SMART HOME AUTOMATION

1. INTRODUCTION

1.1 OBJECTIVES AND GOALS

Objectives

- Design the wireless mesh for IoT in Home.
- With this project we try to make a smart home in which we include some sensor which make our day-to-day life easy and safe.
- To discover answers to questions through the application of scientific procedures.

Goal

- To find out the way to control household appliances using Arduino and Sensors.
- The basic aim of Home automation is to control or monitor signals from different appliances, or basic services.
- To use smart way such as smartphone to control or monitor the home automation system.

1.2 APPLICATIONS

- The most common applications of home automation are **lighting control, door opening, kitchen appliances**, and many more.
- It close and open the gate when ever the person is detected nearby.
- It buzzers the alarm when gas is detected in home which is the safety application of our smart home automation.
- Our project is also design to save energy as a person can say to switch on or off the light whenever he wants so that he/she don’t have to stand up from his/her place to do the action.
- Same with Air Conditioner.
- Our project is made for hand free technology as we have a voice controller in our application.

1.3 FEATURE

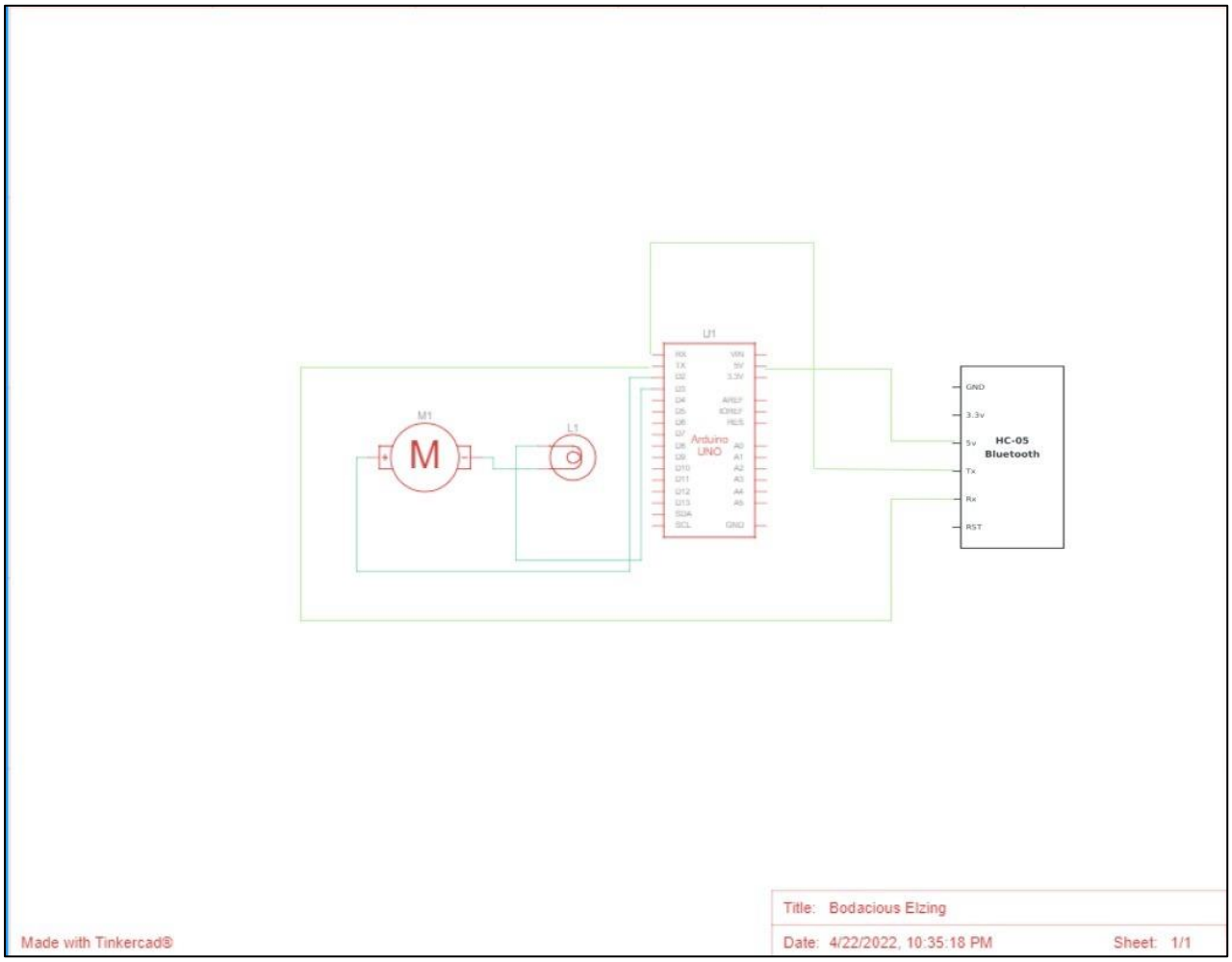
- Advanced home network, you've probably heard of the “Internet of Things” by now.
- Remote access. When most people talk about smart homes, what they really mean is remote access to one's home systems.
- Advanced security, smoke sensor in kitchen appliances.
- Lighting control, automated door treatments.
- Distributed audio.

