated devices.**

***Index terms*- Battery, Motors, Sensors, Relay, Liquid Crystal Display**

I.INTRODUCTION

In metro cities purchasing and shopping at super shops, big malls are a daily activity. We have seen big lines for payment of the bill at malls on holidays and weekends. When there are special offers and discount the rush is also even more. Customers will purchase many items and put it into the trolley. After customers done the purchase they need to go to billing counter for payment. At the billing counter the customer will prepare the bill using bar code reader which is a time consuming process and will creates the long queues at billing counters. All the products in the shop are attached with RFID tags. When a customer put any products in the trolley, its unique code will be detected and the price of those products will be get stored in memory. In a world where technology is replacing the ways we pursue everyday activity, the future of the retail industry.

II.HARDWARE REQUIREMENTS

- MICROCONTROLLER
- BUZZER
- RELAY
- DC MOTOR
- LIQUID CRYSTAL DISPLAY
- RADIO FREQUENCY IDENTIFICATION
- BATTERY

III BLOCK DIAGRAM

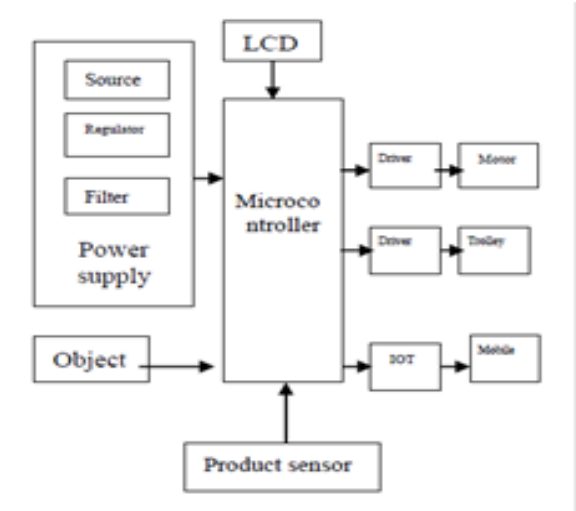

Fig.1.Trolley Block Diagram

IV.WORKING METHODOLOGY

In the modern world, every supermarket and hypermarkets employ shopping baskets and shopping trolleys in order to aid customers to select and store the products which they intend to purchase. The customers have to drop every product which they wish to purchase into the shopping cart and then proceed to checkout at the billing counter. After customers done the purchase they need to go to billing counter for payment. The billing process is quite tedious and highly time consuming and has created the need for shops to employ more and more human resource in the billing section, and yet waiting time remains considerably high. In this project, we seem it fit to propose the "Intelligent Shopping Basket" which aims to reduce ,and possibly eliminate the total waiting time of customers, lower the total manpower requirement and expenses for markets and increase efficiency overall.. This sensor is used for identify a person in front of the trolley. In a world where technology is replacing the ways we pursue everyday activity, the future of the retail industry also lies in more and more automated devices.

A. Microcontroller

PIC16F877 belongs to a class of 8-bit microcontrollers of RISC architecture. It has 8kb flash memory for storing a written program. Since memory made in FLASH technology can be programmed and cleared more than once, it makes this microcontroller suitable for device development. IT has data memory that needs to be saved when there is no supply. It is usually used for storing important data that must not be lost if power supply suddenly stops. For instance, one such data is an assigned temperature in temperature regulator.

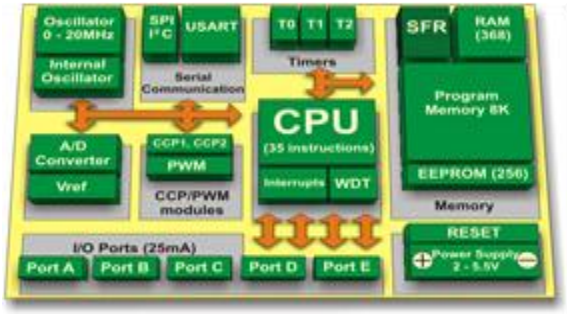

Fig.2.Block Diagram PIC16F887

B. Buzzer

A buzzer or beeper is an audio signal device, which may be mechanical, electromechanical, and piezoelectric. Typical use of buzzers and beepers is giving sound indication to the users.

