DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DELHI TECHNOLOGICAL UNIVERSITY, SHAHBAD DAULATPUR
(FORMERLY DELHI COLLEGE OF ENGINEERING)

ELECTRONICS WORKSHOP – II

SUBJECT CODE – EC106

PROJECT FILE

TITLE : BLUETOOTH CONTROLLED CAR USING ARDUINO

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AIM

To design a car which can be operated using Arduino with the help of Bluetooth.

ABSTRACT

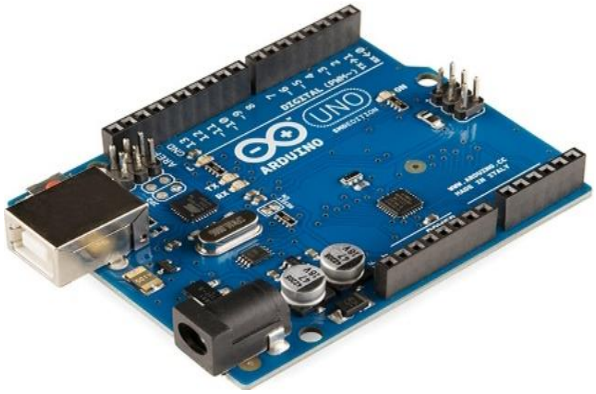
A remote-controlled vehicle is any mobile machine controlled by means that are physically not connected with the origin external to the machine. In this project, we make use of Bluetooth technology to control our machine car. We do not call this a robot as this device does not have any sensors. Thereby, senseless robots are machines. The project aims are to design a Bluetooth control Arduino car and write a program into the Arduino microprocessor. Arduino car contains an Arduino microcontroller with basic mobility features. In this project, we make use of Bluetooth technology to control our machine car. After doing this only we can say that we have been able to create as per our goal described. The device can be controlled by any smart device with android. The major reason for using a Bluetooth-based tech is that we can change the remote anytime – mobile phones, tablets, and laptops and physical barriers like walls or doors do not affect the car controls.

COMPONENTS AND TOOLS REQUIRED

1. Chassis (Including motors and wheels): The main body of the car consists of the chassis. Alongside there will be two motors for the two wheels which will lead down the car. It will form the basis of structural design of the car.

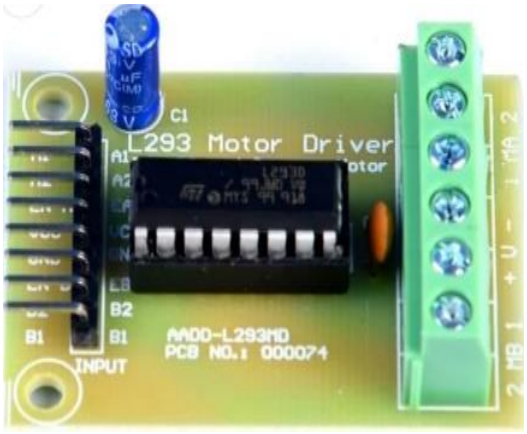
2. Arduino Uno:

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 with various expansion boards and other circuits for prototyping electronic projects.



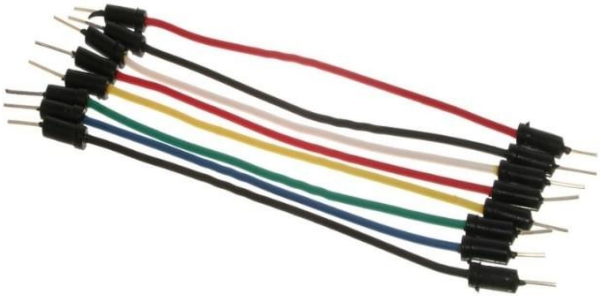
3. L293 Motor Drive H-Shield:

The L293 motor driver shield is a popular choice for driving DC motors or stepper motors with Arduino boards. The Motor Driver is a module for motors that allows you to control the working speed and direction of two motors simultaneously. The L293 motor driver shield typically has six pins for connecting to an Arduino board: two for power (VCC and GND), two for motor control (IN1 and IN2 for one motor, and IN3 and IN4 for another motor), and two for enabling or disabling the motor outputs (EN1 and EN2).



