"BLUETOOTH CONTROLLED HOME AUTOMATION SYSTEM"

PROJECT REPORT

Submitted for the course: Advanced Microcontrollers (ECE 4002)

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Slot: B2+TB2

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CERTIFICATE

This is to certify that the project work entitled "**Bluetooth Controlled Home Automation System"** that is being submitted by **Sushant Govingraj, Shivani Rai** and **Ashwini Rajasekhar** for Advanced Microcontrollers is a record of bonafide work under my supervision. The contents of this project work, in full or in parts, have neither been taken from any other source nor have been submitted for any other CAL course.

Place: Vellore

(PROF. VIDHYAPATHI C.M)

<u>ACKNOWLEDGEMENTS</u>

We would like to express our gratitude to our Professor, **Vidhyapathi C.M,** who gave us the opportunity to do this project on the topic "Bluetooth Controlled Home Automation System" and us helped in doing research to bring out the best in us. We are very thankful to him.

Secondly, we would also like to thank each other for working as a team and finishing this project within the stipulated time.

ABSTRACT

Smart homes are now gaining popularity giving people the luxury of controlling the appliances present at home from anywhere. It includes controlling lights, fan, in fact even security systems to know who has visited in their absence or to detect intruders. This project aims at making one such model that will control the fans and lights of a house only in presence of people. It also keeps a count of number of people present in the room at a given instant of time.

<u>Introduction</u>

Smart homes, though they involve initial investment, are the best way to economically utilise energy resources we use daily. These sensor-based systems can be used in variety of applications under the topic smart homes. These systems can be implemented anywhere. And they can be controlled from anywhere using Bluetooth or by connecting it to the internet making it an IoT based application. A user-friendly app can easily be made to control the appliances.

This project makes use of IR sensors to detect people entering or leaving the house. Two separate sensors are used, one for entry and one for exit. Entry will increment the latest value by one and exit will decrement the latest value. When the count increases from 0 to 1, all the appliances get switched on and will remain on till the last person leaves. This is one way of controlling the appliances/lights/fans using the reading taken by the sensors.

The other way is to control the appliances/lights/fans through an app that will bypass all other operations due to sensor readings and switch on or switch off the devices.

This reduces power consumption, and this saves money on our electricity bills. The power consumed can be calculated too by monitoring the usage of the devices.

BLOCK DIAGRAM
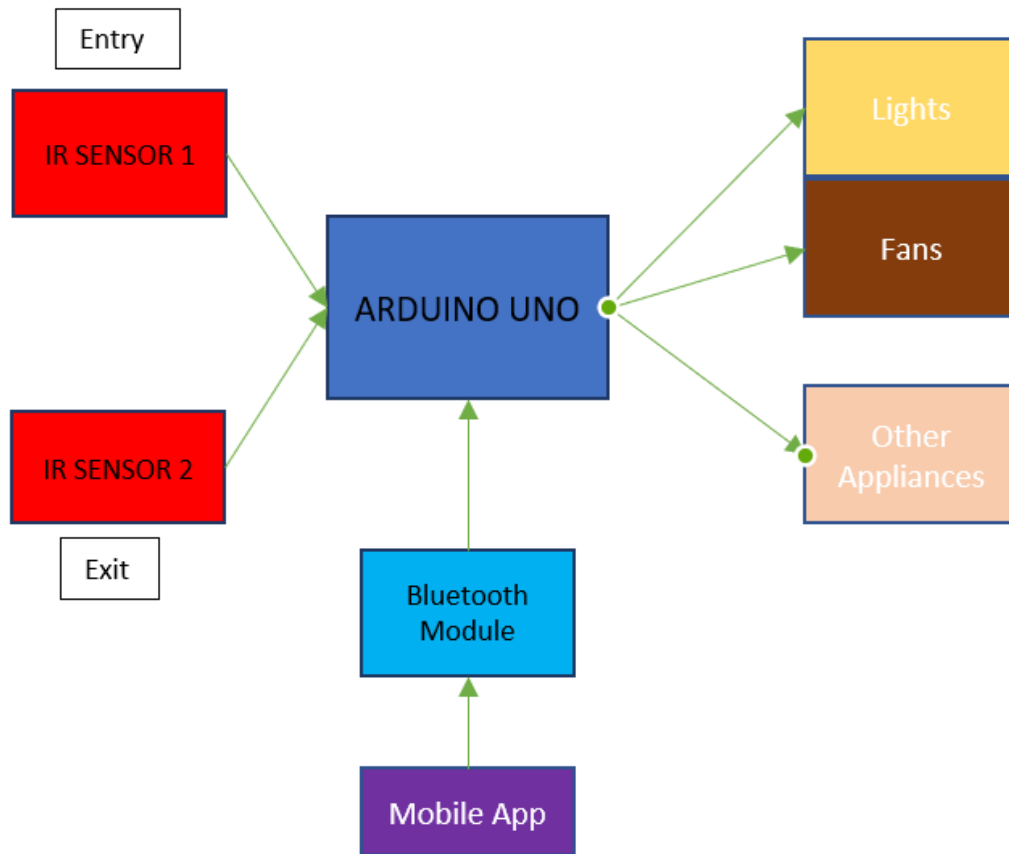
Microcontroller Arduino UNO is the heart of the project controlling all the devices attached to it. It is controlled in two ways:

1) With the IR sensors: The devices/electronic appliances are switched on when the first person enters and switched off as soon as the last person leaves.
2) With the Mobile app: This feature gives us the status of the devices at home allowing us to control them remotely. We can either switch on or switch off the everything irrespective of the sensor readings.

The app also shows the count of number of people in the room as it gets live updates continuously being collected from the sensors.

The bulb and fans work on AC supply. Thus, a relay was used to control the appliances using the power supplied by Arduino.

A Bluetooth technology is a high speed low powered wireless technology link that is designed to connect phones or other portable equipment together.

Wireless signals transmitted with Bluetooth cover short distances, typically up to 30 feet. It is a transceiver and can connect 8 devices.

COMPONENTS USED:

1) 2 IR Sensors- (Ganesh Electronics Rs.150)
2) HC-05 Bluetooth Module- (Ganesh Electronics Rs.300)
3) Relay module- (Ganesh Electronics Rs.160)
4) Bulb + Bulb Holder- (Ganesh Electronics Rs.90)
5) Motor- (Ganesh Electronics Rs. 80)
6) Empty 2 pin socket- (Ganesh Electronics Rs.10)
7) LED- (Ganesh Electronics Rs.2)

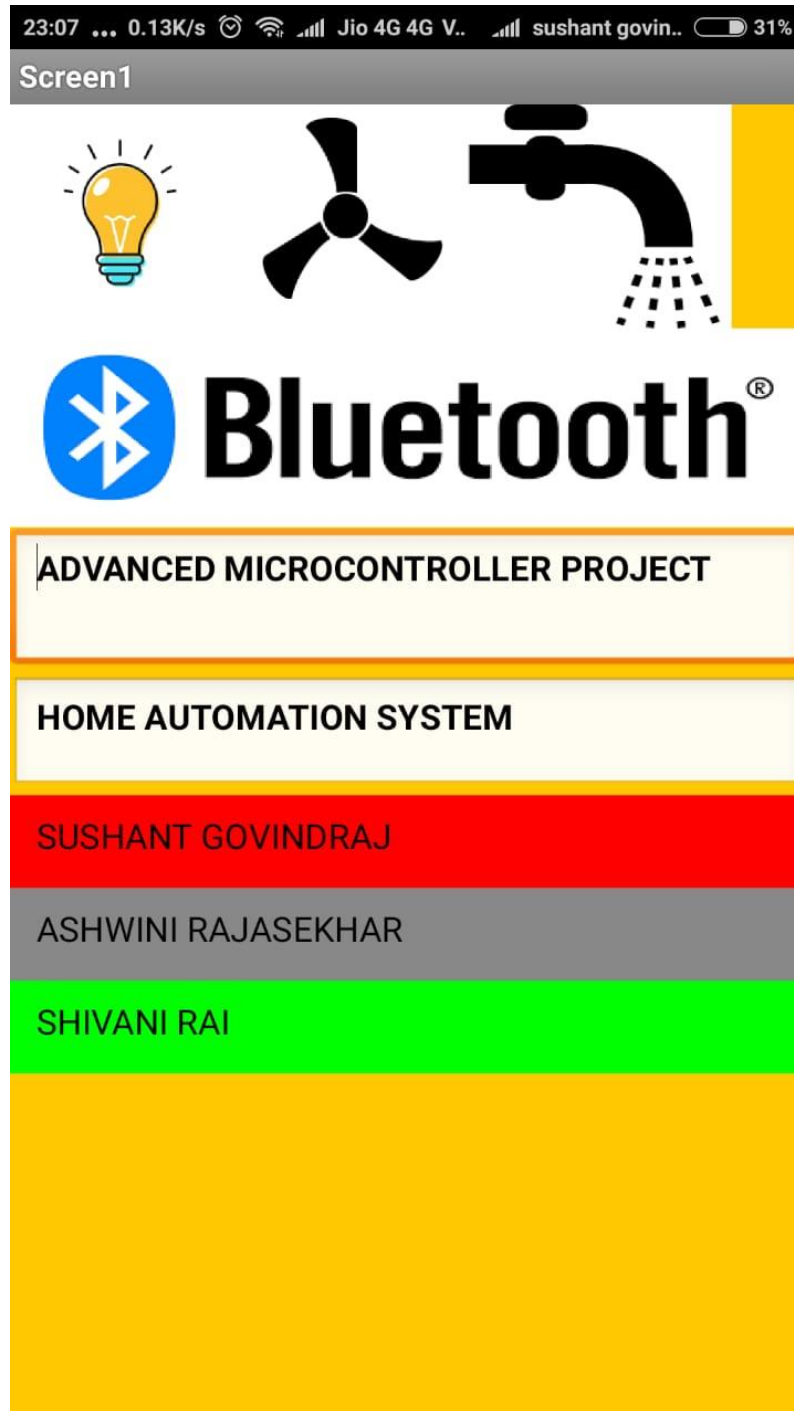# BLUETOOTH CONTROLLED HOME AUTOMATION SYSTEM

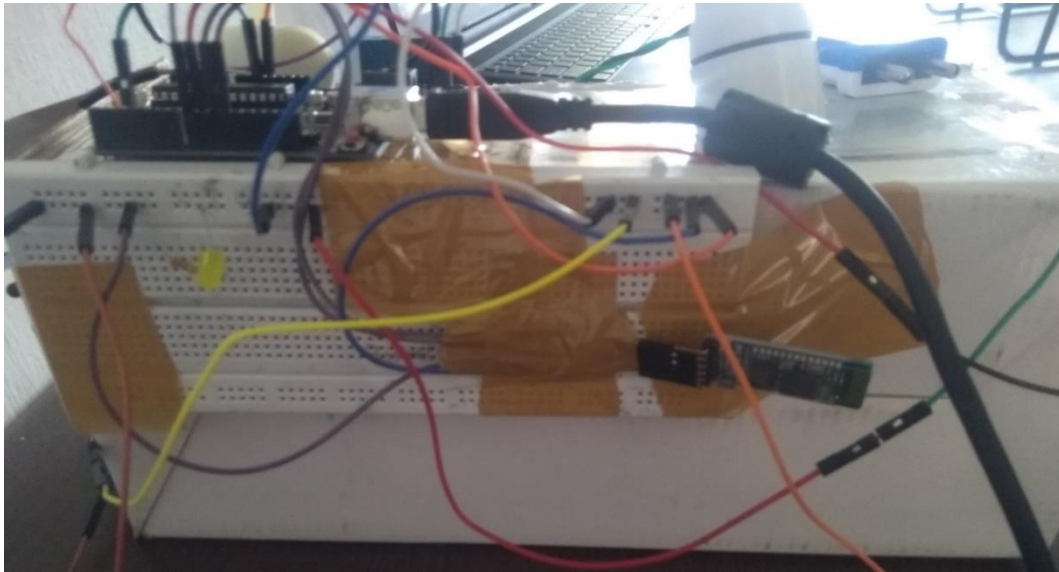Fig: Mobile App to control the Appliances

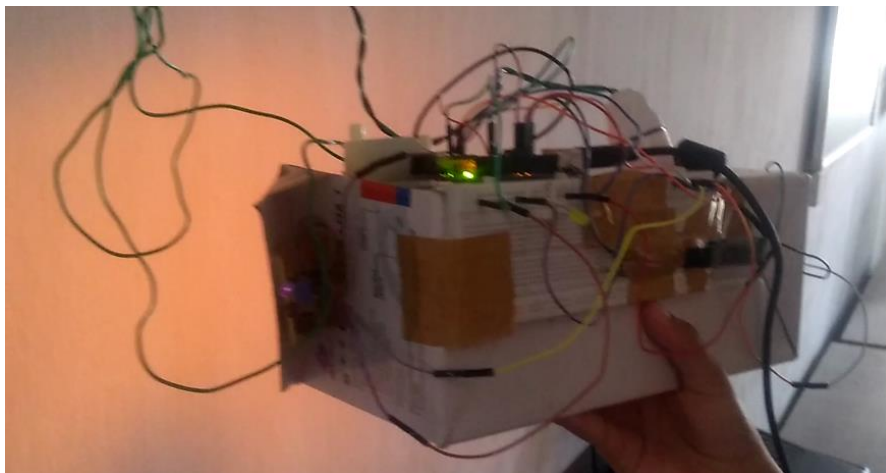Fig: Connection of Bluetooth Module and Sensors to the Arduino

