AUTOMATIC DOOR OPENING SYSTEM

WITH VISITOR COUNTER

PROJECT REPORT
SUBMITTED IN PARTIAL FULFILLMENT OF THE

REQUIREMENT FOR THE AWARD OF THE DEGREE OF

Diploma in Engineering
in
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BY

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Candidate's Declaration

I hereby declare that the work, which is being presented in this dissertation, entitled "**AUTOMATIC DOOR OPENING SYSTEM WITH VISITOR COUNTER**" in partial fulfillment for the award of the degree of **Diploma in Electronics Engineering** in the **Electrical Engineering Section, University Polytechnic,** , Aligarh Muslim University Aligarh, is an authentic record of my own work carried out under the supervision of Mr**. Mr. Tehzeeb Ahmad Abbasi**, Electrical Engineering Section, University Polytechnic, A.M.U., Aligarh.

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MUNAZIR REZA

ABSTRACT

This project report presents an automatic door opening system with visitor counter employing ARDUINO UNO. A PIR sensor in conjunction with motor driver module L293D and Arduino microcontroller implements the door opening mechanism by detecting human movement near the door. Visitor counter shows the number of person entered in the room. The open-source Arduino Software Integrated Development Environment (IDE) software is employed to implement the code and upload it to the Arduino board. The microcontroller sends an active high signal to the motor driver which controls the door and its status is displayed on the LCD screen. The visitor counter will show how many persons enter in the room. The circuit is powered using two standard 9V PP3/6FF22 batteries. The software used to implement the code is ARDUINO Integrated Development Environment,

List of Abbreviations	
IDE	Integrated Development Environment
PIR	Passive Infrared
IC	Integrated Circuit
ASCII	American Standard Code for Information Interchange
LED	Light Emitting Diode
LCD	Liquid Crystal Display
EEPROM	Electrically Erasable Programmable Read Only Memory
ICSP	In Circuit Serial Programming
DIY	Do It Yourself

CONTENTS

CHAPTER 1
INTRODUCTION

An Automatic Door Opener System is a simple project based on PIR Sensor and Arduino which automatically opens and closes the door by detecting a person or an object. The no. of person enters in the room will show in the visitor counter. Automatic Door Opening Systems are installed at shopping malls, cinemas, hospitals etc. As soon as a person approaches the door (at about 2 or 3 feet), the door automatically slides open and after some time (about 5 to 10 seconds), the door closes by sliding in the reverse direction.

Automatic Door Opening mechanisms are very useful as an additional person is not required to stand at the door and open it whenever a guest comes in. Since the doors are opened and closed only when a person approaches the door, there is significant less loss of air conditioning. To better understand the potential of this concept, we have implemented a simple Automatic Door Opening System using Arduino and PIR Sensor with visitor counter.

In the Automatic Door Opening System, the main component or hardware is the sensor which detects the persons (well, the motion of the person in our case). For this purpose, we will be using the PIR Motion Detector Sensor.
For the purpose of demonstration, we have used a CD Tray to replicate the door. Whenever the PIR Sensor detects a motion, the CD Tray opens and then closes after some time. In order to control the 5V DC motor in the CD Tray, we have used the L293D Motor Driver Module. For visitor counter we have used decade counter (IC CD4033) and seven segment LED display.
Automation is the technology by which a procedure or process is performed with minimal human assistance. With the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life. The demand for the electronic device which can control the doors automatically has seen a great surge where it can be implemented in many real time applications like in hotels, living rooms and for security purposes.
The implemented hardware model can sense the human movement in the proximity of the door and controls it. The person entering the room through the gate will be sensed by the PIR sensor and the signal sensed is then sent to the Arduino UNO for processing and controlling the gate.

1.1. LITERATURE REVIEW

There had been growing reasons of people in choosing automatic over manual doors, particularly to highly sophisticated facilities and organizations such as: (1) compliance to regulatory laws on the welfare of disabled and elderly, (2) the ease of access, especially for shopping malls and other public places, (3) improved reliability and maintenance.

Owing to the above reasons, automatic door opening system is used throughout the world. They are used in many places such as shopping malls, public buildings, airports, hospitals, theatres etc. These systems are used to open the door when a person comes near to the entrance of the door and close after entered into the door. The automatic door opening system consists of sensing process, main controller circuit and motor.

The models and kits that were designed around the Arduino open-source electronics prototyping platform provided a complete, flexible, easy-to-use hardware and software platform that is widely used by artists, designers, and hobbyists. The kits use the Arduino UNO, a microcontroller board with fourteen digital input/output pins, six analog inputs and a USB port. The board is programmed using the Arduino language, which is based on C/C++.

Arduino uses a hardware known as the Arduino development board and software for developing the code known as the Arduino IDE (Integrated Development Environment). Built up with the 8-bit Atmel AVR microcontroller's that are manufactured by Atmel or a 32-bit Atmel ARM, these microcontrollers can be programmed easily using the C or C++ language in the Arduino IDE.

The UNO can be programmed to communicate with sensors or LED's to perform controlled actions, or be run with a computer as a peripheral. The Arduino board comes equipped with 14 digital input/output pins, of which 6 can be used as PWM (pulse width modulation) outputs, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP (In Cicuit Serial Programming) header allowing bypassing of the boot loader, and a reset button.

The designing of a remote automatic door system using Arduino Uno is discussed. Arduino Uno serves as the processor of the door lock control via SMS Gateway. The automated room monitoring system with visitor counter is demonstrated. .

In this paper, we implemented a prototype hardware model of the automatic door opening system which works on the basic principle of the detection of any human movement near the door with help of a PIR sensor employing Arduino microcontroller and L293D motor module.

1.2. ARDUINO BASED VISITOR COUNTER.

“Arduino based Visitor counter” is designed and presented in order to count the visitors of an auditorium, hall, offices, malls, sports venue, etc. The system counts number of persons entering in the auditorium or hall or other place, where it is placed. Depending upon the clock, the system identifies the number of the visitor. On the successful implementation of the system, it displays the number of visitor enter in the auditorium or hall. This system can be economically implemented in all the places where the visitors have to be counted and controlled. Since counting the visitors helps to maximize the efficiency and effectiveness of employees, floor area and sales potential of an organization, etc.

Digital visitor counter is a reliable circuit that takes over the task of counting number of Persons/ Visitors in the Room very accurately. When somebody enters into the Room then the Counter is Incremented by one. The total number of Persons inside the Room is displayed on the seven segment display module. The microcontroller does the above job it receives the signals from the Arduino, and this signals operated under the control of software which is stored in EEPROM. It can be used to count the number of persons entering a hall in the up mode at entrance gate.. It can also be used at gates of parking areas and other public places. This circuit divided in three parts: Arduino, controller and counter display. The sensor would observe an interruption and provide an input to the controller which would run the counter in up mode depending upon the selector setting. The same count is displayed on a set of 7-segment displays through the controller. In this project we will create counter system for apply the total number of times gates open. The total number of persons is displayed on the seven segment display. The system is fully controlled by the Arduino. It can also be used at gates of parking areas and other public places.

CHAPTER 2
DESCRIPTION OF CIRCUIT COMPONENTS

2.1 ARDUINO UNO.

Arduino UNO acts as the main controlling part. It reads the data from the PIR Sensor and activates the L293D Motor Driver based on the data from the PIR Sensor.

In this project, Arduino UNO acts as the main controlling part. It reads the data from the PIR Sensor and activates the L293D Motor Driver based on the data from the PIR Sensor. Detecting human motion is done with the help of PIR Sensor.

