

# Smartphone Bluetooth Controlled Robot

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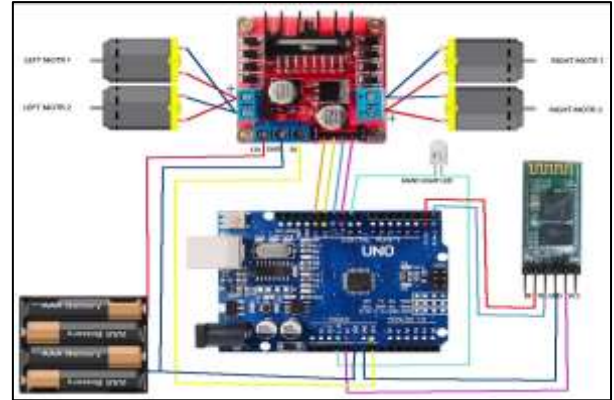
**Abstract**— In this project, I will show you how to design and develop a Bluetooth Controlled Robot using Arduino, HC-05 Bluetooth Module and L298N Motor Driver Module. On the other end of the Bluetooth Communication, I will be using a Smart Phone and a simple Android App to control the Robotic Car. Robot is a reprogrammable, multifunctional device which is primarily designed to do work like human such as pick and place, loading and unloading, surveillance, health care, industrial, aerospace application. It can perform dangerous and accurate work to increase the productivity without rest. An android application has developed using a Bluetooth communication is made with robot which interfaces with microcontroller to control its speed and direction. Aim of this work is to design and control the motion of robot using Bluetooth device of an Android phone.

**Keywords:** Bluetooth device, Arduino, Smart Phone, programmable, communication; microcontroller; Android phone

## I. INTRODUCTION

Bluetooth controlled car is controlled by using Android mobile phone instead of any other method like buttons, gesture etc. Here only needs to touch button in android phone to control the car in forward, backward, left and right directions. So here android phone is used as transmitting device and Bluetooth module placed in car is used as receiver. Android phone will transmit command using its in-built Bluetooth to car so that it can move in the required direction like moving forward, reverse, turning left, turning right and stop. The mind of this device is arduino Uno and for sensing purpose we use HC-05 Bluetooth module. For power supply we use 7.4v 1200mAh Li-ion battery which is rechargeable. Here, we use L298 motor driver. 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.

### A. Implemented Diagram of Smartphone Bluetooth Controlled Robot.



### B. Equipment needed:

- 1) Arduino Uno
- 2) Dc geared motor
- 3) Motor driver(L2983d)
- 4) HC-SR05 Bluetooth module
- 5) 5.12V Battery
- 6) Wheel
- 7) Jumper wire

1) *Arduino Uno*  
 Arduino Uno is a microcontroller board based on 8-bit ATmega328P microcontroller. Along with ATmega328P, it consists other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, A Power barrel jack, an ICSP header and a reset button.

### 2) Pin Description of Arduino Uno

Pin Category	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	Vin: Input voltage to Arduino when using an external power source. 5V: Regulated power supply used to power microcontroller and other components on the board. 3.3V: 3.3V supply generated by on-board voltage regulator. Maximum current draw is 50mA. GND: ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A5	Used to provide analog input in the range of 0-5V

Input/Output Pins	Digital Pins 0 - 13	Can be used as input or output pins.
Serial	0(Rx), 1(Tx)	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.
SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)	Used for SPI communication.
Inbuilt LED	13	To turn on the inbuilt LED.
TWI	A4 (SDA), A5 (SCA)	Used for TWI communication.
AREF	AREF	To provide reference voltage for input voltage.

### 3) Arduino Uno Technical Specifications

Microcontroller	ATmega328P – 8 bit AVR family microcontroller
Operating Voltage	5V
Recommended Input Voltage	7-12V
Input Voltage Limits	6-20V
Analog Input Pins	6 (A0 – A5)
Digital I/O Pins	14 (Out of which 6 provide PWM output)
DC Current on I/O Pins	40 mA
DC Current on 3.3V Pin	50 mA
Flash Memory	32 KB (0.5 KB is used for Bootloader)
SRAM	2 KB
EEPROM	1 KB
Frequency (Clock Speed)	16 MHz

### 4) Application Downloaded:

– Car Bluetooth RC

### 5) Software needed:

– Arduino IDE

### 6) Necessary tools:

- 1) Hot glue gun.
- 2) Soldering iron

## II. CONSTRUCTION

Now after completing the circuit diagram we have to implement the circuit diagram on the cardboard

So here we use a cardboard and put all the equipment on the cardboard and paste it with the help of hot glue gun and solder all the wire from motor properly implement all the connection according to the circuit diagram shown above.

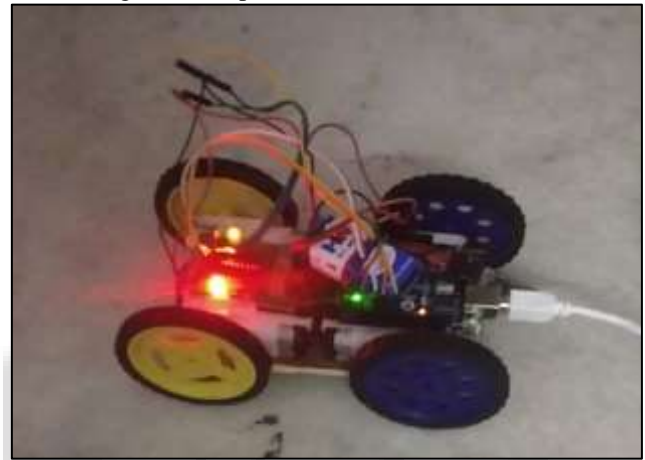
Connect motor wire to the motor driver according to circuit diagram and connect motor driver pin to the arduino according to circuit diagram and connect Bluetooth RX pin to arduino TX pin and Bluetooth TX pin to arduino RX pin and connect vcc to arduino vcc and Bluetooth gnd to also gnd.

And also connect motor driver gnd to arduino gnd and same motor driver gnd to battery negative terminal and positive terminal of the battery to the motor driver 12V pin.

## III. WORKING:

When we open the Car Bluetooth RC app and click the connect button then connect to the HC-05 and enter the password 0000 or 1234 then our Bluetooth car will be connected and after that when we click the upward button then our car will move in forward direction and when we click the downward button then the car will move in backward direction and when we press the left switch then our car will move in left direction and when we press the right switch then our car will move in right direction and our car will turn . The image of this Bluetooth app is shown below

Actual image of smartphone Bluetooth controlled car:



## IV. CONCLUSION

The operating system of smart phone is android which can develop effective remote control program. At the same time, this program uses blue-tooth connection to communicate with robot. It has proven to allow for meaningful two-way communication between the Android phone and the robot which would allow a non-expert to interact with and adjust the functionality of a system which uses ATmega328 controller, a single board micro-controller intended to make the application of interactive objects or environments more accessible. The surveillance is always has been a quite sensitive task. And it includes so many risks. So it's better to use robot for this job instead of people. And if you are able to control the robots with efficiency and accuracy then you can guarantee yourself with good results and success.

## V. APPLICATION

- In Domestic Use: This project can be used at homes— for many purposes like picking up and placing some objects from one to other.
- In Spying Operations: This robot can help in— spying operations. The object recognition and android control makes it Hi-Fi.
- For Handicapped People: This project can help the— handicapped people especially those who had lost their feet unfortunately.

- Robo Races: The tilt control of robots can be used in robo races which will be revolutionary. Military Application and Hostage Rescue

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