



# Car Accident Detection with Alert System

Gayatri Mali<sup>1</sup>, Shruti Desai<sup>2</sup>, Vaibhavi Mhaske<sup>3</sup>, Chaitanya Sonawane<sup>4</sup>, Prof. Mrs. Dhage T.S<sup>5</sup>,

Mr. Bhapkar A.S<sup>6</sup>

Information Technology, Dattakala Group Of Institutes, Pune, Maharashtra, India<sup>1-4</sup>

Guide, Department Of Information Technology, Dattakala Group Of Institutes, Pune, Maharashtra, India<sup>5</sup>

Co-Guide, Department Of Technology, Dattakala Group Of Institutes, Pune, Maharashtra, India<sup>6</sup>

**Abstract:** The accidents and the accident injuries in the world is increasing in our day today life so there must be good and efficient control for the safety of human life violation of traffic rules drunk driving, careless driving are because of road accidents as we know we cannot stop the accidents but we can reduce the accidents by some precautionary measures. Road accident is most undesirable thing to happen to a road user, though they happen quite often. Most of the fatal accidents happened due to over speeding. This system provides a good and securable driving for the driver. In this project we are controlling the speed, seat belt, obstacle detection, alert indication, notification about accident whole security of the vehicle. Proposed method resolves the problems faced by the existing systems. In this project the vehicle is partially controlled by various sensors. There is a vehicle black box it will store the data of various sensors which measure various performance of the vehicle and also sends information to various authorities about the vehicle position to get immediate first aid. When any abnormalities from the threshold value occurs, the microcontroller sends message to the desired positions and immediate first aid and other facilities are available. This system is suitable in all type of vehicles.

**Keywords:** IoT, Accident Detection, GSM, GPS, Arduino, Vehicle Safety, Real-Time Monitoring.

## I. INTRODUCTION

Nowadays, road accidents have become a major concern due to the rapid increase in the number of vehicles and traffic congestion, especially on highways. Rash driving, over-speeding, driver fatigue, and lack of timely monitoring are some of the primary causes of these accidents. In many cases, the situation becomes more critical because immediate assistance is not provided to the victims. A significant challenge is the delay in informing emergency services such as ambulances, hospitals, and police authorities.

In several accident scenarios, especially during nighttime or in isolated areas, accidents may go unnoticed for a long time. Victims may be unconscious or severely injured, making them unable to seek help on their own. Even when bystanders are present, they may not have the necessary contact information to inform nearby hospitals or police stations quickly. This delay in communication leads to a slower emergency response, which can increase the severity of injuries and, in many cases, result in loss of life. To address this issue, there is a need for an intelligent and automated system that can detect accidents and immediately notify the concerned authorities without human intervention. The proposed system utilizes Internet of Things (IoT) technology along with sensors, GPS, and GSM modules to create a real-time accident detection and alert mechanism. The system is capable of identifying accidents based on sudden changes such as impact or abnormal motion and can instantly send the location details to emergency contacts.

In addition to accident detection, the system also incorporates features like vehicle tracking, collision warning, and speed monitoring to enhance overall road safety. Furthermore, the integration of a linefollowing mechanism enables applications such as automatic parking, improving vehicle control and reducing human effort. The main objective of this project is to reduce the response time after an accident and ensure that victims receive immediate medical assistance. By implementing this system, it is possible to improve road safety, assist traffic authorities in monitoring driving behavior, and ultimately save human lives.

## II. LITERATURE SURVEY

### 2.0.1 Smart Vehicle for Accident Prevention

This system enhances vehicle safety using sensors, a wireless black box, and eye blink detection. It monitors parameters like speed, seat belt usage, and obstacles. In case of abnormal conditions, alerts are sent to authorities with vehicle location for quick emergency response.



### 2.0.2 Automatic Road Accident Detection Techniques

This survey discusses methods for detecting accidents quickly using technologies like smartphones, GPS, GSM, and VANET. These systems automatically send accident information and location to emergency services, reducing response time.

### 2.0.3 Driver Knowledge on Animal-Vehicle Collisions

This study highlights the importance of driver awareness and responsible driving to reduce animal-vehicle collisions. It suggests collaboration between road and wildlife authorities along with proper safety measures.

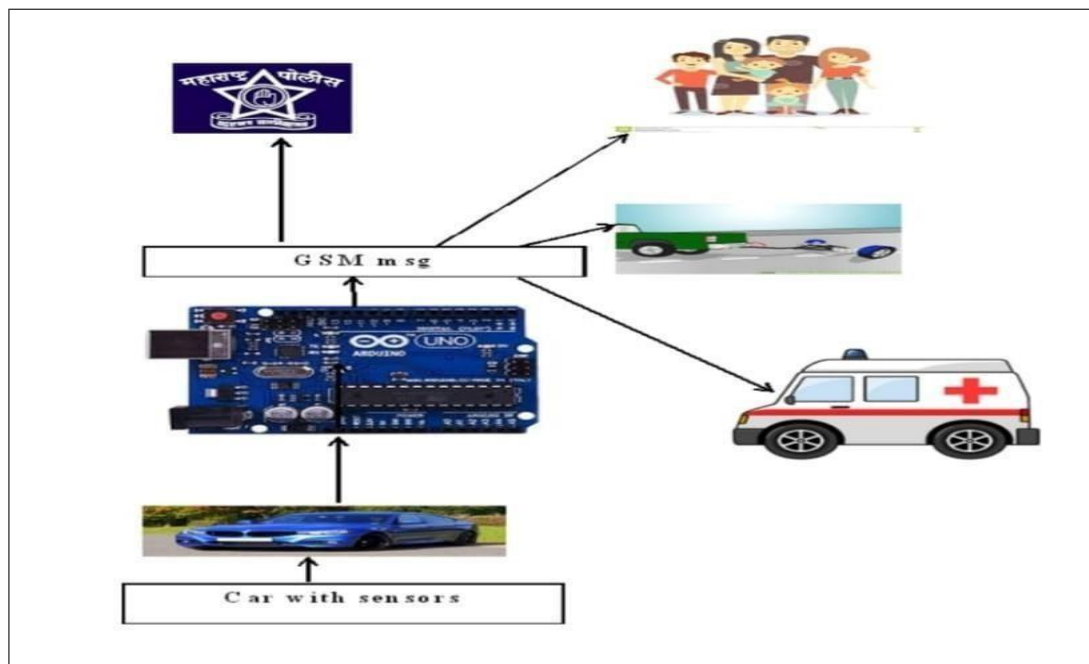
## III. METHODOLOGY

It is important to think the project thoroughly from the beginning of the first stage towards the end of its production. Type of methodology chosen and techniques justification, hardware or software requirement and project planning will be discussed in developing of project. The success of the project will depend critically upon the effort, care and skill that apply in its initial planning. The proposed project will be developed using waterfall model weather project will be constructed following the preliminary investigation phase, analysis phase and requirement phase, system design phase, development and implementation phase, system testing phase and operation and maintenance phase. The suitable techniques and tools will be selected to implement in the development process. Work breakdown structure will be used as a technique to decompose the project into phases, activities and tasks to perform an easier and sequential step of project development. System testing will be performed from time to time and optimal solution will be selected from many alternatives available to solve the arise problems.

## IV. SYSTEM ARCHITECTURE

Architectural design is a concept that focuses on components or elements of a structure. An architect is generally the one in charge of the architectural design. They work with space and elements to create a coherent and functional structure

By constantly monitoring the operational behavior of the vehicle (e.g. sensing if the vehicle is drifting out of its driving lane), the system can identify signs of inattentiveness or distraction in the driver. When the system detects such behavior, voice and message alerts are issued via the navigation system. The seatbelt alert mechanism is also activated, tightening around the driver to gain immediate attention. A Line Follower car parking, as the name suggests, is an automated guided vehicle, which follow a visual line embedded on the floor or ceiling for park the car.

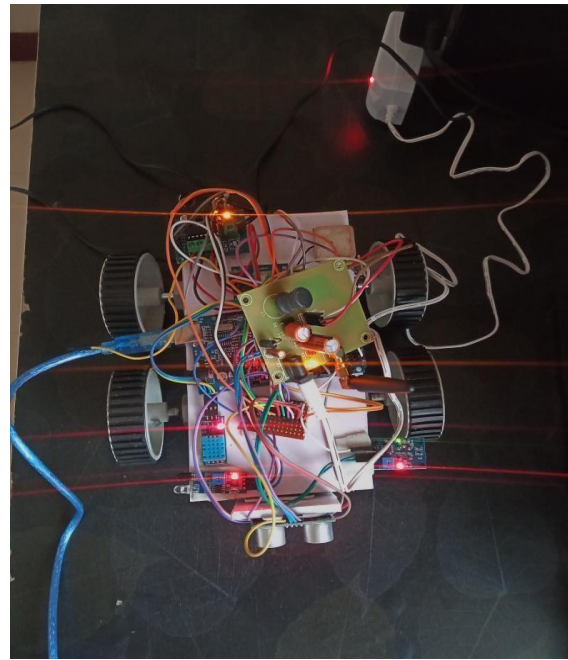
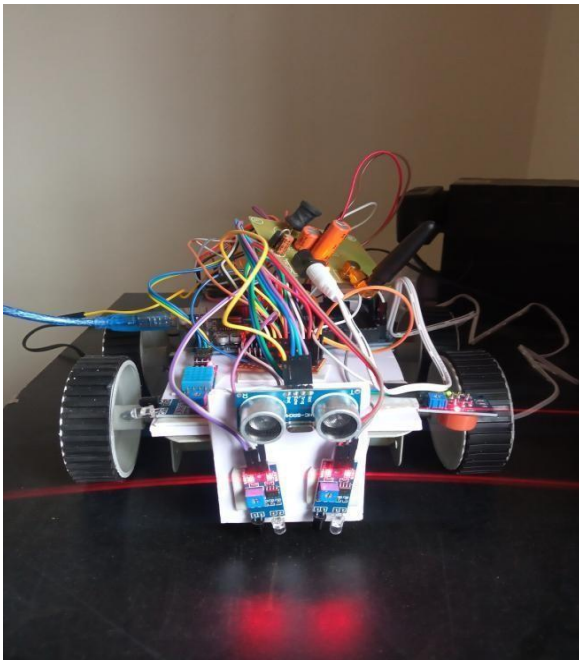