Fig.3.Buzzer

C. Relays

Relays are simple switches which are operated both electrically and mechanically. Relays consist of an electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. The main operation of a relay comes in places where only a low-power signal can be used to control a circuit. It is also used in places where only one signal can be used to control a lot of circuits. The application of relays started during the invention of telephones. They played an important role in switching calls in telephone exchanges. They were also used in long distance telegraphy. They were used to switch the signal coming from one source to another destination. After the invention of computers they were also used to perform Boolean and other logical operations.

Fig.4.Relay

D. DC Motor

Electrical motors are everywhere around us. Almost all the electro-mechanical movements we see around us are caused either by an A.C or a DC motor. Here we will be exploring this kind of motors. This is a device that converts DC electrical energy to a mechanical energy. This DC or direct electric current motor works on the principal, when a electric current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move.

This is known as motoring action. If the direction of electric current in the wire is reversed, the direction of rotation also reverses. When magnetic field and electric field interact they produce a mechanical force, and based on that the working principle of dc motor established.

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Fig.5.DCMotor

E. Liquid Crystal Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being:

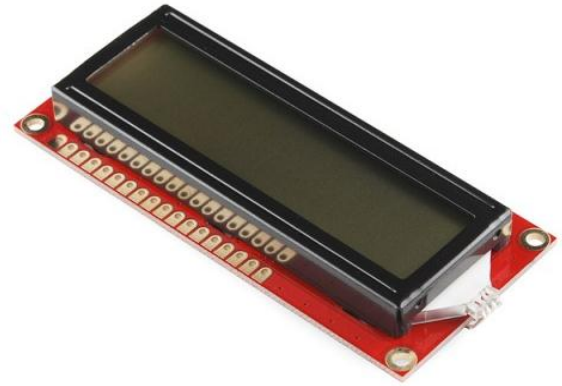

Fig 6.LCD

- LCDs are economical
- Easily programmable
- Have no limitation of displaying special characters.

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like

- Initializing it
- Clearing its screen

F. Radio Frequency Identification

In a very interesting article, the San Jose Mercury News tells us about Charles Walton, the man behind the radio frequency identification technology (RFID). Since his first patent about it in 1973, Walton, now 83 years old, collected about $3 million from royalties coming from his patents. Unfortunately for him, his latest patent about RFID expired in the mid-1990s. So he will not make any money from the billions of RFID tags that will appear in the years to come. But he continues to invent and his latest patent about a proximity card with incorporated PIN code protection was granted in June 2004. RFID is short for Radio Frequency Identification. Generally a RFID system consists of 2 arts. RFID systems evolved from barcode labels as a means to automatically identify and track products and people. RFID.

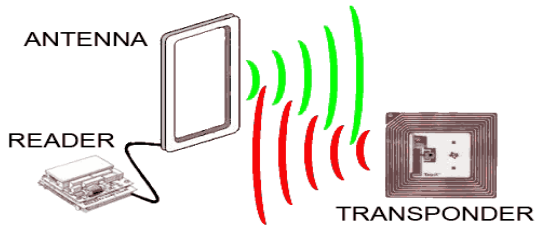

Fig.7.Radio Frequency Identification

Passive tags have no power source of their own and instead derive power from the incident electromagnetic field. When the Tag enters the generated RF field it is able to draw enough power from the field to access its internal memory and transmit its information. When the transponder Tag draws power in this way the resultant interaction of the RF fields causes the voltage at the transceiver antenna to drop in value. Basic RFID systems consist of three components.

V.HARDWARE MODEL

Fig.8. Hardware Model

CONCLUSION

Experience with Smart Shopping has indicated that there are many technical challenges will be met in deploying a pervasive retail system. Technologies that capture information about interactions between physical products are not yet mature enough for the consumer market as they are relatively costly. Even when such data is available the task of interpreting it is often as challenging as its registration, since no standardized classification scheme or appropriate taxonomy exists. Several efforts to create standards are underway but are still at least years away. Although in the relatively controlled environment of the smart shopping trolley project it has been possible to address this problem on a wireless basis it is hard to envision a situation where widely deployed retail services can operate without such standards.

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