PROJECT REPORT

ON

BLUETOOTH CONTROLLED ROBOTIC CAR

Presented by:

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ABSTRACT:

A remote controlled vehicle is any mobile machine controlled by means that is physically not connected with origin external to the machine. There are many types in it, based on the controls – radio control device, Wi-Fi controlled and even Bluetooth controlled. These devices are always controlled by humans and take no action autonomously. The main target in such vehicles would be to safely reach a designated point, wherever the area and reach back to the point of origin.

In this project we make use of the Bluetooth technology to control our machine car. We don't call this as a robot as this device doesn't have any sensors. Thereby, sensor less robots are machines. This machine can be controlled by any human using his/her android mobile phone, by downloading an app and connecting it with the Bluetooth module present inside our car. User can perform actions like moving forward, backward, moving left and right by the means of command using his-her mobile phone app. Arduino play a major role in the control section and had made it easier to convert digital signals and analogue signals into physical movements. The major reason for using a Bluetooth based tech is that we can change the remote anytime – mobiles phones, tablets and laptops and physical barriers like wall or doors do not affect the car controls.

INTRODUCTION:

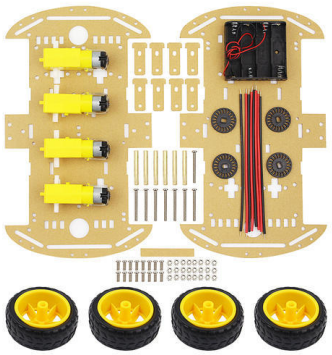
A robot is an electromechanical machine that is controlled by computer program to perform various operations. Industrial robots have designed to reduce human effort and time to improve productivity and to reduce manufacturing cost. Today human-machine interaction is moving away from mouse and pen and becoming much more pervasive and much more compatible with the physical world. Android app can control the robot motion from a long distance using Bluetooth communication to interface controller and Android.

As per the commands received from Android app the robot motion can be controlled. The output motion of a robotic vehicle is accurate and repeatable. Pick and place robots can be reprogrammable and tool can be interchanged to provide for multiple applications. The purpose of this work is to design and implement an android controlled Bluetooth robot which is used for surveillance, home automation, wheel chairs, military and hostages rescue applications.

COMPONENTS:

Name: CHASSIS KIT

Image:



Name: ARDUINO BOARD

Model: UNO with ATMEGA32 micro controller

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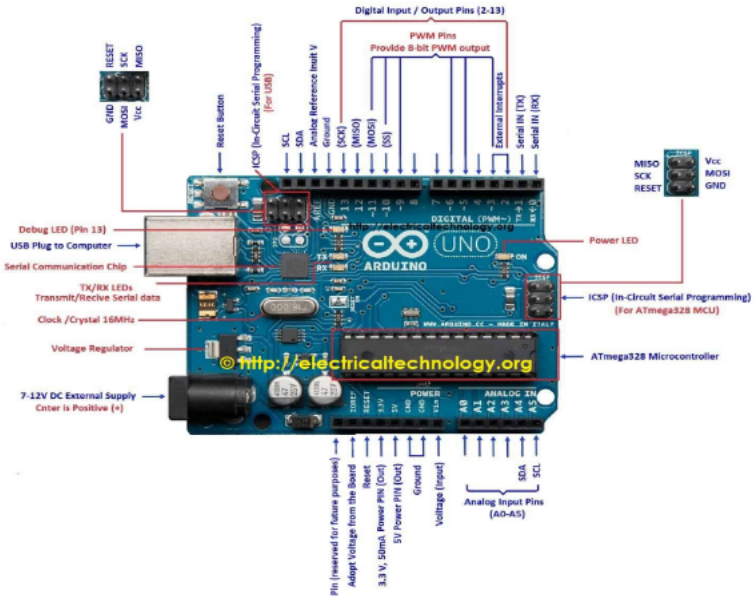


Functionality:

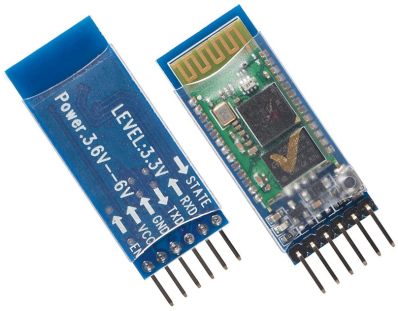
The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo.

