

Automated Accident Intimation and Rescue System for Vehicles

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ABSTRACT

Now a days, automation and advancement in the system is implemented everywhere. All the automobile industries are working to compete with the others. Also there is much more advancement in technologies, which are commonly available in the vehicles. The facilities provided with the vehicles such as self-start, auto-gear, battery chargers, remote controls, etc are commonly provided with all the vehicles. Everyone uses his own vehicle for travelling and transportation as there is a vast development in the nearby areas of the cities. The road accidents in metropolitan areas as well as in countryside areas have increased to an uncertain level due to these developments. The system can also be implemented for the rescue of the accident victims. Many issues like arrival of ambulance, the investigations made by the police department and operating the victim by the hospitals can be minimized by implementing the proposed system in every vehicle, including two wheelers and three wheelers.

Keywords: WSN, sensors, GPS, traffic system, AAIRS

1. INTRODUCTION

There has been tremendous growth in the traffic due to urbanization and especially due to population in India, resulting in the growth in automobile industries. This heavy traffic has also increased the problems like traffic congestion, resulting in the rule violations. Also it has increased the fuel consumption. These are the main reasons behind the mishaps on the road like accidents. Vehicle accidents are one of the leading causes of death in the India. An effective approach for reducing traffic sufferers, is the time minimization between when an accident occurs and as it is responded by people, such as medical personnel, are dispatched to the scene of the accident. Also there is the problem of Police enquiry, due to which the public avoid to help the victims on the road.

Nowadays, various fields such as weather monitoring, military, home automation, security and safety are using Wireless Sensor Networks (WSN) as a major part of their system. The well known field, where WSN is used is the Traffic Signal System for gathering the information about the incoming flow of traffic, traffic load on a particular road. WSN installed along the road is used to control the traffic load on roads and at traffic intersections [1]. The main features, which are used in the traffic control systems, are energy harvesting, resilience, scalability, and ability to withstand harsh environmental conditions, size of the sensor nodes, etc.

Traffic Signal system uses the sensor nodes of two types: i) Intrusive type and ii) Non-Intrusive type. Intrusive types of sensor are situated under the road, whereas Non-Intrusive sensors are fitted on the road [1]. Non-intrusive sensors are preferred as they are more cost-effective, easy to install, corrosion resistant compared to intrusive sensors.

Wireless Sensor nodes, deployed on the road can be utilised to prevent the accident victims from the death. Also the sensor nodes can be deployed on the vehicles to intimate the mishaps. Global Positioning System can be used to indicate the on road positions of the victims. The death ratio is increased due to the road accidents, as there are many obstacles like Ambulance arrival at exact location, investigations by the Enquiry units, followed by the actions taken by the hospital personals. The whole procedure takes the time, which is actually to be given for the treatment by the hospital personals.

2. LITERATURE SURVEY

The centralized location and navigation systems make use of communications networks, host facilities, and other infrastructures with the on-board vehicle equipment to locate and navigate to search the victim location [10]. K. Athavan [2] proposed a system, AARS to control the traffic signals to pass the ambulances if the accidents occur. The AARS can also be used to monitor the passing notifications of the commanding vehicles. V. O. Matthews, et.al.[7] designed a platform for emergency rescue in case of an auto crash and developed a prototype named as VAAL. They used the M2M technologies and GPS/GSM module, which operates usually under M2M platform. The communicating devices without human interface come under M2M. V. Gaud, et.al. [3] proposed a system, called as ARM. The controller processes the signal, as received and sends the message using GSM module. The system is integrated with

the positioning .e. GPS systems. A. Kushwaha, et.al.[9] designed the accident alarm system, AAS. It is totally integrated with the hardware and software modules including navigation systems. Whenever the sensor gets the signal, the acknowledgement will be obtained from GSM modem to specified mobile numbers stored in EEPROM, without making any delay [9][5].

