



AUTOMATIC DOOR

*Artificial Intelligence &
Internet of Things*

Prepared By :
Sudhanshu Modi - 12010612

TABLE OF CONTENT

ABSTRACT	3
INTRODUCTION	4
TYPES	5
WHY AUTOMATED DOORS?	6
LITERATURE SURVEY	7
METHODOLOGY FOLLOWED	8
EXPECTED OUTCOME	14
FUTURE SCOPE	15
APPLICATIONS	16
CONCLUSION	18
REFERENCES	19

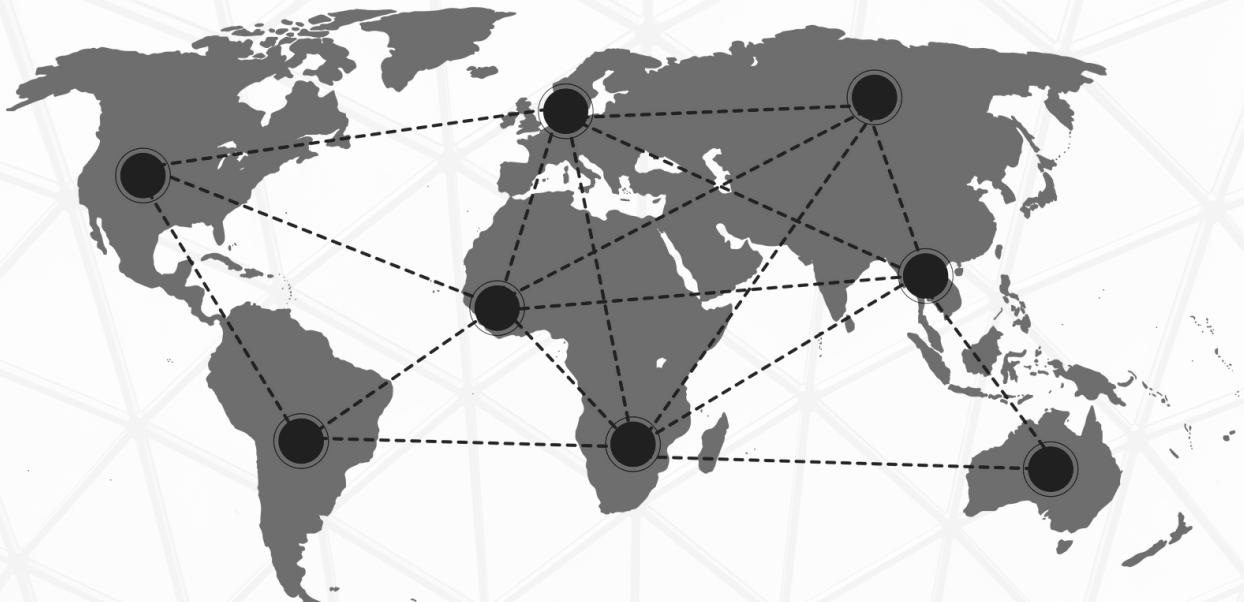


ABSTRACT

- In this project, we will develop an automatic door opener system using an Arduino Uno R3 and a passive infrared (PIR) motion sensor.
- This module is easy to use when creating a PIR sensor that can detect motion. Luminous Display - LED lights up when motion is detected.
- The system keeps the door open only when a person is detected, otherwise it stays closed, saving a lot of energy that could be used for air conditioning.
- This automatic sliding door system can be useful for blind, old and maimed people.

INTRODUCTION

- The project module designed is Automatic Door System using Arduino Uno R3 and Passive Infra-Red (PIR) motion detector.
- Open/close of door is always tiresome work especially for blind, disabled and aged people in their home, shopping malls, etc.
- This project automatically open/close door by sensing any motion near the door using PIR (Passive Infrared) motion detector.
- Human body has tendency to emit infrared radiation, this will be sensed by PIR sensor. This signal is fed to Arduino UNO R3 board which then operates the door through motor driver IC.
- When a person is within the operating range of the sensor, it sends a logic signal to operate the door, so the door opens and after sometime when the person has moved and he is out of range of the sensor, the door closes after some delay time.



WHY AUTOMATIC DOORS?