2. DESIGN

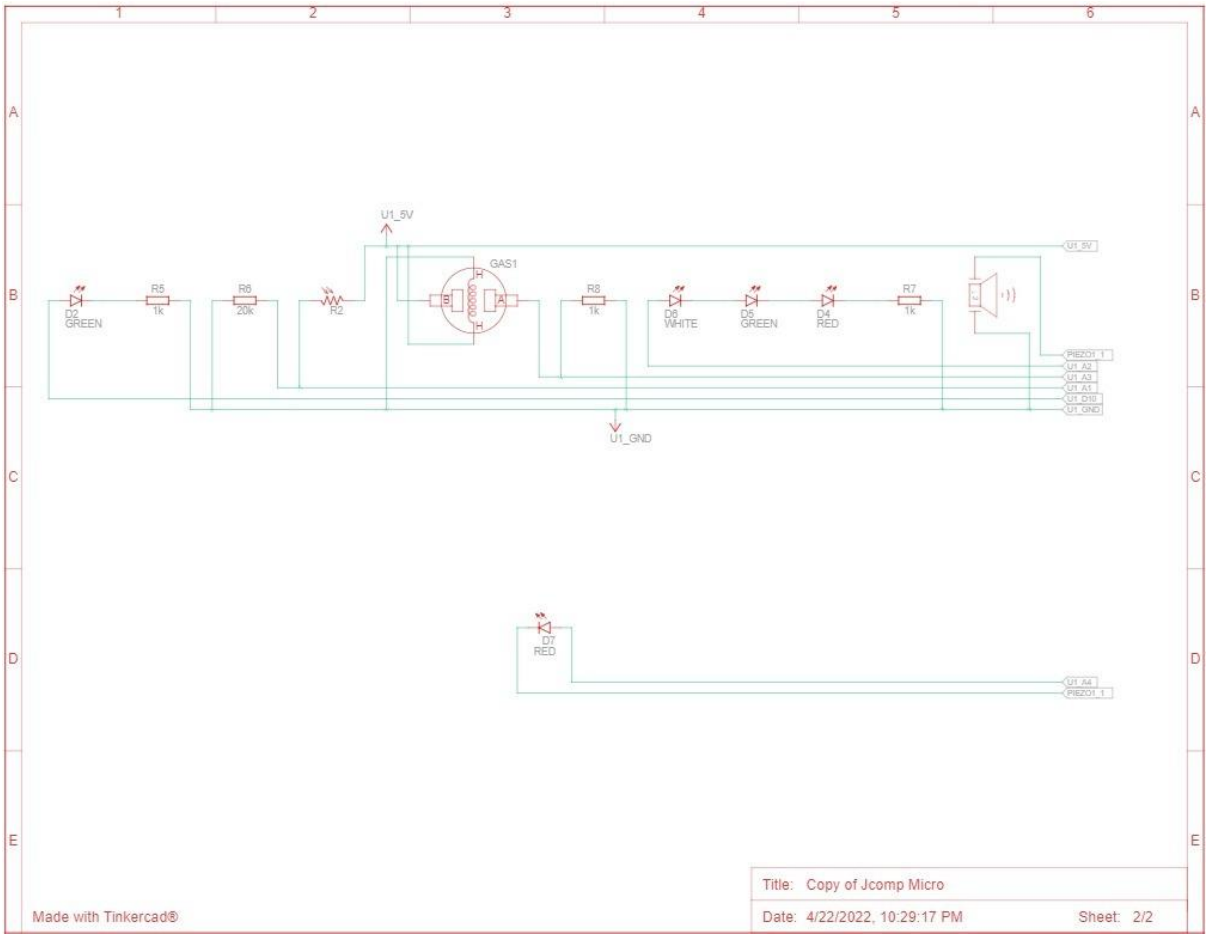
2.1 Block Diagram

2.2 Snapshots - Project

→ Voice Enhanced Smart Home Automation



