Mobile phone Controlled Car Using G-Sensor

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Abstract

In this we are going to Control the Robot Car through the G sensor of our mobile phone and you will be able to move the Robot just by tilting the Phone. We will also use Arduino and RemoteXY app for this G-Sensor Controlled Robot.

RemoteXY app is used to create the interface in the

Smart Phone for controlling the Robot. We will add the joystick in the interface so that Robot can also be controlled by Joystick as well as by tilting the phone.

Introduction

G-Sensor or Gravity sensor is basically Accelerometer in Smart phone which is used to control the screen orientation of phone. Accelerometer senses the X, Y, Z directions of the Gravitational force and rotate the Screen according to alignment of the Phone.

Now days, more sensitive and accurate Gyroscope sensor is used in mobiles for deciding the orientation of the Screen. In our Project, Robot car will move, according to the direction in which phone is being tilted, like when we tilt the phone forward, then car will move forward and we tilt it down then car will move backward. This is same like when we play some car games in Mobile, they also use G sensor to move the car accordingly.

Required Components

1) *Two-wheel robot car chassis.*
2) *Arduino UNO.*
3) *L298N Motor Controller.*
4) *HC-06 Bluetooth module .*
5) *Power supply or Cells.*
6) *Connecting wires.*
7) *Wireless Camera.*

1) Two Wheel Robot Car Chassis

This DIY 2 Wheel Drive Robot Chassis is the perfect mechanical platform for your robotics projects. This kit includes all the hardware and mechanical components required to build your robot, including motors, wheels, chassis, nut and bolts, etc.

Just add your electronics - Arduino/Raspberry Pi and Motor Driver and you can start programming your robot. It offers a large space with predrilled holes for mounting sensors and electronics as per your requirement.

This robot chassis lets you get your mechanical platform ready in minutes and QuickStart your robot building process. Allows you to spend your time and effort on programming your robot rather than designing and fabricating your own custom platform.

1) Arduino UNO:

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.

The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits.
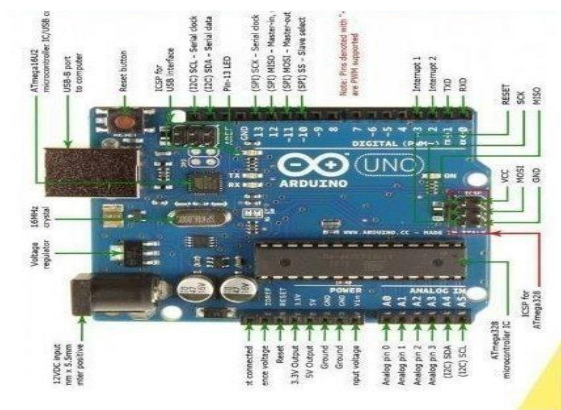
2) L298N Motor Module

This L298N Based Motor Driver Module is a high power motor driver perfect for driving DC Motors and Stepper Motors. It uses the popular L298 motor driver IC and has the onboard 5V regulator which it can supply to an external circuit. It can control up to 4 DC motors, or 2 DC motors with directional and speed control.

This motor driver is perfect for robotics and mechatronics projects and perfect for controlling motors from microcontrollers, switches, relays, etc.
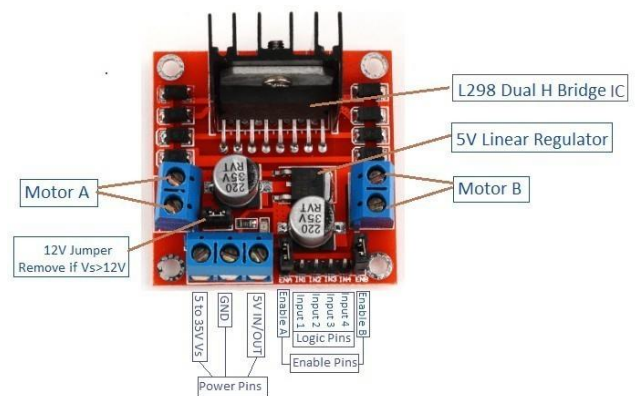
3) HComponents-06 Bluetooth Module
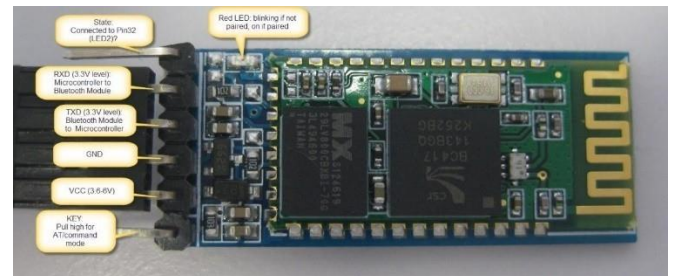
HM-06 is a Bluetooth module designed for establishing short range wireless data communication between two microcontrollers or systems. The module works on Bluetooth 2.0 communication protocol and it can only act as a slave

