

## Original Research Article

# Monitoring on Guardrails to Afford Road Safety Using IOT

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## ABSTRACT

The preservation of the road infrastructures has become an important issue to the road safety and structural monitoring systems industry aiming to reduce the maintenance cost and also to increase the drivers safety. The collision features of the simulation of car- guard rail. It is found that the vibration features of the guardrail within the accident have a good performance to the accident identification. The vibration data of the guardrail are recorded real-timely by the nodes with accelerator sensors on the guardrail network. Then the collision accident is identified in terms of the vibration threshold. The proposed design is a system which can detect accidents in significantly less time and sends the basic information to first aid center within a few seconds covering geographical coordinate the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time which will help in saving the valuable lives.

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## I. INTRODUCTION

The increased the vehicle population, the accident on the highway has an increasing trend. According to the statistics among all the traffic accidents the accidents take place in highway out of 55% about 30% of which involve the car-guardrail collision. One third of the fatal accidents per year are due to the car-guardrail collision. Therefore, it is urgent to develop effective solution for highway accidents monitoring. Ongoing efforts are being made in order to monitor and preserve the road surface and bridges increasing the infrastructure life time and consequently the drivers safety providing diverse security which lead to reduce the number of accidents and injuries. The proposed design is a system which can detect accidents in significantly less time and sends the basic information to first aid center within a few seconds covering geographical coordinate the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time which will help in saving the valuable lives Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team. When the accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the GSM module and the location of the accident is detected with the help of the GPS module. The accident can be detected precisely with the help of vibration sensor and RFID tag to detect the vehicle the use of RFID tag is due to what if the vibration was made by the natural disaster. This application provides the fast recovery solution to poor emergency facilities provided to the roads accidents. The instant detection of collisions with the guardrails will allow to minimize the consequences of an accident or disaster. The location can also be

viewed on Google maps. After conforming the location necessary action is taken. As a future implementation a wireless webcam added.

## **II.LITERATURE SURVEY**

Kiran Sawant et al., created an accident alert system using GSM and GPS modem and Raspberry Pi. A piezoelectric sensor first senses the occurrence of an accident and gives its output to the microcontroller. The GPS detects the latitude and longitudinal position of a vehicle. The latitudes and longitude position of the vehicle is sent as message through the GSM. The static IP address of central emergency dispatch server is pre-saved in the EEPROM. Whenever an accident has occurred the position is detected and a message has been sent to the pre-saved static IP address [1].

Mrs Manasi Patil et al., described a better traffic management system using Raspberry pi and RFID technology. The vehicle has a raspberry pi controller fixed in it which is interfaced with sensors like gas sensor, temperature sensor and shock sensor. These sensors are fixed at a predetermined value before accident. When an accident occurs the value of one of the sensor changes and a message to a predefined number (of the ambulance) is sent through GSM. The GPS module which is also interfaced with the controller also sends the location of the vehicle. When the message is received by the ambulance, a clear route has to be provided to the ambulance. The ambulance has a controller ARM which is interfaced with the RFID tag sends electromagnetic waves. When an ambulance reaches the traffic signal the RFID reader which is placed on the joints detect the electromagnetic waves of the tag. If the traffic signal is red, then the readers goes through the database in fraction of seconds and turn the red-light green. And automatically in such condition the RFID on opposite joints turn the opposite signal red. This provides a clear route to the ambulance. [2]

V.Sagar Reddy et al., developed an accelerometer-based System for driver safety. The system has the advantage of tracking or identifying vehicles location just by sending a SMS or email to the authorized person. The system is designed by using Raspberry Pi (ARM11) for fast access to accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so

they can take immediate action to save the lives and reduce the damages [3].

Sri Krishna Chaitanya Varma et al., proposed an Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems. AT89C52 microcontroller is used in the system. When the system is switched on, LED is ON indicating that power is supplied to the circuit. When the IR sensors that are used sense any obstacle, they send interrupt to microcontroller. The message gives the information of longitude and latitude values. Using these values, the position of the vehicle can be estimated [4].

Apurva Mane et al., described the methods for vehicle collision detection and remote alarm device using Arduino. Key features of this design include real-time vehicle monitoring by sending its information regarding position (longitude, latitude), time, angle to the monitoring station and to the user/owners mobile that should help them to get medical help if accident or the theft occurs. Also user/owner has an access to get real-time position of a vehicle in real time. Whenever accident occurs MEMS and vibration sensor detects and sends the signals to microcontroller, by using GPS particular locations where accident has occurred is found, then GSM sends message to authorized members-[5] Prof.Mrs.Bhagya Lakshmi V et al., proposed a FPGA Based Vehicle Tracking and Accident Warning system using GPS. FPGA is mainly used to track position of any vehicle and send automated message to preprogrammed number.

The owner of vehicle, police to clear traffic, ambulance to save people can be informed by this device. It can also be predicted whether the vehicle is in normal position or upside down [6].

## **III.SUMMARIZATION**

With the advent of science and technology in every walk of life the importance of vehicle safety has increased and the main priority is being given to reduce the accident detection time when an accident occurs, so that the wounded lives can be attended in lesser time by the rescue team. The Microcontroller along with ultrasonic sensor, accelerometer, GPS and GSM modules shorten the alarm time to a large extent and locate the site of accident accurately. Consequently, the time for searching the location is reduced and the person can be treated as soon as possible which will

save many lives.

This system will have broad application prospects as it integrates the positioning systems and the network of medical based services. In the existing accident detection systems there is the problem of false alarms or situations where immediate help is not necessary. In such cases the driver must be able to manually switch off the alert system and stop the sending of message.

#### **IV.PROPOSED SYSTEM**

The aim of the system is to create a smart accident detection system using that detects the occurrence of an accident and sends a message to the traffic control authorities or emergency help centers in case of an accident so that immediate help can be provided. It also enables real-time tracking of vehicle's location via SMS. The system has a switch to enable driver to stop alert system in case of false alarms. This system acts as a black box to vehicles. The vehicles location can be viewed using Google maps which is much easier than location in terms of latitude and longitude.

#### **V.CONCLUSION**

Hence the automatic alarm device for vehicle accidents has been implemented using microcontroller. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid Centre within a few seconds covering geographical coordinates, the time in which a vehicle accident has occurred. The switch provides the driver a chance to cut off emergency help systems in case the system triggers a false alarm or if the accident is very severe and immediate help is not required. The additional Google maps interface also makes the viewing of the location easier.

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