COMPLETE HOME AUTOMATION

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BONAFIDE CERTIFICATE

Certified that this project report entitled "**COMPLETE HOME AUTOMATION"** is a bonafide work of **– ADAVELLI ROHAN REDDY (20BRS1270)** who carried out the Project work under my supervision and guidance for **CSE2006-MICROPROCESSOR & INTERFACING.**

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ABSTRACT

In order to help maintain comfortable living conditions within a home, home monitoring and automation are utilized. Among the several standards of comfort in homes, the most significant ones are the thermal comfort, which is related to temperature, followed by the visual comfort, related to colors and light.

Home automation systems have been in existence since decades. The implementation of home automation systems have led to the visions of smart homes. However these systems have not been widely adopted due to various barriers. These barriers are high cost of ownership, inflexibility, poor manageability, and difficulty achieving security. We realize that home automation systems can be made more efficient by eliminating the need for structural changes for installing home automation, and enable composition of home devices.

An affordable system can be set to monitor these parameters to help maintain them within an acceptable range which would also help in conserving energy and preventing energy loss.

Additionally, making the house smart is to allow for intelligent automatic executing of the home appliances.

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ADAVELLI ROHAN REDDY

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1. INTRODUCTION

Automation is today's fact, where things are being controlled automatically, usually the basic tasks of turning ON/OFF certain devices and beyond, either remotely or in close proximity . Automation lowers human judgment to the lowest degree possible but does not completely eliminate it. The concept of remote management of household devices over the internet from anywhere, any time in the world today can be a reality.

While the cost of living is going up, there is a growing focus to involve technology to lower those prices. With this in mind the Smart Home project allows the user to build and maintain a house that is smart enough to keep energy levels down while providing more automated applications. A smart home will take advantage of its environment and allow seamless control whether the user is present or away. With a home that has this advantage, you can know that your home is performing at its best in energy performance. By implementing this system, it is possible to explore a variety of different engineering challenges, including software programming, PCB design and other aspects. This automation system provides great insights to the challenges of software and hardware design.

1.1 OBJECTIVES AND GOALS

India, shares about 17% of the world population, has limited energy resources and shares roughly 0.6%, 0.4% and 7%, for world gas, oil and coal reserves respectively.

However, in India, the electricity consumption due to ICT usage has increased from 24 TWh to 31 TWh in the last five years. This has resulted in electricity consumption of roughly 6.5%.

Thus, saving power is the main concern, which is the basic aim of this project.

Currently, most of the home automations are achieved by devices like Google Home, Amazon Echo etc which require smart appliances to operate.

To use normal appliances, a complete home has to be automated which can consume a lot of energy.

So our model will focus on using regular appliances for home automation along with reduced energy consumption.