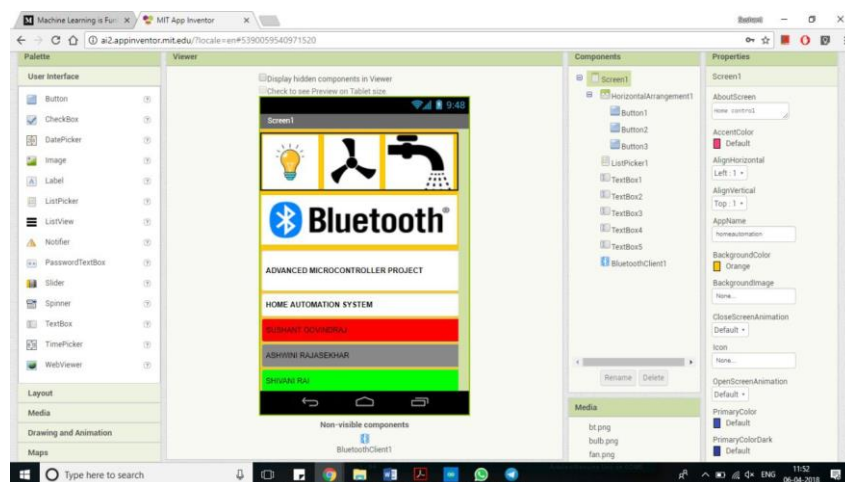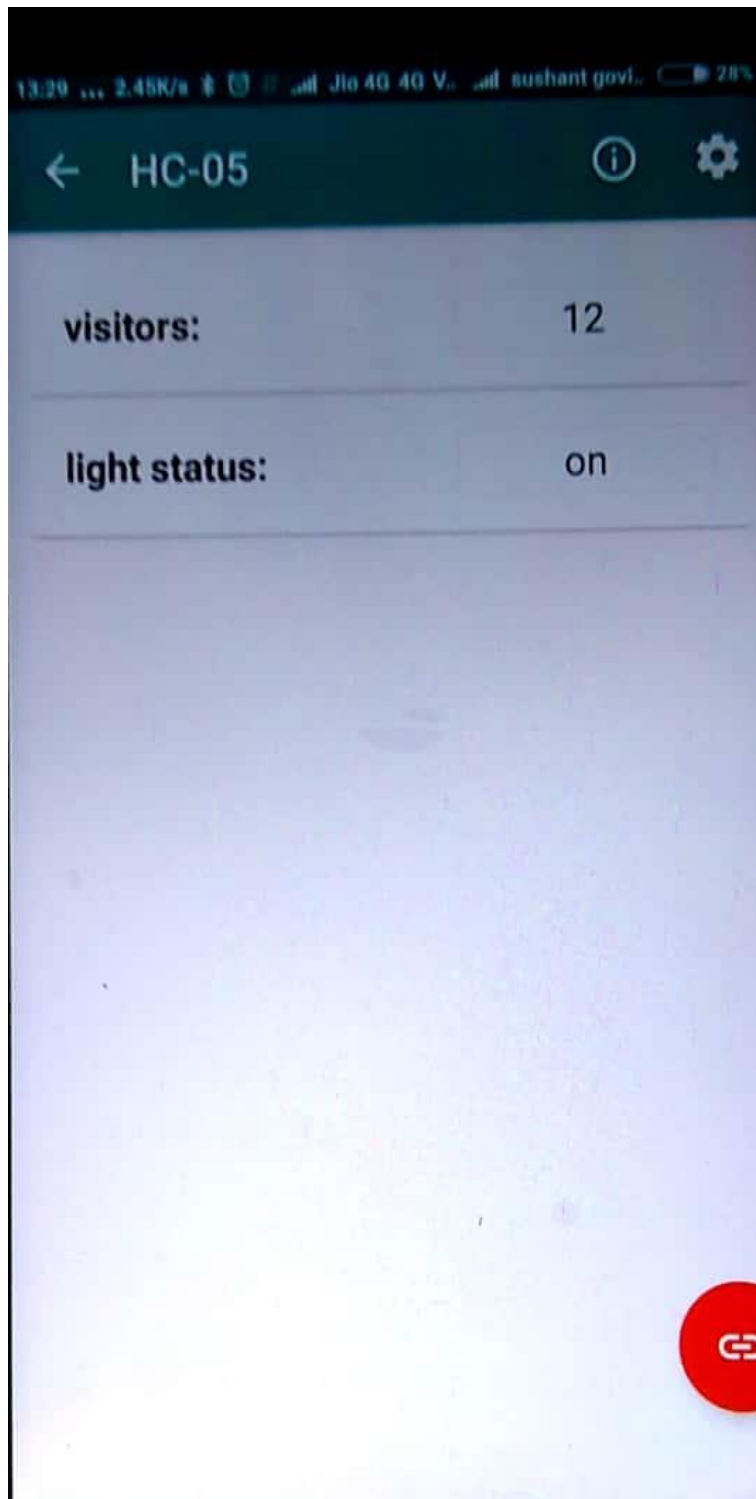Fig: Light glowing after the entry of a person