device. This is cheapest method for wireless data transmission and more flexible compared to other methods and it even can transmit files at speed up to 2.1Mb/s.

4) Power supply or cells and Connecting Wires
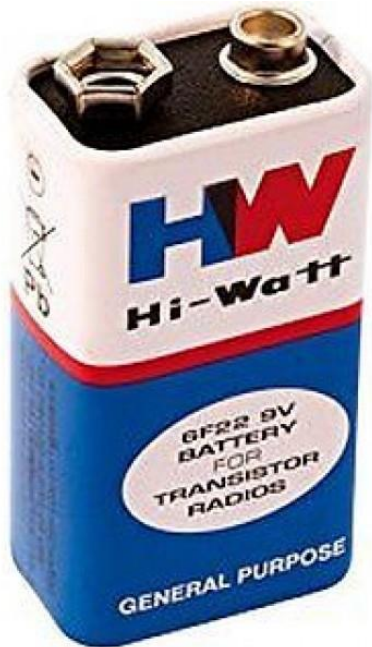
A battery is a device consisting of one or more electrochemical cells with external connections for powering electrical devices such as flashlights, mobile phones, and electric cars.

When a battery is supplying electric power its positive terminal is the cathode and its negative terminal is the anode

. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal.
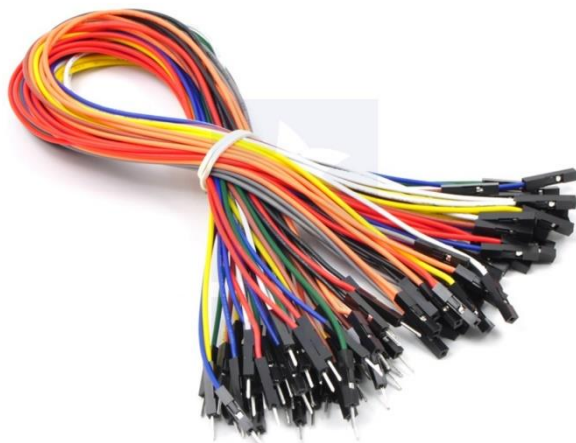
www.pololu.com

Jumper wires typically come in three versions: male-to-male, male-to female and female- to- female. The difference between each is in the end point of the wire.

Male ends have a pin protruding and can plug into things, while female ends do not and are used to plug things into For Transmission & Receiving of Data.

5) Wireless Camera

Wireless Camera is used in Video Surveillance which will be used for capturing or monitoring situations and time-time& place to Place.
In this project we are using Wireless camera attached to the front of the robot used for capturing photos, videos , monitoring and recording. It has Audio facility also . it can view in 115 degrees for complete monitoring the video surveillance of what's going on in the surroundings.


Creating Interface for Robot Using RemoteXY app

For creating the interface to control the Robot Car using RemoteXY app, you will have to go to following link