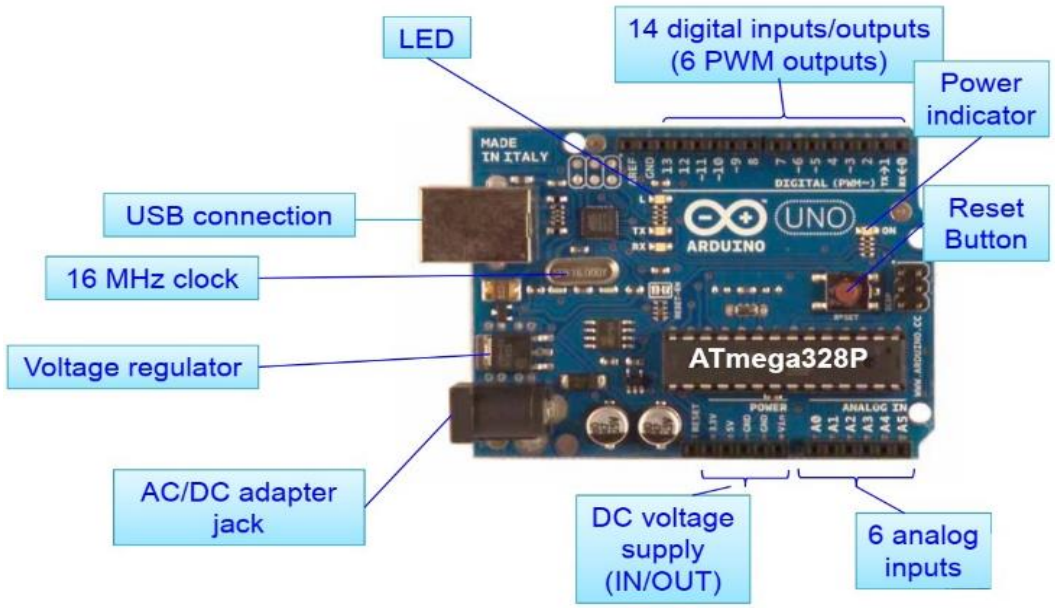

Figure 2.1 ARDUINO UNO Front view

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. Arduino IDE is a special software running on our system that allows us to write sketches for different Arduino boards. The Arduino programming language is based on a very simple hardware programming language called processing, which is similar to C language.

Over the years Arduino has been the brain of thousands of projects, from everyday objects to

complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.

Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for Internet of things (IoT) applications, wearable, 3D printing, and embedded environments. All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it is growing through the contributions of users worldwide.

2.2 PIR SENSOR.

A Passive Infrared Sensor is an electronic sensor that measure infrared light radiating from object in its field of view. They are most often used in PIR based motion detector. A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR- based motion detectors. PIR sensors are commonly used in automatic door opener system, security alarms and automatic lighting applications. PIR sensors detect general movement, but do not give information on who or what moved. For that purpose, an active IR sensor is required."

"PIR sensors are commonly called simply "PIR", or sometimes "PID", for "passive infrared detector". The term passive refers to the fact that PIR devices do not radiate energy for detection purposes. They work entirely by detecting infrared radiation (radiant heat) emitted by or reflected from objects."

2.2.1 OPERATION PRINCIPLE OF PIR SENSOR.

All objects with a temperature above absolute zero emit heat energy in the form of radiation. Usually this radiation isn't visible to the human eye because it radiates at infrared wavelengths, but it can be detected by electronic devices designed for such a purpose.

2.2.2 Construction of PIR Sensor

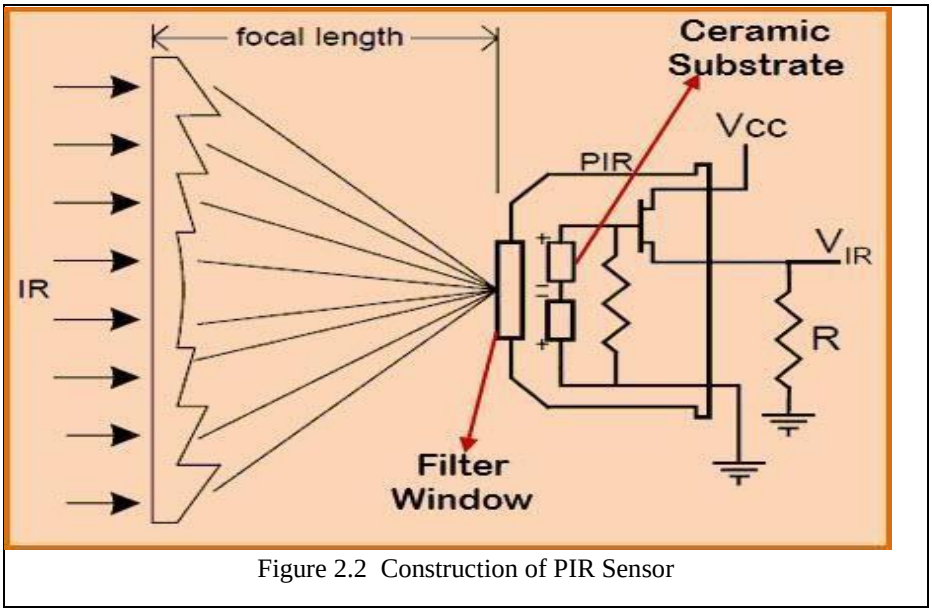

Figure 2.2 Construction of PIR Sensor

Infrared radiation enters through the front of the sensor, known as the 'sensor face'. At the core of a PIR sensor is a solid-state sensor or set of sensors, made from pyroelectric materials—materials which generate energy when exposed to heat. Typically, the sensors are approximately 1/5-inch square (50 mm2), and take the form of a thin film. Materials commonly used in PIR sensors include gallium nitride (GaN), Cesium nitrate (CsNO3), polyvinyl fluorides, derivatives of phenyl pyridine, and cobalt phthalocyanine. The sensor is often manufactured as part of an integrated circuit.

2.2.3 PIR BASED DOOR SYSTEM

The automatic door opening systems are used in commercial buildings, shopping malls, theatres, etc. These systems are used to open the door when a person comes near to the entrance of the door and close it after he moves away from the door or after entered into the door. There are various kinds of sensors are available in the market to make such types of systems such as Radar sensors, PIR sensors, Infrared sensors and Laser sensors, etc. This project uses a PIR sensor to open or close the door automatically which senses the infrared energy produced by the human body. When someone approaches the door, the IR energy sensed by the PIR sensor changes and activates the sensor to open and close the door automatically. Further, the signal sent to microcontroller to control the door.

Figure 2.3. Top and Back view of PIR Sensor

2.3 L293D MOTOR DRIVER MODULE.

The L293D Driver is a high voltage, high current dual full bridge driver design to accept standard TTL Logic levels and drive inductive loads such relays, solenoids DC Stepping motor. It is used as interfacing device between Arduino UNO and load.