4. Jumper Wires:

A jump wire (also known as jumper, jumper wire, DuPont wire) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

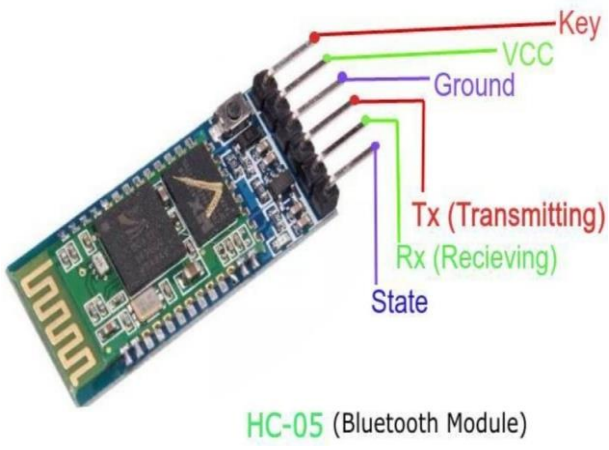


5. Battery:

A battery is an energy source consisting of one or more electrochemical cells and terminals on both ends called an anode (-) and a cathode (+). Here for the project, a 12V battery has been used.

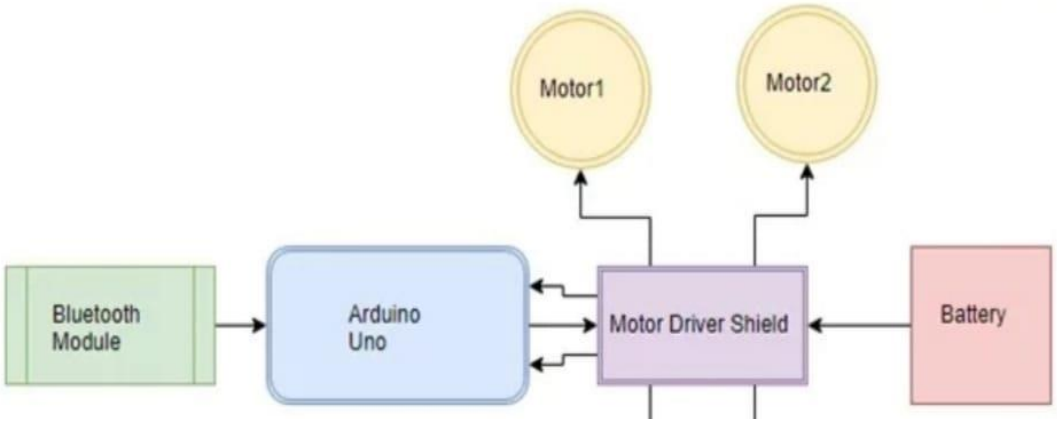
6. Bluetooth Module:

HC-05 6 Pin Wireless Serial Bluetooth Module is a Bluetooth module for use with any microcontroller or for adding Bluetooth functionality to Arduino projects. It uses the UART protocol to make it easy to send and receive data wirelessly.



HC-05 (Bluetooth Module)

THEORY :



BLOCK DIAGRAM OF BLUETOOTH CONTROLLED CAR USING ARDUINO

Upon successful connection of Bluetooth module with any android device we could control our car. The Bluetooth controlled car receives commands from a Bluetooth-enabled device (smartphone, remote control, etc.), and these commands are processed by the Arduino. The Arduino then generates motor control signals, which are sent to the motor driver through its digital pins to drive the DC motors. Motor Driver will get this through their input pins and excersise them through their output pins where motor is connected.