1.2 APPLICATIONS

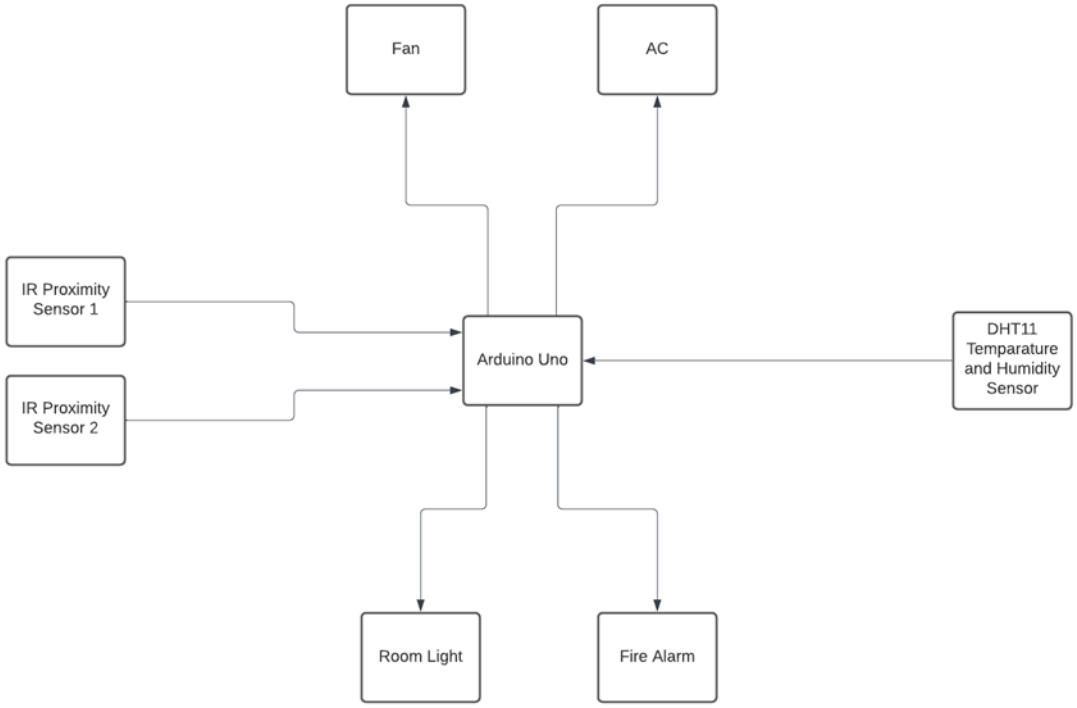
Nowadays, we have remote controls for our television sets and other electronic systems, which have made our lives real easy. Have you ever wondered about home automation which would give the facility of controlling tube lights, fans and other electrical appliances at home using a remote control? Off-course, Yes! But, are the available options cost-effective? If the answer is No, we have found a solution to it. We have come up with a new system called Arduino based home automation. This system is super-cost effective and can give the user the ability to control any electronic device without even spending for a remote control. Time is a very valuable thing. Everybody wants to save time as much as they can. New technologies are being introduced to save our time. To save people's time we are introducing a Home Automation system.

1.3 FEATURES

1) Energy saving
2) No controls, So artificially sensing the environment and acts accordingly
3) Optimal usage of energy which draws line between us and other Home automation systems
4) Cost effective

2. DESIGN

2.1 BLOCK DIAGRAM



2.2 HARDWARE ANALYSIS

COMPONENTS REQUIRED

1. ARDUINO UNO BOARD

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.

2. BREADBOARD

A breadboard, or protoboard, is a construction base for prototyping of electronics.

3. INFRARED PROXIMITY SENSORS

A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact. A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation and looks for changes in the field or return signal.

3. DHT11 TEMPERATURE AND HUMIDITY SENSOR

The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed).

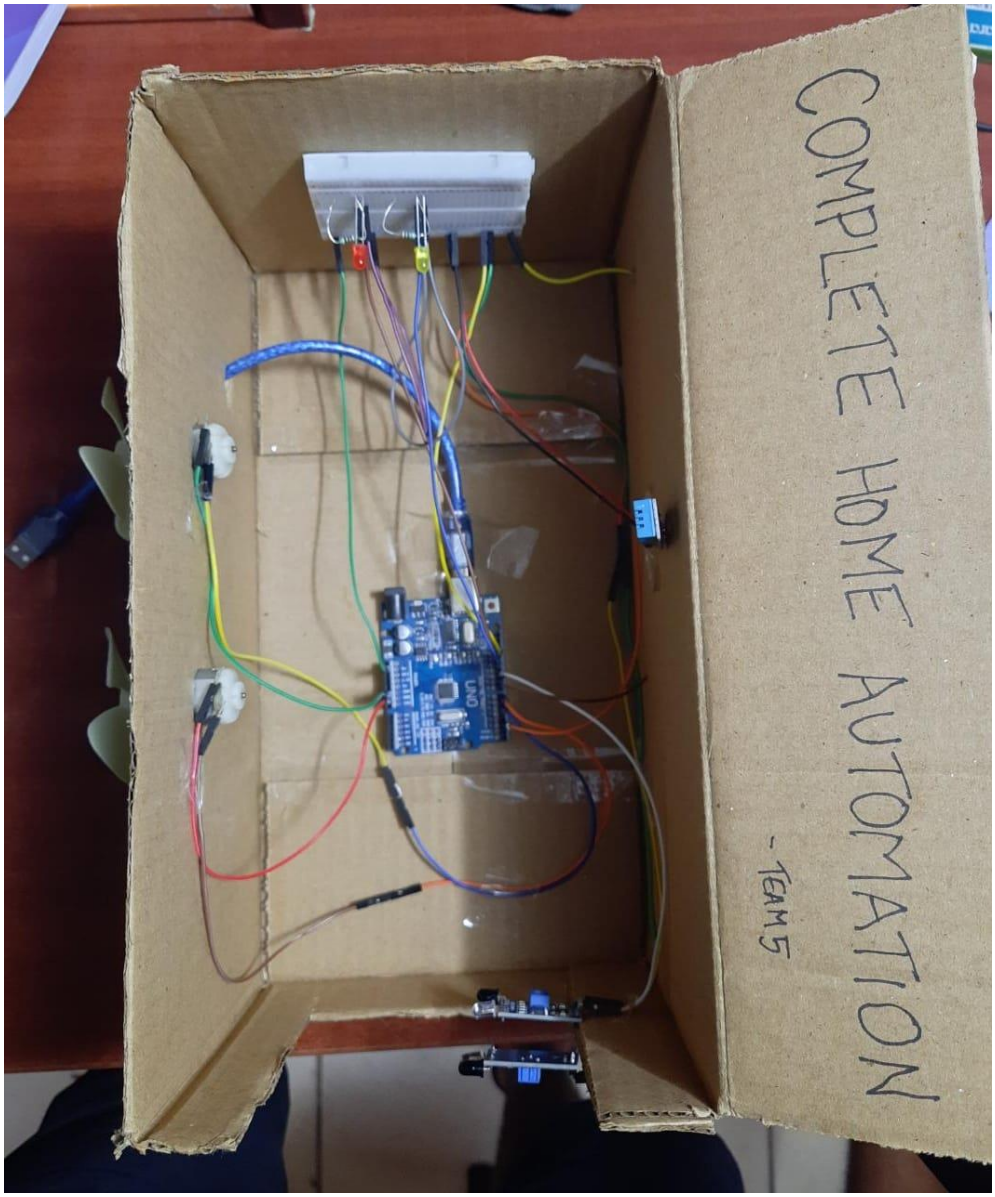
4. JUMPER WIRES

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering.

