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Voice Control Car

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Project Name: Voice Control Car

Theory:

We connect the Bluetooth module with the mobile app. Once done, the commands which we give through the mobile get sent to the Arduino via the module. We accept character by character from the serial buffer sent by the app and combine them to form a string.

We then compare it to the command. If it matches, the command is carried out. For example, when the string we receive is "Right", the bot turns right.

Required Equipments :

- Arduino Uno
- Motors x4
- Wheels x4
- Motor Driver 298N
- Chassis (of appropriate size)
- 12V Lipo battery(power source)
- Jumper wires
- Bluetooth Module HC-05
- Some screws and nuts
- Castor wheel

Introduction with components :

✓ Arduino Uno :

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits.



Figure : Arduino Uno

✓ DC power supply /Battery

A DC power supply is one that supplies a constant DC voltage to its load. Depending on its design, a DC power supply may be powered from a DC source or from an AC source such as the power mains.



Figure : Battery

✓ DC Motor (High torque)

DC motor is one type of motor that uses the DC current to convert electrical energy into mechanical energy. When the electric current passes through a coil in a magnetic field, a magnetic force will be generated, which produces a torque in the DC motor.



Figure : DC Motor

✓ Motor Driver

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.

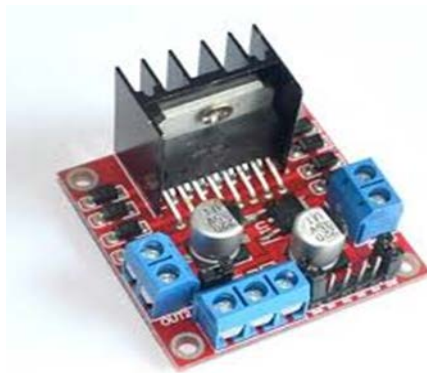


Figure : Motor Driver

HC-05:

The Bluetooth module HC-05 is a MASTER/SLAVE module. By default the factory setting is SLAVE. The Role of the module (Master or Slave) can be configured only by AT COMMANDS. The slave modules cannot initiate a connection to another Bluetooth device, but can accept connections. Master module can initiate a connection to other devices.

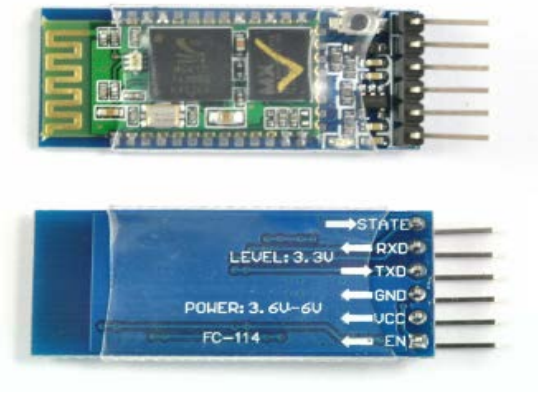


Figure:HC-05

Working principle :

Now the voice feature actually works with the bluetooth. Now after you speak on the app after a couple of seconds it returns what you just said on your mobile screen. It actually uses the Google Voice. So now what you said is transmitted over the bluetooth. Upload the test code given on the Nano.remove RX TX lines while uploading. After uploading reinsert again. The HC05 accepts that data using the Serial.read() function and you can see what you just said on the serial monitor using Serial.print. Speak anything on the app and see the serial monitor. I have attached all the step by step screenshots about connecting HC05 with app...speaking and seeing on the serial monitor. See them. If you say go it will show as *go#. So using this app we can manipulate our code which is attached in the upcoming steps.

Procedure:

Step 1: Parts List

1. Arduino UNO
2. HC05 bluetooth module
3. Wires
4. Chassis
5. 150/300 rpm motor with 4 wheels
6. Some screws and nuts
7. Castor wheel
8. motor driver(:L298N)
9. 12V power source

Step 2: Building the Circuit on Setup Chassis:

Now Arduino nano is the brains of the project. Using Bluetooth connectivity feature for controlling the car with smartphone.

Now the yellow wires represent the 4 output that would control the motor driver. Those 4 logic levels actually are the inputs of the motor driver and the motor driver uses that logic levels to move as per the logic levels are fed. And the arduino controls that means that it enables the driver to move both motors forward or backward or reverse or move right or left or just stop. This is accomplished in the code.

Then connect the motor driver inputs. Then connect the motors at the output with a couple of screws and fix the wheels. Connecting L293D driver as per it's connection.

Fix the motors with screws and fix the motor driver with double sided tapes or simple tape. Also fix the castor wheel.

Step 3: About the Testing Code and the App Working Principle:

Now the voice feature actually works with the bluetooth. There is an app on called "BT Voice Control for Arduino". Download and install it on android phone and pair with HC05. If it is connected for 1st time ,pair it beforehand with 1234 or 0000 as pass. If it does not pair, try again.

Now after speak on the app after a couple of seconds it returns what just said on mobile screen. It actually uses the Google Voice. So now what is said is transmitted over the bluetooth. Upload the test code given on the Nano.remove RX TX lines while uploading. After uploading reinsert again. The HC05 accepts that data using the Serial.read() function and we able to see what just said on the serial monitor using Serial.print.Speak anything on the app and see the serial monitor.If say stop it will show as *stop#. So using this app we can manipulate our code which is attached in the upcoming steps.

After uploading code make sure we disconnected the RX TX lines. It won't be uploaded otherwise. After uploading connect them again. Now connect a 12V power source .You can change the strings which wrote as go,stop,left,right by any word felt easy.Have to just speak up that word on the app.

Previously described how to use that app. Now speak up go, left, right, stop. They are used these words in my code. It is possible to change that string in the else if statements and upload again. Just speak up that word on that app and it would work fine.

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Source Code:

```
#include <SoftwareSerial.h>

int right=5,left=10;

SoftwareSerial BT(0, 1); //TX, RX respectively

String readvoice;


void setup() {
  BT.begin(9600);
  Serial.begin(9600);
  for(int i=5; i<11; i++)
  {
    pinMode(i,OUTPUT);
  }

}

//-----//

void loop() {
  while (BT.available()){ //Check if there is an available byte to read
    delay(10); //Delay added to make thing stable
    char c = BT.read(); //Conduct a serial read
    readvoice += c; //build the string- "forward", "reverse", "left" and "right"
  }
  if (readvoice.length() > 0) {
    Serial.println(readvoice);
  }
}
```

```
if(readvoice == "go")  
{  
  digitalWrite(6, HIGH);  
  digitalWrite(7, LOW);  
  analogWrite(right,110);  
  digitalWrite(8,HIGH);  
  digitalWrite(9,LOW);  
  analogWrite(left,110);  
  delay(100);  
}  
  
else if(readvoice == "back")  
{  
  digitalWrite(6, LOW);  
  digitalWrite(7, HIGH);  
  analogWrite(right,100);  
  digitalWrite(8,LOW);  
  digitalWrite(9,HIGH);  
  analogWrite(left,100);  
  delay(100);  
}  
  
else if (readvoice == "left")  
{  
  digitalWrite(6, HIGH);
```

```
digitalWrite(7, LOW);  
analogWrite(right,80);  
digitalWrite(8,HIGH);  
digitalWrite(9,LOW);  
analogWrite(left,40);  
delay (800);  
    digitalWrite(6, HIGH);  
digitalWrite(7, LOW);  
analogWrite(right,80);  
digitalWrite(8,HIGH);  
digitalWrite(9,LOW);  
analogWrite(left,40);  
    delay(100);  
  
}
```

```
else if ( readvoice == "right")  
{  
    digitalWrite(6, HIGH);  
digitalWrite(7, LOW);  
analogWrite(right,40);  
digitalWrite(8,HIGH);  
digitalWrite(9,LOW);  
analogWrite(left,80);  
    delay (800);
```

```
digitalWrite(6, HIGH);  
digitalWrite(7, LOW);  
analogWrite(right,40);  
digitalWrite(8,HIGH);  
digitalWrite(9,LOW);  
analogWrite(left,80);  
delay(100);  
}
```

```
else if (readvoice == "stop")  
{  
digitalWrite(6, HIGH);  
digitalWrite(7, LOW);  
analogWrite(right,0);  
digitalWrite(8,HIGH);  
digitalWrite(9,LOW);  
analogWrite(left,0);  
delay (100);  
}
```

```
readvoice="";}} //Reset the variable
```

Advantages of the system:

The practicalities are below :

- ♣ Less time required to sort the product.
- ♣ Less manpower required.
- ♣ As the whole system is performed by machine there is less possibility of mistake.
- ♣ It can reduce cost of inspection.
- ♣ The installation cost and running cost of this system is very low. So, it is very economic.

Cost Analysis and Estimation :

The basic components and corresponding approximate prices are listed below:

LIST OF PRICES OF DIFFERENT COMPONENTS

<i>No</i>	<i>Components</i>	<i>Price(TK)</i>
01	4 wheel car set	700
02	Caster wheel	70
03	HC-05	230
04	293D IC	180
05	12 V Battery	30
06	Rechargable Battery	1000
07	Arduino Uno	250
08	Jumper Wire	20
09	Some screws and nuts	20
Total		2500

Discussion:

We have done all the steps. We have uploaded the program on the arduino and the uploading is done and the app we have downloaded it and connected to it also... But even after giving the command the car is not working. So we check the connection again. But all connection setup were fine. Now we noticed that the bluetooth module was not working. So we changed it and we also change some jumping wire. Then the car works according to command.

Address:

<https://github.com/tahmid062/Voice-Control-Car.git>