Review on Accident Alert and Vehicle Tracking System

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Abstract: **Vehicle accidents are one of the most leading causes of fatality. The time between an accident occurrence and the emergency medical personnel are dispatched to the accident location is the important factor in the survival rates after an accident. By eliminating that time between an accident occurrence and the first responders are dispatched to the scene decreases mortality rates so that we can save lives. One approach to eliminate that delay between accident occurrence and first responder dispatch is to use An Accident Alert and Vehicle Tracking System, which sense when a traffic accident is likely to occur and immediately notify emergency occurred. In this paper, that system is described the main application of which is early accident detection. It can automatically detect traffic accidents using vibration sensors and immediately notify a central emergency dispatch server after an accident had occurred using GPS coordinates further the central emergency dispatch sever send that location details to the ambulances which are near to that location. This system uses the things i.e. Raspberry Pi, Vibration Sensors, GPS and GSM modules to detect traffic accidents.**

Keywords: **GPS Module, GSM Module, Raspberry Pi, Accelerometer ADXL 335.4.**

1. INTRODUCTION

The high demand of vehicles has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country. An automatic alert system for vehicle accidents is introduced in this paper. The proposed 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 and angle in which a vehicle accident had occurred. This alert message is sent to the central emergency dispatch server in a short time so that the emergency dispatch server will inform to the ambulances which are near to that location, which will help in saving the valuable lives. A 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 ambulance. When the accident occurs the alert message is sent automatically to the central emergency dispatch server. 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. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way.

PROBLEM DISCRIPTION:

The Accident Alert and Tracking System is the system which track vehicle current location using global positioning system (GPS).This product gives the live updates of accidental vehicle with their location details. It ensures the vehicle which has got accident to send location details to web server located at emergency ambulance center further that location details of accidental vehicle send to nearby ambulance as well as display it on map.

As per the system architecture, Accident Alert and Tracking System is working same as follows. When the accident will occurred, then the system will direct send the accident alert message along with location details of the accidental vehicle

to emergency dispatch sever further it will send that alert message to the nearby ambulance so that it will go to that location. By using system like this we can decrease the mortality rate which is lead by accident.
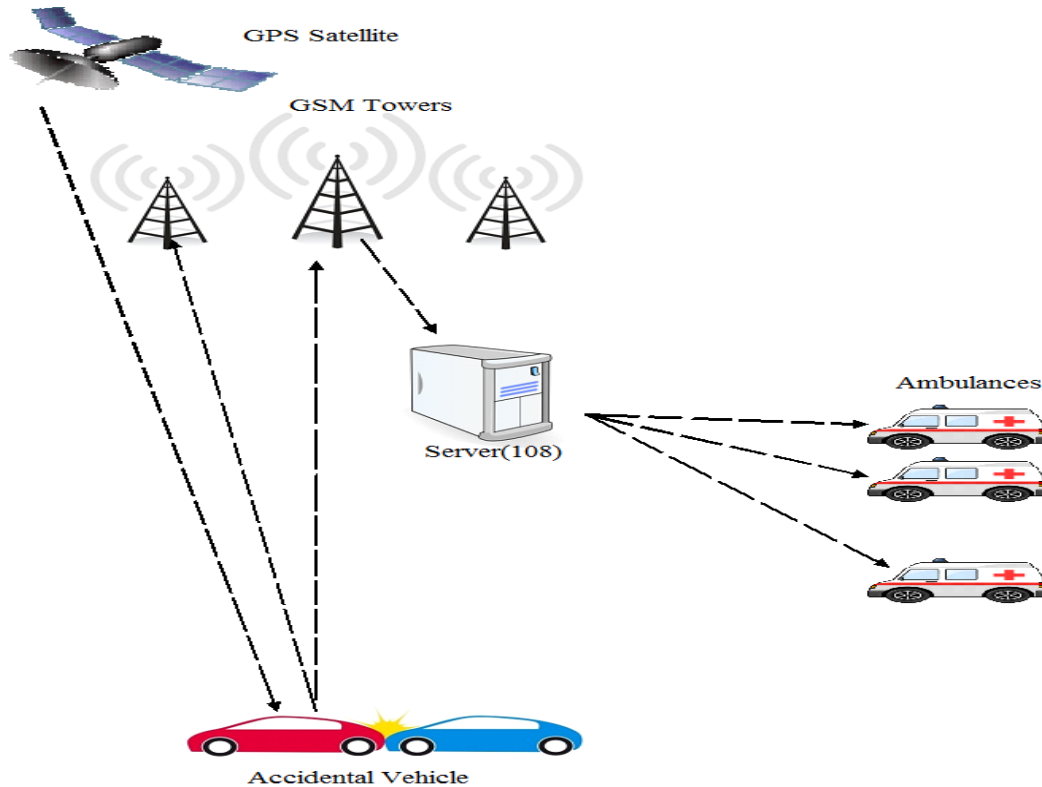

