

AN OVERVIEW OF COMPONENTS

The list of components used in this project are:

Table 1.1: Components Used in the project

Sr. no	Product name	qty.
1.	18650 Batteries	2
2.	Jumper wire	1
3.	Arduino board	1
4.	L298N Motor driver	1
5.	Wheels	4
6.	Servo motor (SG90)	1
7.	Ultrasonic distance sensor (HC-SR04)	1
8.	RC car frame	1
9.	USB cable	1
10.	Gear DC motor	2
11.	Switch	1
12.	Battery holder	1
13.	Bluetooth Module HC-05	1

1. Arduino

Arduino is a microcontroller and the model we have used Arduino UNO. We can connect it directly via a USB cable, this port can act as both power source and as a serial port. Arduino is a microcontroller-based open source electronic prototyping board which can be programmed with an easy-to-use Arduino IDE.

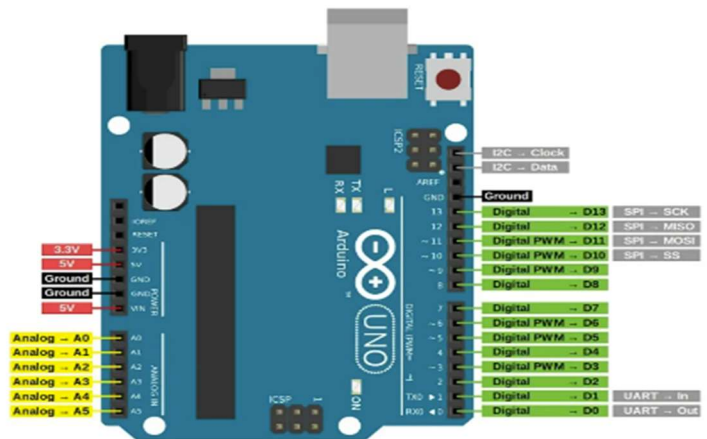


Fig.1.1: Arduino UNO

PIN DESCRIPTION OF ARDUINO UNO:

Table 1.1: PIN DESCRIPTION OF ARDUINO UNO

SR. NO.	PIN	DESCRIPTION
1.	Vin	I/P volt pin, used to provide input supply.
2.	5V	Regulated power supply to board and onboard components.
3.	3.3V	Provide supply generated from voltage regulator
4.	GND	Ground the Arduino board.
5.	Analog pins	A0-A5 analog input, range of 0-5V.
6.	Digital pins	Pins 0-13 as input and output.
7.	Serial/UART pins	Communication b/w computer and Arduino
8.	Ext. interrupt pins	To produce Ext. interrupt, by pins 2 and 3.
9.	PWM pins	Digital into analog by varying width of pulse (pin# 3,5,6,9,10 and 11)
10.	SPI pins	Maintain SPI communication with the help of SPI library.
11.	LED pin	Inbuilt LED in Arduino
12.	AREF pin	Provide reference voltage from ext. power supply
13.	Reset	Reset the microcontroller.

2. Motor Driver

The wire from both the wheels of the car is connected to output 1,2 and 3,4 respectively. We use PWM signal to control the speed of motor by controlling the input voltage. For rotating the direction, we just inverse the current flow by using H-bridge circuit.

By activating two switches out of four in a H-bridge we can change the direction. Input1 and 2 are used to control rotation of Motor A and Input 3 and 4 are used to control the rotation of motor B.

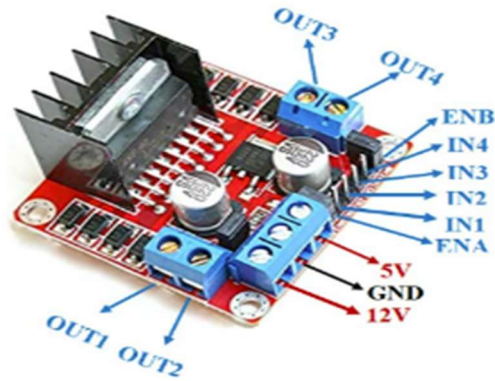


Fig.2.1: L298N H-Bridge Motor Driver

Table 2.1: Pin description of Motor Driver

Pin Name	Description
IN1 & IN2	Motor A input pins. Used to control the spinning direction of Motor A
IN3 & IN4	Motor B input pins. Used to control the spinning direction of Motor B
ENA	Enables PWM signal for Motor A
ENB	Enables PWM signal for Motor B
OUT1 & OUT2	Output pins of Motor A
OUT3 & OUT4	Output pins of Motor B
12V	12V input from DC power Source
5V	Supplies power for the switching logic circuitry inside L298N IC
GND	Ground pin

3. Ultrasonic Distance Sensor (HC-SR04):

The HC-SR04 Ultrasonic Distance Sensor is a sensor used for detecting the distance to an object using sonar. This kind of sensor cannot detect the interference of smoke, gas, and other airborne particles.

