

# Collision and Rollover Detection in Vehicles

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**Abstract:-** This Project application is all about collision detection in vehicles and sending information about collision to nearby emergency care like ambulance and police station. When a vehicular accident occurs in remote locations, the accident may render the driver and passenger unconscious, which would lead to a situation where no call could be placed for help. In such cases of immediate hospitalization the role of this application comes to existence. When an accident occurs, this application detects the intensity of collision at which car met with the accident and if it is above certain threshold thrust then the application gets activated and waits for a user response. This leads to the following two conditions: If driver is in a condition to move and via the application confirm his condition, application does not perform any action, else the application directly contacts nearby emergency care like ambulance and police.

**Keywords:-** Vehicle collision, hospitalization, user response.

## 1. INTRODUCTION

People around the world are trying to lead a safe life. Total 7.3 billion people drive everyday. Nowadays the technology growth has also did lot of changes in all the fields of science. Current transportation systems face several challenges such as traffic congestion, mobility, and safety from the tremendous increase in traffic accidents especially in developing countries [1]. Traffic accidents are one of the key causes of death and injury in the world [2]. Accidents can occur due to engine failure, it might also happen due to careless driving or fault of other driver. Vehicular collision detection system is developed to avoid accidents, based on GPS technology. Our collision detection system captures the geographic location of vehicles [3]. Even if vehicle due to accident is rolled over from top of mountains or off the road and damaged is caused this is detected by the device and nearby emergency care is contacted on the spot even if the victim is unable to reach the device. This helps to save passenger's and driver's life if they are not in conscious state to reach the device. This system helps people who have met with accident in remote area during night time on highways where nobody stops to help or on some ghat section where nobody is present to witness or help even if willing to do so, since no pedestrian could witness this until the next daylight. Due to non compensatable GPS(Global Positioning System) positional errors Regional

Navigation Satellites(RNS) are used to spot the exact location of the accident with the help of sensors.



Figure 1: Accident in remote area and night time.

## 2. RELATED WORK

The Vehicular Collision Warning Systems (CWS) are mainly classified into two categories. First category includes the systems where each vehicle is autonomous and is capable of detecting obstacles, even of heterogeneous types. A vehicle would gauge obstacles in its path through the use of cameras, radars, acoustic systems, sensors etc [5]. In [6] the sensor technologies and placement of sensors for accident detections with a focus on the rollover crash detection was reviewed. The paper also discussed sensor selection for particular crash detection based on sensors performance. The research presented in [7] aims at developing an engineering tool for evaluating technical and functional specifications of a forward looking automotive radar sensor and threat assessment algorithms for forward collision system.

## 3. SYSTEM MODEL

There are many collision detection model available related to collision avoidance and collision detection. This system helps to locate exact location where accident occurred and through help of live satellite information is sent in fraction of seconds to emergency care by pre recorded voice or textual form. This helps in saving life of many people whenever accident occur. This helps in high speed data transfer. GPS error is particularly problematic for detection in multi-lane environments. Most conventional vehicle GPS devices are unable to determine a vehicle's location to lane-level accuracy as the GPS error is usually larger than standard widths [9].

### 3.1 Details sent when accident occurred

A GPS device implemented into device along with satellite components helps to locate location of the Car in any remote area of any part of earth. After accident the details that are together sent to satellite servers.

Device Id	Longitude	Latitude	Threshold rate
Unique	Accurate	Accurate	Collision freq

### 3.2 Satellite Server

Regional satellite always orbit around the countries always monitor the status of weather, national security and military purpose can be also used to implement and help the common people.



Figure 2: RNS Operation.

### 3.3 Better accuracy

The Regional Navigation satellites helps in locating the device implemented in car within 3-4 meters whereas the google maps or satellites which uses GPS locates the device with in

100 meters of range. Therefore using of RNS is the best possibility to find the accident location of the car. RNS implementation helps emergency care to find exact spot of accident sometimes there will changes of vehicle getting rollover from mountains and hilly areas this system helps emergency cares to locate the exact location of device.

### 3.4 Placing of the Device.

In many cases the device is placed in front part of the car, mostly the device in kept somewhere near the dash board of

the car, or at times near steering. This may lead to failure of device since there is a high chance of device getting damaged during high rate impact collision. By placing the device in between the first two seats of the car the possibilities of device getting damaged is reduced and also the driver's reachability to device is increased and whenever device is active i.e, when the car meets with a major accident, driver is able to confirm his condition by clicking alright button. This is the best place to place the device.



Figure 3: Placing device

### PROTOTYPE DEVELOPMENT SYSTEM

A prototype of the collision detection system is developed with the help of RNS and satellite module combined. Satellite plays very important role by sending accurate data at high speed to emergency care. As soon as device receives no response from driver within the set time, it assumes driver's condition as critical and sends signals to satellite module even in remote area and satellite module server is connected to emergency care centers which could immediately deploy its units for help. This system could be helpful in saving people's life on highway during night time when after accident no one stops vehicles for help (may be lack of sight of the accident) and in remote areas when car slides off the road or crashes and nobody is around to help even if wanted to do so. This system is well places the device in such a way that device is secured and there should be no device failure occurs in case of emergency.

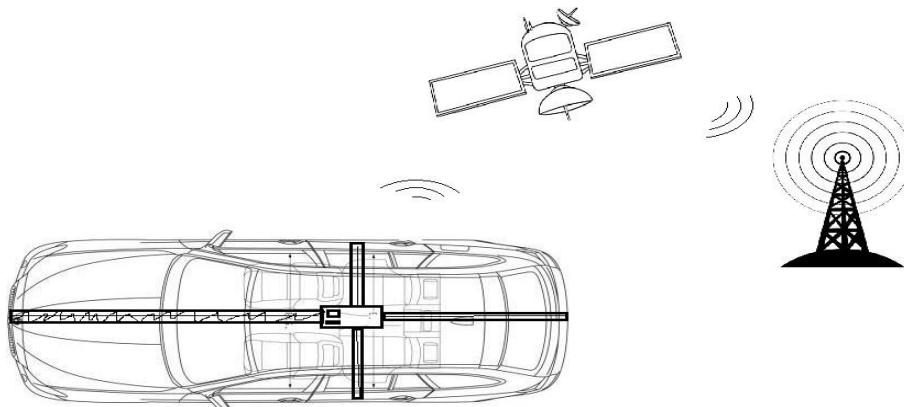


Figure 4: System implementation

#### 4. CONCLUSION

In this paper we have proposed that vehicle collision detection and roller detection techniques with the help of RNS and satellite module. Satellites are used to track the device. RNS modules helps to send signals to satellite. If the impact of collision is very high and driver is unable to confirm his /her condition, then the device (placed within the car) sends the signal to the satellite immediately contacts nearby emergency care center by sending the exact location of accident with the help of pre recorded audio or in textual form. This system is going to help a lot of travelers who's unaccepted encounter with major injuries may make them unconscious on highway and remote areas or any low populated area.

#### 5. FUTURE WORK

A future work can be carried out by combining collision avoidance alert system and satellite mapping location system using RNS.

In the GMPE\_ACR [8] model, n Gauss-Markov equations are used to describe the movement of an object in n dimensional space. Quick hospitalization is provided people who have undergone major injuries.

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