Obstacle-Avoiding Robot Using Arduino

By Prathyusha Baikani

1. Introduction

An obstacle-avoiding robot is an autonomous robot that moves freely and avoids obstacles using ultrasonic sensors. It continuously scans for obstacles in its path and changes direction when necessary. This project is ideal for beginners in robotics and helps in understanding the basics of sensors, motor control, and programming with Arduino.

2. Uses & Applications

- Autonomous navigation in robotics.
- Smart vacuum cleaners.
- Automated delivery bots.
- Educational robotics projects.

3. Components Required

1. **Arduino Uno** – Microcontroller to control the robot.
2. **Ultrasonic Sensor (HC-SR04)** – Detects obstacles.
3. **L298N Motor Driver Module** – Controls the motors.
4. **DC Motors with Wheels** – Enables movement.
5. **Chassis** – Base for mounting components.
6. **Battery (9V or 12V Li-ion)** – Power supply.
7. **Jumper Wires** – Connecting components.

4. Circuit Diagram

- **VCC** of Ultrasonic Sensor → **5V on Arduino**
- **GND** of Ultrasonic Sensor → **GND on Arduino**
- **Trig Pin** → **Digital Pin 9**
- **Echo Pin** → **Digital Pin 10**
- **Motor Driver Inputs** → **Arduino Digital Pins 4, 5, 6, 7**

5. Code

Check out the code in the below link :

Prathyusha656/Obstacle-Avoiding-Robot-Using-Arduino

6. Working Principle

- The **ultrasonic sensor** sends out sound waves.
- If an obstacle is detected, it calculates the distance.
- If the distance is less than **15 cm**, the robot stops and turns.
- If no obstacle is detected, the robot moves forward.

7. Advantages

- Fully autonomous navigation.
- No need for human intervention.
- Teaches basics of Arduino and robotics.
- Can be enhanced with AI for smart navigation.

8. Images & Circuit Diagram

PROJECT 1:
2WD OBSTACLE AVOIDING ROBOT
BY: HDA ROBOTICS
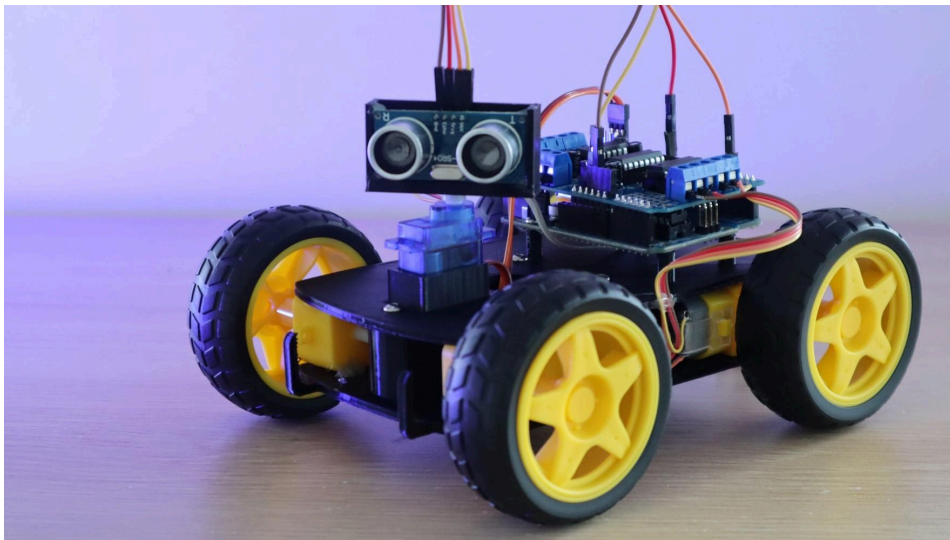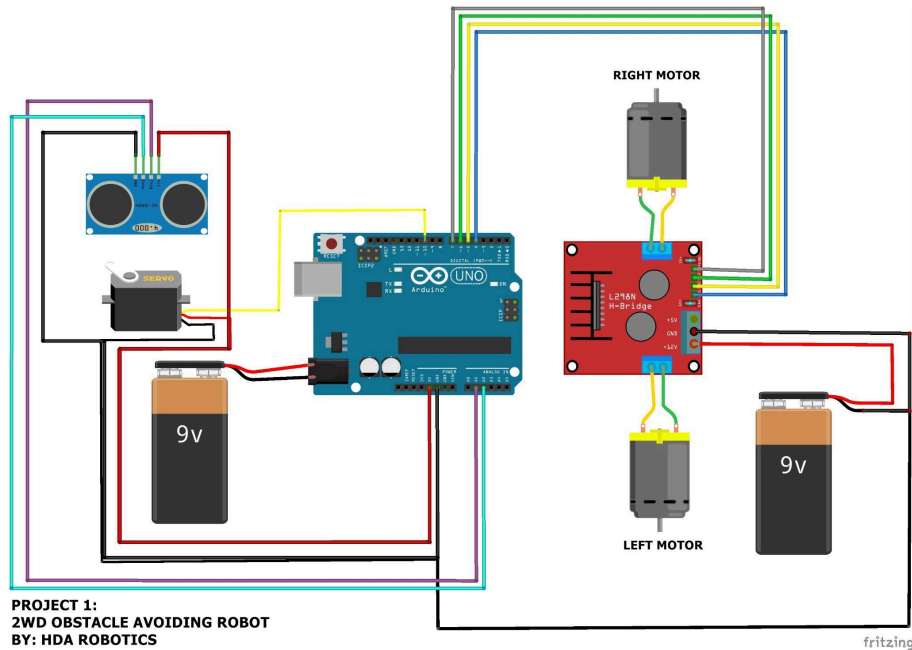
9. Future Enhancements

- Adding a **Bluetooth module** for remote control.
- Implementing **AI-based path planning**.
- Using **multiple sensors** for better navigation.

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