Figure 1: System Architecture

This system is a prototype model of Accident Alert and Vehicle Tracking System using GSM and GPS modem and Raspberry Pi working will be made in the following steps:

[1] A piezoelectric sensor will first sense the occurrence of an accident and give its output to the microcontroller.

[2] The GPS detects the latitude and longitudinal position of a vehicle.

[3] The latitudes and longitude position of the vehicle is sent as message through the GSM.

[4] The static IP address of central emergency dispatch server is pre-saved in the EEPROM.

[5] Whenever an accident has occurred the position is detected and a message has been sent to the pre-saved static IP address.

2. RELATED WORK

Benjamin Coifman [1]: As per the "A Real-Time Computer Vision System for Vehicle Tracking and Traffic Surveillance" research paper, Benjamin Coifman and his colleagues had developed a feature-based tracking system for detecting vehicles under challenging conditions such as Increasing congestion on freeways and problems associated with existing detectors. In their system, instead of tracking entire vehicles, vehicle features were tracked to make the system robust to partial occlusion. The system was fully functional under changing lighting conditions because the most salient features at the given moment were tracked. After the features exit the tracking region, they were grouped into discrete vehicles using a common motion constraint. The groups represented individual vehicle trajectories which can be used to measure traditional traffic parameters as well as new metrics suitable for improved automated surveillance. Their paper describes the issues associated with feature based tracking, presents the real-time implementation of a prototype system, and the performance of the system on a large data set.

V.Ramya, B. Palaniappan and K. Karthick[4]: V.Ramya,B.Palaniappan and K.Karthick had developed the system named as "Embedded Controller for Vehicle In-Front Obstacle Detection and Cabin Safety Alert System". According to their research paper, they had developed a system which had provided good safety and security while travelling. Their project was basically to design an embedded system for vehicle cabin safety and security by modifying and integrating the existing modules. This monitored the level of the toxic gases such as CO, LPG and alcohol inside the vehicle and provided alert information in the form of alarm during the critical situations. And also sent SMS to the authorized person through the GSM. An IR Sensor was used to detect the static obstacle in front of the vehicle and the vehicle got stopped if any obstacle was detected. This may avoid accidents due to collision of vehicles with any static obstacles.

Albert Alexe and R. Ezhilarasie[5]: Albert Alexe and R.Ezhilarasie had developed the vehicle tracking system named as "Cloud Computing Based Vehicle Tracking Information Systems" which was implemented using centralized web service and cloud computing. The proposed technology was based on GPS technology, GSM and cloud computing infrastructure. The vehicles were fitted with specialized embedded device, GPS device and GSM enabled device.

The embedded device was fitted with "sensors".

The sensors involve:

[1] To identify the fuel level/status.

[2] Alcohol sensor – status of the driver.

[3] To indentify current name of the location.

[4] To find distance covered.

[5] To predict arrival time.

This all stimulus data were transferred to cloud server through GSM enabled device. The GPS device was used to track the vehicle locations. All the data's were stored in centralized server which was maintained in cloud. Each licensed vehicle owner could access the cloud using web portal. From the web portal the user could retrieve all the real time data. Proposed system may allow for the stability, equilibrium, efficient resource use and sustainability of a tracking system.

R. Ramani, S. Valarmathy, Dr. N. Suthanthira Vanitha, S. Selvaraju, M. Thiruppathi and R. Thangam[2]: R.Ramani and his colleagues had designed the system named as "Vehicle Tracking and Locking System Based on GSM and GPS" for the safety of vehicles to avoid a theft of vehicles. Vehicle tracking and locking system was installed in the vehicle, to track the place and locking engine motor. The place of the vehicle was identified using Global Positioning system (GPS) and Global system mobile communication (GSM). These systems was constantly watched a moving Vehicle and reported the status on demand. When the theft was identified, the responsible person sent SMS to the microcontroller, then microcontroller issued the control signals to stop the engine motor. Authorized person needed to send the password to controller to restart the vehicle and open the door. Their system was more secured, reliable and low cost.

