END SEMESTER ASSESSMENT (ESA)
B.TECH. (CSE)
IV SEMESTER

UE18CS256 – MICROPROCESSOR AND COMPUTER ARCHITECTURE LABORATORY

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
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MINI PROJECT REPORT

ON

HOME AUTOMATION

SUBMITTED BY:

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ABSTRACT OF THE PROJECT:

Due to the rapid development in the field of the Automation industry, human life is becoming more advanced and better in all aspects. In the present scenario, Automated systems are being preferred over the non-automated system. With the rapid growth in the number of consumers using the internet over the past years, the Internet has become an important part of life, and IoT is the newest and emerging internet technology. Internet of things plays an important role in human life because they are able to provide information and complete the given tasks while we are busy doing some other work.

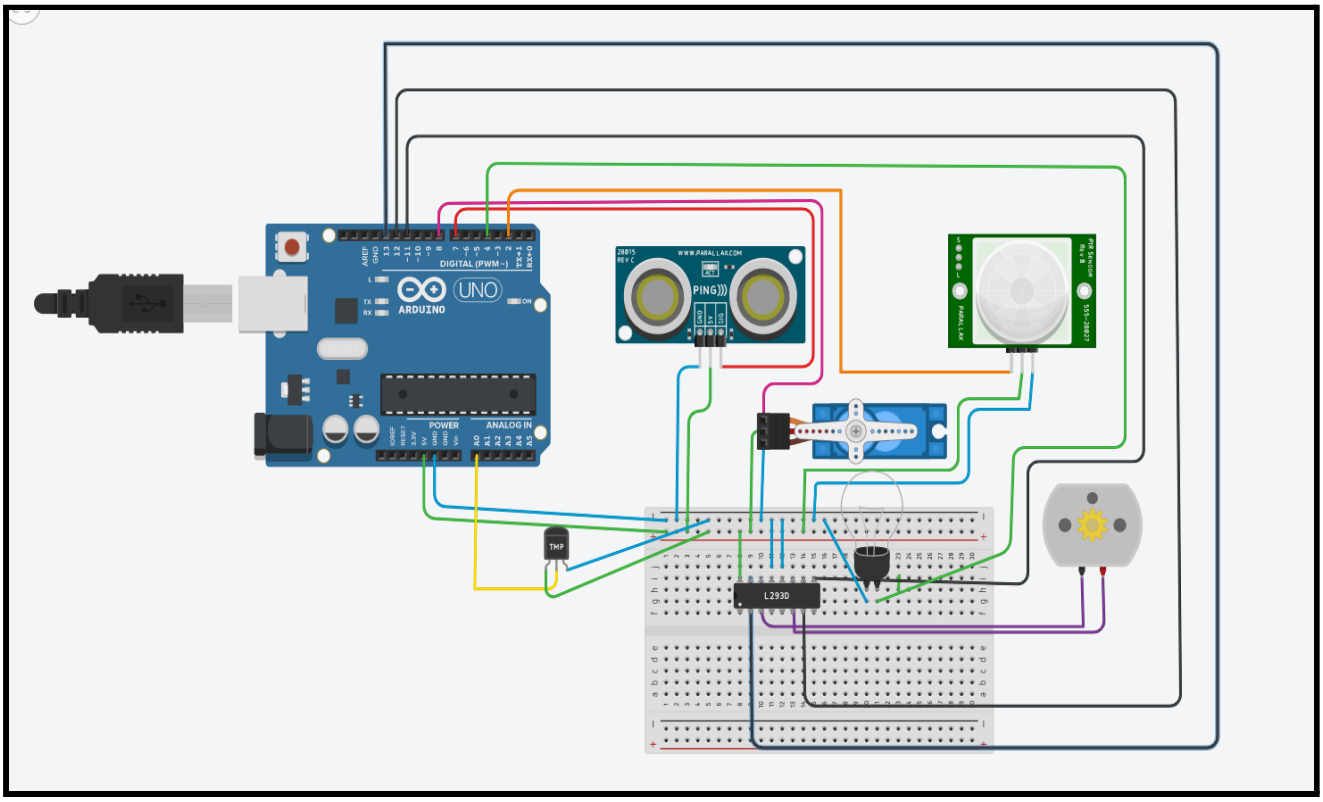
In this miniproject, we simulate the following:

- **Motion Based Switches:**
  1. Control surrounding's appliances with contactless motion sensors which serve as alternative for traditional switches.
  2. This is implemented using PIR sensors which act like switches and light bulb which act like appliances.