→ Humidity


U1_5V
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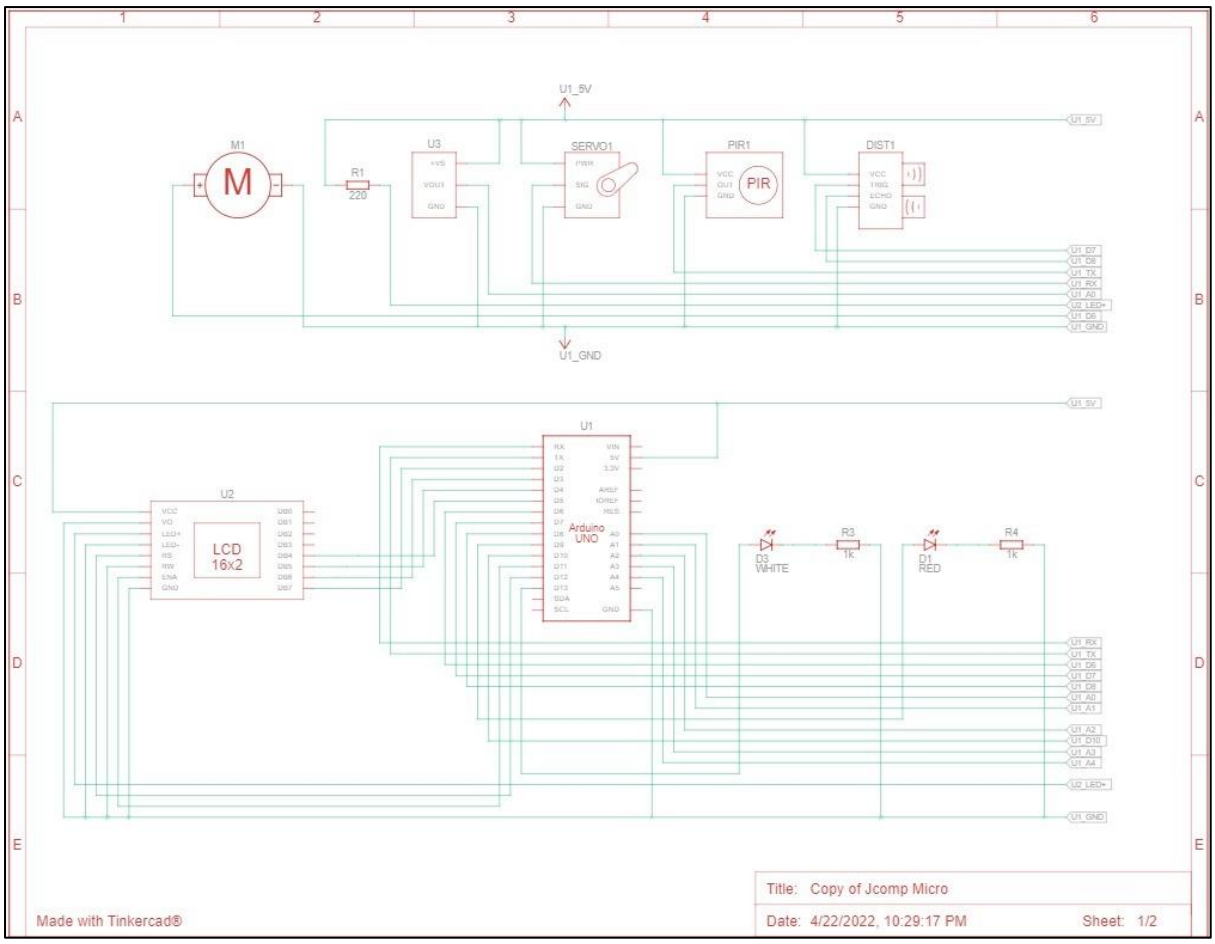
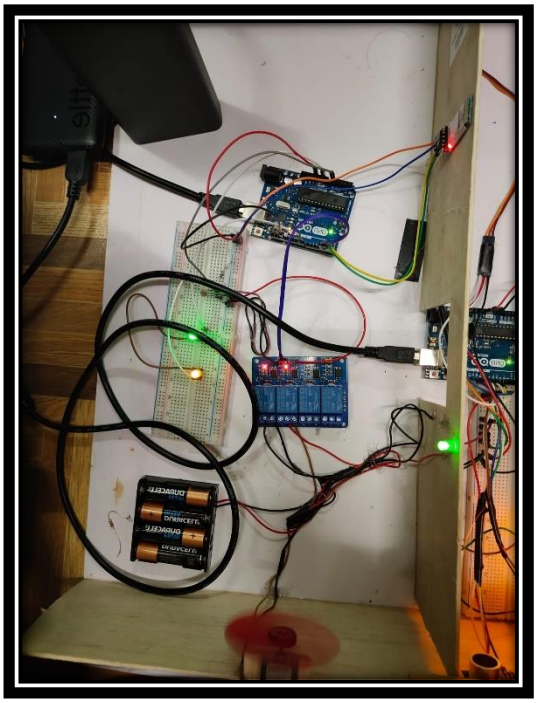
