Object-Avoiding Robot (Arduino-Based)

Description

This project is an autonomous 4-wheel robot that detects and avoids obstacles using an ultrasonic sensor. It's powered by an Arduino Uno and programmed to navigate its environment by continuously scanning for obstacles and altering its path to avoid collisions.

Components Used

- Arduino Uno - Main controller

- 4-Wheel Robot Car Chassis Kit - Includes BO motors and wheels

- L293D Motor Driver Shield - Controls the four motors

- SG90 Servo Motor - Rotates the ultrasonic sensor to scan surroundings

- HC-SR04 Ultrasonic Sensor - Measures distance to obstacles

- Ultrasonic Sensor Mount - Holds the sensor on the servo

- Female-to-Female Jumper Wires - For electrical connections

Working Principle

- The ultrasonic sensor detects obstacles in front of the robot.

- The servo motor moves the sensor left and right to scan the area.

- Based on the distance readings, the Arduino decides whether to:

  - Move forward if the path is clear

  - Stop and scan if an obstacle is detected

  - Turn left or right to find a clear path

- The L293D motor shield drives the motors in the appropriate direction.

Power Supply Notes

- The robot should be powered by a 6V-9V battery pack (such as 6x AA or 2x 18650 Li-ion) for reliable performance.

- Avoid using a regular 9V rectangular battery as it cannot supply enough current to drive motors and servo effectively.

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Key Features

- Fully autonomous obstacle avoidance

- Real-time environment scanning with servo-mounted ultrasonic sensor

- Compact and modular design

- Easy to customize or extend (e.g., add Bluetooth or line-following capability)