ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

A Survey on Automatic Emergency Alert and Rescue Services for Vehicle Accidents

Hemantkumar G Sarode, Prof. Sonal Bankar

M.E Student, Dept. of Computer Engineering, Lokmanya Tilak College of Engineering, Sector-4, Koparkhairane, Navi Mumbai , University of Mumbai, India

Asst. Professor, Dept. of Computer Engineering, Lokmanya Tilak College of Engineering, Sector-4, Koparkhairane, Navi Mumbai, University of Mumbai, India

ABSTRACT: The high requirement of automobiles has also increased the traffic casualties and the road accidents. The updated technologies in communication is integrated into the automotive sector like GPS (Global Positioning System) has become an integral part of a vehicle system which provides speed, time, direction etc. This paper especially designed to detect and provide faster assistance for traffic accidents, to the rescue team in a short time, which will help in saving the valuable lives. The proposed system requires each vehicle to be endowed with an On-Board Unit responsible for detecting and reporting accident situations. For this our system considers the most relevant variables such as the vehicle speed, the type of vehicles involved, the impact speed, and the status of the airbag. We develop a prototype of our system based on off-the-shelf devices, and validate it at the Applus+ IDIADA Automotive Research Corporation facilities, to alert and deploy the emergency services after an accident takes place.

KEYWORDS:Vehicular Networks; Traffic Accidents Assistance; GPS; GSM;DoD;map matching; SMS; VANET; Intelligent Transportation Systems; V2V and V2I communication.

I. INTRODUCTION

In the last 2 or 3 decades, the number of automobile vehiclesaround the world has experiencingthe remarkable growth. Due to this vast increase in vehicles road traffic has also been getting more and more congested& complex. As higher population and increased business& social activities results in greater demand for private, public & goods vehicles for transportation. While careful traffic planning can help to reduce transportation problems& accidents. [8].

The effect of this situation is the increase of traffic accidents on the road, representing a serious problem in most countries [7].Speed is one of the most important and basic risk factors in driving. Speed is not only affects the severity of a crash, but also increases risk of being involved in a crash or accidents. Despite many efforts has been taken by different governmental and non-governmental organizations all around the world by various programs to aware against careless driving, yet accidents occurs on roads. However, many lives could have been saved if the emergency service could get the crash information in time.

GPS tracking is a very popular technology developed by American Department of Defense (DoD) for military use. Later on it was available for civilian use. Nowadays, GPS is becoming an integral part of a vehicle system. GPS provides accurate time, precise location coordinates and speed. On the other hand, Global System for Mobile communications (GSM) is a digital mobile telephony system that is widely used. More than 700 mobile network companies provides GSM services across 220 countries and GSM represents 85% of all global mobile connections. Including voice communication, it also offers Short Message Service (SMS) and General packet radio service (GPRS) to transfer data [1] [5].

The European Commission is currently funding several projects under the i2010 Intelligent Car Initiative, which promotes several efforts toward new safety systems. Cooperative Systems using vehicle-to-vehicle (V2V) communications are now considered necessary to accomplish these objectives, and will play an increasing role in the Intelligent Transportation Systems (ITS) area. Most ITS applications, includingroad safety, fleet management and

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

navigation system, will depends on information and communication technologies between the vehicle and the roadside infrastructure (V2I), or between vehicles (V2V) [4] [7] [8].

To increase the benefits of using communication systems between vehicles, the infrastructure should be supported by intelligent systems capable of estimating the severity of accidents, and involuntarily deploying the actions required, that reduces the time needed to assist injured passengers. Many of the manual decisions taken till date by emergency services are based on incomplete or inaccurate accidental data, which can be replaced by automatic systems that adapt to the specific characteristics of each accident. A preliminary assessment of the severity of the accident that will help emergency services to adapt the human and material resources to the conditions of the accident, with the consequent assistance quality improvement [6].

In this paper, we have put forth how we can take the advantage of use of vehicular networks to collect precise& detailed information about road accidents that can be used to estimate the severity of the accidental collision. We propose estimation based on data mining classification algorithms, trained using historical data about previous accidents. Our proposal does not focus on directly reducing the number of accidents, but on improving post collision assistance.