The main functionality of arduino uno in this project is it receives input signals /instructions from Bluetooth module and generates small amount of electrical signal and transmits output electrical signal to motordriver.

Name: BLUETOOTH MODULE

Model: HC-05

Image:



Functionality:

Bluetooth wireless technology is a short range communications technology intended to replace the cables connecting portable unit and maintaining high levels of security. Bluetooth technology is based on Ad-hoc technology also known as Ad-hoc Pico nets, which is a local area network with a very limited coverage.

WLAN technology enables device connectivity to infrastructure based services through a wireless carrier provider. The need for personal devices to communicate wirelessly with one another without an established infrastructure has led to the emergence of Personal Area Networks (PANs). Bluetooth specification details the entire protocol stack. Bluetooth employs Radio Frequency (RF) for communication. It makes use of frequency modulation to generate radio waves in the ISM band.

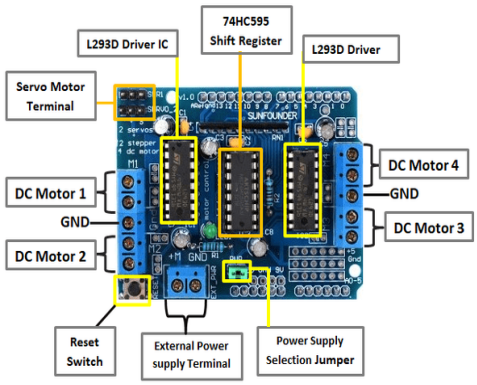
The usage of Bluetooth has widely increased for its special features. Bluetooth offers a uniform structure for a wide range of devices to connect and communicate with each other. Bluetooth technology has achieved global acceptance such that any Bluetooth enabled device, almost everywhere in the world, can be connected with Bluetooth enabled devices. Low power consumption of Bluetooth technology and an offered range of up to ten meters has paved the way for several usage models. Bluetooth offers interactive conference by establishing an adhoc network of laptops. Bluetooth usage model includes cordless computer, intercom, cordless

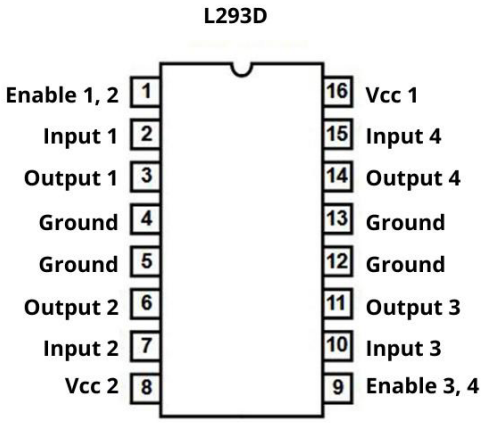
phone and mobile phones.

Name: MOTOR DRIVE SHIELD

Model: L293D Motor Driver

Image:





Functionality:

The Motor Driver is a module for motors that allows you to control the working speed and direction of two motors simultaneously .This Motor Driver is designed and developed based on L293D IC. L293D is a 16 Pin Motor Driver IC. This is designed to provide bidirectional drive currents at voltages from 5 V to 36 V. Rotation of motor depends on Enable Pins. When Enable 1/2 is HIGH , motor connected to left part of IC will rotate.

Motor driver reveives an input electrical signals from arduino and it amplifies the electrical signal which was sufficient for dc motors rotation and output electrical signal transmits to dc motors through l293d ic's.

Name: DC GEAR MOTOR

12V, 200rpm

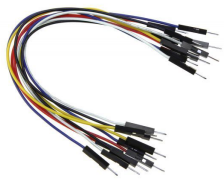
Image:

Functionality:

It is used to rotate car wheels. It takes electrical power through direct current from motor driver and convert this energy into mechanical rotation. This rotation leads to rotate wheels.