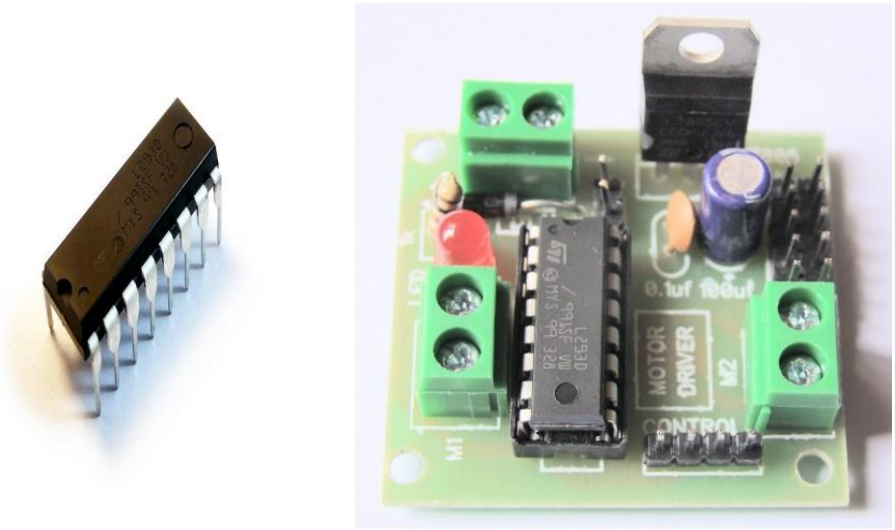

Figure 2.4 L293D Motor Driver Module

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that it can control two DC motor with a single L293D IC. Dual H-bridge *Motor Driver integrated circuit* (*IC*). The L293D can drive

small and quiet big motors as well.

2.3.1 Concept of L293D MOTOR DRIVER MODULE

It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. In H-bridge voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, hence H-bridge IC are ideal for driving a DC motor. In a single L293D chip there are two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic and automations application for controlling DC motors. Given below is the pin diagram of a L293D motor controller. There are two Enable pins on L293D. Pin 1 and pin 9, for being able to drive the motor, the pin 1 and 9 need to be high. For driving the motor with left H-bridge, it needs to enable pin 1 to high. And for right H-Bridge, it needs to make the pin 9 to high. If anyone of the either pin 1 or pin 9 goes low then the motor in the corresponding section will suspend working. It's like a switch.

2.3.2 L293D Pin Diagram

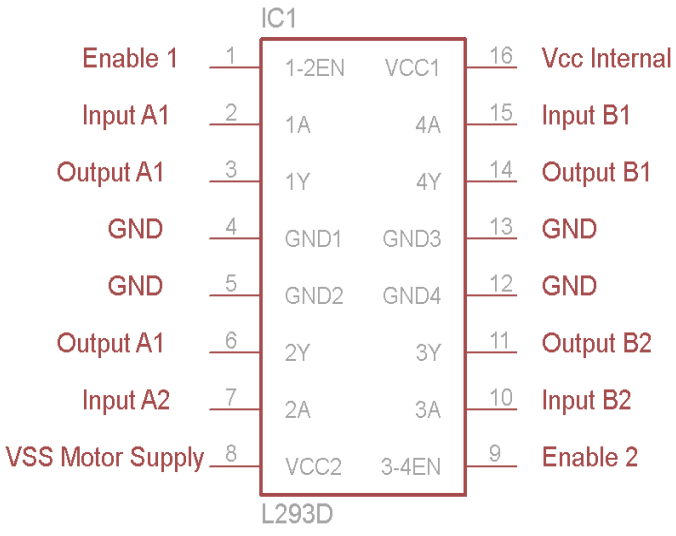

Figure 2.5 Pin description of L293D Motor Driver Module

2.3.3 Working of L293D MOTOR

There are 4 input pins for L293D, pin 2, 7 on the left and pin 15 ,10 on the right as shown in the pin diagram. Left input pins will regulate the rotation of motor connected across left side and right input for motor on the right hands side. The motors are rotated on the

basis of the inputs provided across the input pins as LOGIC 0 or LOGIC 1. It is simple to provide Logic 0 or 1 across the input pins for rotating the motor.

2.4 LCD DISPLAY.

An LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16*2 LCD display is very basic module commonly used in DIYs and circuit. It has 16 columns and 2 rows.

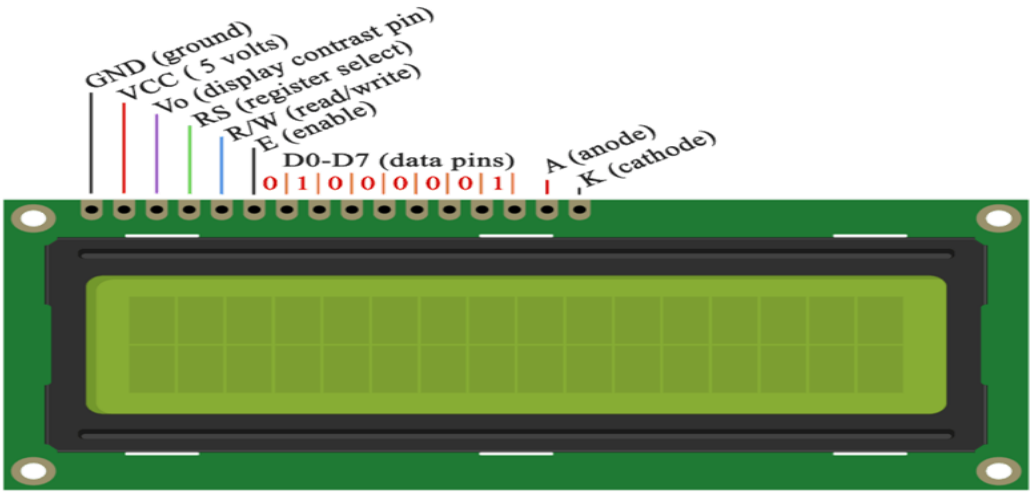

Figure 2.6 LCD Display

It has 16 pins and the first one from left to right is the Ground pin. The second pin is the VCC which we connect the 5 volts pin on the Arduino Board. Next is the Vo pin on which we can attach a potentiometer for controlling the contrast of the display.

Next, The RS pin or register select pin is used for selecting whether we will send commands or data to the LCD. For example, if the RS pin is set on low state or zero volts, that commands are sending to the LCD. Set the cursor to a specific location, clear the display, turn off the display and so on. And when RS pin is set on High state or 5 Volts we are sending data or characters to the LCD.

Next come the R / W pin which selects the mode whether we will read or write to the LCD. Here the write mode is obvious and it is used for writing or sending commands and data to the LCD. The read mode is used by the LCD itself when executing the program.

Next is the E pin which enables the writing to the registers, or the next 8 data pins from D0 to D7. So, through this pin 8 bits data are sending. When we are writing to the registers or for example if we want to see the letter uppercase A on the display, we will send 0100 0001 to

the registers according to the ASCII(American Standard Code for Information Interchange) table. The last two pins A and K, or anode and cathode are for the LED back light.

2.4.1 Circuit Schematic of LCD Display

We will use just 6 digital input pins from the Arduino Board. The LCD's registers from D5 to D7 will be connected to Arduino's digital pins from 5 to 7. The Enable pin will be connected to pin number 2 and the RS pin will be connected to pin number 1. The R/W pin will be connected to the Ground and the Vo pin will be connected to the potentiometer.