The accident location can be exactly achieved, if the system is installed in the vehicles. Y. Zhao [10] discussed various technologies such as TOA (Time of Arrival), TDOA (Time Difference ao Arrival), and assisted-GPS solutions, which are the topmost competing communication systems nowadays. He also suggested the implementation of these systems in the mobile phone can improve the safety in the transportation, also for tracing the locations. He also proposed a mayday system. It makes use of a cellular phone for voice and data communications, a global positioning system (GPS) receiver for location tracing [11]. S. Sonika, et.al. [4] proposed a system to block a vehicle by passing a message, and only a authorized person unlock using security code, and helps the victim. The system can reduce the time required to reach from the accident place to the hospital. J. M. S. Pons, et.al. [6] discussed various techniques of geographical information systems and Intelligent transport system, which can help to form the strong communication network in the world. S. K. C. Varma, et.al. [5]. Sara Nazari,et.al.[12] proposed a modification of the Dijkstra’s shortest path routing algorithm, in which it is specified that the the search space can be minimized by using a rectangle or a static and dynamic hexagon. This can improve the performance of the system, in terms of time and memory usage, as the nodes and edges visited will be limited. Zhaosheng Yang [13] presented a new signaling method to pass the vehicles at the signal intersections priority wise. In this proposed work, the signal parameters can be changed, if there is any vehicle passing through any direction, if the vehicle is having GPS to locate its position.

3. PROBLEM STATEMENT

The use of vehicles increases in the proportion of the population. Due to the traffic congestion, the accidents are also increasing day by day. This causes the loss of life due to the delay in the arrival of ambulance to the accident spot or from the accident spot to the hospital. So, it is necessary to take the accident victim to the hospital as soon as possible. Whenever, the accident is occurred, it has to be informed to the investigation unit. So, it is also beneficial if the intimation is reached to the enquiry section so that the time for the investigation can be minimized.

4.PROPOSED SYSTEM

The proposed system, “Automated Accident Intimation and Rescue System”, has to be implemented in different places. Figure 4.1 shows the block diagram of automated accident Intimation and Rescue system (AAIRS). The vibration sensors can be deployed in the vehicles. Whenever the accidents occur, the vibrations get sensed by vibration sensors and send the signal to the controller unit. Immediately the controller unit will pass the message to the nearby hospitals and also to the survey units, which are associated with the system. The GSM system is used to trace the shortest path from the victim location to the nearby hospital.

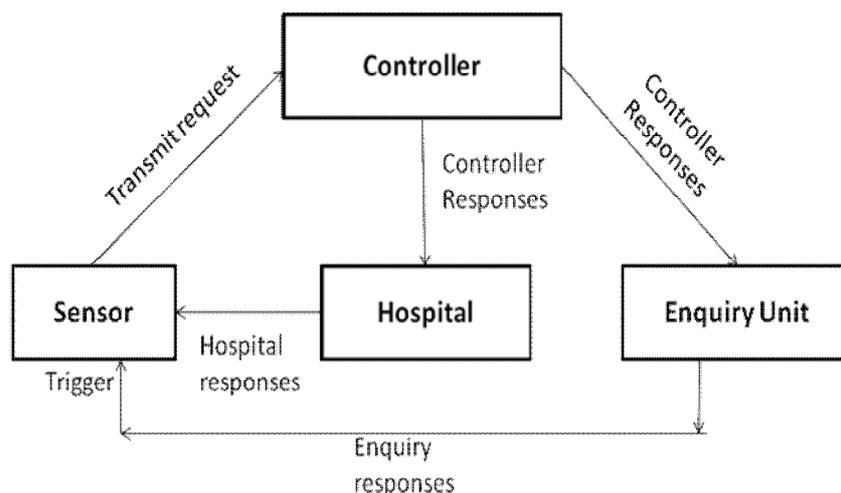


Figure 4.1 Automated Accident Intimation and Rescue Systems

As shown in the figure 4.2, whenever the accident occurs, sensor deployed in the vehicle senses the vibration of the vehicle. If it exceeds the threshold value, the switch gets pressed by the system and the alert message is sent to the controller unit through GSM modem. If the vibration is below the threshold value, then no operation is performed. At that time, it will be assumed that the vibrations would be sensed due to minor crash by vehicle.