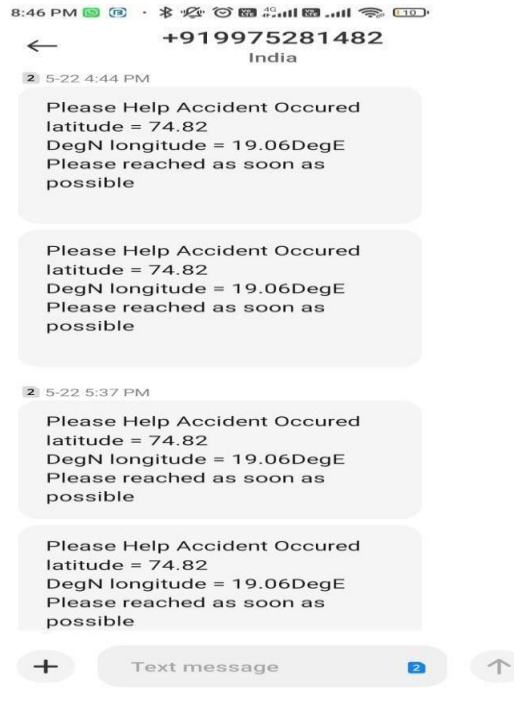
## V. ALGORITHM



1. **Sensor Data Acquisition:** The robot is equipped with one or more-line sensors, such as infrared or reflective sensors, positioned underneath it to detect the line. These sensors provide input signals that indicate whether the line is detected or not.
2. **Sensor Calibration:** Before starting the line following task, it's often necessary to calibrate the sensors to determine the threshold values that differentiate between line and non-line readings. This calibration step helps establish reliable readings for subsequent processing.
3. **Line Detection:** The sensor readings are processed to determine the presence and position of the line. This can be achieved by applying a threshold to the sensor values to convert them into binary information (line or non-line) and then analyzing the resulting data to detect the line's location.
4. **Error Calculation:** The position of the line with respect to the center of the robot is calculated, creating an error value. The error represents how far off-center the robot is from the desired path.
5. **Control Signal Generation:** The error value is used to generate a control signal that determines the robot's movements. This signal could be a proportional, integral, and derivative (PID) control signal or any other suitable algorithm. The control signal provides information on whether the robot needs to turn left, right, or continue straight to reposition itself on the line.
6. **Motor Control:** The control signal is used to adjust the robot's motor speeds or steering mechanism. For example, if the robot needs to turn left, the motor controlling the right wheel might slow down or stop, causing the robot to turn in the desired direction.
7. **Iterative Process:** The line following algorithm continuously repeats the steps from line detection to motor control in a loop, allowing the robot to adjust its movements and stay on the line dynamically.

## VI. RESULTS AND DISCUSSION





## VII. CONCLUSION

The IoT-based vehicle accident detection and rescue system is designed as an intelligent, sensor-driven safety framework that continuously monitors vehicle conditions and responds immediately in case of emergencies. This system integrates multiple technologies such as sensors, GPS, GSM communication, and microcontroller-based processing to create a real-time safety solution. The core functionality begins with data acquisition, where sensors like vibration sensors, ultrasonic sensors, and speed monitoring modules continuously collect information about the vehicle's movement, surroundings, and driving conditions. This data is processed by a microcontroller (such as an Arduino-based system), which analyzes whether the vehicle is operating under normal conditions or if there is a potential accident scenario.

In the event of a collision or abnormal impact, the system quickly detects sudden changes such as high vibration or abrupt deceleration. Once an accident is identified, the GPS module immediately captures the exact location of the vehicle in terms of latitude and longitude. This location data is then transmitted via the GSM module, which sends alert messages to predefined contacts such as family members, nearby hospitals, and police stations. This rapid communication reduces response time and increases the chances of timely medical assistance, which is often critical in saving lives.

Another important feature of this system is vehicle tracking. Since the GPS module continuously updates location data, the vehicle can be tracked in real time. This is especially useful not only during accidents but also for general vehicle monitoring and security purposes. The system can also include a speed detection mechanism, which helps identify rash or over-speed driving. If the vehicle exceeds a predefined speed limit, the system can trigger warnings through a buzzer or alert notifications, encouraging safer driving behavior.

The collision warning system further enhances safety by using ultrasonic sensors to detect nearby obstacles. If the vehicle comes too close to another object, the system alerts the driver, helping to prevent accidents before they occur. Alongside this, an alerting system integrates all safety features and ensures that warnings and notifications are delivered promptly and effectively.

To make the system more sustainable and energy-efficient, it can be powered using solar energy. By integrating solar panels, the device can store energy for future use, reducing dependency on conventional power sources and making it suitable for long-term, real-time applications.

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