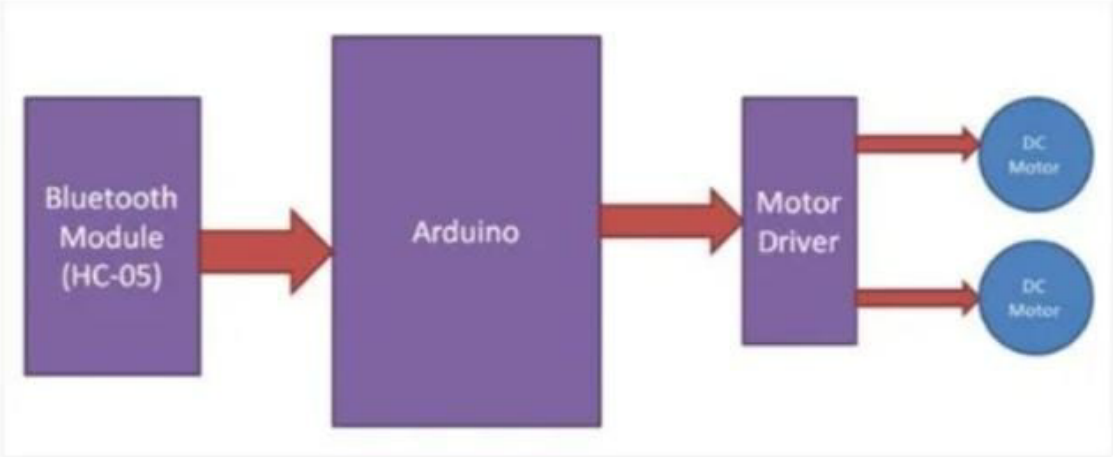
Name: JUMPER WIRES

Image:

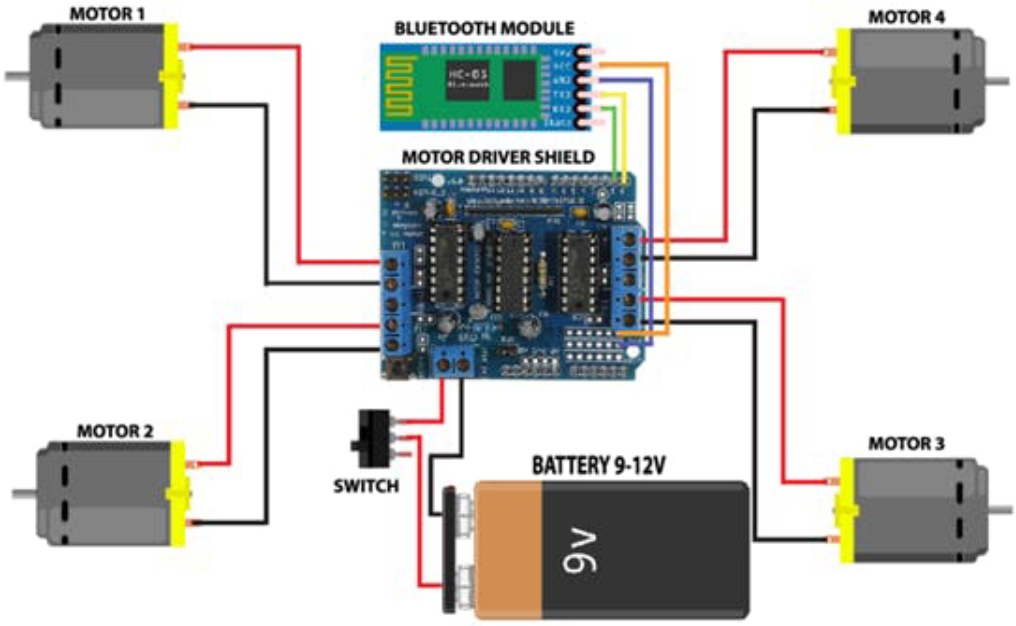


Functionality: It is used for the connection purpose.