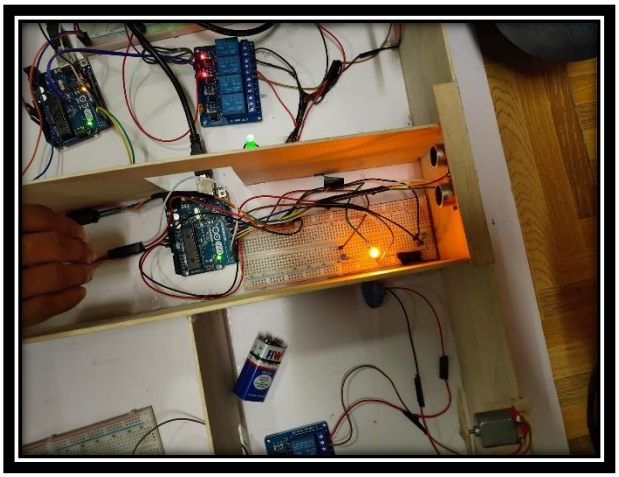
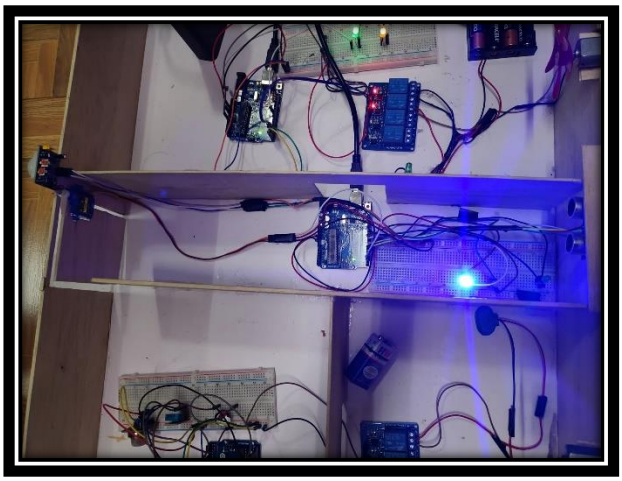
→ Door Sensor and Hallway Lights