II. Motivation

When road accident occurs, providing the assistance to injured passengers as soon as possible is very important to minimize the negative effects on their life. Mortality from traffic accidents can be classified in three different stages [2]:

- First phase: It involves casualties in the first few minutes or seconds after the accident (about 10% of all deaths).
- Second phase: The so-called Golden Hour, as it usually occurs during the first hour after the accident. It causes the highest mortality, i.e.75% of all deceases. It is the phase in which the highest death rate can be avoided by proper initial health care.
- Third phase: It happens days or weeks after the traumatic incident, causing 15% of mortality. It takes hard work and a high amount of resources to reduce mortality in this phase.

III. Literature Survey

There number of research projects are in progress held by different research institutes and car manufacturers around the world. They are been focusing on inter vehicle communication systems to reduce the Golden Hour required in accidents. Some of the projects related to the proposed system are listed below.

1. Y. Li and M. McDonald [13] presented a probe-vehicle-based algorithm to detect incidents on motorways (A broad highway designed for high-speed traffic). The algorithm proposed by Y. Li and M. McDonald is based on a bivariate analysis model (BEAM) using two variables: 1.The average travel time of probe vehicles, and 2. Travel time differences between adjacent time intervals. The area of the model is that link travel times increase more rapidly as a result of a change in capacity (i.e. when an incident occurs) than as a result of a change in demand. In this method,statistical principles of bivariate analysis have been used to study the relationships between the two variables in incident and non-incident conditions [13].
2. Tanushree Dalai [14] proposed a Telematic model which has three main modules. The objective of the system is to capture the location of the vehicle through GPS receiver &send the location information to the mobile number of vehicle owner mobile through SMS and also to the Telematics operator server through GPRS. It consists of modules which are 1) A GPS receiver is required to get the accurate information from the GPS satellites GSM/GPRS 2) The GSM/GPRS modem utilizes the GSM network to send the location of the accident and other necessary information. The modem can be controlled by a microcontroller through AT Command set. 3) The microcontroller unit (MCU) receives data from the GPS, processes all data, send location of the vehicle to server and vehicle owner/family members.
3. In E. Davila, eCall [15] the authors present an automatic emergency alert system for two-wheeled. eCall system has features like crash detector and an eCall box, which can be connected over a wired or wireless link which was developed only for two wheeler bikes. The box provides the notification or emergency call service, which sends

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

minimum Set of Data to the Public Safety Answering Point. Early experimental results showed systems reliability of the detector-box wireless communication, and detection of front, side and roll-over crash types. This system alerts the driver of the vehicle about accidents on the coming roads and also advices to control the speed i.e. acceleration and braking.

4. Richard Bossom and his partners [16] proposed a prototype COMeSafety, Its main goal of the system is to develop a European set of standards to support wide implementation and deployment of cooperative Intelligent Transportation Systems (ITS). Also it aims at coordinating the activities toward the realization of cooperative systems on European roads, focusing on all issues related to Vehicle to vehicle (V2V) and Vehicle to Infrastructure (V2I) communications. Such technologies do not prevail in India hence we proposed this system.

IV. PROPOSED SYSTEM

Our primary approach is to collect the information available when a traffic accident occurs, which is captured by sensors installed on-board the vehicles. The data collected are structured in a packet, and transmitted to a Remote Control Unit through a of V2V and V2I wireless communication. Based on this information, our system estimates the accident severity by comparing the received data with information of previous accidents stored in a database. This information is of utmost importance to determine the most suitable set of resources in a rescue operation. Since we considering the information obtained just when the accident occurs, to estimate its severity immediately, so we are limited by the data automatically retrievable, omitting other information, e.g., about the driver's degree of attention, drowsiness, etc. [6].

a. SYSTEM ARCHITECTURE OVERVIEW

Figure 1 presents the basic structure of the e-NOTIFY system. Our proposed system consists of several components with different functions. Firstly, the vehicles should incorporate an On-Board unit (OBU) responsible for detecting accidents and communicating about dangerous situations. Next, the notification of the detected accidents is made through a combination of both V2V and V2I communications. Finally, the destination of the information is the Control Unit (CU) that will handle the warning notification, estimating the severity of the accident and communicating the incident to the appropriate emergency services.