BLOCK DIAGRAM:



PIN DIAGRAM AND CONNECTIONS:



WORKING:

Working Take a closer look on the Wiring Diagram. We could notice the power source, a 9 volt battery is connected to the 12V power pin of L293D Motor Drive and ground of Motor Drive and Arduino UNO. This supplies essential power to the circuit. A total of 9 volts is being supplied to this system, where the maximum permissible amount is 12 volts. Digital wires of Arduino are connected with the input1, input2, input3 and input4 of the motor drive. Motors are connected to the either sides of Motor Drive which are the outputs terminals. To complete the power source circuit, 5V of Motor Drive is connected to Vin power pin of Arduino UNO. Followed by this, HC05 Bluetooth Module's Vcc is connected to 5V pin of Arduino UNO, which supplies power to Bluetooth Module. Ground to Ground connections are also made. Transistor Transistor logic pins, Transmitter (TX) and Receiver (RX) of Arduino UNO are connected to RXD and TXD of HC05 respectively. The program is uploaded to Arduino before connecting the Bluetooth module.

After all successful connections, switch on the power source. Lights at Motor Drive, Arduino UNO and HC05 would indicate the correct connection. Upon successful connection of your Bluetooth module with any android device, we could control this device. By passing the command, for example, to move forward we pass 'F'. This command is transmitted by our device to Bluetooth module, which in turn transmits to Arduino UNO. Arduino receives and passes the same to Motor Drive through its digital pins. Motor Drive will get this through their input pins and

exercise them through their output pins and motor is connected.

SOURCE CODE:

```
#include <AFMotor.h>
#include <SoftwareSerial.h>

SoftwareSerial bluetoothSerial(9, 10); // RX, TX

//initial motors pin
AF_DCMotor motor1(1, MOTOR12_1KHZ);
AF_DCMotor motor2(2, MOTOR12_1KHZ);
AF_DCMotor motor3(3, MOTOR34_1KHZ);
AF_DCMotor motor4(4, MOTOR34_1KHZ);

char command;

void setup()
{
  bluetoothSerial.begin(9600);  //Set the baud rate to your Bluetooth module.
}

void loop() {
  if (bluetoothSerial.available() > 0) {
    command = bluetoothSerial.read();

    Stop(); //initialize with motors stoped

    switch (command) {
      case 'F':
        forward();
```

```
    switch (command) {
      case 'F':
        forward();
        break;
      case 'B':
        back();
        break;
      case 'L':
        left();
        break;
      case 'R':
        right();
        break;
    }
  }
}

void forward()
{
  motor1.setSpeed(255); //Define maximum velocity
  motor1.run(FORWARD);  //rotate the motor clockwise
  motor2.setSpeed(255); //Define maximum velocity
  motor2.run(FORWARD);  //rotate the motor clockwise
  motor3.setSpeed(255); //Define maximum velocity
  motor3.run(FORWARD);  //rotate the motor clockwise
  motor4.setSpeed(255); //Define maximum velocity
  motor4.run(FORWARD);  //rotate the motor clockwise
```

```
void back()
{
  motor1.setSpeed(255); //Define maximum velocity
  motor1.run(BACKWARD); //rotate the motor anti-clockwise
  motor2.setSpeed(255); //Define maximum velocity
  motor2.run(BACKWARD); //rotate the motor anti-clockwise
  motor3.setSpeed(255); //Define maximum velocity
  motor3.run(BACKWARD); //rotate the motor anti-clockwise
  motor4.setSpeed(255); //Define maximum velocity
  motor4.run(BACKWARD); //rotate the motor anti-clockwise
}

void left()
{
  motor1.setSpeed(255); //Define maximum velocity
  motor1.run(BACKWARD); //rotate the motor anti-clockwise
  motor2.setSpeed(255); //Define maximum velocity
  motor2.run(BACKWARD); //rotate the motor anti-clockwise
  motor3.setSpeed(255); //Define maximum velocity
  motor3.run(FORWARD);  //rotate the motor clockwise
  motor4.setSpeed(255); //Define maximum velocity
  motor4.run(FORWARD);  //rotate the motor clockwise
}

void right()
{
  motor1.setSpeed(255); //Define maximum velocity
  motor1.run(FORWARD);  //rotate the motor clockwise
```

