



# Volleyball

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**SRB DEMO FILES**

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## Introduction

The Volleyball bot made here is mounted on a four-wheel drive car powered by minimal number of electrical components, featuring instantaneous response to driver's input. The bot is compact and light, enabling it to traverse through any terrain. The driver can modify various features according to his will, the main objective here is reach at the desired location and then serve/hit the ball.

## Requirements

A list of requirements and goals was developed to help guide you in the development of this project. The requirements are as follows.

- The four-wheel drive car and the arms that are used to push the volleyball towards the opponent's court shall be controlled by a Bluetooth controller.
- The arms that are used for getting into different positions should be moving in a specific path and manner that can be controlled by the user.

### Materials:

Arduino Uno R3
HC-05 Bluetooth Module
12V Lithium-ion Battery
L298N Motor Driver Module
DC Motors (300 RPM)
Car Chassis
Servo Motors

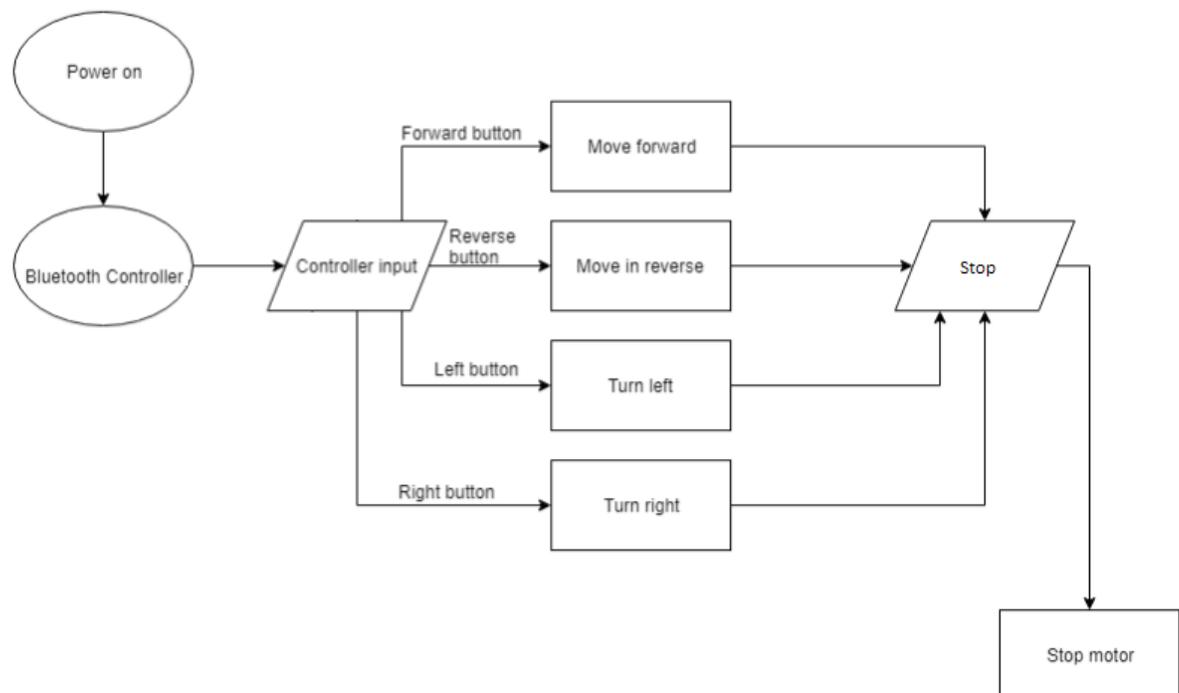
In addition to the hardware used on the arms and the car itself, there was some other hardware necessary to build and the arms of the bot and to run the car. These additional tools included a soldering iron and some solder to assemble the arms of the bot and to assemble RC car and solder wires to the pins connected to the motor batteries. In addition an Android phone is required along with the app "**Arduino Bluetooth Control**" which can be found in the Google Play Store.

The app has prebuilt symbols, the user just needs to assign various characters (A-Z or a-z) to these symbols and press enter after assigning characters to each symbol.

Once all the required characters are assigned the user should select “switch to controller mode” for connecting the Bluetooth with the Arduino microcontroller.

If asked for a password, the password may be 0000 or 1234 and the name of the Bluetooth module will be HC-05.

## Working

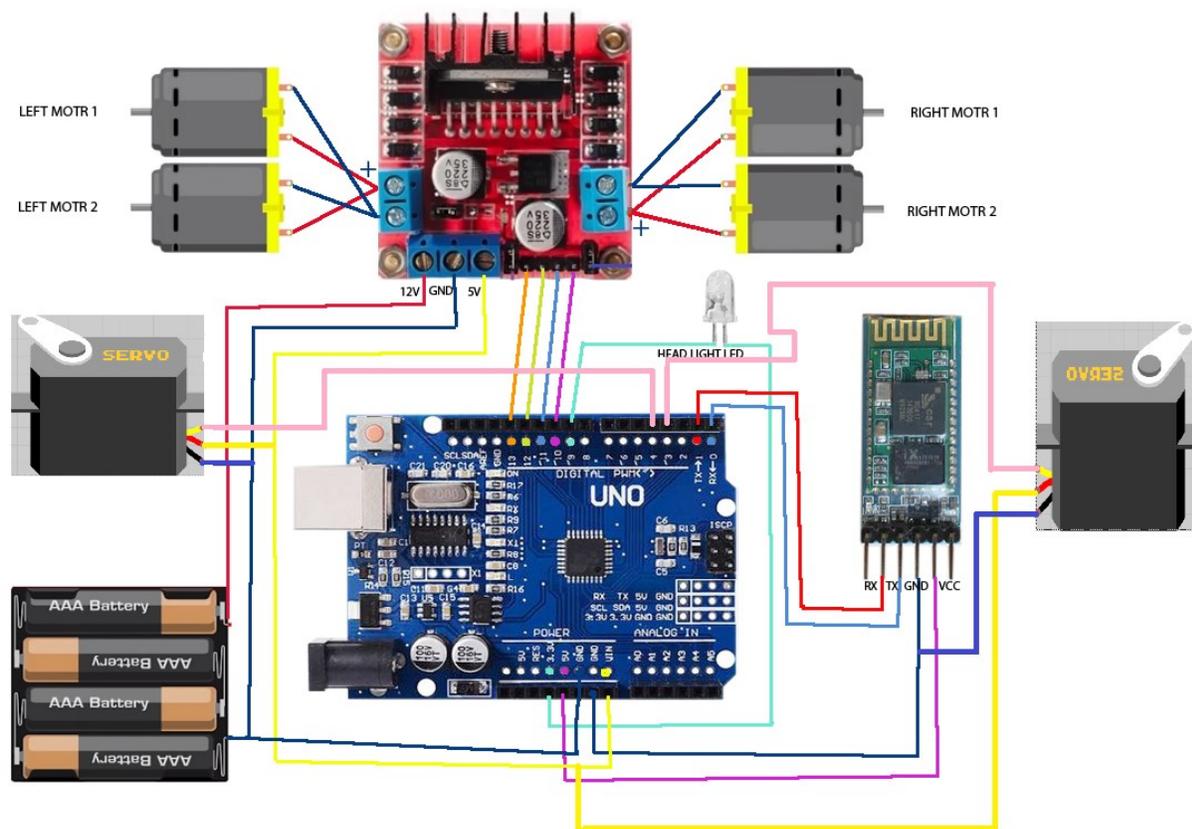


The working of this volleyball bot is based on Arduino UNO microcontroller. The block diagram above explains the movement that the car will take in order to reach a specific location on the court and there are buttons on the app for moving the arms in the predefined manner. The controller is used for communication between various electrical components. Motor driver is connected to the controller and is used to provide sufficient power to the motors connected to it and acts as a medium for communication between Arduino and the motors. The Bluetooth module helps in communicating the desired motion via a mobile application. The predefined code helps to achieve forward, backward, right turn and left turn motion as well as it gives us the control of the left and right arms of the bot.

### **NOTE:**

When uploading the program to the Arduino the connection to the GPIO pin D0 and D1 had to be temporarily removed until uploading. This became somewhat of a hassle after many times having to upload new code. This must be done since the D0 and D1 pin is used for serial communication between the Arduino and computer.

