# Object Detection Car

Using Arduino and Ultrasonic Sensor

This document provides a detailed guide to building an autonomous object detection car using an Arduino microcontroller and an ultrasonic sensor. The project detects obstacles and navigates accordingly.

This 4-page document covers:
1. Components List
2. Circuit Diagram & Connections
3. Arduino Code
4. Testing, Calibration & Troubleshooting

# Components List

- 1 x Arduino Uno (or compatible)
- 1 x HC-SR04 Ultrasonic Sensor
- 2 x DC motors with wheels
- 1 x L298N Motor Driver Module
- 1 x Chassis (with mounting hardware)
- 1 x 9V Battery or 7.4V LiPo battery pack
- 1 x Breadboard (optional)
- Jumper wires (male-to-male, male-to-female)
- USB cable for programming Arduino
- Miscellaneous (screws, double-sided tape)

# Circuit Diagram & Connections

1. Ultrasonic Sensor HC-SR04:
   - VCC to 5V on Arduino
   - GND to GND
   - Trig to digital pin 9
   - Echo to digital pin 10

2. Motor Driver (L298N):
   - IN1 to digital pin 2 (Motor A forward)
   - IN2 to digital pin 3 (Motor A backward)
   - IN3 to digital pin 4 (Motor B forward)
   - IN4 to digital pin 5 (Motor B backward)
   - VCC to battery positive
   - GND to battery negative and Arduino GND

3. DC Motors to Motor A and Motor B terminals

4. Power:
   - Battery to VIN or barrel jack on Arduino
   - Ensure common ground between Arduino and Motor Driver

# Arduino Code & Testing

```
// Object Detection Car
#define trigPin 9
#define echoPin 10
#define motorA1 2
#define motorA2 3
#define motorB1 4
#define motorB2 5

void setup() {
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(motorA1, OUTPUT); pinMode(motorA2, OUTPUT);
  pinMode(motorB1, OUTPUT); pinMode(motorB2, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  long duration, distance;
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = duration * 0.034 / 2;
  Serial.print("Distance: "); Serial.println(distance);

  if (distance < 20) {
    // Obstacle detected, stop or reverse
    digitalWrite(motorA1, LOW); digitalWrite(motorA2, LOW);
    digitalWrite(motorB1, LOW); digitalWrite(motorB2, LOW);
  } else {
    // Move forward
    digitalWrite(motorA1, HIGH); digitalWrite(motorA2, LOW);
    digitalWrite(motorB1, HIGH); digitalWrite(motorB2, LOW);
  }
  delay(100);
}
```