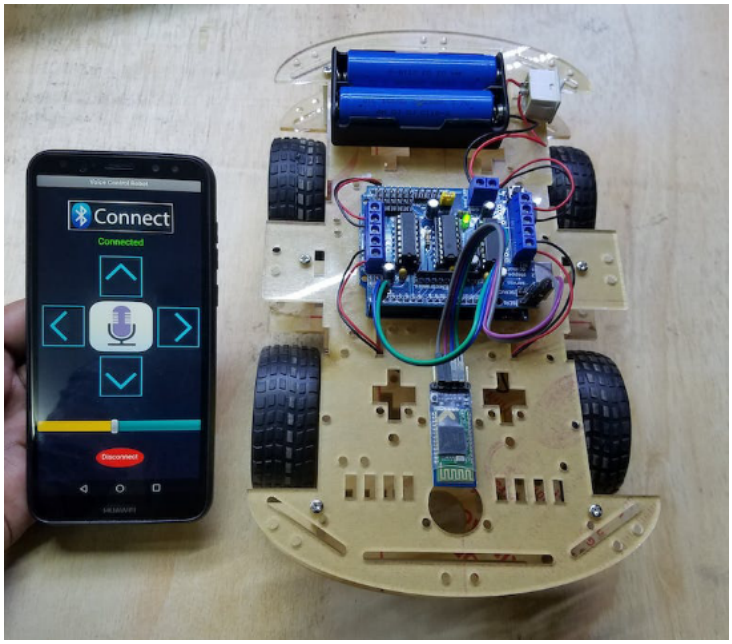
```
  motor2.setSpeed(255); //Define maximum velocity
  motor2.run(FORWARD);  //rotate the motor clockwise
  motor3.setSpeed(255); //Define maximum velocity
  motor3.run(BACKWARD); //rotate the motor anti-clockwise
  motor4.setSpeed(255); //Define maximum velocity
  motor4.run(BACKWARD); //rotate the motor anti-clockwise
}

void Stop()
{
  motor1.setSpeed(0);  //Define minimum velocity
  motor1.run(RELEASE); //stop the motor when release the button
  motor2.setSpeed(0);  //Define minimum velocity
  motor2.run(RELEASE); //rotate the motor clockwise
  motor3.setSpeed(0);  //Define minimum velocity
  motor3.run(RELEASE); //stop the motor when release the button
  motor4.setSpeed(0);  //Define minimum velocity
  motor4.run(RELEASE); //stop the motor when release the button
}
```

DEMO VIDEO:

https://drive.google.com/file/d/10_Rn_wN3cxwoU1AMMVEbCwNiqFHcJRj_/view?usp=drivesdk

FINAL PRODUCT:



APPLICATION:

- The robot is small in size so can be used for spying.
- With few additions and modifications, this robot can be used in the borders for detecting and disposing hidden land mines.
- The robot can be used for reconnaissance or surveillance.
- Low range Mobile Surveillance Devices
- Military Applications (no human intervention)
- Assistive devices (like wheelchairs)
- Home automation.

FUTURE SCOPE:

The final product we obtained is just the skeleton of those Remote Control Cars we see in the market. The mechanical design of this product is also proposed, which could be practically made to give a much better looking commercial product.

For future plans, this product could be added with sensors like, accelerometer and humidity sensor, thereby widening their field of use. The present product however could show some latency. The reason is, due to many connections and least power source of 6V, which result in loss of energy. In future, we could make use of this RC Motor Car as a surveillance system or rovers by adding a few more sensors and updating the code. This would make them into robots. These robots could self monitor under any human supervision, thereby reducing man power. These are just the alternatives, on which this project could be improvised and updated.

CONCLUSION:

To us the need of internet and the things based are very much important nowadays. internet is the very

important part in both computer and our daily lives. The above model describes how the ardunio programs the car motor module and by using Android phone we actually rotate the wheels and give direction to the car. It gives us the opportunity to work with different platforms and it helps us to create various interesting modules to work on. We also tested the applications used to drive the car. Due to the new concept of Wireless Controlled Car using Bluetooth we were able to come up with various possibilities.