



MINI PROJECT REPORT ON
(Paper Code- EC681)

Automatic Door Opener using Arduino and PIR Sensor

Under the Guidance of

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CERTIFICATE

This is certify that the project entitled “Automatic Door Opener Using Arduino & PIR Sensor” has been completed under the guidance of Dr. Subhashis Maitra Sir and submitted as a Mini Project to Kalyani Government Engineering College, in partial fulfillment of the requirement for the award of B.Tech degree in Electronics & Communication Engineering for the session 2019-2023.

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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 object.

You might have seen Automatic Door Opener Systems at shopping malls, cinemas, hospitals etc. where, 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.

Such Automatic Door Opener Systems are very useful as you do not need a person to standby the door and open it whenever a guest comes. Also, since the doors are opened and closed only when a person approaches the door, there is significantly less loss of air conditioning.

So, in order to understand the potential of this concept, we have implemented a simple Automatic Door Opener System using Arduino and PIR Sensor.

OBJECTIVE

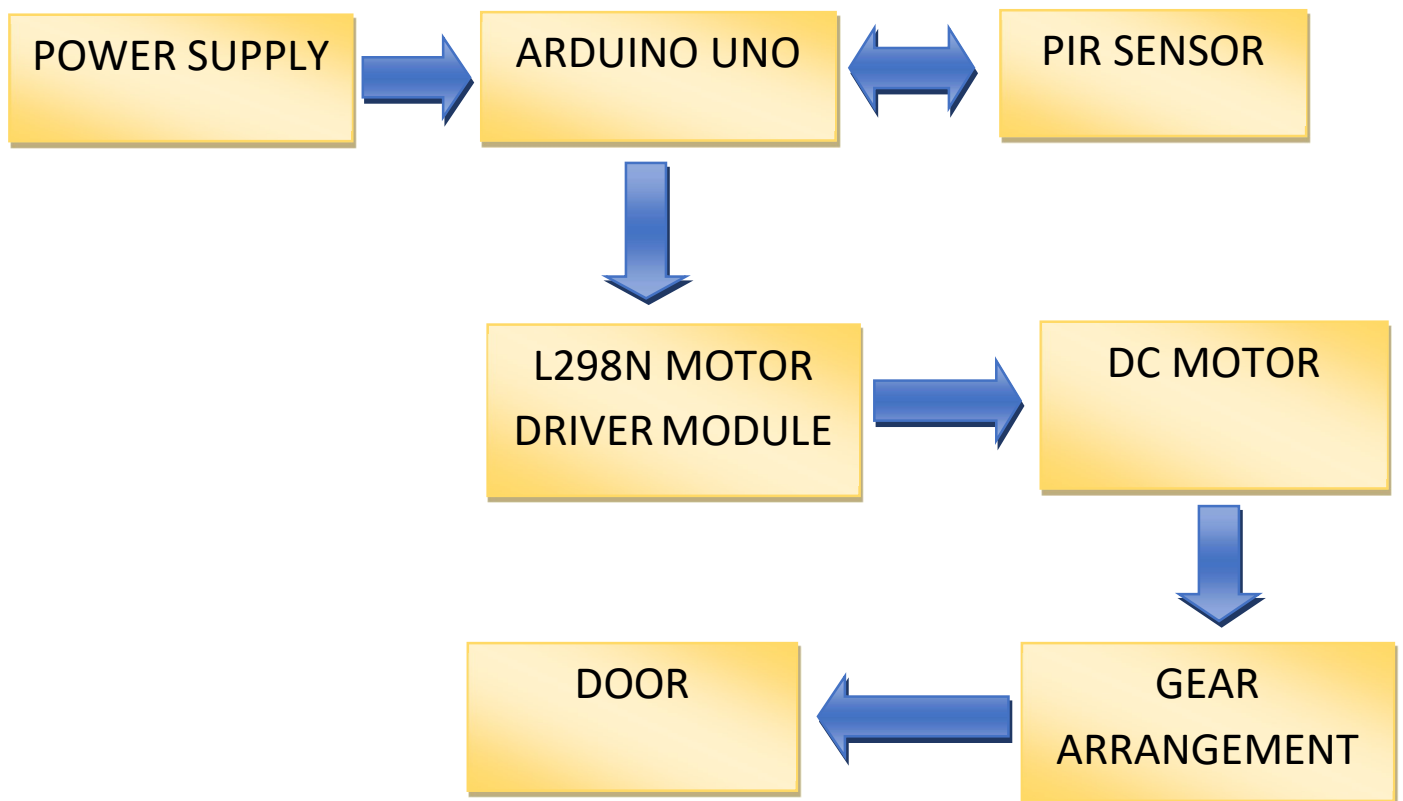
An Automatic Door Opener System is a simple project based on PIR Sensor and Arduino, which automatically opens and closes the door by detecting a person or object.