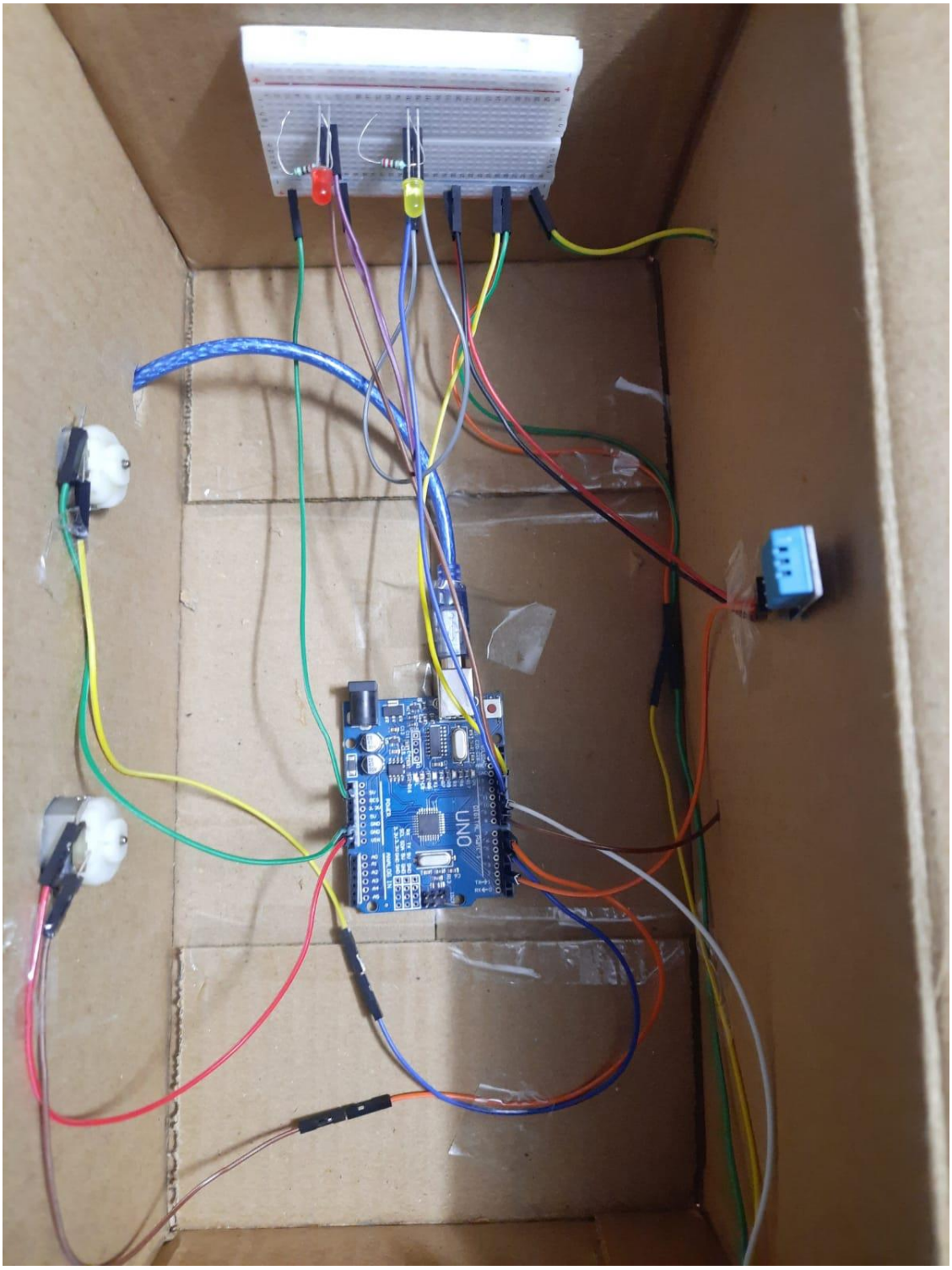
5. APPLIANCES LIKE LIGHTS(LED), FANS

2.3 PROJECT SNAPSHOT

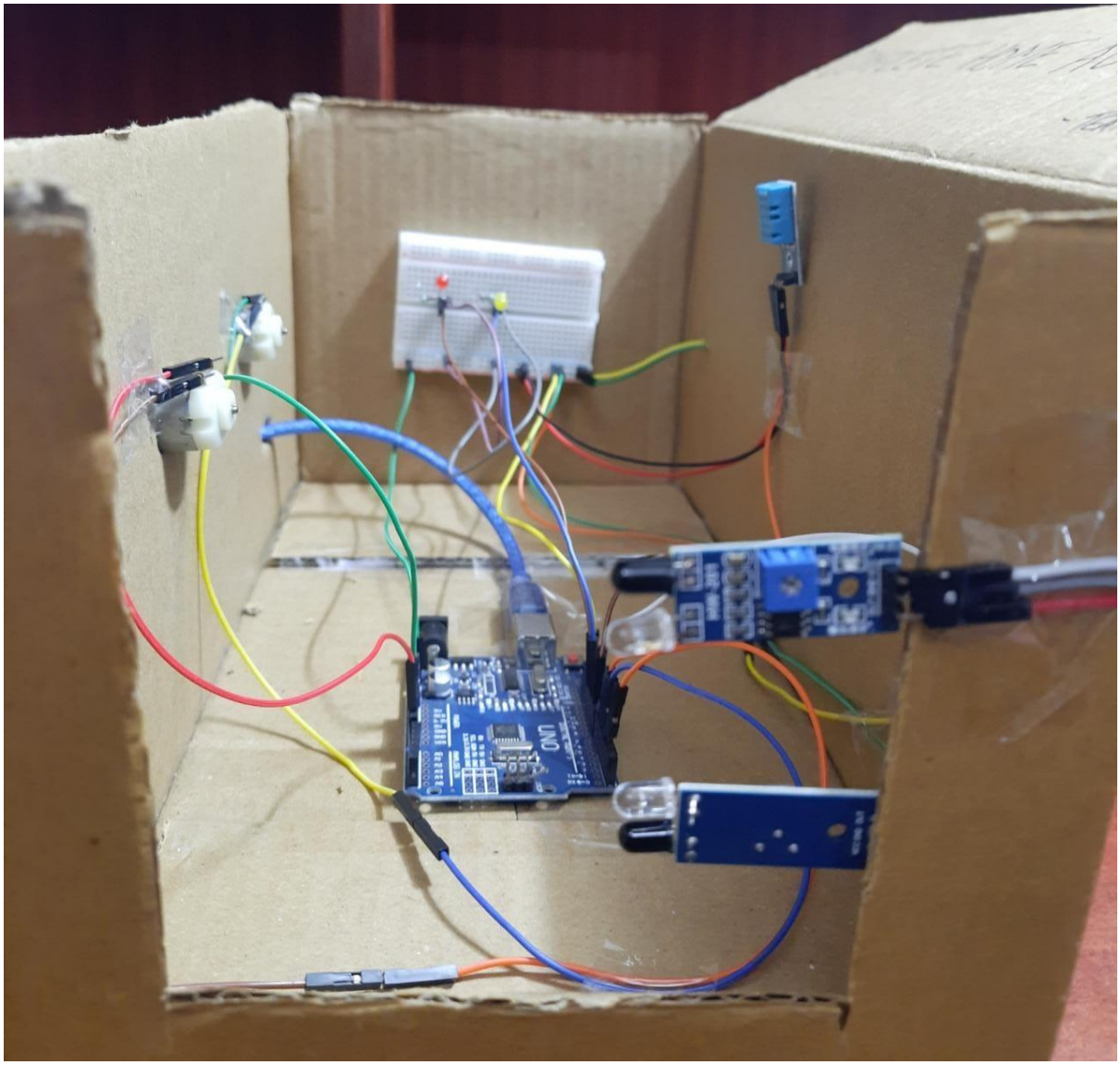
Top View 1



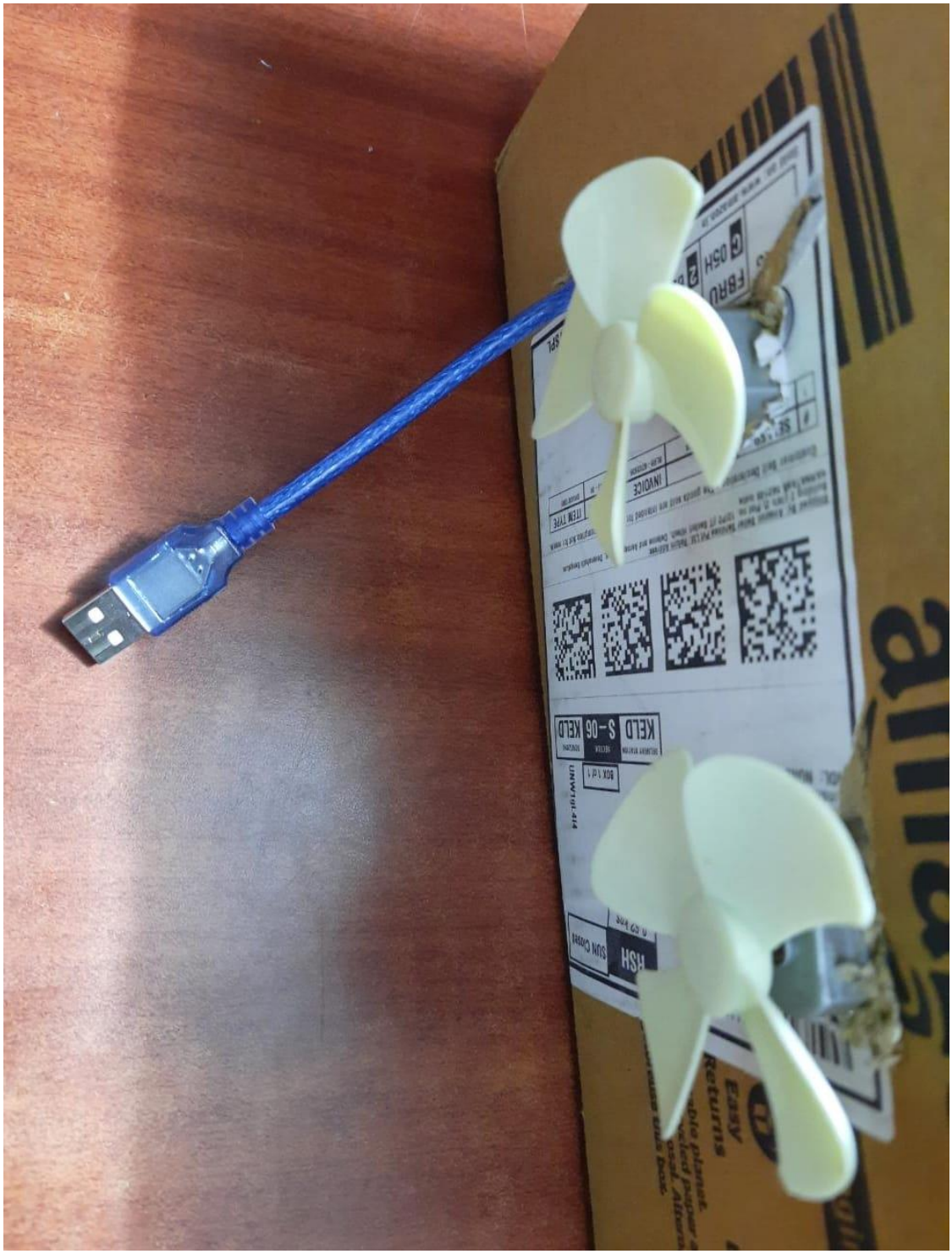
Top View 2



Front View



Side View



3. SOFTWARE AND CODING ANALYSIS

Code:

```
#include <TimeLib.h>
// include the EduIntro library
#include <EduIntro.h>
DHT11 dht11(D2);  // creating the object sensor on pin 'D2'
int C;   // temperature C readings are integers
float F; // temperature F readings are returned in float format
int H;   // humidity readings are integers
int count=0;
void setup(){
  // initialize serial communications at 9600 bps
  Serial.begin(9600);
  pinMode(5,OUTPUT);//FAN
  pinMode(12,OUTPUT);//LIGHT
  pinMode(7,OUTPUT);//AC
  pinMode(13,OUTPUT);//FIRE ALARM
  pinMode(9,INPUT);//IR SENSOR 1
  pinMode(10, INPUT); //IR SENSOR 2
   setTime(22, 10, 30, 24, 4, 2022);
}
void loop(){
```

```
  dht11.update();
  C = dht11.readCelsius();       // Reading the temperature in Celsius degrees and store in the C variable
  F = dht11.readFahrenheit();    // Reading the temperature in Fahrenheit degrees and store in the F variable
  H = dht11.readHumidity();      // Reading the humidity index