PROCEDURE :

- Connect the DC motors to the motor driver module. The motor driver acts as an interface between the Arduino and the motors, controlling their speed and direction.

- Connect the motor driver to the Arduino. Usually, this involves connecting control pins on the motor driver to digital output pins on the Arduino.

- Connect the Bluetooth module to the Arduino. This typically involves connecting the TX pin of the Bluetooth module to the RX pin of the Arduino, and vice versa. Ensure to power the Bluetooth module appropriately.

- Power the Arduino and motor driver with a suitable power source, usually a battery pack.

- Write a program (sketch) for the Arduino that reads commands from the Bluetooth module and controls the motors accordingly.

- Initialize the serial communication for both the Bluetooth module and the Arduino board.
- Continuously read the incoming data from the Bluetooth module. Interpret these commands to determine the desired action for the motors (e.g., forward, backward, left, right).

- Based on the received commands, send appropriate signals to the motor driver module to control the speed and direction of the motors.
- Pair your smartphone or another Bluetooth-enabled device with the Bluetooth module on the Arduino.

- Use a Bluetooth terminal app on your smartphone to send commands (such as 'F' for forward, 'B' for backward, 'L' for left, 'R' for right) to the Arduino via Bluetooth.

- Once everything is set up and powered on, you can control the car wirelessly using the Bluetooth terminal app on your smartphone.

- When you send a command from the app, it is transmitted via Bluetooth to the Arduino. The Arduino then interprets the command and controls the motors accordingly, causing the car to move in the desired direction.

- Ensure that your power source can supply enough current to drive the motors without damaging them or the motor driver.

- Be cautious while testing the car, especially if it's moving fast or in unpredictable directions. Keep it away from obstacles and people to avoid accidents.

FUTURE SCOPE

The future scope of Bluetooth-controlled cars is promising, with advancements in technology enabling more sophisticated features and functionalities. Here are some potential future developments:

1. Enhanced Connectivity: As Bluetooth technology evolves, future Bluetooth-controlled cars may incorporate newer versions of the Bluetooth protocol, offering improved data transfer rates, range, and reliability. This could enable more seamless connectivity between the car and external devices, such as smartphones, tablets, or wearable gadgets.

2. Smartphone Integration: With the proliferation of smartphones and their increasingly powerful capabilities, future Bluetooth-controlled cars may integrate more deeply with mobile apps. Users could have enhanced control over various car functions, such as remote start, locking/unlocking, GPS navigation, and real-time diagnostics, all from their smartphones.

3. Autonomous Features: While Bluetooth-controlled cars currently rely on user input for navigation and control, future iterations may incorporate autonomous features enabled by advancements in artificial intelligence and sensor technology. This could include capabilities such as obstacle detection, lane

following, and autonomous parking, making Bluetooth-controlled cars safer and more convenient.

4. Internet of Things (IoT) Integration: Future Bluetooth-controlled cars may be part of the broader Internet of Things ecosystem, allowing them to interact with other connected devices and services. For example, the car could communicate with smart home devices to adjust temperature settings, turn on lights, or even place orders for goods and services based on user preferences.

5. Surveillance: Surveillance is needed in almost every field. It could be a great solution to various problems or situation where surveillance is needed. Our scope has tremendous scope as it uses the latest technology in the market. Our application uses the android OS which is currently the most used OS and also has great future scope. The Surveillance robot can be controlled using the android application; this gives it a huge scope for future application.

CONCLUSION

This project consists of a basic prototype of a Bluetooth control car above stated. The prototype car can recognize commands from users and can turn the car left, right, and stop with great accuracy.

It can be further improved by using different sensors like ultrasonic or infrared and with various levels of coding. Our Bluetooth control car has a range of 10-20 meter with the mobile Bluetooth controlling system. The range mostly depends on the receivers transmission level.

With the ever-increasing problems, our knowledge has to expand to adapt better to the changes all around us. In the same way, it is hoped that this activity is a small step that would lead us to further enhancements and goals.