This is an electronic device used to measure the distance to an object by emitting the ultrasonic waves and converting it into electrical signals. It contains two components

1. Transmitter

It is used to transmit signal

2. Receiver

It is used to receive the signal after hitting the object

Based on the time take for the signal sent via the transmitter to the receiver, the distance is calculated.

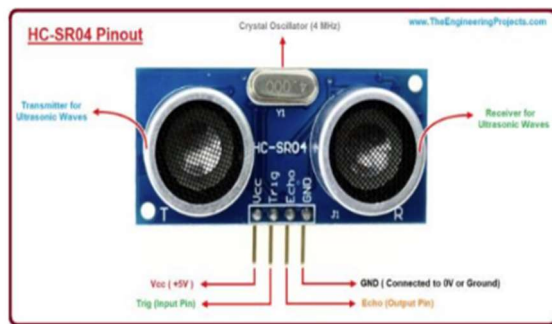


Fig.3.1 (a): HC-SR04 Pin diagram

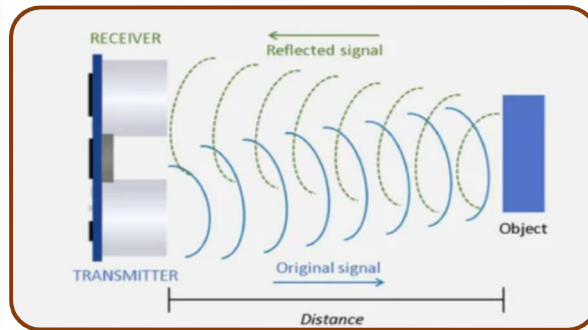


Fig.3.2 (b): HC-SR04 Working

The HC-SR04 Ultrasonic Range Sensor Features:

- Input Voltage: 5V
- Current Draw: 20mA (Max)
- Digital Output: 5V
- Digital Output: 0V (Low)
- Working Temperature: -15°C to 70°C
- Sensing Angle: 30° Cone
- Angle of Effect: 15° Cone
- Ultrasonic Frequency: 40kHz
- Range: 2cm - 400cm

4. Other Components used:

i. Gear DC motor

Gear DC motor is used to convert Direct Current into Electrical energy. It is a combination of gearbox and motor.



Fig.4.1: Gear DC motor

ii. Jumper Wires



Fig.4.2: Jumper Wire

A jumper wire is an electric wire used to connect remote electric circuits used for printed circuit boards. These wires are of three types: M2M, F2F, M2F and we have used these wires to connect the Arduino, motor driver and other components together.

iii. 18650 Battery

The 18650 battery is the source to the Arduino and other components on the RC car frame. The Arduino, Bluetooth and other components work on power sourced by these batteries.



Fig.4.3: 18650 Battery

iv. Wheels



Fig.4.4: Wheels

The wheels are used to move the obstacle avoiding car front and back. The wheels used have a diameter of 68 mm width of and 26mm.

v. **Battery Holder and Switch**

The battery is placed inside this holder and fixed to the RC car frame along with the switch to control the on/off state of the car.



Fig.4.5: Battery Holder and Switch

vi. **RC Car frame**



Fig.4.6: RC Car frame

The RC car frame is where all the components of the obstacle avoiding car is fixed. It unites together all the components in a comprised manner to give an elegant look.

vii. **Bluetooth**

HC-05 has red LED which indicates connection status. It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. We can use a controller and control the robot via the Bluetooth.

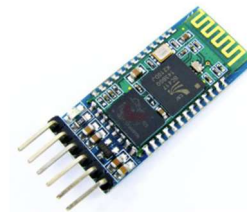


Fig.4.7: Bluetooth

viii. **Servo Motor SG-90**



Fig.4.8: Servo Motor

A servo motor is a self-contained electrical device, that rotate parts of a machine with high efficiency and with great precision. Servo Motor used in our project is SG-90. It can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller.