# A Review Paper on Prevention and Detection of Vehicle's Accident using Mobile Sensors

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***Abstract :*** Road accidents rates are very high nowadays, accidents occur mainly due to rash driving (over-speeding, overtaking, not following traffic rules, etc.). Timely medical aid can help in saving lives. This proposed system aims to alert the nearby medical services about the accident to provide immediate medical aid. And as a result reduce or avoid accident cases. The attached sensor (accelerometer) in the vehicle senses the tilt of the vehicle. Thus the proposed system will make the decision to alert the admin (owner of the vehicle or family members) and it will send the information through the smartphone. The Android application in the mobile phone will send text message to the nearest medical services and family or vehicle owner. Proposed system also shares the exact location of accident with emergency medical services and admin (owner of the vehicle or family members).

***Keywords* -Android, Location Based Services, GPS technology, Decision Making Algorithm.**

## I. INTRODUCTION

The high demand of vehicles has additionally multiplied the traffic hazards and also the road accidents.Life of the people is under high risk. This is thanks to the shortage of best emergency facilities accessible in our country. This style could be a system which might notice accidents in considerably less time and sends the fundamental data to tending centre among some seconds covering geographical coordinates, the time and angle during which a vehicle accident had occurred. This alert message is shipped to the rescue team in a very short time, which will help in saving the valuable lives. Not only there is accident detection mechanism but also accident prevention mechanism. The system uses internal sensors of a smartphone, therefore it is cost effective. Accelerometer checks if a collision has occurred and GPS signal is sent to the nearest emergency services. Due to lack of immediate medical assistance during an accident many lives are lost. The system will help in saving lives. But it will also help in preventing rash driving behaviour which leads to accident

## II. DIAGRAM



### 2.1 Existing mobile applications for accident detection

SOSmartapp: This mobile application detects an accident using internal sensors (accelerometer and GPS). The notification of accident and accident location is sent to the contacts which are pre-selected by its user. And the users pre-selected contacts can send help. The app also shows nearby hospitals for emergency medical assistance.

Blinkapp: This mobile application analyzes the motion of vehicle using internal sensors of smartphone. After it detects the accident it confirms with the user if accident has happened or not. And then notifies the hospitals, police stations, ambulance, family and friends about the accident. Emergency services reaches the accident location for help.

## III. RELATED WORK

**AjithKumar.A, Jaganivasan.V, Sathish.T [1]**

The Expected performance is achieved through implementation of the proposed system. The sensor and other required components are distributed throughout the car providing more optimal results to detect accidents. The proposed system can also be used for traffic estimation and system performance estimation to prevent loss of life to its maximum.

**Ahmad ALkharabsheh [2]**

In this paper, the researcher proposed an intelligent method based on agents system that would use the agent's features to maximize the potential quality of save accident Victims life by reducing the time needed to identify accident location. An intelligent early accident detection and notification system using multi-agents approach is proposed and designed. A new dynamic method for finding the nearest neighbours of accidents location that would help to dynamically contact the accidents neighbours for requesting their support is presented. A prototype of agents sensory input is implemented and tested. To be concluded, a new method for early accident detection and identify it's exactly accident location was investigated. The main objective of such method is reduction of the time interval between the accident occurring and the arrival of the emergency services to the accident location which is lead to a lower probability of death. Depending on this method, the rate of rescue of the accident victims is expected to rise significantly and thus the lives of the injured will be safer.

**Saurabh S. Sharma, Shubham Tendulkar [3]**

"Accident Alert and Vehicle Tracking Mechanism" is give a general idea about vehicle tracking and vehicle accident detection system using the GPS and GSM Module has been successfully explained. The incident get detected and the detection system can track coordinates of the location of incident happening i.e. geographical information automatically using GPS System and sends an alert SMS notification about accident. Though it will increase little cost of vehicle but safety is the major requirement of the current time due to heavy increase in traffic and is highly beneficial to the automotive trade. Tentative work has been carried out cautiously. The result shows that higher compassion and correctness and will decrease the rate of accidents happening all around the country.

**Imran A. Zualkernan; Fadi Aloul; Fayiz Basheer; GurdutKhera;Shruthi Sriniyasan [4]**

Road accidents are one of the leading causes of mortality. While most accidents merely affect the exterior of the cars of the drivers involved, some of them have led to serious and fatal injuries. It is imperative that the Emergency Medical Services (EMS) are given as much information about the crash site as possible before their arrival at the scene. In this paper, a mobile phone application is developed that, when placed inside a car, intelligently classifies the type of accident it is involved in and notifies the EMS team of this classification along with the car's GPS location. The classification mechanism is built through a collection of data sets from a simulation of three types of collisions, which creates a knowledge base for an artificial intelligence-based classifier software. The experimental setup for data collection and the functionality of the mobile phone application called `Crash Detect' are explored.

**Tey Han Yee, Phooi Yee Lau [5]**

Vehicle collision detection (VCD) system is an Android Apps. VCD system requires the assistance of on-board sensors: (1) GPS, and (2) Accelerometer, and (3) Linear Acceleration. GPS is used to calculate the car speed, while the accelerometer is used to calculate the acceleration force. Our idea is to combine both sensors decision to evaluate an accident condition, i.e. the severity of potential accidents. Connectivity is required, as the database is located at the backend using backendless API, for data creation/updates. User can be service provider or driver, (1) providers will receive accidents sent by driver and (2) driver has to provide information surrounding the trip. The typical flow of the application (for driver) is: Step 1: Driver activate application and key-in relevant information, Step 2: When potential accident is detected, the system will automatically check for the closest Service Provider(s), and Step 3: Relevant information and notification to them. The application begins by prompting the number of passengers from the user (integer value). Then, the user activates the detection; the application will monitor speed and acceleration force of the vehicle. When a potential dangerous event data occurs, it will prompt the user to confirm whether an accident has occurred. User can cancel if no accident has happened, whereas if there is no responds from user for 20 seconds, the application will search for the nearest providers within 10km radius. If a Provider is found within 10km radius, details of the accidents including number of passenger, current victim and location will be stored in a database and assigned to the provider. Lastly, a notification will be delivered to the assigned provider.

**ZhengxuHou;Yiping Chen [6]**

Hundreds and thousands of vehicle are involved in severe traffic accident every year world-wide. The place where accidents are more likely to happen include someplace where has few inhabitants or no camera surveillance such as highway and Country trail. In this situation, it will impede rescuing process when driver is comatose by a severe collision accident. Vehicle Collision Sensor Systems are a valid device for increasing drivers safety by informing the police of precise location of the accident automatically through telephone after accidents. In this work, we present a collision reporting system based on TCP/IP protocol. The system is composed of three parts, vehicle collision sensor terminal worked on car cigarette lighter, application used on smartphones and remote server based on LabVIEW software. At the end of the paper, remote control and alarm tests are carried out. A detailed evaluation of the proposed system and collision reporting demonstrates the suitability as Vehicle Collision Reporting System for human drivers.

## IV. COMPARATIVE ANALYSIS

| Sr. No. | Paper Title | Accident notification | Rash Driving alert | Use of smartphone sensors | External Hardware | Accelero meter | GPS | Description |
|---|---|---|---|---|---|---|---|---|
| 1 | Accident Alert and Vehicle Tracking Mechanism | Yes | No | No | Yes | No | Yes | Uses GPS & GSM with raspberry pi to detect accident |
| 2 | Accident Detection And Alerting System Using GPS & GSM | Yes | No | No | Yes | Yes | Yes | Vehicle accidental monitoring system using MEMS, GPS and GSM Technology. |
| 3 | Early Car Accident Detection and Notification Based on Multi-Agents Approach | Yes | No | No | Yes | No | Yes | Developed a Multi-Agent Systems for accident detection. |
| 4. | Proposed System | Yes | Yes | Yes | No | Yes | Yes | Uses built-in mobile sensors to detect accident. And also detect rash driving. |

## IV. METHODOLOGY

The Table No. 1 shows what are the different technologies used to develop their application. The table is divided into several parameters like accident notification for emergency services (hospital, police, etc.), rash driving detection and alert, use of smartphone sensors, need of external hardware, is accelerometer used, is GPS used. With the help smart phone devices we can detect the rash driving and send back the acknowledgement to the vehicles owner, also provide the emergency services at the accidental spot.

### 4.1 Methodology Process

In Table No. 1 we compare different parameters to find out the better solution. Advantages and limitations are compared with each other. As discussed in paper "Accident Alert and Vehicle Tracking Mechanism**.**" the system can detect the accident by using external hardware (raspberry pi & GPS), but there is no use  of smartphone nor does the system try's to prevents the accident by detecting rash driving. In the second paper, "Accident Detection And Alerting System Using GPS & GSM**".** The system uses an external system (Arduino MEGA 2560, accelerometer, GPS) to detect accident. But this system also does not prevent rash driving. In the third paper "Early Car Accident Detection and Notification Based on Multi-Agents Approach", the paper discusses about developing a Multi-Agent System by using arduino controller, GPS, GSM and touch sensor) this system also doesn't detect rash driving behavior. The Proposed system, does not require any external hardware as it uses internal GPS and accelerometer in smartphone. Also, it prevents accident by detecting rash driving behavior.

### V. ANALYSIS

From the above mentioned Table No. 1 different technologies are discussed and there use is stated in a system. In this survey paper, different systems are compared. They use different types of external hardware to check for accidents. The hardware consist of a GPS to send the location of a vehicle. And a GSM module  to send emergency messages. These types of systems cannot detect rash  driving. The installation of the hardware device can be cumbersome process. The vehicle needs to be modified to install the device. This can lead to unnecessary labour. Many system only detect an accident, they don't help in prevention of accident.

### VI. PROPOSED SYSTEM

The proposed system helps in preventing accident, by detecting rash driving patterns. And also detects accidents. As it uses internal sensors of a smartphone, the proposed system is cost effective. The use is hassle free as no hardware device needs to be installed. The internal accelerometer of smartphone can detect minute changes. So Rash driving can be detected by checking the speed, sudden left or right turns, etc.  Alert the driver and owner of the vehicle by sending a notification about the rash driving. It also detects accidents, and informs the emergency services about the accident location. Rash driving behaviour alert can deter driver from irresponsible driving. Informing emergency services about accident location can save life. Use of built-in sensors of smartphone is cost effective.

### VII. EXISTING DIFFERENT TYPE OF APPLICATIONS

- Location based applications: OLA, Uber, etc.
- Accident detection applications: SOSmartapp, Blinkapp, etc.
- Accident prevention applications: None.

### VIII. CONCLUSION

As the analysis over all the proposed systems, the proposed system can prevent and detect the rash driving by using the sensors with an mobile application. Built-in sensors (accelerometer and GPS) of smartphone are used; hence no external hardware is needed for the proposed system. Proposed system not only detects accident, but also helps in preventing accident by detecting rash driving.

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