ARDUINO-BASED AUTOMATIC CAR

**Objective**

To design and implement an autonomous robotic car using Arduino that moves forward and automatically avoids obstacles using an ultrasonic sensor and servo motor

|  |  |
| --- | --- |
| **Component** | **Quantity** |
| Arduino Uno | 1 |
| Ultrasonic Sensor | 1 |
| Servo Motor | 1 |
| DC Motors | 2 |
| Motor Driver | 1 |
| Wheels | 2 |
| Jumper Wires | Several |
| LED (for alert) | 1 |

**Working**

1. **Ultrasonic Sensing**: The ultrasonic sensor continuously measures the distance to obstacles in front of the car.
2. **Obstacle Detection**: If the distance is less than a defined 40 cm, the car stops and changes direction.
3. **Servo Scanning**: The servo motor rotates to scan surroundings, though in your current code it's static at 90° during an obstacle event.
4. **Movement Control**: Based on the obstacle, the car either:
   * Moves forward when path is clear.
   * Turns right if an obstacle is detected ahead.

CODE

#include <Servo.h> // Include Servo library

Servo eby; // Create a Servo object

#define trigPin 6 // Ultrasonic trigger pin

#define echoPin 7 // Ultrasonic echo pin

// Motor driver pins

int motor1pin1 = 2;

int motor1pin2 = 3;

int motor2pin1 = 4;

int motor2pin2 = 5;

int duration, distance;

void setup() {

Serial.begin(9600);

eby.attach(8); // Attach servo to pin 8

eby.write(0); // Initialize servo to 0 degrees

// Ultrasonic sensor setup

pinMode(trigPin, OUTPUT);

pinMode(echoPin, INPUT);

// LED indicator setup

pinMode(13, OUTPUT);

// Motor pins setup

pinMode(motor1pin1, OUTPUT);

pinMode(motor1pin2, OUTPUT);

pinMode(motor2pin1, OUTPUT);

pinMode(motor2pin2, OUTPUT);

}

void loop() {

// Trigger the ultrasonic sensor

digitalWrite(trigPin, HIGH);

\_delay\_ms(500);

digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH); // Read echo time

void loop () {

// Trigger the ultrasonic sensor

digitalWrite(trigPin, HIGH);

\_delay\_ms(500);

digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH); // Read echo time

distance = duration \* 0.034 / 2; // Calculate distance in cm

Serial.println(distance);

if (distance < 40) {

// Obstacle detected

digitalWrite(13, HIGH); // Turn on LED as indicator

eby.write(90); // Turn servo to 90° (middle scan position), Along with ultrasonic sensor

// Turn right

digitalWrite(motor1pin1, HIGH);

digitalWrite(motor1pin2, LOW);

digitalWrite(motor2pin1, LOW);

digitalWrite(motor2pin2, LOW);

delay(3000);

}

else {

// Clear path, move forward

digitalWrite(13, LOW); // Turn off LED

eby.write(0); // Reset servo

digitalWrite(motor1pin1, HIGH);

digitalWrite(motor1pin2, LOW);

digitalWrite(motor2pin1, HIGH);

digitalWrite(motor2pin2, LOW);

}

}

**Relevance and Applications**

This project introduces key concepts in **robotics, automation, and sensor integration**, which are highly relevant in:

* **Autonomous vehicle development**
* **Industrial automation**
* **Smart delivery robots**
* **Security patrolling systems**
* **Educational robotics platforms**