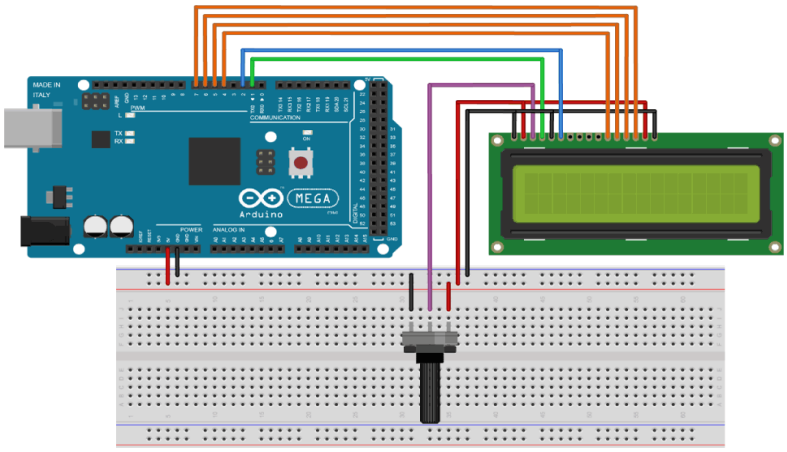

Figure 2.7 LCD display interface with Arduino UNO

2.6. JUMPER WIRES

Figure 2.8 Jumper Wire

Jumper wires are simply wire that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wire are typically used with breadboards and others prototyping tools in order to make it easy to change a circuit as needed.

A jump wire (also known as jumper wire, or jumper) is an electrical wire, or group of them in a cable, with a connector or pin at each end which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

2.7 CD Tray Mechanism

To replicate the door for entry and exit of people, in this prototype we have used a CD tray for demonstration purposes.

2.8 BREADBOARDS

A breadboard is used to build and test circuits quickly before finalizing any circuit design. The breadboard has many holes into which circuit components like ICs and resistor can be inserted.

2.9. DECADE COUNTER (IC CD4033)

A decade counter is one that counts in decimal digits, rather than binary.CD4033 is a Johnson counter IC commonly used in digital display. It has five stage. Johnson decade counter with decoder which convert the Johnson code to seven segment decoded output means it convert the input into numeric display which can be seen on the seven segment display or with the help of LEDs.

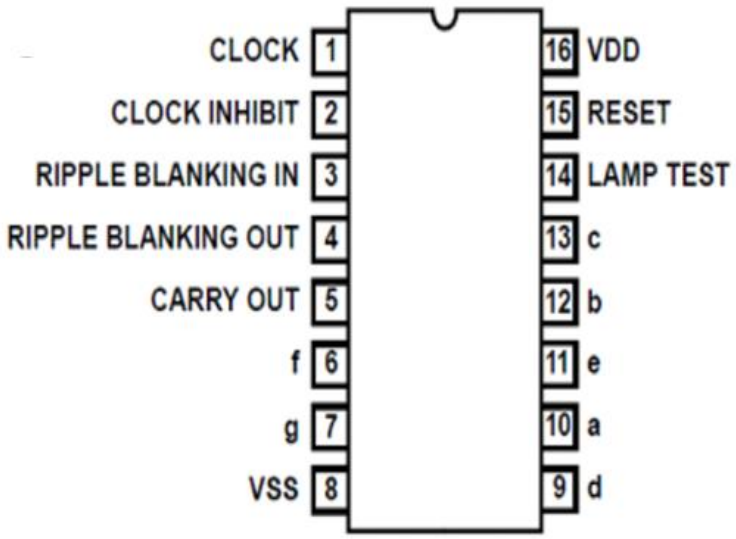

Figure 2.9 Pin description of Decade Counter(IC CD4033)

2.10. LED DISPLAY

A light emitting diode (LED) semiconductor light source that emits light. When current flow through it .Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The colour of the light (corresponding to the energy of the photons)is determined by the energy required for the electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light emitting phosphor on the semiconductor device.

Early LEDs were often used as indicator lamps, replacing small incandescent bulbs, and in the seven segment displays

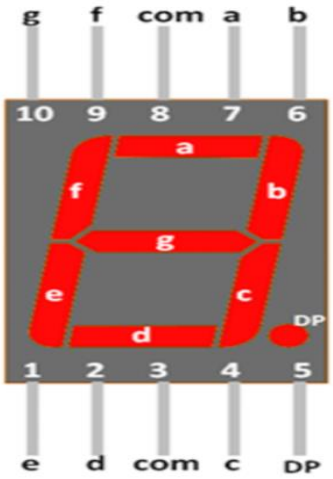

Figure 2.10 7-Segment LED Display

CHAPTER 3

SOFTWARE DESCRIPTION

Arduino IDE(Integrated Development Environment) is a special software running on our system that allows us to write sketches for different Arduino boards. The Arduino programming language is based on a very simple hardware programming language called processing, which is similar to C language.

3.1. PROGRAMMING CODE.

```
  #include <LiquidCrystal.h>
LiquidCrystal lcd(13, 12, 11, 10, 9, 8);
  #define PIR_sensor A0
  #define counter 7
  #define m11 0
  #define m12 1

  void setup()

  {

  lcd.begin(16, 2);
   lcd.clear ();
 pinMode(m11, OUTPUT);
 pinMode(m12, OUTPUT);
pinMode(PIR_sensor, INPUT);
pinMode(counter , OUTPUT);
lcd.print("AUTOMATIC DOOR");
lcd.setCursor(0,1);
lcd.print("OPENING SYSTEM  ");
delay(1000);
lcd.print("WITH VISITOR    ");
delay(1000);
  lcd.setCursor(0,1);
lcd.print("    COUNTER     ");
  delay(1000);
                        //initialize visitor counter as int visitor =0
 }

void loop()

   {

       if(digitalRead(PIR_sensor))

  {
```

```
    digitalWrite(counter,HIGH);
    digitalWrite(counter,LOW);
    lcd.setCursor(0,0);
    lcd.print("MovementDetected");
    lcd.setCursor(0,1);
    lcd.print(" Gate Opened  ");
   digitalWrite(m11, HIGH);        // gate opening
   delay(1000);
   digitalWrite(m12, LOW);
   delay(1000);
   digitalWrite(m11, LOW);         // gate stop for a while
   digitalWrite(m12, LOW);
   delay(1000);
   lcd.clear();
   lcd.setCursor(0, 0);
   lcd.print("   Gate Closed    ");
  digitalWrite(m11, LOW);          // gate closing
  digitalWrite(m12, HIGH);
  delay(2000);
    digitalWrite(m11, LOW);
    digitalWrite(m12,LOW);
    delay(1000);

                              //display visitor count to seven segment display

                                //please increase visitor count ++

}

     else

{

      digitalWrite(counter,LOW);
    lcd.setCursor(0,0);
    lcd.print("   No Movement");
      delay(200);
    lcd.setCursor(0,1);
    lcd.print("   Gate Closed   ");
   digitalWrite(m11, LOW);
   digitalWrite(m12, LOW);  }
}
```

CHAPTER 4

WORKING PRINCIPLE OF AUTOMATIC DOOR OPENING SYSTEM WITH VISITOR COUNTER

Arduino UNO acts as the main controlling part. It reads the data from the PIR Sensor and activates the L293D Motor Driver based on the data from the PIR Sensor.

This project uses a PIR sensor to open or close the door automatically which senses the infrared energy produced by the human body. When someone approaches the door, the IR energy sensed by the PIR sensor changes and activates the sensor to open and close the door automatically. Furthermore, the signal is sent to microcontroller to control the door.

When the PIR Sensor detects any motion of a person, its Data OUT Pin will become HIGH. As this pin is connected to the Arduino UNO, it will detect this HIGH Signal and understands that there is a person approaching the door.