http://remotexy.com/en/editor/ The webpage will look like this
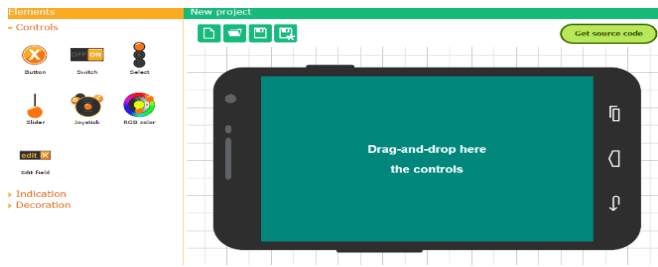
Then from the left side of screen, pick up the switch button and the joystick and place it in the mobile interface. The button will turn on
the light at pin 13 which is connected internally in the Arduino and the joystick will move the robot car. The webpage after placing the switch and the joystick will look like this.
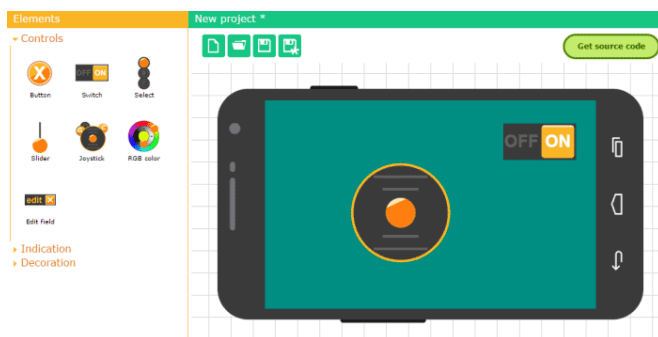
Then we will have to **place the enable the G sensor enable/disable button** along with the joystick, so that we can move the Robot Car by tilting the phone in left, right, up and down direction.
Using that button we can enable and disable G sensor, when G sensor is disabled Car can be controlled by moving the Joystick. So to place the G sensor enable/disable button, click on the joystick you placed in the interface and on the left side there will be a properties section, there will be a option in the end for placing the G sensor button near the joystick, so place the G sensor button where ever you will like.

The webpage after this will look like this.
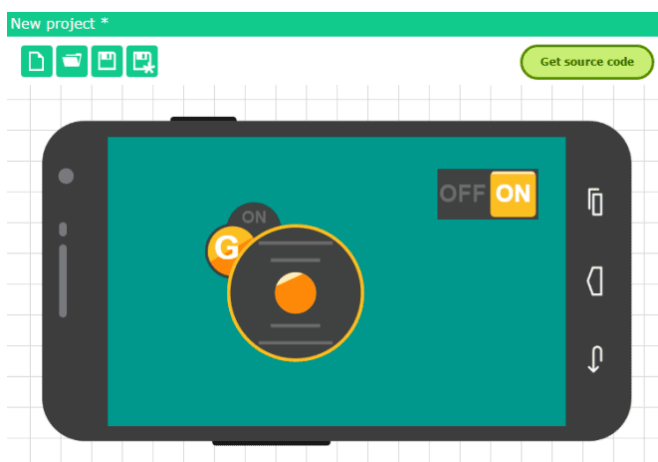
After that, click on the button **"Get source code" and save it onto your computer**. Download the library from here and save it into the Arduino library folder. Compile the downloaded code to check that there are no errors. This is not the code that will run the Robot but it will help in using the App with the Arduino.
 Download the app from here or go to the Play Store and download RemoteXY app from there for you Android Smart Phone.

### Circuit Diagram And Explanation

First of all, we will interface the L298N motor controller with the Arduino. Connect the ENA and ENB pin of the motor controller to the Arduino pin 12 and 11 respectively. These two pins are for the PWM control of the motor. Using theses pins, we can increase or decrease the speed of car. Then connect the IN1, IN2, IN3 and IN4 to the Arduino pins 10, 9, 8 and 7 respectively. These pins will rotate the motors in both directions (clockwise and anti-clockwise).
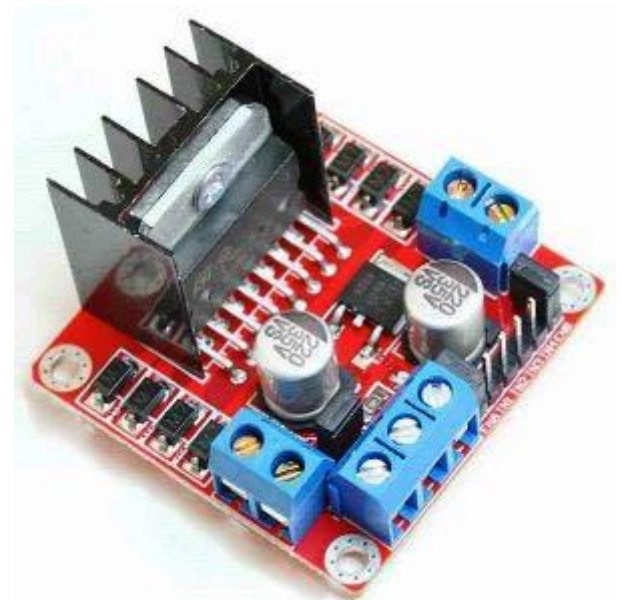
To power the motor, connect the positive and negative of the battery to the 12V and the ground of the motor controller. Then connect the 5V and the ground from the motor controller to the Arduino Vin and the ground.

