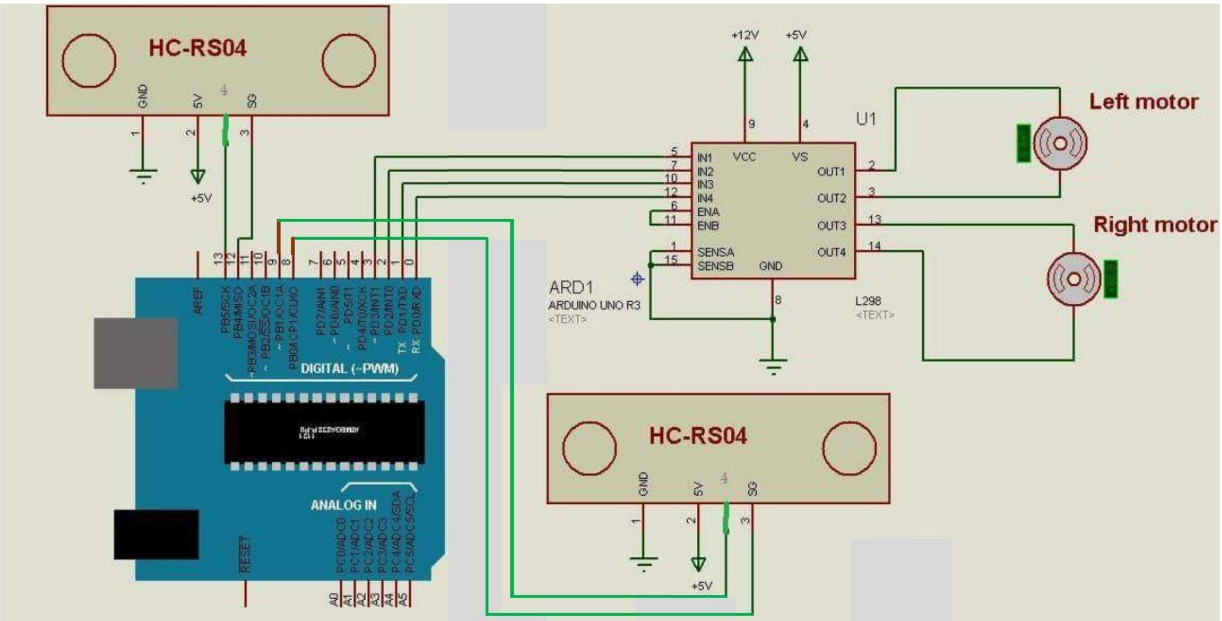
Circuit Diagram:



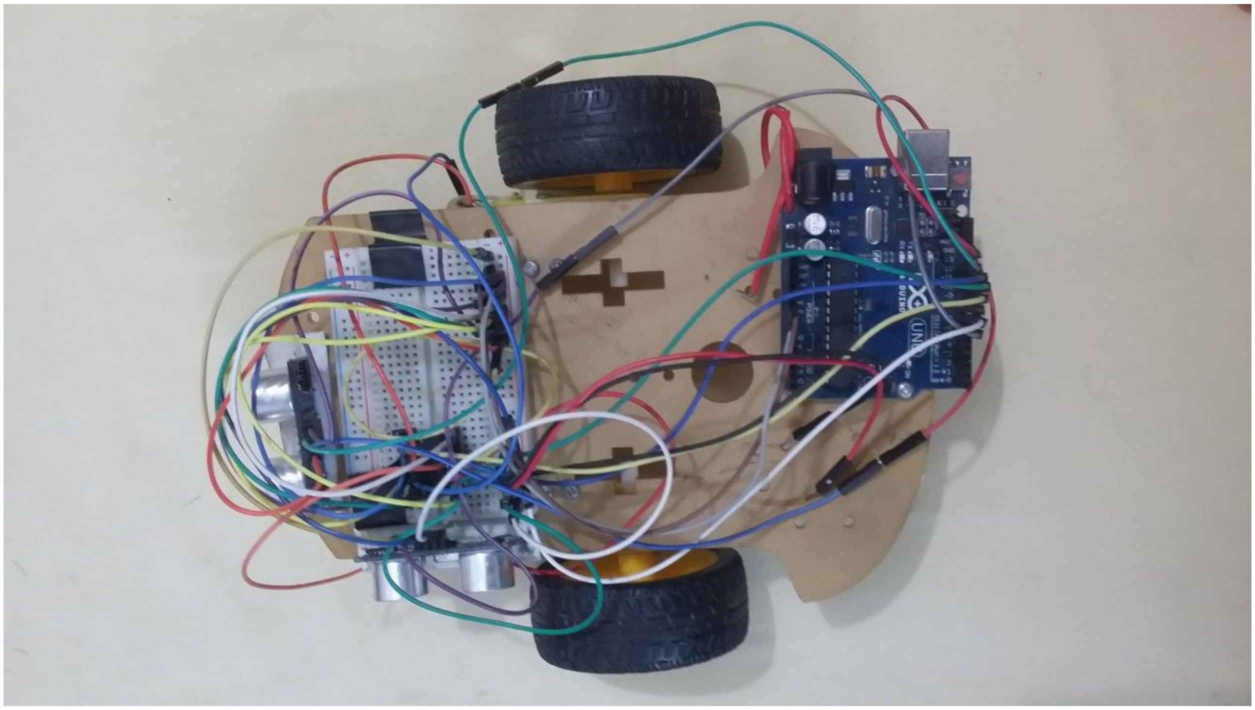
Working Procedure:

- Obstacle avoidance & maze solving robotics system
- Arduino will be used to achieve the desired operation
- Sonar sensors for its sensing operation.
- Sensor will be attached in front and left of the system.
- Motors will be connected through motor driver IC to Arduino
- The left sonar will be used to detect the robot’s left side and traverse using it
- Robot will go to the desired and smart path the sonar sensor transmit the ultrasonic wave continuously from its sensor head
- Arduino will control the motors left, right, back, front, based on ultrasonic signals from left and front Sonar.

Source Code:

```
const int TrigLeft = 12;
const int EchoLeft = 13;

const int TrigFront = 8;
const int EchoFront = 9;

int LeftMotorForward = 2;
int LeftMotorReverse = 3;

int RightMotorForward = 4;
int RightMotorReverse = 5;

long durationleft,durationfront,cmleft, cmfront, firstTime = 0;

void setup() {
  pinMode(TrigLeft, OUTPUT);
  pinMode(EchoLeft, INPUT);
  pinMode(TrigFront, OUTPUT);
  pinMode(EchoFront, INPUT);
  pinMode(RightMotorForward, OUTPUT);
  pinMode(RightMotorReverse, OUTPUT);
  pinMode(LeftMotorForward, OUTPUT);
  pinMode(LeftMotorReverse, OUTPUT);
  Serial.begin(9600); // Starts the serial communication
}

void loop() {
 // Clear the trigPins
  digitalWrite(TrigLeft, LOW);
  delayMicroseconds(2);

  // Sets the trigPin on HIGH state for 10 micro seconds
  digitalWrite(TrigLeft, HIGH);
  delayMicroseconds(5);
  digitalWrite(TrigLeft, LOW);

  // Reads the echoPin, returns the sound wave travel time in
microseconds
  durationleft = pulseIn(EchoLeft, HIGH);
  cmleft = durationleft / 29 / 2;//converts the time duration to cm

  digitalWrite(TrigFront, LOW);
  delayMicroseconds(2);

  digitalWrite(TrigFront, HIGH);
  delayMicroseconds(5);
  digitalWrite(TrigFront, LOW);
  durationfront = pulseIn(EchoFront, HIGH);
  cmfront = durationfront / 29 / 2;//converts the time duration to cm
  // Prints the distance on the Serial Monitor

  Serial.print("left: ");
  Serial.println(cmleft);

  Serial.print("front: ");
  Serial.println(cmfront);

  if(firstTime == 0){
    if(cmleft > 20 && cmfront > 20){
      turn(4);
      firstTime=1;
      delay(550);

    }
  }
  if(cmleft < 30)
  {
    if(cmfront < 30)
    {
        turn(6);
        delay(650);
        turn(0);
        delay(400);
    } else {
        turn(2);
        delay(500);
        //turn(0);
        //delay(80);
    }
  }
  else
  {
    if(cmfront < 30)
    {
      turn(6);
      delay(650);
      turn(0);
      delay(400);

    }
    else {
      turn(2);
      delay(70);

    }
  }
}
void turn(int d){
  if(d == 4)   // Left Turn
  {
   digitalWrite(RightMotorForward, HIGH);
   digitalWrite(RightMotorReverse, LOW);
   digitalWrite(LeftMotorForward, LOW);
   digitalWrite(LeftMotorReverse, LOW);
  }
  else if(d == 2) // Forward
  {
   digitalWrite(RightMotorForward, HIGH);
   digitalWrite(LeftMotorForward, HIGH);
   digitalWrite(RightMotorReverse, LOW);
   digitalWrite(LeftMotorReverse, LOW);
  }
  else if(d == 6) // Right turn
  {
   digitalWrite(LeftMotorForward, HIGH);
   digitalWrite(LeftMotorReverse, LOW);
   digitalWrite(RightMotorForward, LOW);
   digitalWrite(RightMotorReverse, LOW);
  }
  else if(d == 0) // Back turn
  {
   digitalWrite(LeftMotorForward, LOW);
   digitalWrite(LeftMotorReverse, HIGH);
   digitalWrite(RightMotorForward, LOW);
   digitalWrite(RightMotorReverse, HIGH);
  }
}
```

Project Picture:



Motivation and Application:

It can perform desired tasks in unstructured environments without continuous human guidance. It can be used in Mines. It can be used for the army application. It can be applied at the toys. It can be used to traverse ruined areas. Autonomous Intelligent Robots are robots that can perform desired tasks in unstructured environments without continuous human guidance.