Kunal Maurya, Mandeep Singh and Neelu Jain[3]: Kunal Maurya and his colleagues had developed the system named as "Real Time Vehicle Tracking System using GSM and GPS Technology-An Anti-Theft Tracking System" was an electronic device which was installed in a vehicle to enable the owner or a third party to track the vehicle's location. Their research paper was proposed to design a vehicle tracking system that works using GPS and GSM technology, which would be the cheapest source of vehicle tracking and it would work as anti-theft system. It was an embedded system which was used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). This design would be continuously monitor a moving Vehicle and report the status of the Vehicle on demand. For doing so an AT89C51 microcontroller was interfaced serially to a GSM Modem and GPS Receiver. A GSM modem was used to send the position (Latitude and Longitude) of the vehicle from a remote place. The GPS modem would be continuously give the data i.e. the latitude and longitude indicating the position of the vehicle. The same data was sent to the mobile at the other end from where the position of the vehicle was demanded. When the request by user was sent to the number at the GSM modem, the system automatically sent a return reply to that mobile indicating the position of the vehicle in terms of latitude and longitude in real time.

Adnan I. Yaqzan, Issam W. Damaj, and Rached N. Zantout[6]: Adnan I. and his colleagues had developed a system named as "GPS-based Vehicle Tracking System-on-Chip" which was real-time, fast and reliable data processing

application. According to their research paper, they had built on a produced VTS (The Aram Locator) offering a system-on-chip (SOC) replacement of the current microcontroller-based implementation. The proposed SOC was built on a field programmable gate array (FPGA) promising a cheaper design, a more cohesive architecture, a faster processing time and an enhanced system interaction. Different designs, and their hardware implementations, were proposed with different levels of integration. Performance analysis and evaluation of the investigated designs were included.

3.   COMPARISON

Table 1:- Comparisons Of Existing Methods

System Name	Author	Year	Functionality
A Real Time Computer Vision System for Vehicle Tracking and Traffic Surveillance	Benjamin Coifman	2003	This was the feature based tracking system for detecting vehicles under challenging conditions such as increasing congestion on freeways.
GPS-based Vehicle Tracking System-on-Chip	Adnan I. Yaqzan, Issam W. Damaj, and Rached N. Zantout	2008	This was a real-time, fast and reliable data processing application.
Cloud Computing Based Vehicle Tracking Information Systems	Albert Alexe and R.Ezhilarasie	2011	This tracking system was implemented using centralized web service and cloud computing. The proposed technology was based on GPS technology, GSM and cloud computing infrastructure. The vehicles were fitted with specialized embedded device, GPS device and GSM enabled device.
Embedded Controller for Vehicle In-Front Obstacle Detection and Cabin Safety Alert System	V.Ramya, B.Palaniappan and K.Karthick	2012	This system had provided good safety and security while travelling. This monitored the level of the toxic gases such as CO, LPG and alcohol inside the vehicle and provided alert information in the form of alarm during the critical situations.
Tracking and Locking System Based on GSM and GPS	R. Ramani, S. Valarmathy, Dr. N. Suthanthira Vanitha, S. Selvaraju, M. Thiruppathi and R.Thangam	2013	This system was developed for the safety of vehicles to avoid a theft of vehicle. In this, vehicle tracking and locking system was installed in the vehicle, to track the place and locking engine motor .The place was identified by using GPS and GSM.
Real Time Vehicle Tracking System using GSM and GPS Technology-An Anti-Theft Tracking System	Kunal Maurya, Mandeep Singh and Neelu Jain	2014	This was an electronic device which was installed in a vehicle to enable the owner or a third party to track the vehicle's location.

4.   CONCLUSION

The aim of the paper is to give an overview of vehicle tracking and vehicle accident detection system. This Vehicle accident detection system can track geographical information automatically and sends an alert SMS regarding accident. Experimental work has been carried out carefully. The result shows that higher sensitivity and accuracy. This system is verified to be highly beneficial for the automotive industry.

ACKNOWLEDGEMENT

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