Then we will connect the Bluetooth module HC-06 with the Arduino. If you have HC-05, then it will work too. Connect the VCC and the ground of the Bluetooth module to the 5V and the ground of the Arduino. Then connect the TX pin of Bluetooth Module to the pin 2 of Arduino and the RX pin to the pin 3 of Arduino. Also

check Bluetooth Controlled Toy Car using Arduino to learn more about using Bluetooth with Arduino.
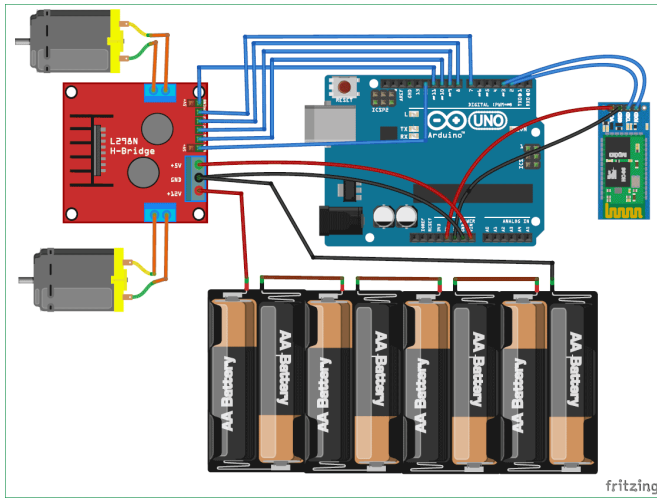
Code Explanation

```
#define REMOTEXY_MODE
 SOFTWARESERIAL
#include <SoftwareSerial.h>
#include <RemoteXY.h>
#define REMOTEXY_SERIAL_RX  2
#define REMOTEXY_SERIAL_TX  3
#define REMOTEXY_SERIAL_SPEED  9600
```

The following code will increase or decrease the motor speed. When the joystick will be at the center, the speed will be zero and when it will be in the forward direction then the speed will increase from zero to 100.

The speed will be decrease from 0 to -100 when the car will move in the reverse direction.

The car can also be moved specific speed, this can be done by giving the PWM signal.

The pwm signal will be given to the motors according to the rotation of the joystick.

```
if (motor_speed>100)
  motor_speed=100;

if (motor_speed<-100)
  motor_speed=-100;   if

 (motor_speed>0) {

 digitalWrite(pointer[0], HIGH);

 digitalWrite(pointer[1], LOW);

 analogWrite(pointer[2],
  motor_speed*2.55);    }

 else if (motor_speed<0) {

 digitalWrite(pointer[0], LOW);

 digitalWrite(pointer[1], HIGH);

  analogWrite(pointer[2], (-
motor_speed)*2.55);    }

  else {


digitalWrite(pointer[0], LOW);

digitalWrite(pointer[1], LOW);
analogWrite(pointer[2], 0);

}
```

In the following code, we have defined the function which will be called whenever we will move the joystick in the app.

When we will turn on the switch in the app then the logic 1 will be given to the pin 13 of the Arduino which turns On the LED pin.

