

EXPERIMENT 24: OBSTACLE AVOIDANCE ROBO (Using Ultrasonic Sensor)

Objective:

The objective of this experiment is to create an obstacle avoidance robot using an ultrasonic sensor. The robot should move forward until it detects an obstacle, then turn randomly to avoid the obstacle.

Setup:

- **Assemble the Robot Hardware:**
 - Connect the motors, ultrasonic sensor, and motor control library based on the provided hardware assembly instructions.
- **Install Required Libraries:**
 - Install the necessary libraries for motor control and ultrasonic sensor:
 - [ControlMotor Library](#): Download and install this library for motor control.
 - [Ultrasonic Library](#): Download and install this library for the HC-SR04 ultrasonic sensor.
 - For include the Arduino library in Arduino IDE please see the link [How to include library in Arduino IDE](#)
- **Connect to Arduino IDE:**
 - Connect the robot to the Arduino IDE as explained in Section 2.3.

Hardware Connections:

- **Right Motor:**
 - IN1 (8): Connected to the digital pin 8 on the Arduino.
 - IN2 (9): Connected to the digital pin 9 on the Arduino.
- **Left Motor:**
 - IN3 (10): Connected to the digital pin 10 on the Arduino.
 - IN4 (11): Connected to the digital pin 11 on the Arduino.

Ultrasonic Sensor:

- Connect the Trig pin to digital pin 2.
- Connect the Echo pin to digital pin 3.

Code Example: [Obstacle avoidance robo](#)

Usage Instructions:

- **Power On:**
 - Power the robot and ensure it is connected to the Arduino.
- **Obstacle Avoidance:**
 - The robot will move forward at a speed of 150.
 - The ultrasonic sensor will continuously measure the distance to the obstacle.
- **Random Turns:**
 - If an obstacle is detected (distance < 10cm):
 - The robot will stop.
 - A random value is generated to determine whether to turn left or right.

- The robot will turn in the randomly chosen direction (right) for 0.5 seconds.

Expected Results:

- The robot should move forward until it detects an obstacle.
- When an obstacle is detected, the robot should randomly turn right to avoid the obstacle.