Automatic Door Opener Systems are very useful as you do not need a person to standby the door and open it whenever a guest comes. Also, since the doors are opened and closed only when a person approaches the door, there is significantly less loss of air conditioning.

So, in order to understand the potential of this concept, we have implemented a simple Automatic Door Opener System using Arduino and PIR Sensor.

METHODOLOGY

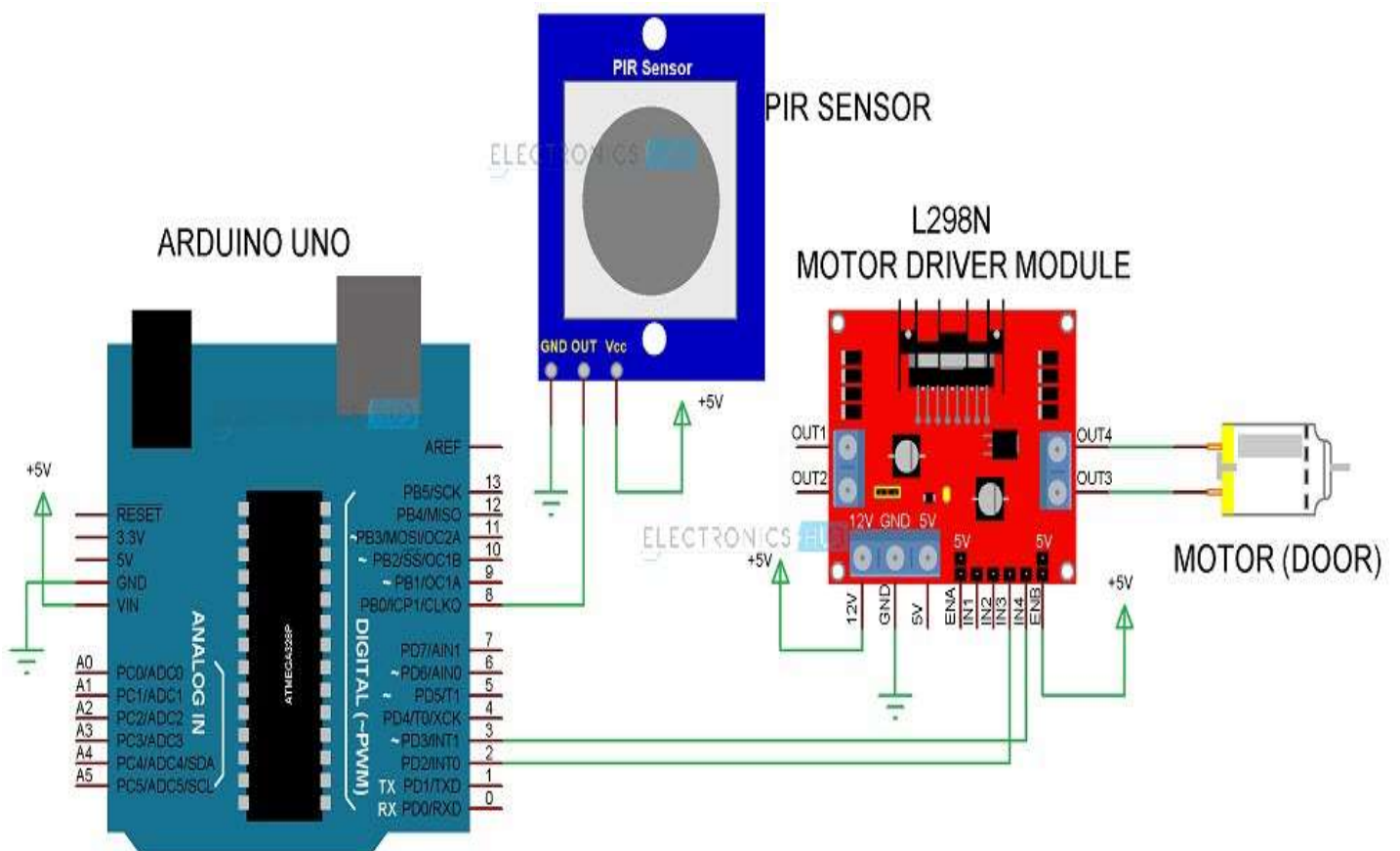
BLOCK DIAGRAM:



COMPONENTS REQUIRED

SL. No.	COMPONENTS	SPECIFICATION	QUANTITY
1	Arduino	Uno	1
2	PIR Sensor		1
3	Motor Driver	L298N	1
4	DC Motor	5v	1
5	Bread Board	17x5 cm ²	1
6	Connecting Wires	Jumpers	10
7	Power Supply	5v	1

CIRCUIT DIAGRAM



Circuit Design

First, the Data OUT of the PIR Sensor is connected to Digital Pin 8 of Arduino. The other two pins of PIR Sensor i.e., Vs and GND are connected to +5V and GND respectively.

Coming to the Motor Driver, we have used the second channel of the L298N Motor Driver Module. Hence, the IN3 and IN4 of the L298N Motor Driver are connected to Digital Pins 2 and 3 of Arduino.

The Enable Pin of the Second Motor on the L298N Module is connected to +5V. Usually, all the L298N Modules consist of a jumper to directly connect the Enable pins to +5V. You can use this option.

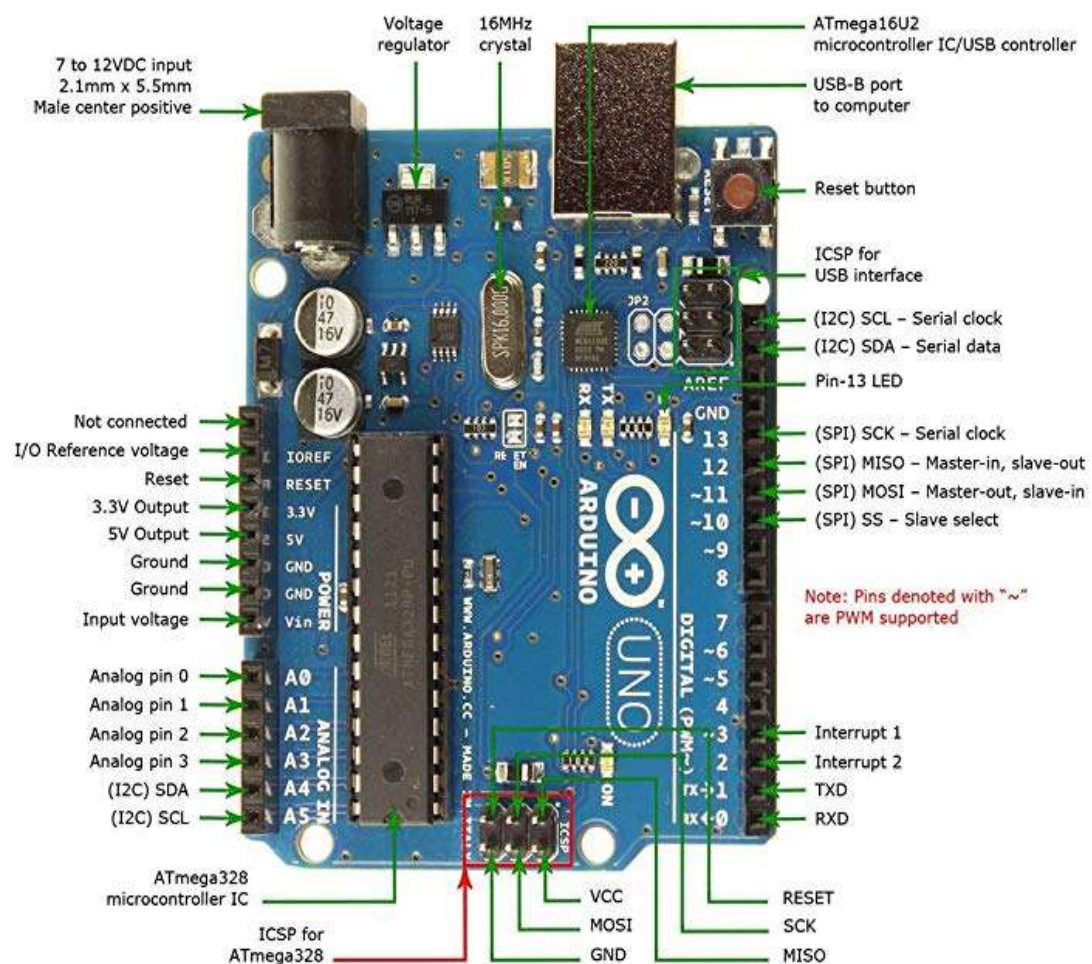
Since the motor used in the project is a 5V Motor, I've connected a 5V Supply to the Motor Driver Module.