## Circuits and Connections



The circuit connections are quite simple, there is one servo motor connected to a pin of the Arduino module that will be used as control inputs for performing arm movements.

The Vcc and Ground pins of the servo motors should be connected to the Vcc and ground pins of the Arduino.

The four motors that are used to move the bot are connected to the L298N motor driver module as shown in the figure.

The servo motor is connected to pin 4 and 3 of the Arduino and moves in the clockwise direction when the user presses the button on the Bluetooth app and thus the arrow is released due to this motion of the servo motor.

## RoboVR Design:



## Code

```
#include<Servo.h>
Servo myservo;
Servo myservo1;
char ch='S'; //initially STOP condition
const int IN1=9;// Define RIGHT MOTOR
const int IN2=10;
const int IN3=11;// Define LEFT MOTOR
const int IN4=12;
const int IN5=3; //servo motor LEFT
const int IN6=4; //servo motor RIGHT

int pos=0;
int pos1=90;

void setup()
{
```

```
pinMode(IN1,OUTPUT);
pinMode(IN2,OUTPUT);
pinMode(IN3,OUTPUT);
pinMode(IN4,OUTPUT);
pinMode(IN5,OUTPUT);
pinMode(IN6,OUTPUT);
myservo.attach(4); // attaches the servo on pin 4 to the servo object
myservo1.attach(3); // attaches the servo on pin 4 to the servo object

Serial.begin(9600);
}

void loop()
{
if(Serial.available()) // check if data is available or not
{
ch=Serial.read(); // read the incoming byte
}
Serial.println(ch);
// say what you got
if (ch=='R')
{
RIGHT();
}
if (ch=='L')
{
LEFT();
}
if (ch=='F')
{
FORWARD();
}
if (ch=='B')
{
BACKWARD();
}
if (ch=='S')
{
STOP();
}
if(ch=='X')
{
```

```
myservo.write(pos); // tell servo to go to position in variable 'pos'
delay(1);
}

if(ch=='U')
{
myservo.write(pos1); // tell servo to go to position in variable 'pos1'
delay(1);

}
if(ch=='W')
{
myservo1.write(pos); // tell servo to go to position in variable 'pos'
delay(1);
}
if(ch=='V')
{
myservo1.write(pos1); // tell servo to go to position in variable 'pos1'
delay(1);
}

}

void FORWARD(){
Serial.println("forward");
//When we want to move the Motor in forward direction,
digitalWrite(IN1,HIGH);
digitalWrite(IN2,LOW);
digitalWrite(IN3,LOW);
digitalWrite(IN4,HIGH);
}
//-----
void BACKWARD(){
Serial.println("backward");
//When we want to move the Motor in backward direction,
digitalWrite(IN1,LOW);
digitalWrite(IN2,HIGH);
digitalWrite(IN3,HIGH);
digitalWrite(IN4,LOW);
}
//-----
void LEFT(){
Serial.println("LEFT");
```

```
//When we want to move the Motor in left direction,
digitalWrite(IN1,LOW);//MOVING RIGHT MOTOR IN CLOCKWISE DIRECTION
digitalWrite(IN2,HIGH);
digitalWrite(IN3,LOW);//MOVING LEFT MOTOR IN ANTICLOCKWISE DIRECTION
digitalWrite(IN4,HIGH);
}
//-----
void RIGHT(){
Serial.println("RIGHT");
//When we want to move the Motor in right direction,

digitalWrite(IN1,HIGH);//MOVING RIGHT MOTOR IN ANTICLOCKWISE DIRECTION
digitalWrite(IN2,LOW);
digitalWrite(IN3,HIGH);//MOVING LEFT MOTOR IN CLOCKWISE DIRECTION
digitalWrite(IN4,LOW);
}
//-----
void STOP(){
Serial.println("stop");
//When we want to Stop the Motor ,
digitalWrite(IN1,LOW);
digitalWrite(IN2,LOW);
digitalWrite(IN3,LOW);
digitalWrite(IN4,LOW);
digitalWrite(IN5,LOW);
digitalWrite(IN6,LOW);
delay(100);
}
```