  // Print the collected data in a row on the Serial Monitor
  int statusSensor = digitalRead (9);
  if(C>45){
     digitalWrite(13,HIGH);
  }
  delay(1000);
  if(digitalRead(9) == 0)
  {
   Serial.println("\tIR 1 high\t");
   delay(2000);
   if(digitalRead(10) == 0)
   {
     Serial.println("\tIR 2 high\t");
     count = count+1; // PERSON WALKS INTO THE ROOM
     Serial.println("count+\t");
     Serial.println(count);
   }
   else
```

```
  {
    Serial.println("\tIR 2 low\t");
  }
}

//Serial.println("2nd\t");
else if(digitalRead(10) == 0)
{
  Serial.println("\tIR 2 high\t");
  delay(2000);
  int statusSensor1 = digitalRead (9);
  if(digitalRead(9) == 0)
  {
    Serial.println("IR 1 high\t");
    count = count-1; // PERSON LEAVES THE ROOM
    Serial.println("count-\t");
    Serial.println(count);
  }
  else
  {
    Serial.println("\tIR 1 low\t");
  }
}
```

```
else
{
  Serial.println("\tBoth low\t");
}
if(count<0)
{
  count=0;
}
delay(2000);

if (count == 0){
  Serial.println("No Person in room");
  digitalWrite(5, LOW); // FAN LOW
  digitalWrite(12, LOW); // LIGHT LOW
  digitalWrite(7, LOW); // AC LOW
}
else
{
  //digitalWrite(7, HIGH); // LED High
  //Serial.print("H: ");
  //Serial.print(H);
  Serial.print("\tC: ");