Arduino then immediately activates the L293D Motor Driver module to open the door. After a pre-defined delay of 6s, the Arduino microcontroller will once again activate the motor driver to close the door. The working principle is illustrated in the flow chart.

The circuit diagram with Arduino UNO, L293D motor driver module, PIR Sensor and all other components is illustrated in Figure 4.3 to provide a better perception of the working principle of the prototype.

4.1 BLOCK DIAGRAM

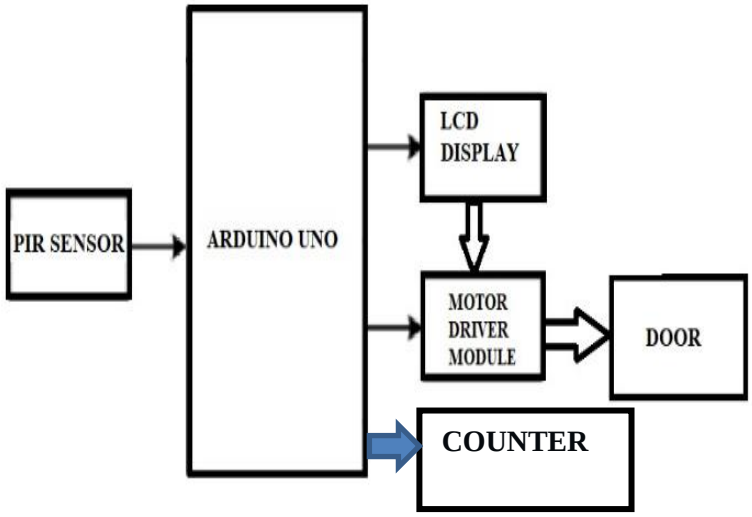

Figure 4.1 Block Diagram

PIR Sensor detect any motion of the body and sends high signal to Arduino then the Arduino activates the motor driver to open the gate and again the motor driver activate the signal to close the door.The counter counts number of time gate opened.

4.2. FLOW CHART

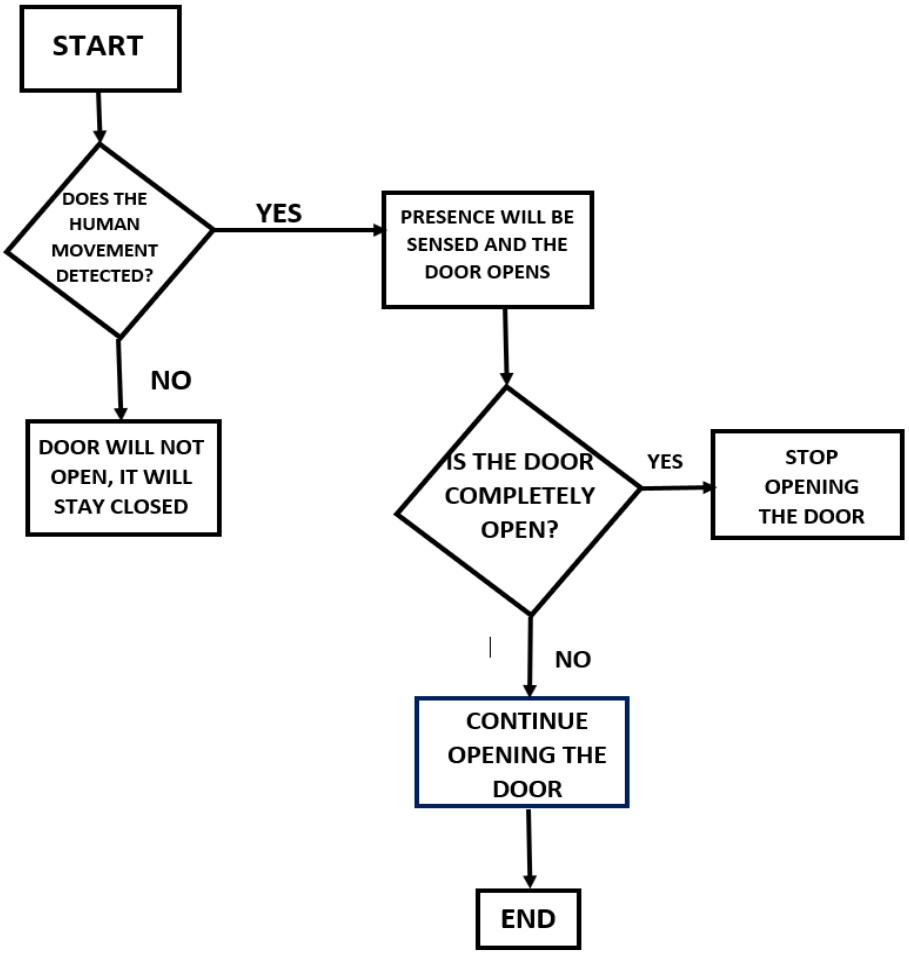

Figure 4.2 Flow chart

From starting the PIR Sensor checks any motion, if motion sensed then it activates high signal otherwise it will remain as low. Finally the door is opened and after some interval of time the door is closed and the loop repeated continuously.

4.3. CIRCUIT DIAGRAM

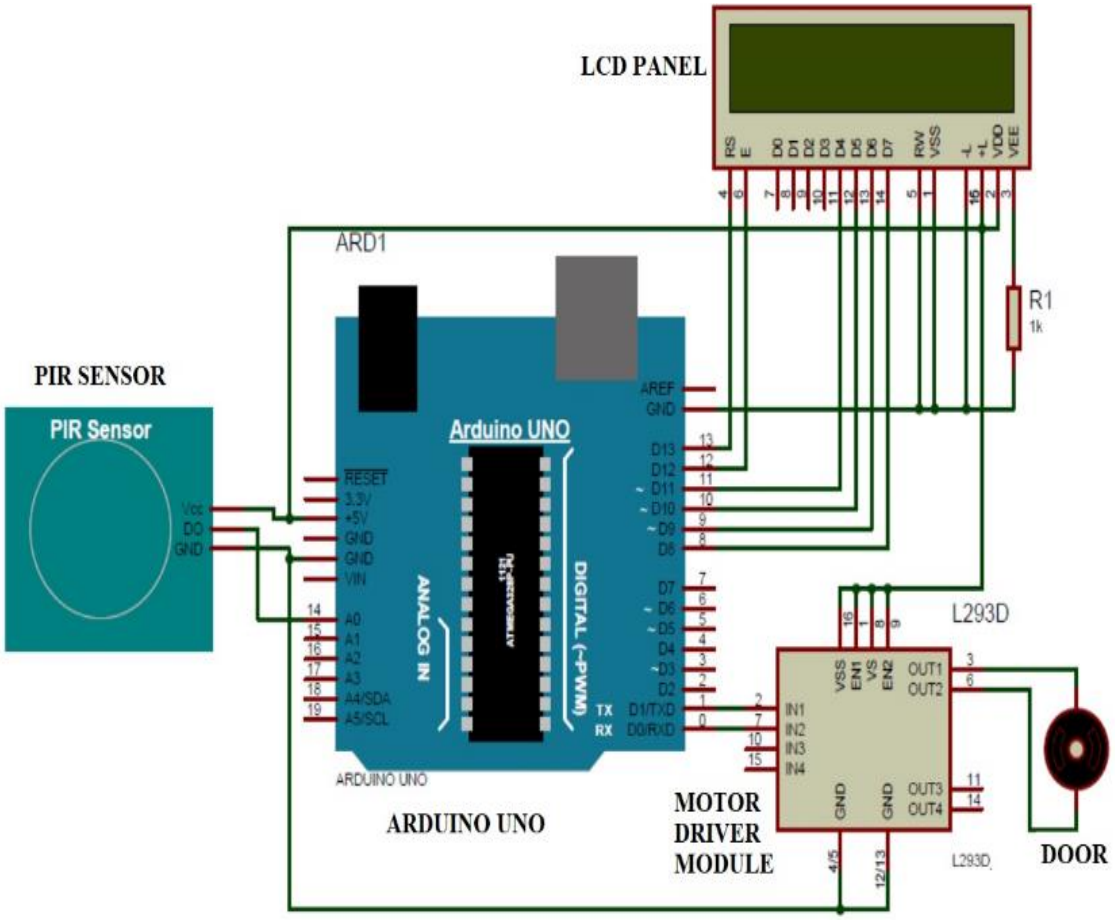

Figure 4.3 Circuit diagram

First, the Data OUT of the PIR Sensor is connected to Digital Pin 14 of Arduino. The other two pins of PIR Sensor i.e. Vss and GND are connected to +5V and GND respectively.