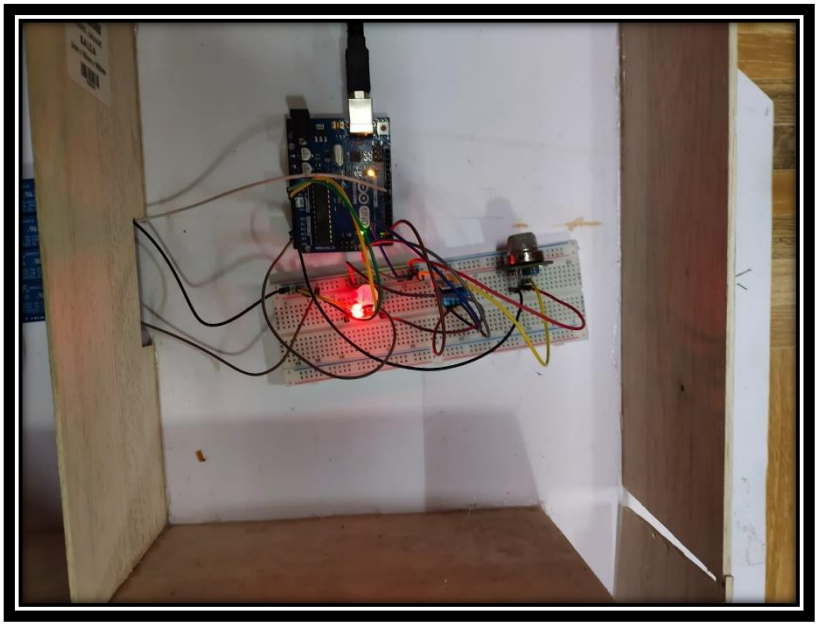


2.3 Results









3. SOFTWARE ANALYSIS

3.1 Coding

→ Voice Enhanced Home Automation

```
String s;
int Lawn_Light=A0;
int Lawn_Lights=9;
void setup() {
 pinMode(2,OUTPUT);
  pinMode(3,OUTPUT);
  Serial.begin(9600);
  pinMode(Lawn_Light,INPUT);
  // digitalWrite(3,HIGH);
  //digitalWrite(2,HIGH);
}
void Fan_switch(String s){
   if(s.equalsIgnoreCase("Jarvis AC on")){
    Serial.println("Yes Boss, switching Fan on");
    digitalWrite(2,LOW);
  }
  else if(s.equalsIgnoreCase("Jarvis AC off")){
    Serial.println("Yes Boss, switching Fan off");
    digitalWrite(2,HIGH);
  }
}

void Light_switch(String s){
  if(s.equalsIgnoreCase("Jarvis Light on")){
    Serial.println("Yes Boss, switching Lights on");
```

```
   digitalWrite(3,LOW);
  }
  else if(s.equalsIgnoreCase("Jarvis Light off")){
    Serial.println("Yes Boss, switching Lights off");
   digitalWrite(3,HIGH);
  }

}
void Lawn_Light_Control(){
  int s=(255./1023.)*analogRead(Lawn_Light);
  Serial.println(s);
  analogWrite(Lawn_Lights,255-s);
  delay(1000);
}

void loop() {

  Lawn_Light_Control();
  s=Serial.readString();
  Fan_switch(s);
  Light_switch(s);
  Serial.println(s);

}
```