  Serial.print(C);
```

```
    //Serial.print("\tF: ");
    //Serial.println(F);
    digitalWrite(5,HIGH);//FAN HIGH ALWAYS WHEN PERSON TRUE
    if(hour()>17 && hour()<23)
    {
      digitalWrite(12,HIGH); //Room Light
    }
    if(C>20 && (hour()>19 ||hour()<5)){
      digitalWrite(7,HIGH);//AC
    }
    else if(C<20){
      digitalWrite(7,LOW);//AC
    }
  }
  delay(1000);                // Wait one second before get another temperature
reading
}
/*
void digitalClockDisplay(){
   // digital clock display of the time
   Serial.print(hour());
   printDigits(minute());
   printDigits(second());
```

```
  Serial.print(" ");
  Serial.print(day());
  Serial.print(" ");
  Serial.print(month());
  Serial.print(" ");
  Serial.print(year());
  Serial.println();
}*/
```

Analysis:

1)The entire project revolves around automation based on readings from sensors

2)The three main parameters are the count of people in the room, the temperature and the time of the day

3)The 2 IR sensors work together in symphony to track the number of people in the room by sequential detection of people passing by then sensors

4)Upon the presence of an individual, the readings from the time and temperature parameters determine the activation of different appliances under different situations and threshold values.

5)There is also a fire detection system which remains uninterruptedly alert.

4. CONCLUSION AND FUTURE WORK

COMPARISON ANALYSIS

	X10	Zigbee	Z-Wave	Insteon	Wifi Based	Our Project
Cost	Very Low	Initial Cost low	High Cost	High Cost	High Initial Cost	Very Low
Flexibility	None	Mid	Low	Low	High	High
Complexity	High	High	High	High	High	Low
Security	None	Available	Available	Available	Available	None

4.1 RESULT, CONCLUSION AND INTERFERENCE

In this paper, a novel architecture for low cost and flexible home control and monitoring system is proposed and implemented. The proposed architecture utilizes a sensor as an interoperable application layer for communicating between the remote user and the home devices.

4.2 FUTURE WORK COST

Many different adaptations, tests, and experiments have been left for the future due to lack of time (i.e. the experiments with real data are usually very time consuming, requiring even days to finish a single run). Future work concerns deeper analysis of particular mechanisms, new proposals to try different methods, or simply curiosity.

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