Finally, the Motor of the CD Tray is connected to the OUT3 and OUT4 of L298N Motor Driver Module.

COMPONENTS DESCRIPTION

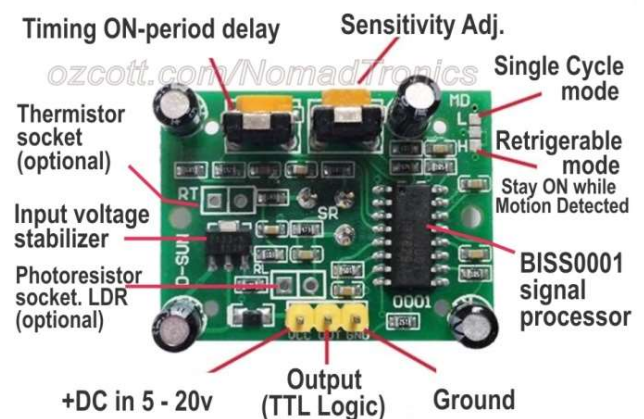
Arduino UNO:

In this project, Arduino UNO acts as the main controlling part. It reads the data from the PIR Sensor and activates the L298N Motor Driver based on the data from the PIR Sensor.



PIR Sensor:

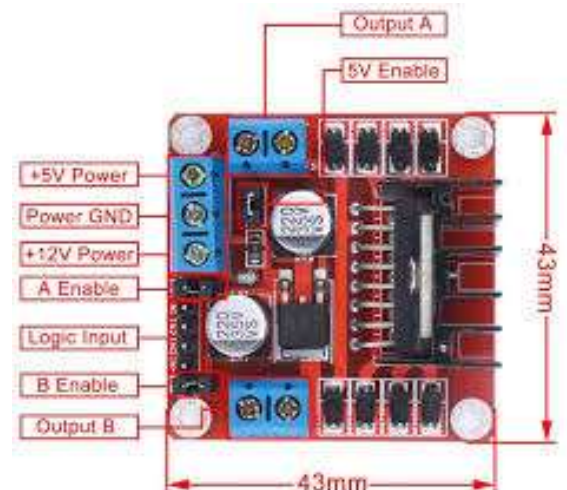
PIN NUMBER	PIN NAME	DESCRIPTION
1	Vcc	Input voltage is +5V for typical applications. Can range from 4.5V- 12V
2	High/Low Output	Digital pulse high (3.3V) when triggered (motion detected) digital low(0V) when idle (no motion detected)
3	Gnd	Connected to ground of circuit



L298N Motor Driver Module

Motor Driver is an important part of the project as it is responsible for driving the motor of the door (CD Tray Motor in this case). In this project, we have used the very common and very popular L298N Motor Driver Module.

- Input Voltage: 3.2V~40Vdc. Brief Data:
- Driver: L298N Dual H Bridge DC Motor Driver
- Power Supply: DC 5 V - 35 V
- Peak current: 2 Amp
- Operating current range: 0 ~ 36mA
- Control signal input voltage range:
 - Low: $-0.3V \leq V_{in} \leq 1.5V$.
 - High: $2.3V \leq V_{in} \leq V_{ss}$.
- Enable signal input voltage range:
 - o Low: $-0.3 \leq V_{in} \leq 1.5V$ (control signal is invalid).
 - o High: $2.3V \leq V_{in} \leq V_{ss}$ (control signal active).
- Maximum power consumption: 20W (when the temperature $T = 75^{\circ}\text{C}$).
- On-board +5V regulated Output supply.



WORKING PRINCIPLE

The working of the Automatic Door Opener System using Arduino and PIR Sensor is very simple. This project can be considered as an extension of Arduino PIR Sensor Tutorial and Arduino L298N DC Motor Control Tutorial.

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, it will detect this HIGH Signal and understands that there is person approaching the door.

Arduino then immediately activates the L298N Motor Driver module to open the door. After some time (about 2 to 5 seconds in this project), the Arduino will once again activate the Motor Drive to close the door.

CODE

The code for the project is given below. It can be used with any Arduino Board.

```
int in1 = 2;
int in2 = 3;
int sensor = 8;
int led = 13;
void setup()
{
    pinMode(in1, OUTPUT); // in1 is selected as output pin of
    arduino
    pinMode(in2, OUTPUT); // in2 is selected as output pin of
    arduino
    pinMode(sensor, INPUT); // sensor is selected as input pin
    of arduino
    pinMode(led, OUTPUT);

    digitalWrite(in1, LOW);
    digitalWrite(in2, LOW);
    //digitalWrite(sensor, LOW);
    digitalWrite(led, LOW);
    while(millis() < 13000)
    {
        digitalWrite(led, HIGH);
        delay(50);
        digitalWrite(led, LOW);
        delay(50);
    }
    digitalWrite(led, LOW);
    digitalWrite(in1, LOW);
    digitalWrite(in2, HIGH);
```

```
____}  
____  
____void loop()  
____  
____{  
____  if(digitalRead(sensor)==HIGH)  
____  {  
____    digitalWrite(in1,HIGH); // code for door opening  
____    digitalWrite(in2,LOW);  
____    digitalWrite(led,HIGH);  
____    delay(2000);  
____    digitalWrite(in1,LOW);  
____    digitalWrite(in2,LOW);  
____    delay(10000); // door remain 10 second open  
____    digitalWrite(in1,LOW); // code for closing the door  
____    digitalWrite(in2,HIGH);  
____    digitalWrite(led,LOW);  
____    delay(2000);  
____    digitalWrite(in1,LOW);  
____    digitalWrite(in2,LOW);  
____  }  
____}  
____}
```


ESTIMATED COST

SL. No.	COMPONENTS	SPECIFICATION	PRICE
1	Arduino	Uno	550/-
2	PIR Sensor		70/-
3	Motor Driver	L298N	130/-
4	DC Motor	5v	45/-
5	Bread Board	17x5 cm ²	60/-
6	Connecting Wires	Jumpers	10/-
7	Power Supply	5v	10/-
Total =			875/-

FUTURE SCOPE

- Along with this project we can use Face-detection through Camera for Automated Attendance System.
- A better sensor is recommended to achieve new functionality. For instance, a suitable sensor such as radar sensor that could detect contraband good in any vehicle.
- In the position of PIR sensor, we can use fingerprint sensor for more security and authentication purpose.

CONCLUSION

- Further this can be enhanced interfacing a counting arrangement for keeping 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.
- Movement Sensed Automatic Door Operating System is very useful.

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(Professor's Signature)