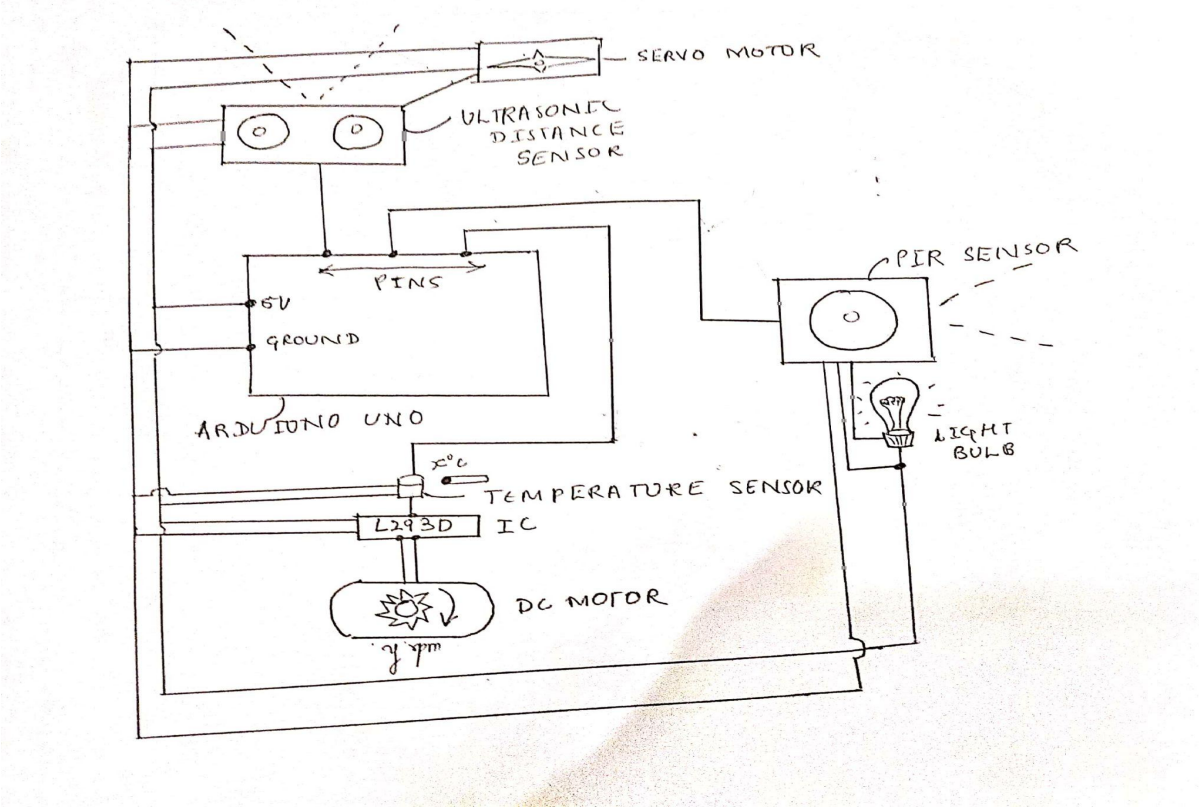
- **Temperature Based Ceiling Fans:**
  1. Fans that turn on or off based on temperature of the surroundings.
  2. This is implemented using temperature sensors and dc motor with the help of IC which acts like fans.

- **Distance based automatic doors:**
  1. Automatic contactless doors that close/open when someone wishes to pass through it.
  2. This is implemented using ultrasonic sensors and servo motors which acts like doors.