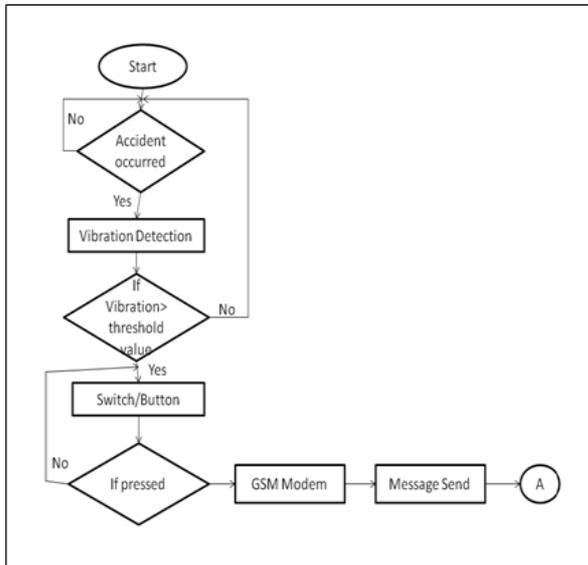


Fig. 4.2 Alert Module

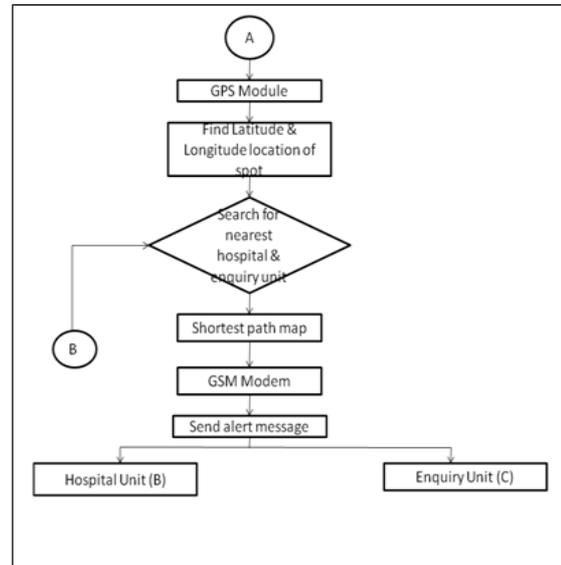


Fig. 4.3 Controller Unit

As shown in figure 4.3, as the message is received by the controller unit, it finds the latitude and longitude of the accident spot, searches the nearest hospital and police station units, and sends the location with the shortest path, obtained by the GSM modem and sends the alert message to the both, the hospital unit and Police station. Figure 4.4 shows the flow diagram of the hospital unit. When it receives the alert message from the controller unit, it checks for the availability /unavailability of the the ambulance, which is required to be sent at the spot. If the ambulance is available, it will send the ambulance at the accident location traced by the GSM modem. Otherwise, it will reply controller unit accordingly. The Enquiry unit will also send their mobile police team to the spot with the help of map. The figure 4.5 shows the flow diagram for Enquiry unit.

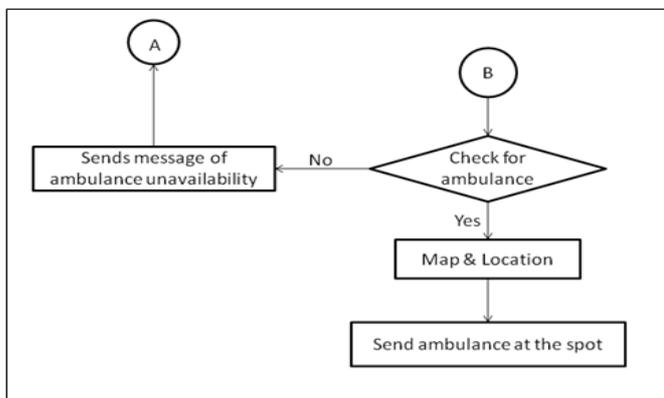


Figure.4.4 Hospital Unit

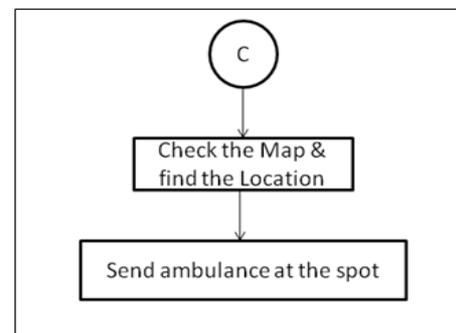


Figure 4.5 Enquiry Unit

5.CONCLUSION

The loss of human life due to accident is to be avoided. To bar loss of human life due to accidents we introduce a scheme called AAIRS (Automated Accident Intimation and Rescue System). The main theme behind this scheme is to provide the medical facilities to the accident victim as early as possible like ambulance to reach the accident location in time and thus minimizing the delay. This process will save time particularly for the areas situated in the outer part of main zone. This scheme can be fully automated to find the accident spot through GPS there by helping ambulance to reach the hospital in time.

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