

AUTOMATIC ACCIDENT AVOIDING CAR

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Abstract - The Automatic Accident Avoiding Car is an intelligent vehicle safety system designed to reduce road accidents by detecting obstacles and taking preventive actions automatically. The system uses sensors such as ultrasonic sensors, infrared (IR) sensors, and microcontrollers to continuously monitor the surroundings of the vehicle. When an obstacle or another vehicle is detected within a predefined distance, the system alerts the driver and automatically slows down or stops the vehicle to prevent a collision.

The primary objective of this project is to enhance road safety by minimizing human errors, which are one of the major causes of traffic accidents. The system operates in real time, providing quick response and efficient obstacle detection. It can be implemented in automobiles, autonomous vehicles, and smart transportation systems to improve safety and reduce accident rates.

1. Introduction:

An **Automatic Accident Avoiding Car** is a smart vehicle safety system designed to reduce road accidents by detecting obstacles and taking preventive actions automatically. The system uses sensors such as ultrasonic sensors, infrared (IR) sensors, cameras, and radar to monitor the surroundings of the vehicle continuously.

When an obstacle, vehicle, pedestrian, or any other object is detected within a dangerous range, the system alerts the driver through alarms or warning signals. If the driver does not respond in time, the system can automatically apply brakes, reduce vehicle speed, or change direction to avoid a collision.

1.1 problem statement

Road accidents are one of the leading causes of injuries and fatalities worldwide. Many accidents occur due to human errors such as overspeeding, driver fatigue, distraction, poor visibility, and delayed reaction to obstacles. Conventional vehicles depend entirely on the driver's attention and decision-making ability, which increases the risk of collisions.

1.2 Objectives

The main objective of an **Automatic Accident Avoiding Car** is to improve road safety by detecting obstacles and preventing collisions automatically.

2. LITERATURE REVIEW:

Literature Review

1. Obstacle Detection Using Ultrasonic Sensors

Many researchers have used ultrasonic sensors to detect obstacles in front of vehicles. The sensor continuously measures the distance between the vehicle and nearby objects. When an obstacle is detected within a predefined range, the system alerts the driver or automatically applies the breaks

2. Infrared (IR) Sensor-Based Collision Avoidance Systems

IR sensors are widely used in prototype accident avoidance systems. These sensors detect nearby objects by transmitting and receiving infrared rays

3. Raspberry Pi-Based Accident Prevention Systems

Several studies have employed the Raspberry Pi Foundation platform as the main controller. The Raspberry Pi processes sensor data and controls vehicle movements

4. IoT-Based Smart Vehicle Safety Systems

Researchers have integrated IoT technology into vehicles for accident prevention. These systems collect data from sensors and communicate with cloud platforms for monitoring and emergency respond.

3. SYSTEM DESIGN AND METHODOLOGY

Phase 1: Requirement Analysis

- Study causes of road accidents.
- Identify safety requirements.
- Select suitable sensors and controllers.

Phase 2: Hardware Design

- Assemble chassis.
- Mount ultrasonic sensors.
- Connect motor driver and motors.
- Install warning devices.

Phase 3: Software Development

- Program the microcontroller.
- Define distance thresholds.
- Implement obstacle detection algorithm.

Phase 4: System Integration

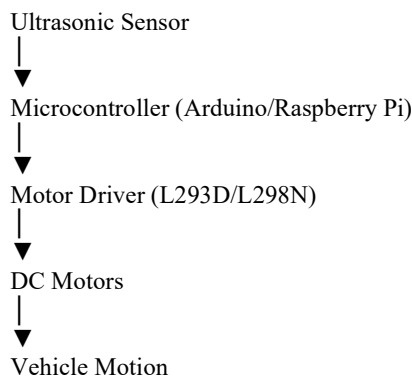
- Connect all hardware modules.
- Upload software.
- Verify communication between components.

Phase 5: Testing and Validation

- Test at different obstacle distances.
- Check warning response time.
- Verify automatic braking operation.
- Record system performance.

4. CIRCUIT IMPLEMENTATION

Block Diagram



Components Used

1. **Ultrasonic Sensor (HC-SR04)**
 - Detects obstacles by transmitting ultrasonic waves.
 - Measures the distance between the vehicle and an object.
2. **Microcontroller (Arduino Uno)**
 - Acts as the brain of the system.
 - Receives distance data from the sensor.
 - Makes decisions based on programmed conditions.
3. **Motor Driver (L293D/L298N)**
 - Controls the speed and direction of DC motors.
 - Amplifies signals from the microcontroller.
4. **DC Motors**
 - Drive the wheels of the vehicle.
5. **Power Supply**
 - Provides power to the controller, sensor, and motors.
6. **Buzzer/LED (Optional)**
 - Gives warning signals when an obstacle is detected.

automatically. The system uses sensors such as ultrasonic, infrared, or radar sensors along with a microcontroller to continuously monitor the surroundings of the vehicle. When an obstacle is detected within a critical distance, the system alerts the driver and can automatically slow down or stop the vehicle to prevent a collision.

This project improves road safety, minimizes human errors, and enhances driving efficiency. It is particularly useful in situations involving driver fatigue, distraction, poor visibility, and sudden obstacles on the road. The system demonstrates how embedded systems, sensors, and automation can be integrated to create safer transportation solutions.

REFERENCES

- Design and Development of an Automatic Accident Avoidance System
 - Focuses on ultrasonic sensor-based obstacle detection and vehicle control.
- Collision Avoidance System Using Ultrasonic Sensors
 - Describes obstacle detection and automatic braking techniques.
- IoT-Based Smart Vehicle Safety and Accident Prevention System
 - Uses IoT, sensors, and wireless communication for accident prevention.
- Automatic Braking System for Collision Avoidance
 - Discusses autonomous braking mechanisms to reduce accidents.

6. CONCLUSION

The **Automatic Accident Avoiding Car** is an intelligent vehicle safety system designed to reduce road accidents by detecting obstacles and taking preventive actions