CIRCUIT DIAGRAM:



BLOCK DIAGRAM:



ARDUINO CODE:

```
#include<Servo.h>
const int pingPin = 7;
int servoPin = 8;
int parity = 1;
Servo servo1;

void setup() {
  // initialize serial communication:
  Serial.begin(9600);
  servo1.attach(servoPin);
  pinMode(2,INPUT);
  pinMode(4,OUTPUT);
  pinMode(11,OUTPUT);
  pinMode(12,OUTPUT);
  pinMode(13,OUTPUT);
  pinMode(A0,INPUT);
  digitalWrite(2,LOW);
  digitalWrite(11,HIGH);

}

void loop() {

  long duration, inches, cm;

  pinMode(pingPin, OUTPUT);
  digitalWrite(pingPin, LOW);
  delayMicroseconds(2);
  digitalWrite(pingPin, HIGH);
  delayMicroseconds(5);
  digitalWrite(pingPin, LOW);

  // The same pin is used to read the signal from the PING))): a HIGH
```

```
pulse
  // whose duration is the time (in microseconds) from the sending of
the ping
  // to the reception of its echo off of an object.
  pinMode(pingPin, INPUT);
  duration = pulseIn(pingPin, HIGH);

  // convert the time into a distance
  inches = microsecondsToInches(duration);
  cm = microsecondsToCentimeters(duration);

  servo1.write(0);

  if(cm < 40)
  {
    servo1.write(90);
    delay(2000);
  }
  else
  {
     servo1.write(0);
  }

  // PIR with LED starts
  int pir = digitalRead(2);

  if(parity && pir == HIGH)
  {
    digitalWrite(4,HIGH);
    Serial.println(parity);
    delay(5000);
    parity = 0;
    Serial.println(parity);
  }
  else if(!parity && pir == HIGH)
```

```
  {
    digitalWrite(4,LOW);
    Serial.println("parity 2");
    delay(5000);
    parity = 1;
  }

  //temp with fan
  float value=analogRead(A0);
  float temperature=value*0.48;

  Serial.println("temperature");
  Serial.println(temperature);

  if(temperature > 20)
  {
    digitalWrite(12,HIGH);
    digitalWrite(13,LOW);

  }
  else
  {
    digitalWrite(12,LOW);
    digitalWrite(13,LOW);
  }
}

long microsecondsToInches(long microseconds) {
  return microseconds / 74 / 2;
}

long microsecondsToCentimeters(long microseconds) {
  return microseconds / 29 / 2;
}
```

SCREENSHOTS OF THE OUTPUT:

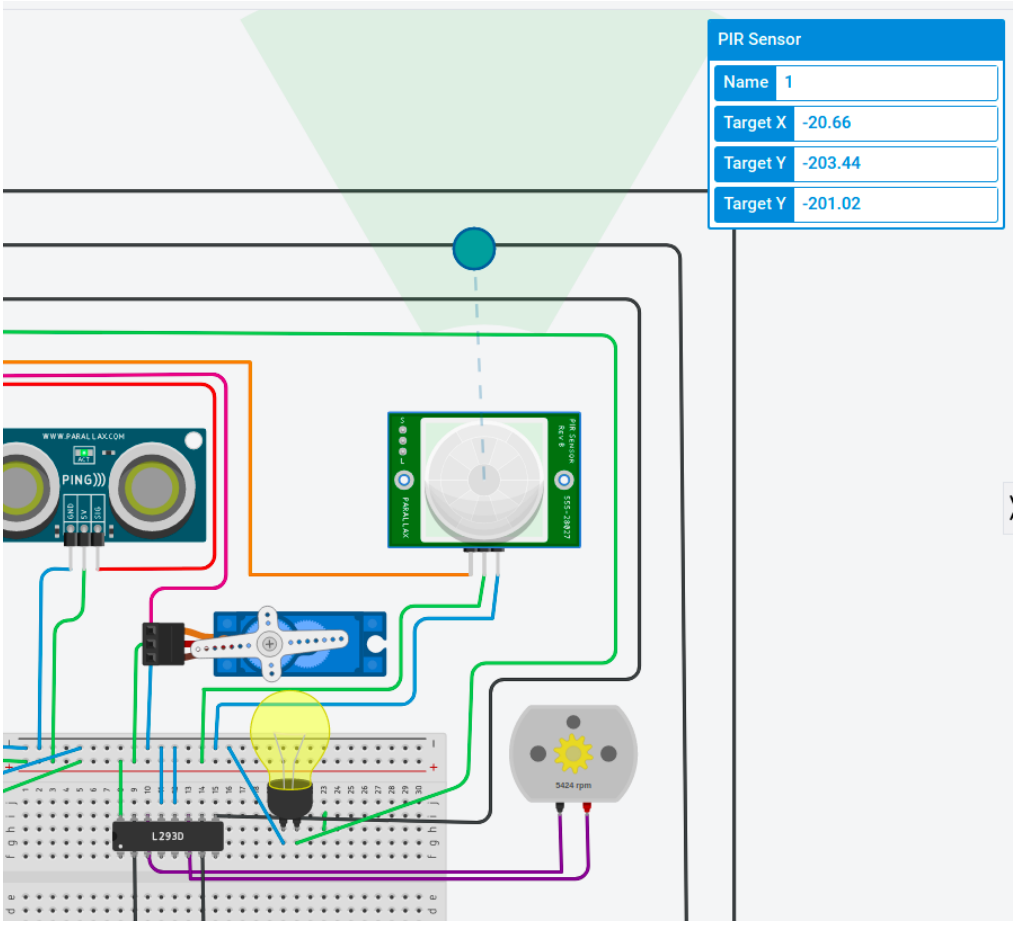


fig1: PIR sensors in action - Switch on(bulb glow)

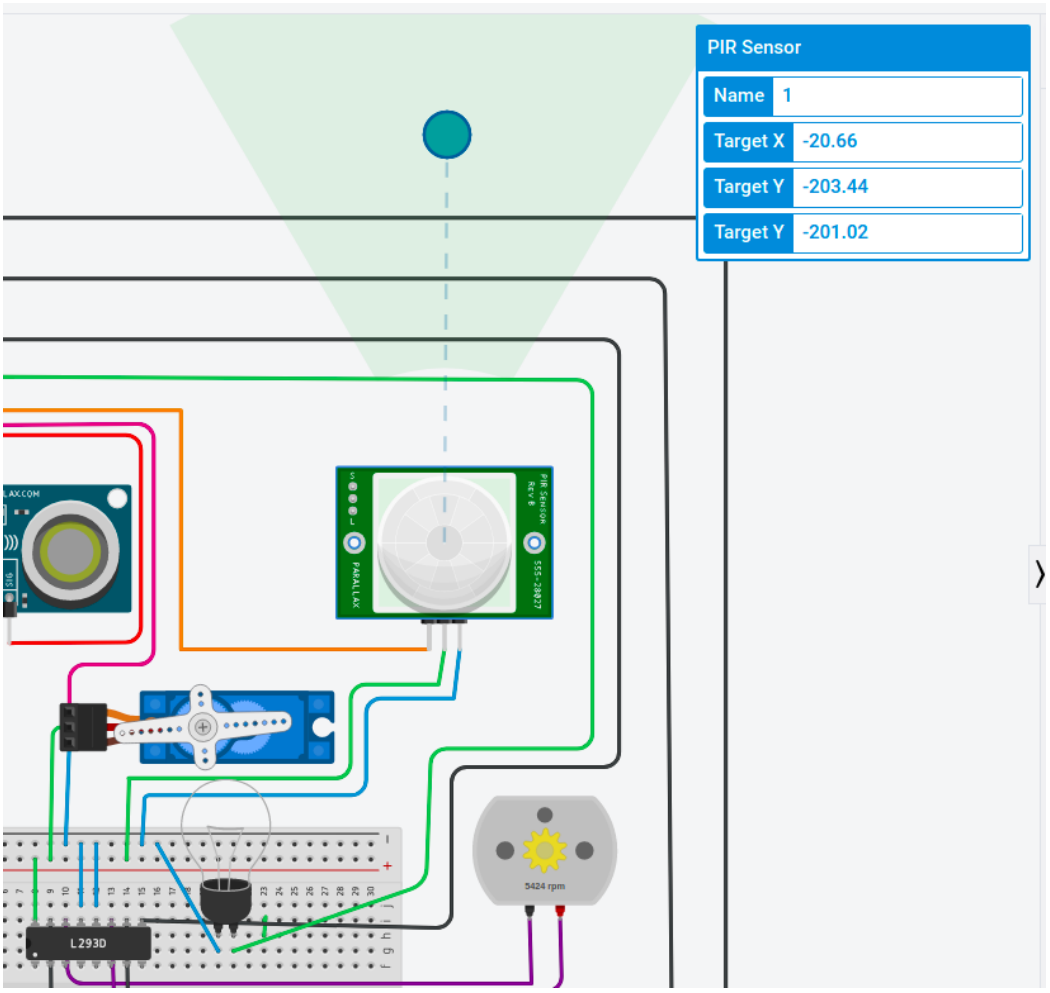


fig2: PIR sensors in action - Switch off(bulb off)

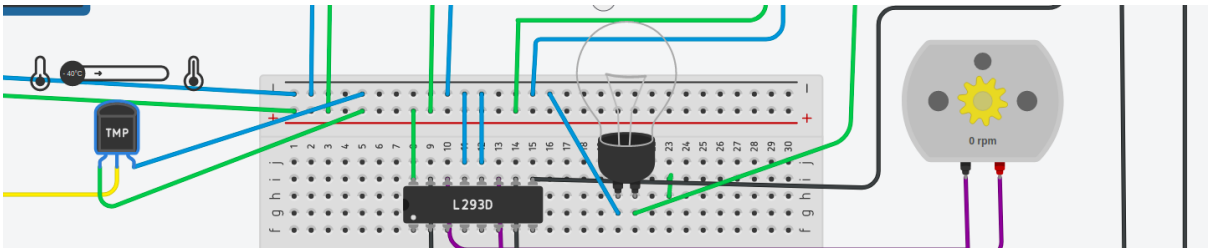


fig3: Temperature sensors in action - Fans off(0 rpm in DC motor)

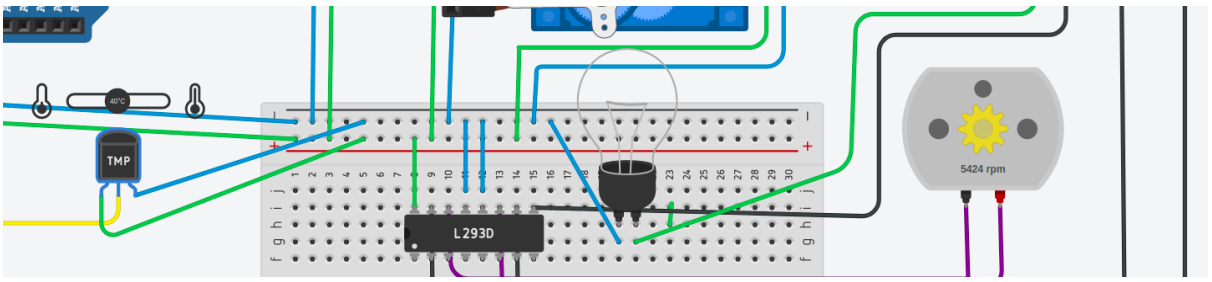


fig4: Temperature sensors in action - Fans on(>0 rpm on dc motor)

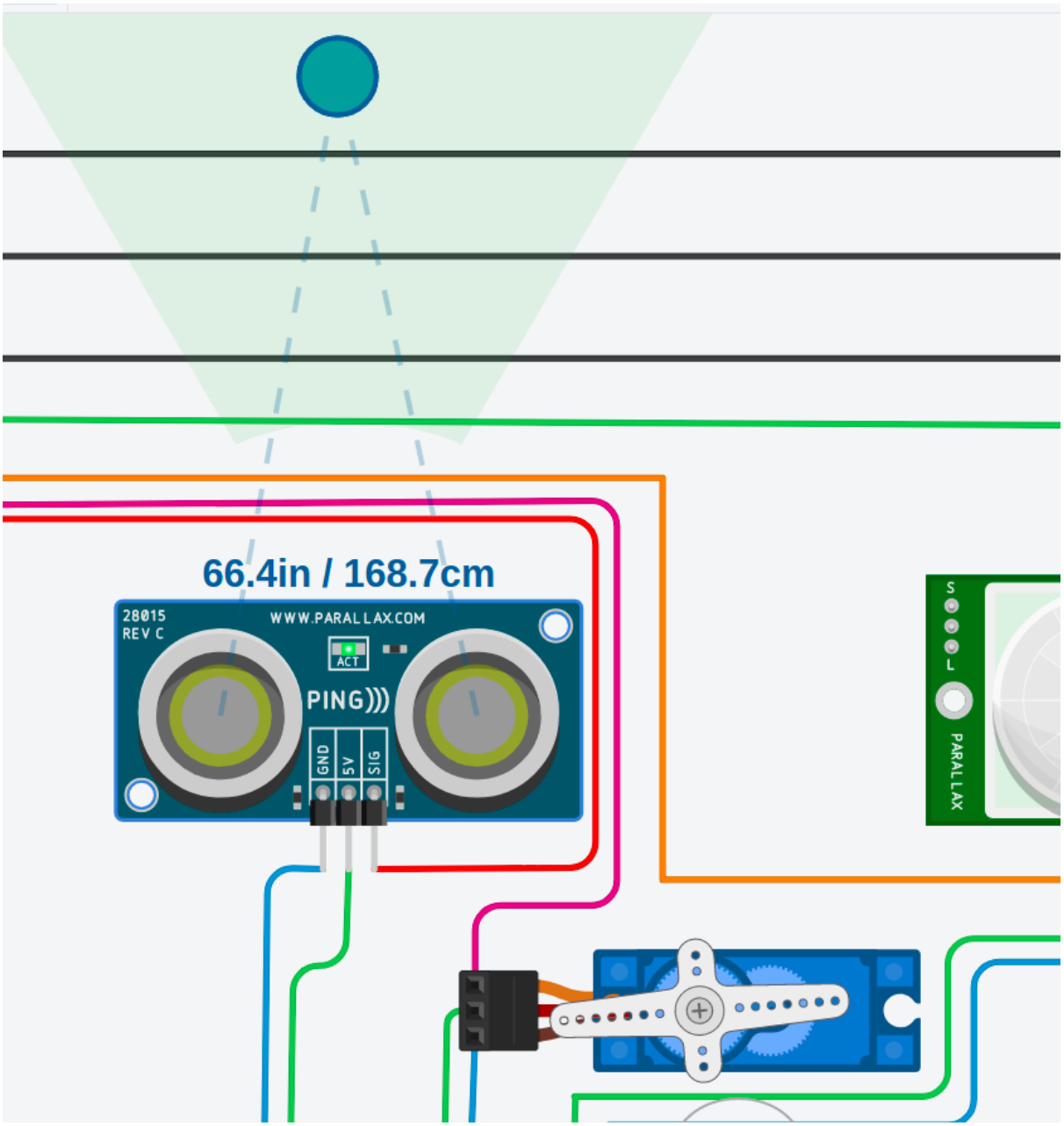


fig5: Ultrasonic sensors in action - Door close(Servo motor 0 degree)

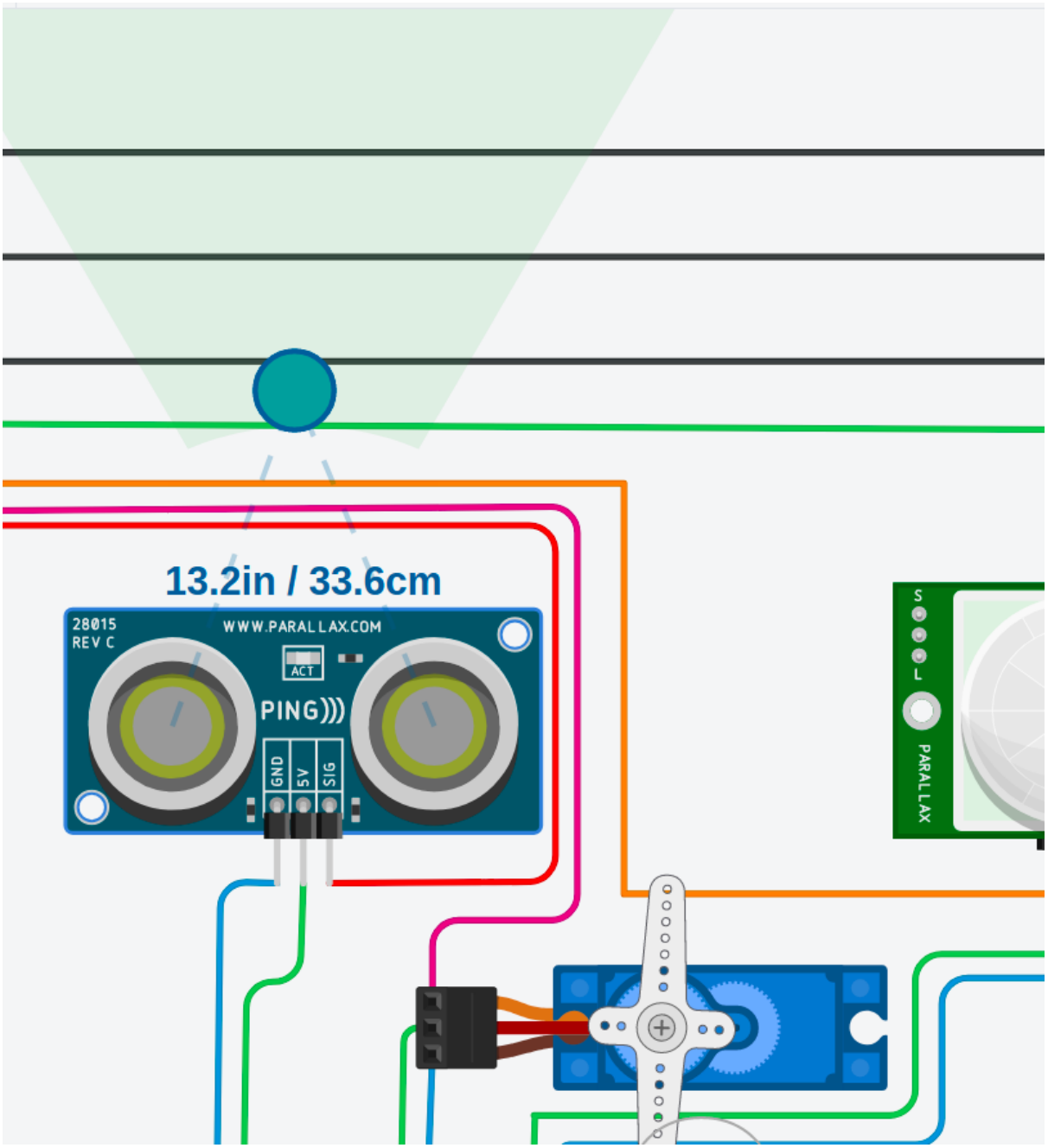


fig6: Ultrasonic sensors in action - Door open(servo motor 90 degrees)

REFERENCES

1. Learning basics of Tinkercad: https://all3dp.com/2/tinkercad-tutorial-easy-beginners/

2. Tinkercad basics: https://www.youtube.com/watch?v=38ur1kyFYxc

3. Home Automation: https://www.youtube.com/watch?v=0i7gKcAliiE

4. Using PIR sensors: https://www.youtube.com/watch?v=PpA4ETebzVQ

5. Using Temperature sensors: https://www.youtube.com/watch?v=sFmuz4mU5w8

6. Using Ultrasonic sensors: https://www.youtube.com/watch?v=WSuIad9Ehd4