Obstacle Detection and Avoidance Robot.

About This Project:

Obstacle Detection and Avoidance Robot is used for detecting any obstacles and avoiding the collision. This is an autonomous robot. The design of obstacle avoidance robot requires the integration of many sensors according to their task. We've used Ultrasonic Sensor. The robot gets the information from surrounding area through mounted sensors on the robot. Ultrasonic sensor is most suitable for obstacle detection and it is of low cost and has high ranging capability. Our proposed project puts forward an obstacle avoider robotic vehicle that uses ultrasonic sensors for this purpose. The system uses an Arduino family Microcontroller to achieve this functionality. The robotic vehicle is designed to first track and avoid any kind of obstacles that comes it's way. The vehicle achieves this smart functionality with the help of ultrasonic sensors coupled with an Arduino and motors. The entire system combined gives the vehicle an intelligent object detection and obstacle avoidance scheme. This system allows the vehicle to guide itself in case it encounters any obstacle. The obstacle detection is done using the ultrasonic sensor. This is detected and a signal is passed on to the Arduino microcontroller. On receiving the signal it guides the vehicle in another direction by actuating the motors through the motor driver IC.

The obstacle avoidance robotic vehicle uses ultrasonic sensors for its movements. An Arduino Nano of Arduino family is used to achieve the desired operation. The motors are connected through motor driver IC L293D to Arduino. The ultrasonic sensor is attached in front of the robot.

Whenever the robot is going on the desired path the ultrasonic sensor transmits the ultrasonic waves continuously from its sensor head. Whenever an obstacle comes ahead of it the ultrasonic waves are reflected back from an object and that information is passed to the Arduino. The Arduino controls the motors left, right, back, front, based on ultrasonic signals. In order to control the speed of each motor pulse width modulation is used (PWM).

Block Diagram:

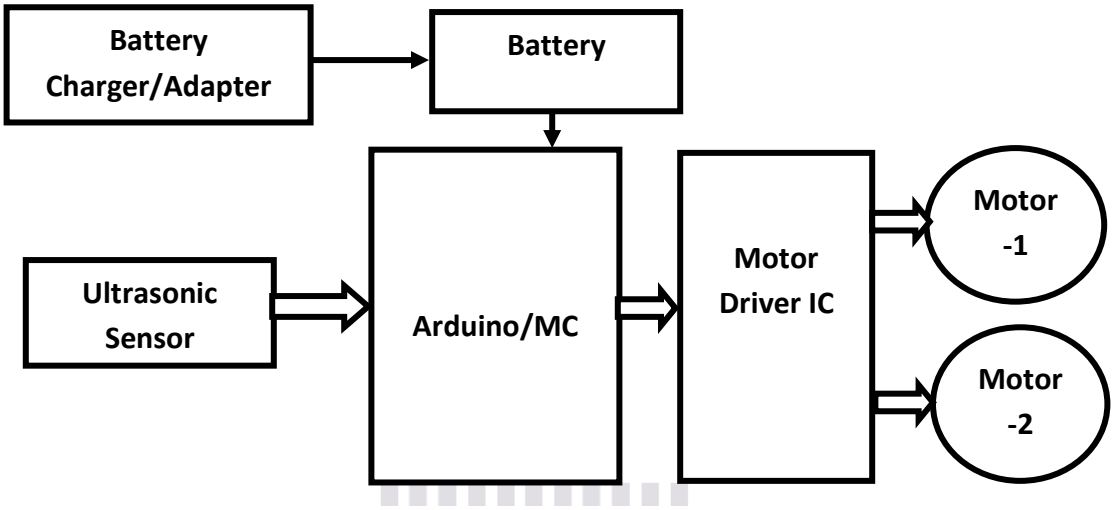

Fig: Block Diagram of Obstacle Detection and Avoidance Robot.

Required Instrument:

- Arduino/Microcontroller.
- Ultrasonic Sensor.
- Motor Driver IC.
- Battery.
- Gear Motor.
- Wheel.
- Voltage Regulator.
- Connecting Wire.

Feature & Advantages:

- Obstacle Detection.
- Obstacle Avoidance
- If There Is Any Obstruction, It Will Give an Alarm and Avoid It.

Applications:

- It can be used for household work like automatic vacuum cleaning.
- It can also be used in Hazardous environments, where human entry could be risky.
- Especially military applications.