→ Hmidity

```
#include <DHT.h>
#define Type DHT11
int sensePin=2;
DHT HT(sensePin,Type);
float humidty;
float tempC;
float tempF;

int val;
int fanPin=9;

//Gas Sensor
int gas_sensor=A3;
int INDICATOR=A4;
void setup() {
   pinMode(fanPin,OUTPUT);
  HT.begin();
  delay(500);

  pinMode(INDICATOR, OUTPUT);
  pinMode(gas_sensor, INPUT);
   Serial.begin(9600);
}
void Gas_sensor()
{
  val=analogRead(gas_sensor);
    if(val>105){
    digitalWrite(INDICATOR, HIGH);
```

```
  }
  else
  digitalWrite(INDICATOR, LOW);
  Serial.println(analogRead(gas_sensor));
}
void loop() {
  // put your main code here, to run repeatedly:

  humidty=HT.readHumidity();
  tempC=HT.readTemperature();
  tempF=HT.readTemperature(true);

  Serial.print("Humidty: ");
  Serial.print(humidty);
  Serial.print(" TempC: ");
  Serial.print(tempC);
  Serial.print("C TempF: ");
  Serial.print(tempF);
  Serial.println("F ");
  if(humidty>=80){
    digitalWrite(fanPin,LOW);
    delay(2000);
  }
  else{
    digitalWrite(fanPin,HIGH);
  }
  Gas_sensor();
  delay(1000);
}
```

→ Door Sensor and Hallway lights

```
#include <Servo.h>

Servo myservo;

int pirPin = 2;
int pirStat = 0;
int pos = 0;
int ultra_trig=7;
int ultra_echo=8;
int RED_passage=9;
int GREEN_passage=10;
int WHITE_passage=13;
int PIR_sense=1;
Servo myServo;
int duration;
float cm;

void setup() {
   pinMode(pirPin, INPUT);
   myservo.attach(3);
   Serial.begin(9600);
   pinMode(ultra_echo, INPUT);
   pinMode(ultra_trig, OUTPUT);
   pinMode(RED_passage, OUTPUT);
   pinMode(GREEN_passage, OUTPUT);
   pinMode(WHITE_passage, OUTPUT);
Serial.begin(9600);
}
```

```
void Door(){
  pirStat = digitalRead(pirPin);
 if (pirStat == HIGH) {
   Serial.println("OPENING THE DOOR");
    for (pos = 90; pos >= 0; pos -= 1) {
    myservo.write(pos);
    delay(15);
   }
   delay(1000);
   for (pos = 0; pos <= 110; pos += 1) {
    myservo.write(pos);
    delay(15);
   }
 }
 else {
 }
}
void Passage_Light(){
   digitalWrite(ultra_trig,HIGH);
   delayMicroseconds(10);
   digitalWrite(ultra_trig,LOW);
   duration=pulseIn(ultra_echo,HIGH);
   cm=duration*0.034/2;
  Serial.println(cm);
  if(cm>35){
    digitalWrite(RED_passage,HIGH);
     digitalWrite(GREEN_passage,LOW);
    digitalWrite(WHITE_passage,LOW);
  }
```

```
  else if(cm>10){
    digitalWrite(GREEN_passage,HIGH);
    digitalWrite(RED_passage,LOW);
    digitalWrite(WHITE_passage,LOW);
  }
  else{
    digitalWrite(WHITE_passage,HIGH);
    digitalWrite(GREEN_passage,LOW);
    digitalWrite(RED_passage,LOW);
  }
  //lcd.print(cm);
  delay(500);
}

void loop() {
  Door();
  Passage_Light();

}
```

4. CONCLUSION AND FUTURE WORK

4.1 Result, Conclusion and Inference

Result:

We successfully run our project "SMART HOME AUTOMATION" and got the output as we wanted and all the components are working fine.

Conclusion:

Hence, we can say that the Arduino Board can be used perfectly without any problems occurring in between for Home Automation.

Inference:

The team truly believes that home automation is the next big step in the lives of consumers. The technology is available, most homes have a WiFi service, most consumers have smartphones.

4.2 Future Work and Cost

Future Work:

To ensure that the prototype created during this project can achieve its maximum potential, there are a number of improvements and changes that can be implemented. Also, the problems encountered throughout this project should be addressed. Foremost, the most prominent would be the Raspberry Pi working as a central unit connecting the consumer to devices in his/her home. Therefore looking into a two way communication between the Raspberry Pi and the device.

Cost:

As per project done, for one home around 5-6K rupees is invested.

But as we go on large scale platform, the components required can be available in cheaper side, additionally there will be in need of work force.