

# Edge line crossing & Obstacles avoiding safeguard

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## 1. Objective

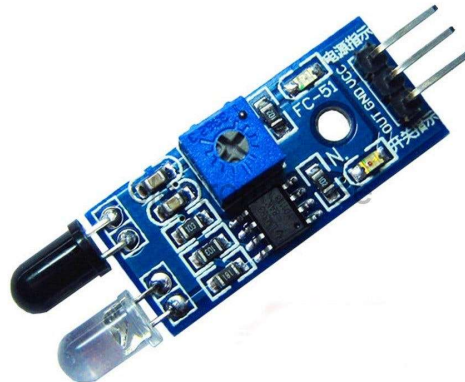
The Edge Line Crossing & Obstacles Avoiding Safeguard project is a system designed to prevent accidents caused by vehicles crossing the edge line or colliding with obstacles on the road. This project aims to reduce the number of accidents on the road and enhance safety by warning drivers of possible dangers ahead. The system uses a combination of IR sensors and Ultrasonic sensors, Arduino UNO, to detect and alert hazards to drivers. The hardware components of this project include ultrasonic sensors, IR sensors, Arduino UNO, a motor driver, and four motor. The ultrasonic sensor detects the presence of obstacles in front of the vehicle and sends signals to the Arduino UNO. The line tracking sensor detects the position of the edge line and sends signals to the microcontroller. The microcontroller processes these signals and sends instructions to the motor driver to control the motor. The motor driver controls the motor, which in turn, steers the vehicle away from the obstacles or back into its lane. The software components of this project include the programming code for the Arduino UNO. The microcontroller programming code includes the logic to process signals from the sensors and control the motor driver.

## 2.Sequence

### Components Required:

1. 6 IR sensors that are mounted on the front, centre and back side of each car to detect the edge line on the road.
2. An ultrasonic sensor to detect obstacles in front of the vehicle.
3. Arduino UNO to process signals from the sensors and control the motor driver.
4. A motor driver to control the motor that steers the vehicle away from obstacles or back into its lane.
5. A motor to steer the vehicle

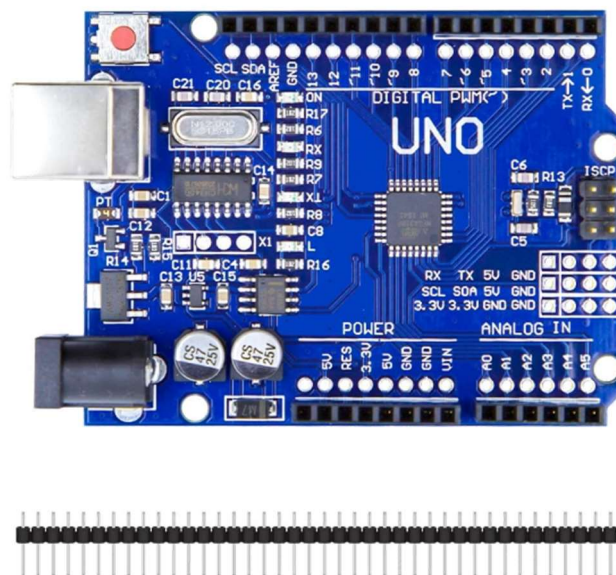
**Infrared Sensor:** The sensor typically has an IR LED & an IR photodiode and combining these two gives way to a photo-coupler or optocoupler. The infrared photodiode responds to the infrared light generated by the infrared LED. The resistance of photodiode & the change in output voltage is directly proportional to the infrared light



**Ultrasonic Sensor :** It includes a transmitter & a receiver. This sensor is used to find out the distance from the objective. Here the amount of time taken to transmit and receive the waves will decide the distance between the sensor and an object. This sensor uses sound waves by using non-contact technology. By using this sensor the distance which is required for the target can be measured without damage and provides accurate details. The range of this sensor available between 2cms to 400cms.



**Arduino UNO:** It is a microcontroller board based on the ATmega328. Arduino is an open-source, prototyping platform. The Arduino Uno has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs.



**Motor Driver:** L293D Motor Driver Module is a medium power motor driver perfect for driving DC Motors and Stepper Motors. It uses the popular L293 motor driver IC. It can drive 2 DC motors with directional and speed control.

The driver greatly simplifies and increases the ease with which you may control motors, relays, etc from micro-controllers.

The L293 is designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V.



**Working:** The working principle of the modified Edge Line Crossing & Obstacles Avoiding Safeguard project will be as follows:

- The 6 IR sensors will detect the position of the edge line and send signals to the microcontroller.
- The ultrasonic sensor will detect an obstacle in front of the vehicle and send a signal to the microcontroller.

The Arduino UNO will process these signals and send instructions to the motor driver to control the motor that steers the vehicle away from obstacles or back into its lane.

#### Application :

The modified Edge Line Crossing & Obstacles Avoiding Safeguard system can be used in a variety of vehicles, including cars, trucks, buses, and even autonomous vehicles. This system is especially useful for drivers who may be tired, distracted, or unfamiliar with the road. Additionally, the system can be used in construction zones, where there are often obstacles on the road that can cause accidents.

### 3.Conclusion:

The modified Edge Line Crossing & Obstacles Avoiding Safeguard project is a cost-effective solution to prevent accidents caused by vehicles crossing the edge line or colliding with obstacles on the road. This system provides real-time updates to drivers, allowing them to take appropriate action to avoid accidents. The system is easy to install and can be customized to suit the needs of different vehicles and road conditions. By implementing this system, we can reduce the number of accidents on the road and enhance the safety of drivers and passengers.