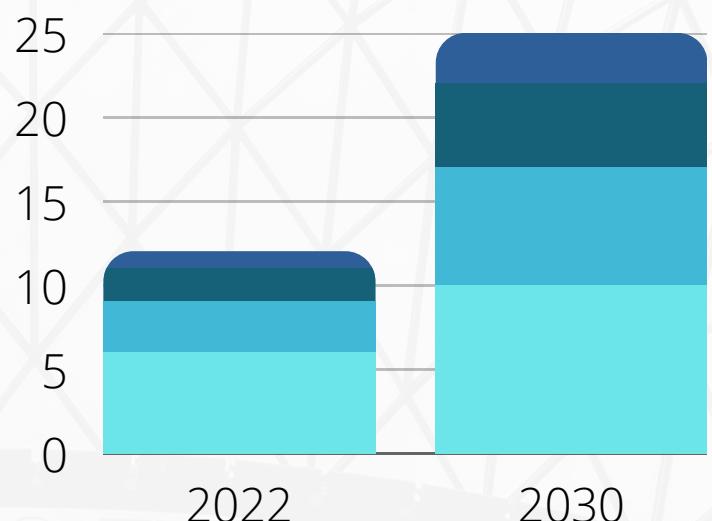
Nowadays automatic doors are in high demand through the globe. People and the companies prefer these doors because:

- *Accessibility:* Since automatic doors can be opened without the use of hands, they offer convenience to everyone even with baggage in both hands or carrying a cart.
- *Energy saving:* Automatic doors effectively contribute to energy saving and reduce annual heating and cooling costs.
- *Hygiene Control:* The hands-free operation of automatic doors offer a optimal solution to hospitals and food factories where sanitation is essential.
- *Barrier-free:* Automatic doors provide excellent customer service by allowing everyone enters easily, regardless of their ages or physical capabilities.

TYPES

There are basically 4 types of automatic doors used in the market nowadays. The types are:

- *Induction:* Automatic induction sliding door uses motion or optical detection sensors in activating the door's motorized closing and opening functions.
- *Password:* Password Based Door Lock System is designed where in once the correct password is entered, the door is opened and the concerned person is allowed access to the secured area.
- *Fingerprint:* The smart door locks use fingerprints, opens when fingerprint is correct and then closes.
- *Remote Control:* A remote control is used here, where a button is pressed to open and close the doors.



LITERATURE SURVEY

R.Kumudham, Department of ECE, School of Engineering, Vels Institute of Science, Technology and Advanced Studies, India, proposed that Passive Infra-Red Sensor detects infrared radiations emitted by Human body in the form of heat. The change in infrared radiation is converted to a voltage. The voltage from the PIR Sensor is given to Arduino UNO R3 for further controlling the motor which then drives the door.

***International Journal of Scientific
Research and Reviews***

METHODOLOGY FOLLOWED

The objective is to design an Automatic Door Open/Close System using Arduino Uno R3 and PIR sensor, in which automatically the door is open/close by sensing the motion of a person. The Data OUT Pin of PIR sensor becomes HIGH, When the it detects any motion of a person. The HIGH Signal is detected by the Arduino, since PIR sensor is connected to the Arduino, and it implies that a person is near to the door. Arduino then sends signal to the L298N Motor Driver module and activates it to open the door. The door should remain open sensing the person presence for some time delay. When the person has moved away, the Data OUT of PIR sensor becomes low and the Arduino will once again activate the Motor Drive and the door closes after 2 to 5 seconds. The door remains closed until the arrival of the next person.

METHODOLOGY FOLLOWED

The main components required here are:

- *PIR motor*: Passive Infra-red Sensor which senses on the basis of the change in infra-red radiation.
- *Arduino UNO R3*: The open source micro-controller board which consists of Atmega328P.
- *LED*
- *16x2 LCD*
- *L293d Motion driver*: Used for the opening and closing of the door.

METHODOLOGY FOLLOWED

```
#include <Servo.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2);
Servo myservo;

int pir=3;
const int buzzerPin = 5;
int Green=9;
int Red=10;

void setup()
{
    pinMode(pir,INPUT);
    pinMode(buzzerPin, OUTPUT);
    pinMode(Green,OUTPUT);
    pinMode(Red,OUTPUT);
    myservo.attach(7);
    Serial.begin(9600);
    lcd.backlight();
    lcd.init();

    lcd.setCursor(0,0);

    lcd.print("Welcome");
    delay(2000);
```

