

Bluetooth Car Controlled Using Arduino

It is through efficient electronic programming that a computer can control a robot, hence a robot can be thought of as an Electromechanical machine. Some of the essential characteristics that a robot must have been - sensing, movement, energy, intelligence. It performs a task using control systems, various power supplies and software all working together.

We developed an RC Bluetooth car which uses a mobile application to control the car and the project is build on the basis of Arduino, motor driver, Bluetooth module.

Keywords: Bluetooth module, Motor Driver, Arduino.

- I. **INTRODUCTION:** Robots are always a fancy topic for students, hobbyists and DIYers. If you are beginner, then building a robot (like a car or an arm) is probably one of the important projects to do after learning about the basics. If you remember the earlier tutorial, I have discussed about HC-05 Bluetooth Module and how to interface one with Arduino. Also, I have provided a simple Bluetooth Controller App, which can be installed on your Android Phone and start transmitting the data.

As a continuation to that project, I will be implementing Bluetooth Controlled Robot using Arduino and a few other components and build a simple robotic car that can be controlled using an Android Phone (through an App) over Bluetooth Communication. The robotic car can be controlled wirelessly via a Smartphone. The smartphone has an Android app through which the user can send commands directly to Robot.

The robot can move forward, backward, left, and right and can also be stopped. The Arduino's Bluetooth-controlled robot car is interfaced with a Bluetooth module HC-05 or HC-06. We can give specific voice commands to the robot through an Android app installed on the phone. At the receiving side, a Bluetooth transceiver module receives the commands and forwards them to the Arduino, and thus the robotic car is controlled.

II. SYSTEM DESIGN AND IMPLEMENTATION: The following is the circuit diagram of Bluetooth Controlled Robot using Arduino, L298N and HC-05.

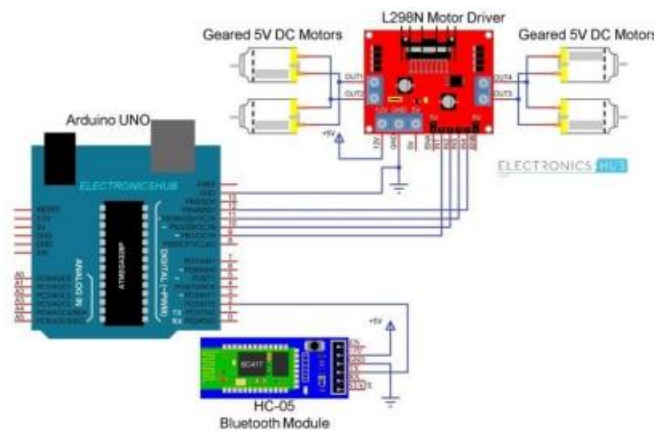


Figure:

Circuit Diagram of Bluetooth Controlled Robot IJAR SCT ISSN (Online) 2581-9429 International Journal of Advanced Research in Science, Communication and Technology (IJAR SCT) Volume 9, Issue 1, September 2021 Copyright to IJAR SCT DOI:

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5.731 Coming to the design of the circuit, first is the HC-05 Bluetooth Module. The +5V and GND pins of the Bluetooth Module are connected to +5V and GND of Arduino.

Since I will be only transmitting data related to the Robot's movement from Android Phone to Bluetooth Module and do not intend to receive any data from Arduino, I will connect only the TX pin of the Bluetooth Module to RX Pin of Arduino. This

RX pin of Arduino is based on Software Serial library (Pin 2 and Pin 3 are configured as RX and TX on Arduino). The RX pin of the Bluetooth is left open. Now, the L298N Motor Driver Module. Digital I/O Pins 9 through 12 of Arduino are configured as Input pins of the Motor Driver and are connected to IN1 through IN4 of the L298N Motor Driver Module. Both the Enable Pins are connected to 5V through provided jumper wires. The robot chassis which I am using in this Bluetooth Controlled Robot Car project is supplied with 4 geared motors. Since L298N has slots for only two motors, I have joined the left side motors as one set and the right-side motors as other set and connected both these sets to the output of L298N Module.