While moving the robot car in the forward and backward direction, the Speed function will be called.

```
void loop()

{

RemoteXY_Handler ();

digitalWrite (ledpin,
(RemoteXY.switch_1==0)?LOW:HIGH);

Speed (first_motor, RemoteXY.joystick_1_y
 - RemoteXY.joystick_1_x);
```
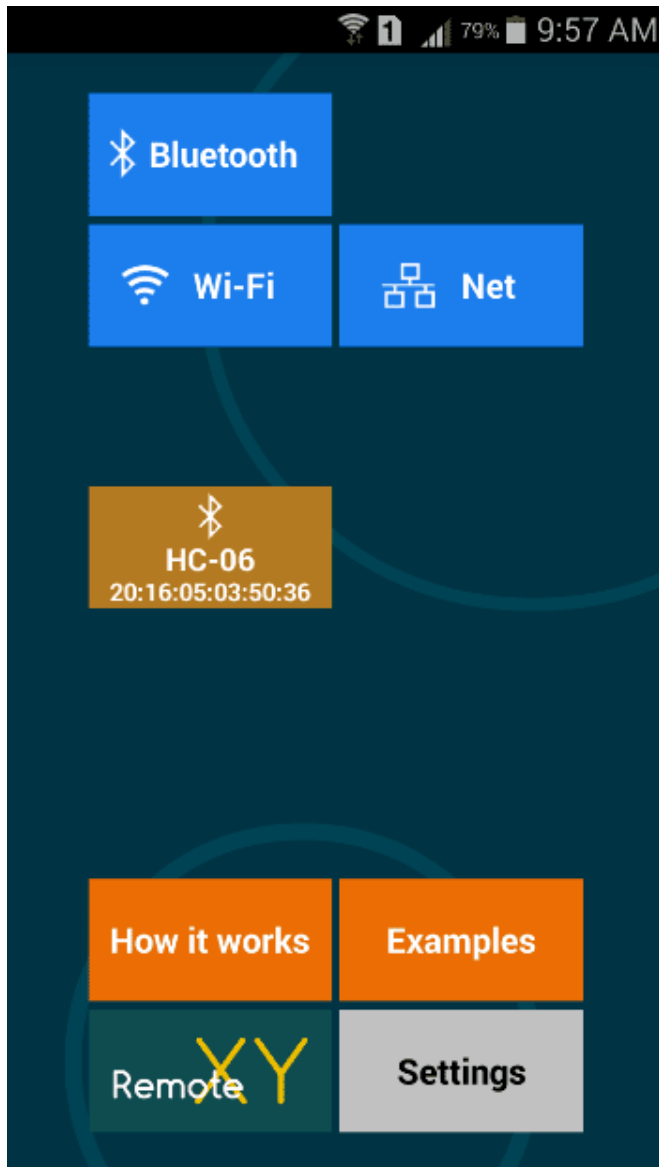
Speed (second_motor,
RemoteXY.joystick_1_y +
RemoteXY.joystick_1_x);

}

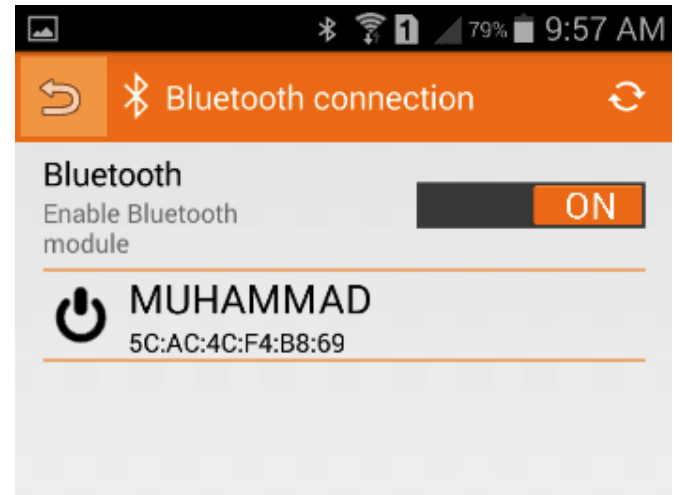### *How To Run It*

Then go to Bluetooth and turn on the Bluetooth there. After turning it on, it will show you the Bluetooth devices.

 Select your HC-06 Bluetooth module from there, it will take you to the interface, from where you can control the Robot Car.

This is how we can use the Gravity Sensor inside our Mobile phone to move the Robot. You can further experiment and find more interesting use of G sensor to control the outside things by interfacing a Microcontorller in between (like Arduino).