METHODOLOGY FOLLOWED

```
lcd.setCursor(0,1);

lcd.print("Automated door ");
delay(3000);
lcd.clear();

}

void loop()
{
    int val = digitalRead(pir);
    if (val==1)
    {Serial.println("motion detected");
    }
    Serial.println(val);
    if(val==HIGH){

        myservo.write(180);
        delay(1000);
        digitalWrite(Green,HIGH);
        delay(500);
        digitalWrite(Red,LOW);
        delay(500);
        lcd.setCursor(1,0);
        lcd.print("Door");
        lcd.setCursor(0,1);
        lcd.print("      Opened ");
    }
}
```

METHODOLOGY FOLLOWED

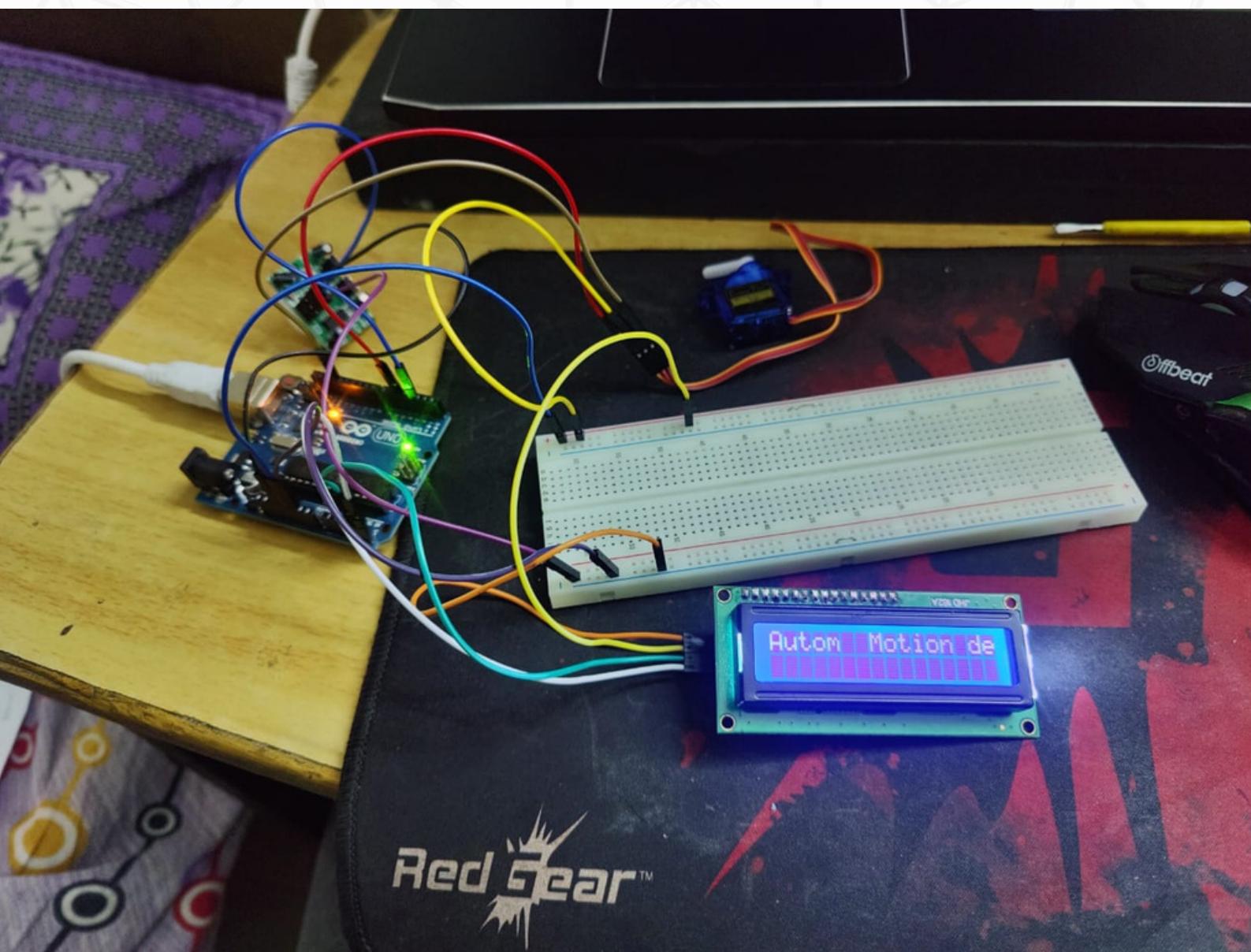
```
digitalWrite(buzzerPin,HIGH);
delay(500);
digitalWrite(buzzerPin,LOW);
delay(500);
}
else{

myservo.write(-180);
delay(1000);
digitalWrite(Red,HIGH);
delay(500);
digitalWrite(Green,LOW);
delay(500);
lcd.setCursor(1,0);
lcd.print("Door");
lcd.setCursor(0,1);
lcd.print("    Closed");
digitalWrite(buzzerPin,LOW);
delay(500);
}

delay(1000);

}
```

METHODOLOGY FOLLOWED



ELIZABETH J. AD 2009 CLASS

EXPECTED OUTCOME

We expect this project to achieve all of its targets. Although it is going to be a tough task in achieving all the designated goals. We have not worked before with a concept like this, but we are aware about the components used in the project by the research work done by the team, the PIR sensor and the Arduino UNO board mainly.

Not only we intent to develop a automatic door but we would also like to make it application oriented, such as we are planning to add a LCD which displays the message on the screen as "THE DOOR IS OPEN" and "THE DOOR IS CLOSED" for the HIGH and LOW value respectively.

FUTURE SCOPE

According to a comprehensive research report by Market Research Future (MRFR), “Global Automatic Gate and Door Opening System Market, by Gate Type, by End User and Region – forecast to 2027” the market valuation is estimated to appreciate USD 14,238.3 million by 2025, growing at a 6.8%.

The automatic gate and door opening system market outlook appears highly positive. The market growth attributes to the increasing installation of automatic gate and door opening systems in residential sectors and the proliferation of smart homes worldwide. Automated door opening systems are widely being installed in residential areas to improve safety and security, driving the growth of the market.

Moreover, the growing awareness about various benefits that automatic gate & door systems, such as improved security and high energy saving & low operational cost, fosters market share.

APPLICATIONS

Automatic doors are ideal for a wide range of commercial, industrial and residential uses. Commercial uses can be grouped into five main sectors: healthcare, sport and leisure, education, professional services and retail.

- *Healthcare:* From GPs' surgeries to clinics and hospitals, the healthcare sector benefits from automatic doors – this application is particularly important since these buildings are visited by the sick, elderly or infirm.
- *Sports and Leisure:* Sports stadiums, theme parks, leisure centres, golf clubs and football clubs are some of the venues that benefit from automatic doors. These types of environments attract large volumes of people – automatic doors can safely accommodate large numbers of people entering and leaving the premises.

APPLICATIONS

- *Education:* From pre-school groups to universities, educational establishments constantly experience heavy traffic areas. To manage heavy footfall in areas where easy yet secure access is vital, automatic doors provide accessibility and security.
- *Professional Services:* There are many different organizations in the professional services sector that benefit from automatic doors. Making life so much easier, they assure easy access for disabled people and create a professional first impression to make visitors feel welcome and valued.
- *Retail and Residential:* From the smallest retail outlets to the major supermarket chains, every type of retail premises can benefit from automatic doors. Automatic doors in residential properties are increasingly popular. Assisting disabled people and helping them to live a more independent life.

CONCLUSION

Thus, Automatic Door Open/Close System is implemented using Arduino Uno R3 and PIR sensor. The door remains open when a person is sensed and remains closed when there is no one present, it saves lot of energy and reduces current consumption. This automatic door system with sliding doors can be useful for blind, old, and maimed people. It can be implemented with additional features like face recognition for security purpose in future.

Apart from this, this project is used in a lot of applications as discussed, which would result in a good amount of market share in the future. This project has a huge future scope.

REFERENCES

- Research paper by R.Kumudham.
- <https://www.arduino.cc/>
- <https://www.automaticaccess.co.uk/blog/where-automatic-doors-are-used/>
- <https://www.globenewswire.com/news-release/2021/06/25/2253315/0/en/Automatic-Gate-and-Door-Opening-System-Market-is-Expected-to-Expand-at-6-8-CAGR-to-Reach-USD-14-238-3-Million-by-2025-Report-by-Market-Research-Future-MRFR.html>
- <https://mccoymart.com/post/automatic-doors-advantages-disadvantages/>
- <https://www.electronicshub.org/automatic-door-opener-using-arduino/>
- <https://dataintelo.com/report/global-automatic-door-market/>