III. Code: The Arduino code for Bluetooth Controlled Robot project is given below:

```
#define in1 5 //L298n Motor Driver pins.
#define in2 6
#define in3 10
#define in4 11
#define light_FR 14 //LED Front Right pin A0 for Arduino
Uno
#define light_FL 15 //LED Front Left pin A1 for Arduino Uno
#define light_BR 16 //LED Back Right pin A2 for Arduino
Uno
#define light_BL 17 //LED Back Left pin A3 for Arduino Uno
#define horn_Buzz 18 //Horn Buzzer pin A4 for Arduino
Uno
int command; //Int to store app command state.
int Speed = 240; // 0 - 255.
int Speedsec;
void setup() {
```

```
pinMode(in1, OUTPUT);
pinMode(in2, OUTPUT);
pinMode(in3, OUTPUT);
pinMode(in4, OUTPUT);
Serial.begin(9600); //Set the baud rate to your Bluetooth
module.
}
void loop() {
  if (Serial.available() > 0) {
    command = Serial.read();
    Stop(); //Initialize with motors stoped.
  }
  switch (command) {
    case 'F':
      forward();
      break;
    case 'B':
      back();
      break;
    case 'L':
      left();
      break;
    case 'R':
      right();
      break;
    case 'G':
      forwardleft();
      break;
    case 'I':
      forwardright();
```

```
    break;
case 'H':
    backleft();
    break;
case 'J':
    backright();
    break;
case 'O':
    Speed = 100;
    break;
case '1':
    Speed = 140;
    break;
case '2':
    Speed = 153;
    break;
case '3':
    Speed = 165;
    break;
case '4':
    Speed = 178;
    break;
case '5':
    Speed = 191;
    break;
case '6':
    Speed = 204;
    break;
case '7':
    Speed = 216;
```

```
        break;
    case '8':
        Speed = 229;
        break;
    case '9':
        Speed = 242;
        break;
    case 'q':
        Speed = 255;
        break;
}
}
void forward() {
    analogWrite(in1, Speed);
    analogWrite(in3, Speed);
}
void right() {
    analogWrite(in4, Speed);
    analogWrite(in1, Speed);
}
void left() {
    analogWrite(in3, Speed);
    analogWrite(in2, Speed);
}
void back() {
    analogWrite(in2, Speed);
    analogWrite(in4, Speed);
}
void forwardleft() {
    analogWrite(in1, Speedsec);
```

```

    analogWrite(in3, Speed);
}
void forwardright() {
    analogWrite(in1, Speed);
    analogWrite(in3, Speedsec);
}
void backright() {
    analogWrite(in2, Speed);
    analogWrite(in4, Speedsec);
}
void backleft() {
    analogWrite(in2, Speedsec);
    analogWrite(in4, Speed);
}
void Stop() {
    analogWrite(in1, 0);
    analogWrite(in2, 0);
    analogWrite(in3, 0);
    analogWrite(in4, 0);
}

```

Android App If you remember the HC-05 Bluetooth Module tutorial, I have used a simple app called Bluetooth Controller, which is installed on an Android Phone to communicate with the Bluetooth Module. In this project, I have used the same app with modifications in the data to be transmitted.

IV.WORKING Assemble the robot, make the necessary connections and upload the code to Arduino. If you understood the HC-05 Bluetooth Module tutorial, then understanding the Bluetooth Controlled Robot project is very easy. First, in the Android App, I have used 5 keys as Forward, Reverse, Left,

Right and Stop. The corresponding data associated with each key is as follows:

- Forward – 1
- Reverse – 2
- Left – 3
- Right – 4
- Stop – 5

When a key is pressed, the corresponding data is transmitted to the Bluetooth Module from the Phone over Bluetooth Communication. In the Arduino code, the Arduino UNO receives any of this data from the Bluetooth Module (as per the key pressed) and performs a simple switch case operation, where each case associated with appropriate instructions to the Motor Driver Input Pins.

For example, if 'Forward' key is pressed in the Android Phone, then '1' is transmitted. Arduino will then make IN1 and IN3 as HIGH and IN2 and IN4 as LOW to achieve a forward motion. Similarly, other keys correspond to appropriate setting of IN1 – IN4 pins.

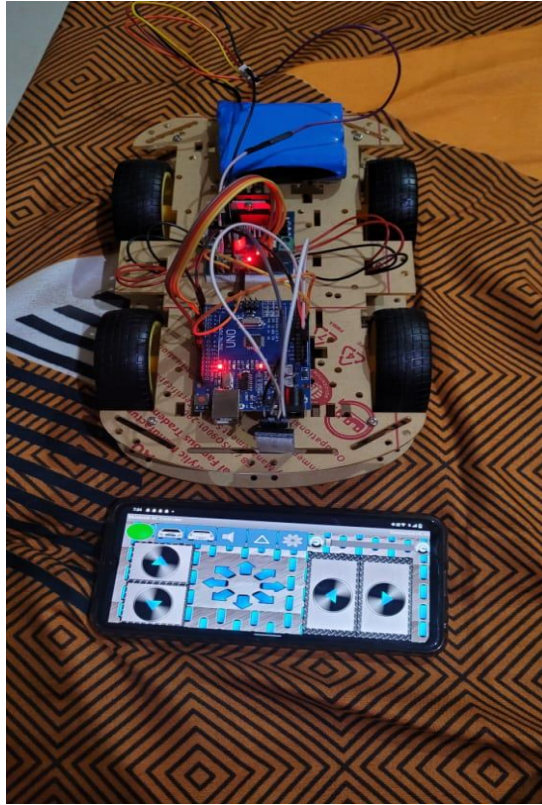


PHOTO OF RC BLUETOOTH CAR:

V. CONCLUSION AND FUTURE WORK: Robots and smart phone are a perfect match for us to realize smart living not only at work, but in our homes, with the aid of easily available and widely used technology, the Bluetooth. IJAR SCT ISSN (Online) 2581-9429 International Journal of Advanced Research in Science, Communication and Technology (IJAR SCT) Volume 9, Issue 1, September 2021 Copyright to IJAR SCT DOI: 10.48175/IJAR SCT-1963 420 www.ijarsct.co.in Impact Factor: 5.731

As the mobile devices are becoming more advanced, using them for controlling Robots and other wireless devices is likely to be a huge trend. It can be concluded that this idea of smart living will let us control our surroundings remotely and wirelessly. With the ever increasing problems, our knowledge

has to expand to adapt better to the changes all around us. In the same way it is hoped that this activity is a small step that would lead us to further enhancements and goals.

REFERENCES:

YouTube:

<https://www.youtube.com/watch?v=V0CKi89dTcM&t=329s>