Future Work:

We will add LED which will display the distance it has gone through. Besides this it can also be improved by adding a part which will detect and remove the object from its way, then again it will start its work. It will be easier to remove obstacle from way. It can be used in road for cleaning. It will have a video cam that will give live video feed to the main room.

Conclusion:

We will try to develop the robot with a very good intelligence which is easily capable to sense the obstacle and find obstacle free path in a smart way. Robot will take the left or right or the forward movement in according to the sensing signal with the help of the two gear motor which makes the movement of the robot smooth. In future, the sensing range can be increased by increasing the sensor quality.

Introduction:

We are going to establish a robotic system which will detect obstacle and traverse the whole area around it. It will Sense the object through its sensor & send a signal, and then the robot will avoid and go around blocks when it will find an obstacle.

Required Equipment:

- Arduino Uno
- Motor Driver
- Sonar Sensor
- IR LED sensor
- 4 AAA Battery
- Wire
- Bread Board
- **2**WD Chassis

a)Arduino Uno:

The Arduino Uno is a microcontroller board based on the ATmega328(datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, anICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2(Atmega8U2up to version R2) programmed as a USB-to-serial converter. Revision 2of the Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode. Revision 3of the board has the following new features:

1.0 pinout: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible both with the board that use the AVR, which operate with 5V and with the Arduino Due that operate with 3.3V. The second one is a not connected pin that is reserved for future purposes stronger RESET circuit.

Atmega 16U2 replace the 8U2."Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

Fig: Arduino UNO

b) Motor Driver l293D:

- Integrated monolithic circuit
- High voltage driver
- Follows standard TTL
- logic

Fig: Motor Driver l293D

c) **2WD Chassis**:

- Body of Obstacle Avoider & Line follower
- Two motors
- Can move in 4.5V DC

d) **Ultrasonic Distance Sensor (#HC04):**

The Sonar sensor is a device you can use with the BASIC Stamp to measure how far away an object is. With a range of 3 centimeters to 3.3 meters, it's a shoe-in for any number of robotics and automation projects. It's also remarkably accurate, easily detecting an object's distance down to the half centimeter.

Fig: Sonar Sensor

Sonar sensor sends a brief chirp with its ultrasonic speaker and makes it possible for the BASIC Stamp to measure the time it takes the echo to return to its ultrasonic microphone. The BASIC Stamp starts by sending the Ping))) sensor a pulse to start the measurement. Then, the Ping))) sensor waits long enough for the BASIC Stamp program to start a PULSIN command. At the same time the Ping))) sensor chirps its 40 kHz tone, it sends a high signal to the BASIC Stamp. When the Ping))) sensor detects the echo with its ultrasonic microphone, it changes that high signal back to low. The BASIC Stamp's PULSIN command stores how long the high signal from the Ping))) sensor lasted in a variable. The time measurement is how long it took sound to travel to the object and back. With this measurement, you can then use the speed of sound in air to make your program calculate the object's distance in centimeters, inches, feet, etc...

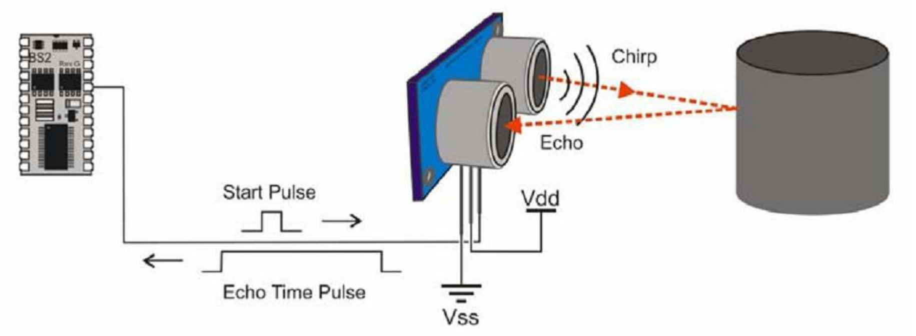


Fig: How the Sonar Sensor Works