Coming to the Motor Driver, we have used the second channel of the L293D Motor Driver Module. Hence, the IN1 and IN2 of the L293D Motor Driver are connected to Digital Pins 0 and 1 of Arduino.

The 9/5V Pin of the Second Motor on the L293D Module us connected to +5V. Usually, all the L293D Modules consists of a jumper to directly connected the 9/5V pins to +5V.

Since the motor used in the project is a 5V Motor, we have connected a 5V Supply to the Motor Driver Module.

Finally, the Motor of the CD Tray is connected to the OUT3 and OUT5 of L293D Motor Driver Module.

The GND, R/W, Backlight (-) pin of LCD is connected to ground. VCC and Backlight (+) is connected to +5V supply. CONTRAST pin is connected to potentiometer. ENABLE is connected to Digital pin 11 of Arduino. D5, D5, D6, D7 is connected to Digital pins of 7,6,5,4 of Arduino.

For Visitor Counter, Pin 1 of decade counter is connected to 7 Pin of Arduino UNO. Pin 2, 14 of decade counter is connected to GND. Pin 3 of decade counter is connected to VCC. Pin 10, 12, 13, 9, 11, 6, 7 is connected to 7, 6, 4, 2, 1, 9, 10 of LED display. Pin 5 of decade counter is connected to pin 1 of second (CLK 2) LED display.

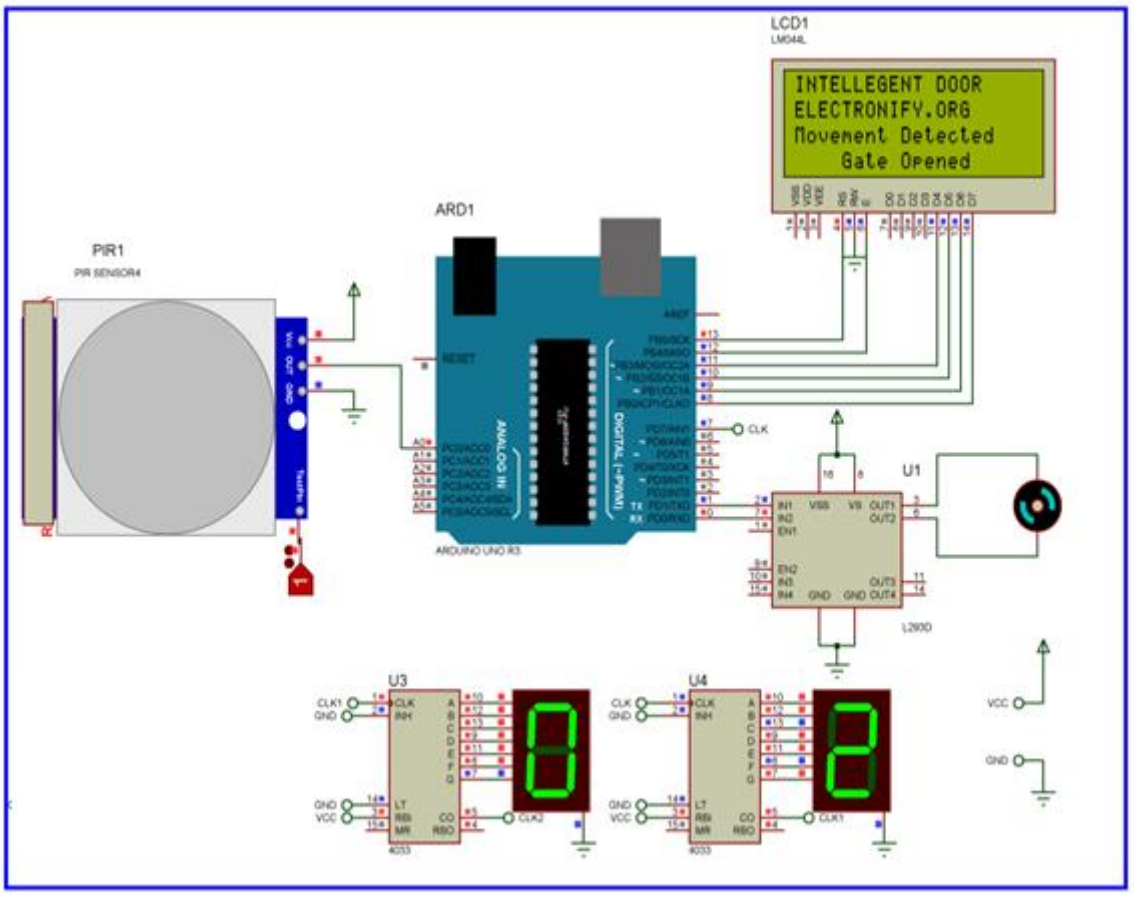

Figure 4.4. Circuit Diagram with visitor counter

4.4. PIN DESCRIPTIONS

TABLE 4.1

ARDUINO PIN	PIR/ MOTOR/ LCD
A0/14	PIR Sensor
0	INT1 pin of motor module
1	INT2 pin of motor module
13	RS pin of LCD
12	EN pin of LCD
11	D4 pin of LCD
10	D5 pin of LCD
9	D6 pin of LCD
7	CLK FOR CD4033 COUNTER
8	D7 pin of LCD
5V/VCC	VCC, A pin of LCD
GND/ 0V	VSS, K, RW, pin of LCD
5V	VCC of PIR sensor
GND	GND of PIR sensor
5V	VCC of motor module
0V	GND of motor module

TABLE 4.2

DECADE COUNTER (IC CD4033)	ARDUINO/LED
1	7 OF ARDUINO
2	GND
14	GND
3	VCC
10	7 (A) OF LED
12	6 (B) OF LED
13	4 (C) OF LED
9	2 (D) OF LED

11	1 (E) OF LED
6	9 (F) OF LED
7	10 (G) OF LED
5	CLK 2

TABLE 4.3

PIN OF LED DISPLAY	SUPPLY
8 (COM)	GND
3 (COM)	GND
5 (DP)	GND

CHAPTER 5
EXPERIMENTS RESULTS

The automated gate control system based on Arduino micro-controller and configured with PIR sensor works essentially in three distinct steps described below:

When there is no human movement detected by the PIR sensor, the gate remains closed and no movement detected is displayed on the LCD screen. The visitor counter reads 0 as shown in Figures 5(a) and 5(d).

When the sensor detects a human motion in proximity, an active HIGH signal is sent to motor driver module L293D and decade counter interfaced with Arduino microcontroller to open the gate. A message "Movement Detected-Gate Opened" gets displayed on the LCD screen and the visitor counter is incremented by 1 as shown in figures 5(b) and 5(e).

Once the gate is open for a pre-defined delay of around 5-6 sec, Arduino microcontroller will once again activate the motor driver to close the door. A status message for the same gets displayed on the panel as shown in Figures 5(c) and 5(f).

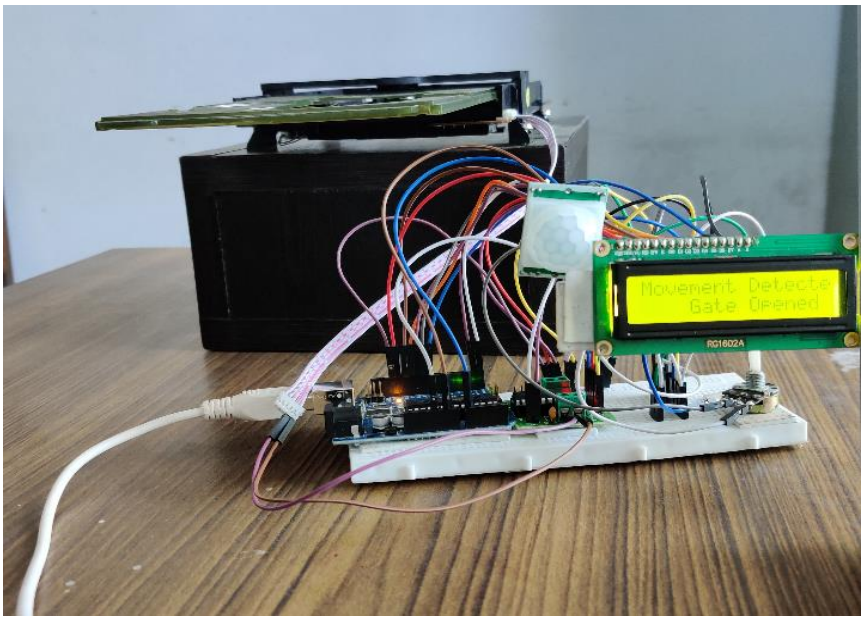

Figure 5(a). Illustration of the message "Automatic Door Opening System" displayed on the LCD screen

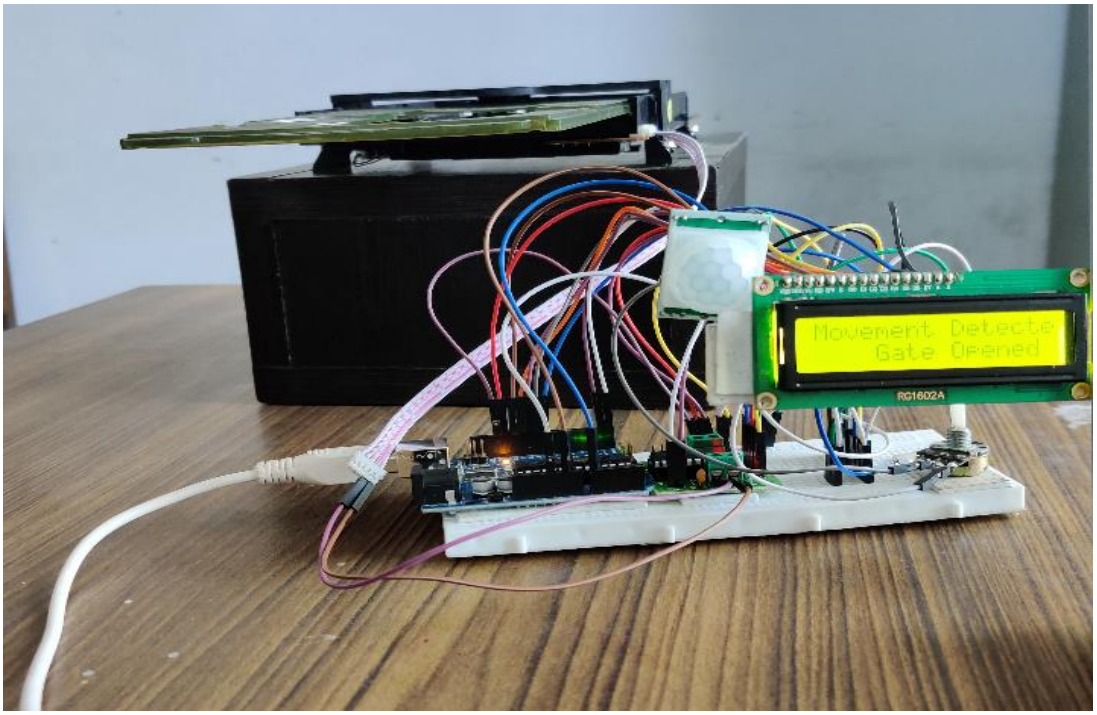

Figure 5(b). Illustration of the message “Gate Opened” on the LCD screen

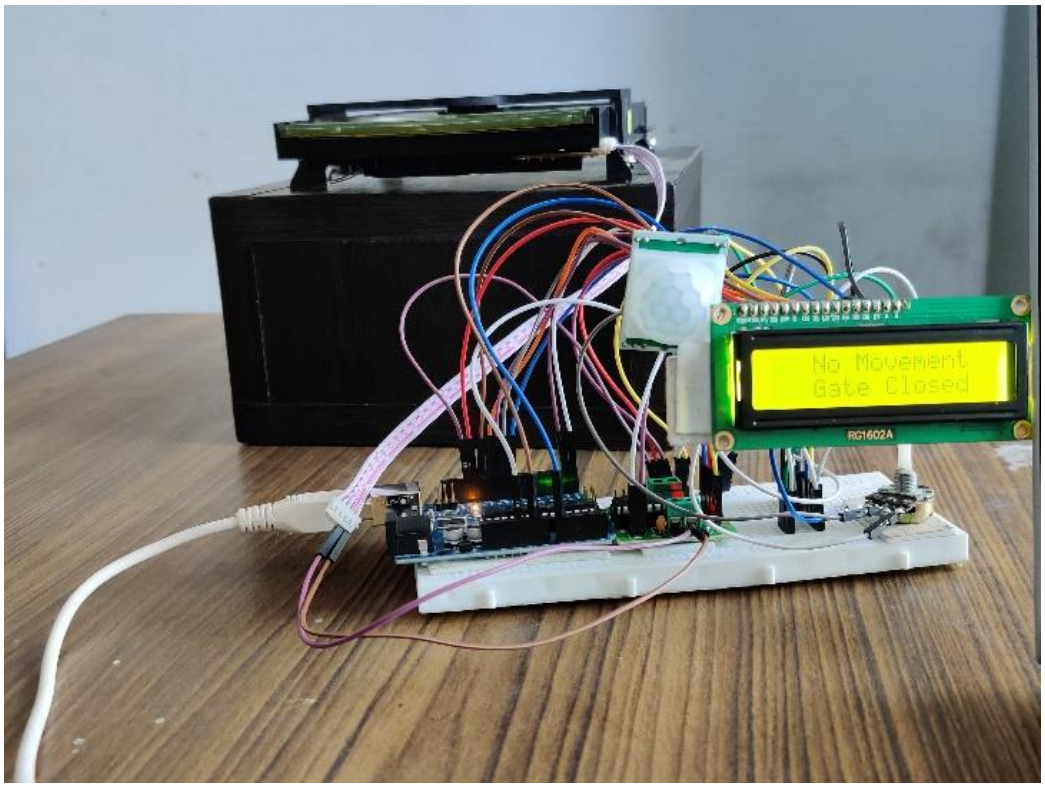

Figure 5 (c): Illustration of “Gate Closed-No Movement Detected” message on the LCD screen

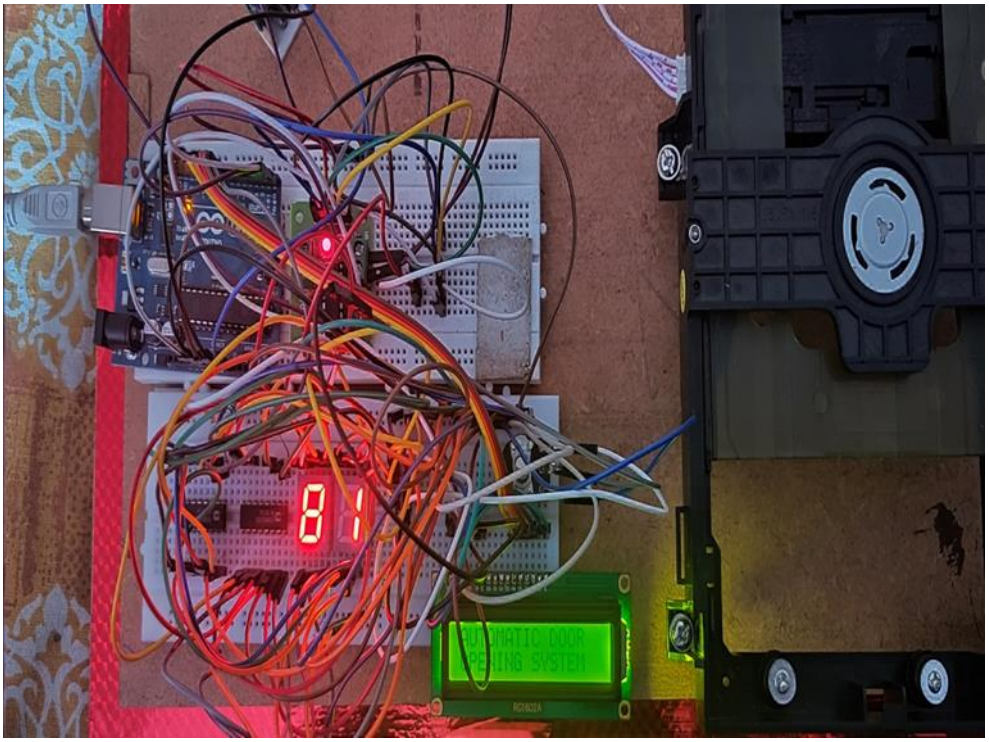

Figure 5(d) Illustration of automatic door opening system with visitor counter reading 81 on the display

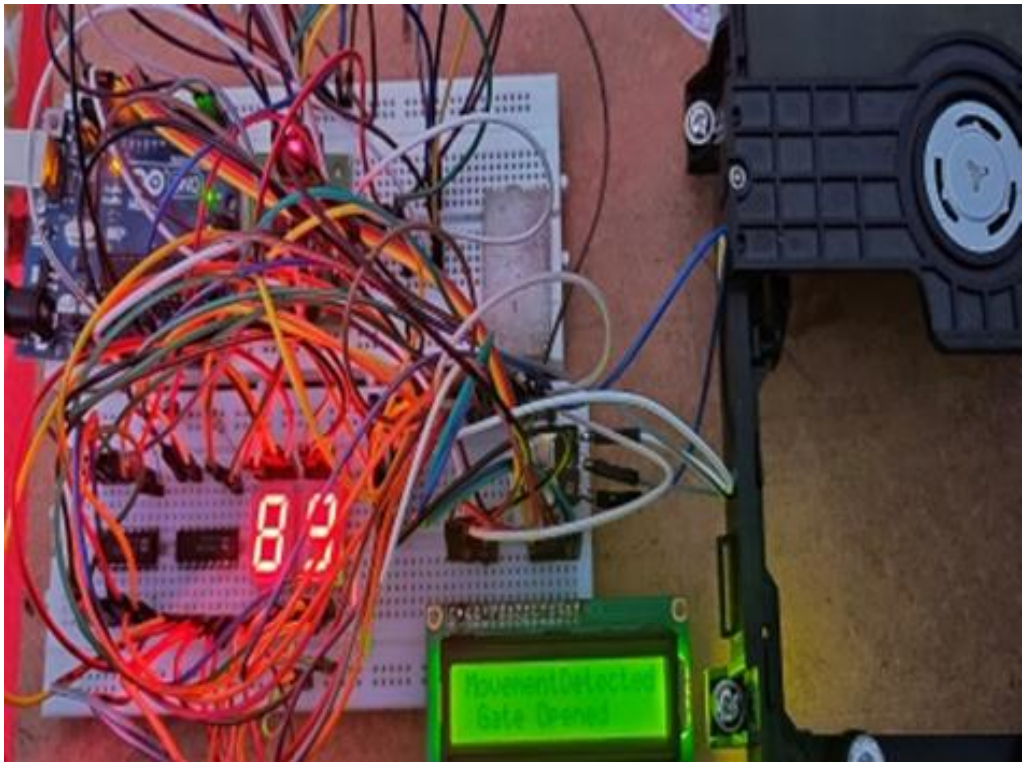

Figure 5(e) Illustration of the gate opened with visitor counter reading 89 on the screen

Figure 5(f) illustration of the gate closed with visitor counter reading 83 on the display.

In the normal position, the LCD panel illustrates the prototype project “Automatic door opening system with visitor counter”. When a human motion is detected, gate opened message is displayed on the LCD screen. Under the condition no human motion is detected in the door’s proximity, it remains closed and “Gate Closed” message is shown on the LCD screen.

CHAPTER 6

CONCLUSION AND FUTURE WORK

CONCLUSION

This report is a hardware model for an automated door controlling system employing ARDUINO UNO. A PIR sensor in conjunction with motor driver module L293D and Arduino microcontroller successfully implemented the door opening mechanism by detecting human movement near the door. Further, its functionality can be enhanced by interfacing a counting arrangement for keeping a record of entry and exit of people at particular place. This can be achieved by interfacing the system with an EEPROM (non-volatile memory) to avoid loss of stored data even if the power fails.

6.1 APPLICATIONS

1. These systems are already being used in many places like malls, theatres and hospitals.
2. One can implement this Arduino based project at their home in Garage Door Openers, toilet
3. cover openers, Office door openers, etc.
4. It can be used in hospital for the patients.

6.2 ADVANTAGES

1. The automatic gates do not need any physical effort to open or close.
2. Automatic gates are used durable, strong and can be available in customized sizes.
3. It is very convenient to enter and leave the automatics gates.
4. Economically viable
5. Easy to use.
6. Less Power consumption

6.3 LIMITATIONS

1. Power failure can cause inconvenience.
2. Cannot used be for security purposes.

6.4 FUTURE WORK

1. Can be added further used in security system by implementing finger print scanner and face detector can be employed.
2. A better sensor is recommended to achieve new functionality, for instance, a suitable sensor as can be used for precise detection.
3. Fan, air conditioners and curtains can be added along with automatic door mechanism.

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