Voice Controlled Home Automation

Introduction:

The Voice-Controlled Lights Arduino project is a hands-on demonstration of integrating voice commands with an Arduino microcontroller to control three different colored lights – Green, Blue, and Red. This project provides an interactive and user-friendly way to manipulate the state of LEDs using spoken commands via an Arduino Bluetooth controller app.

Objective:

The primary goal of this project is to showcase the integration of voice recognition capabilities with Arduino, enabling users to control lights through simple voice commands using a Bluetooth controller app.

Components:

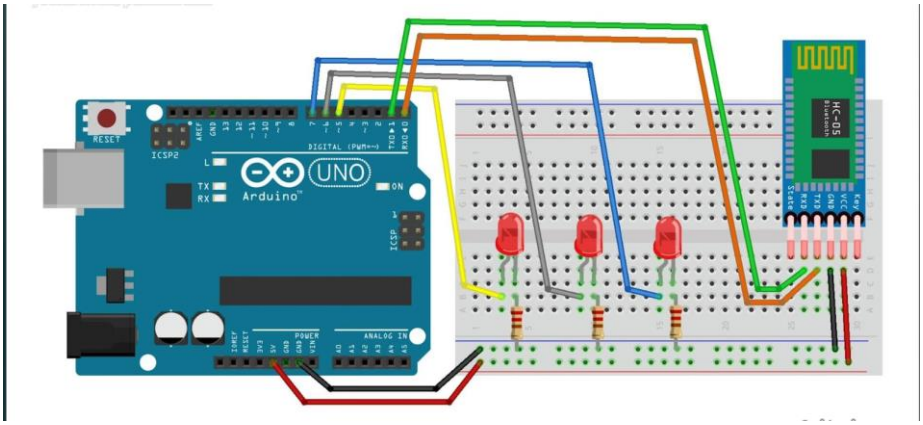
To build this project, you will need the following components-

- *Arduino Board – Any standard Arduino board (e.g. Arduino Uno).*
- *Bluetooth Module – For wireless communication (e.g. HC-05).*
- *LEDs – Three LEDs of different colors(Green, Blue, Red).*
- *Resistors – Ensure the LEDs are appropriately current-limited using resistors.*
- *Jumper Wires – For connecting components on the breadboard.*

- *USB Cables – To connect the Arduino to a computer for programming.*
- *Arduino Bluetooth Controller App – Install on your smartphone for voice command input.*

Circuit Diagram:

Connect the components as per the following circuit diagram:



Arduino Code:

```
int Green = 3;
int Blue = 4;
int Red = 5;
void setup() {
  Serial.begin(9600);
  pinMode(Green, OUTPUT);
  pinMode(Blue, OUTPUT);
  pinMode(Red, OUTPUT);
}
```

```
String voice;
void loop() {
  if (Serial.available() > 0) {
    voice = Serial.readString();
    Serial.print("Received command: " + voice + '\n');

    // Process voice commands
    if (voice == "turn green light on") {
      digitalWrite(Green, HIGH);
      Serial.println("Green light is ON");
    } else if (voice == "turn green light off") {
      digitalWrite(Green, LOW);
      Serial.println("Green light is OFF");
    } else if (voice == "turn blue light on") {
      digitalWrite(Blue, HIGH);
      Serial.println("Blue light is ON");
    } else if (voice == "turn blue light off") {
      digitalWrite(Blue, LOW);
      Serial.println("Blue light is OFF");
    } else if (voice == "turn red light on") {
      digitalWrite(Red, HIGH);
      Serial.println("Red light is ON");
    } else if (voice == "turn red light off") {
      digitalWrite(Red, LOW);
      Serial.println("Red light is OFF");
    } else if (voice == "turn all lights on") {
```

```
    digitalWrite(Green, HIGH);
    digitalWrite(Blue, HIGH);
    digitalWrite(Red, HIGH);
    Serial.println("All lights are ON");
  } else if (voice == "turn all lights off") {
    digitalWrite(Green, LOW);
    digitalWrite(Blue, LOW);
    digitalWrite(Red, LOW);
    Serial.println("All lights are OFF");
  } else {
    Serial.println("Unknown command: " + voice);
  }

  // Clear the voice command for the next iteration
  voice = "";
 }
}
```

Code Explanation:

- *Setup Section*
  The 'setup' function initializes the serial communication and sets the pin modes for the LEDs.
- *Loop Section*
  The 'loop' function continuously checks for incoming serial data (voice commands). It then processes the commands and controls the LEDs accordingly.

Usage Instructions:

Follow these steps to use the Voice-Controlled Lights Arduino project:

1. *Connect the Arduino board to your computer using the USB cable.*
2. *Attach the Bluetooth module to the Arduino board.*
3. *Connect the LEDs and resistors as indicated in the circuit diagram.*
4. *Upload the provided code to the Arduino board.*
5. *Install the Arduino Bluetooth Controller app on your smartphone.*
6. *Pair your smartphone with the Bluetooth module on the Arduino.*
7. *Open the Serial Monitor in the Arduino IDE to view the system's.*
8. *Use the Arduino Bluetooth Controller app to send voice commands for controlling the lights.*

Voice Commands:

The following voice commands are recognized:

- *"Turn green light on"*
- *"Turn green light off"*
- *"Turn blue light on"*
- *"Turn blue light off"*
- *"Turn red light on"*
- *"Turn red light off"*
- *"Turn all lights on"*
- *"Turn all lights off"*

Using Arduino Bluetooth Controller App:

Download and install the Arduino Bluetooth Controller app on your smartphone. Connect your smartphone to the Bluetooth module on the Arduino. Use the app's voice input feature to send voice commands to control the lights.

Troubleshooting:

If you encounter issues:

- *Ensure that the Arduino and Bluetooth module are properly connected and powered.*
- *Check the wiring according to the circuit diagram.*
- *Verify that the voice commands are spoken clearly and match the predefined commands.*
- *If there are serial communication problems, try adjusting the baud rate in the code and Serial Monitor.*

Acknowledgement:

The success of this project is a result of the collaborative efforts of our dedicated team members-

- *Alok kumar*
- *Aman kumar*
- *Deepak kumar*
- *Siddharatha Shankar*

Conclusion:

The Voice-Controlled Lights Arduino project demonstrates a simple yet engaging application of voice recognition technology with Arduino. This project can be expanded upon

by incorporating more sophisticated voice commands or integrating additional hardware components.