Fig: Home Screen being developed

Fig: App keeping a count of the number of people in the room

CODE:

Code (APP):

```
#include <SoftwareSerial.h>
SoftwareSerial BTserial(10, 11); // RX | TX

 #define in 8
 #define out 9
#define led 2
 #define fan 3
 int count=0;

void IN()
{
   count=count+1;
    //Serial.println("person in the room");
    Serial.println(count);

   delay(1000);
}

void OUT()
{
 count=count-1;
 //Serial.println("person in the room");ll
  Serial.println(count);

   delay(1000);
```

```
}

void setup()
{

  Serial.begin(9600);
  BTserial.begin(9600);
  pinMode(in, INPUT);
  pinMode(out, INPUT);
  pinMode(led, OUTPUT);
  pinMode(fan, OUTPUT);
// Serial.println("person in the room");
// Serial.println(count);
}
void loop()
{
  String cond1;
  if(digitalRead(in))
  IN();
  if(digitalRead(out))
  OUT();

  BTserial.print(count);
  BTserial.print(",");
  if(count<=0)
  {
   String cond = "off";
  // lcd.cledar();
```

```arduino
    digitalWrite(led, LOW);
    digitalWrite(fan, HIGH);
    //BTserial.print(",");
    BTserial.print(cond);

  // delay(200);

  Serial.println("light is off");
  Serial.println("nobody");
  Serial.println(count);

  delay(200);
 }

 else
 {
String cond = "on";
Serial.println("Light is on");
Serial.println(count);
  digitalWrite(led, HIGH);
  digitalWrite(fan, LOW);
  //BTserial.print(",");
  BTserial.print(cond);

  delay(200);

 }
 BTserial.print(";");
}
```

Code: (IR sensors)

```
///#include <SoftwareSerial.h>
//SoftwareSerial BTserial(10, 11); // RX | TX

int motor=4;
int light=2;
int fan=3;

int Received=0;
int light_state =0;
int fan_state = 0;
//int vent_state = 0;
//int pc_state = 0;


void setup(){

  Serial.begin(9600);
 // pinMode(lamp,OUTPUT);
  //pinMode(vent,OUTPUT);
  pinMode(light,OUTPUT);
  pinMode(motor, OUTPUT);
  pinMode(fan, OUTPUT);
 // pinMode(pc,OUTPUT);

}

void loop(){
```

```
 if(Serial.available()>0)
 {
   Received = Serial.read();


 }
////////////////LIGHT////////////////////
if (light_state == 0 && Received == '1')
 {
   digitalWrite(light,HIGH);
   light_state=1;
   Received=0;
 }
if (light_state ==1 && Received == '1')
 {
   digitalWrite(light,LOW);
   light_state=0;
   Received=0;
 }
////////////////FAN/////////////////////////
if (fan_state == 0 && Received == '1')
 {
   digitalWrite(fan,HIGH);
   fan_state=1;
   Received=0;
 }
if (fan_state ==1 && Received == '1')
 {
   digitalWrite(fan,LOW);
   fan_state=0;
```

```
    Received=0;
  }
///////////////MOTOR////////////////////
 if (Received =='8'){
  digitalWrite(motor,HIGH);
 }
 if (Received == '9'){
digitalWrite(motor,LOW);

//Bluetooth app control
}
```

<u>CONCLUSION</u>

The project is just a prototype of what can be done with simple sensors and wireless communication. As the prototype has given a desirable output, the next step would be to optimise the model. Future work in this field includes adding a sensor-based security system for example. Making the home automation set up solar controlled will make the model truly economical. Also, an IoT based home automation system would allow the user to control the appliances from anywhere around the world.