The OBU definition is of utmost importance for the proposed system. This device must be technically and economically feasible, as its adoption in a wide range of vehicles could become massive in a near future. In addition, this system should be open to future software updates.

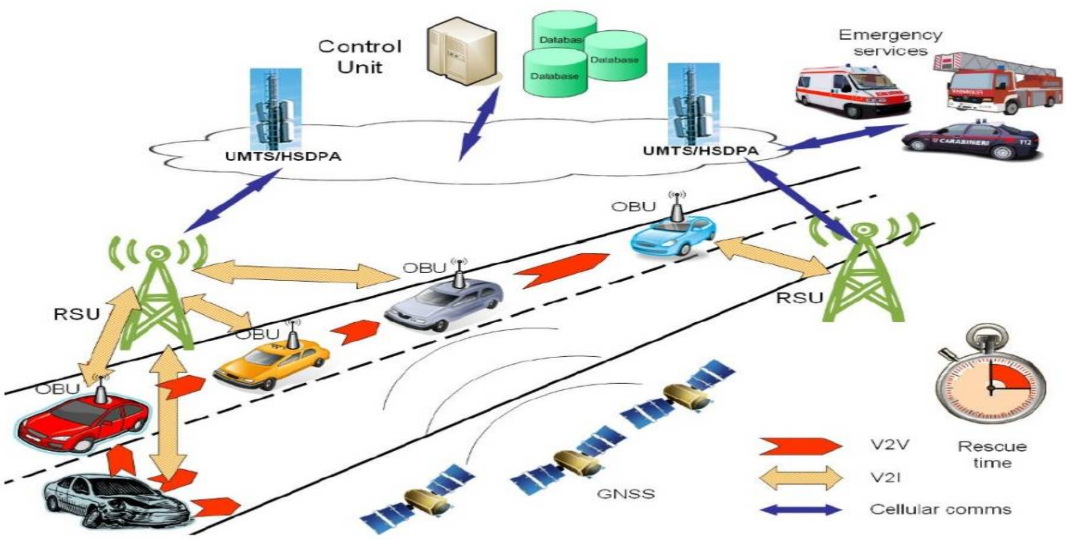

Figure 1 System Architecture

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

Initially the design of the hardware is included in some special purpose vehicles systems, this trend is heading towards general-purpose systems because of the consistent inclusion of new services. The information communication between the OBUs and the CU is made through the Internet, either through vehicles providing Internet access (via UMTS, for example), or by reaching infrastructure units (Road-Side Units, RSU) that provide this service. If the vehicle does not get direct access to the CU on its own, it can generate messages to be broadcast by nearby vehicles until they reach one of the aforementioned communication paths. These messages when broadcasted among the vehicles in the area where the accident took place, also serve the purpose of alerting drivers traveling to the accident area about the state of the affected vehicle, and its possible interference on the normal traffic flow.

The goal of our proposal is to provide an architecture that fallows:

i. Direct communication between the vehicles involved in the accident,
ii. Automatic sending of a data file containing important information about the incident to the Control Unit,
iii. Preliminary and automatic assessment of the damage of the vehicle and its occupants, based on the information received from the involved vehicles, and a database of accident reports.

According to the reported information and the preliminary accident estimation, the system will alert the required rescue resources to optimize the accident assistance [4].

b. ON-BOARD UNIT STRUCTURE

The main objective of the proposed OBU lies in obtaining the available information from sensors inside the vehicle to determine when a dangerous situation occurs, and reporting that situation to the nearest Control Unit, as well as to other nearby vehicles that may be affected.

- In-vehicle sensors are required to detect accidents and provide information about its causes. Accessing the data from in-vehicle sensors is possible nowadays using the On-Board Diagnostics (OBD) standard interface [7], which serves as the entry point to the vehicle’s internal bus. This system is compulsory & mandatory in Europe and USA since 2001.

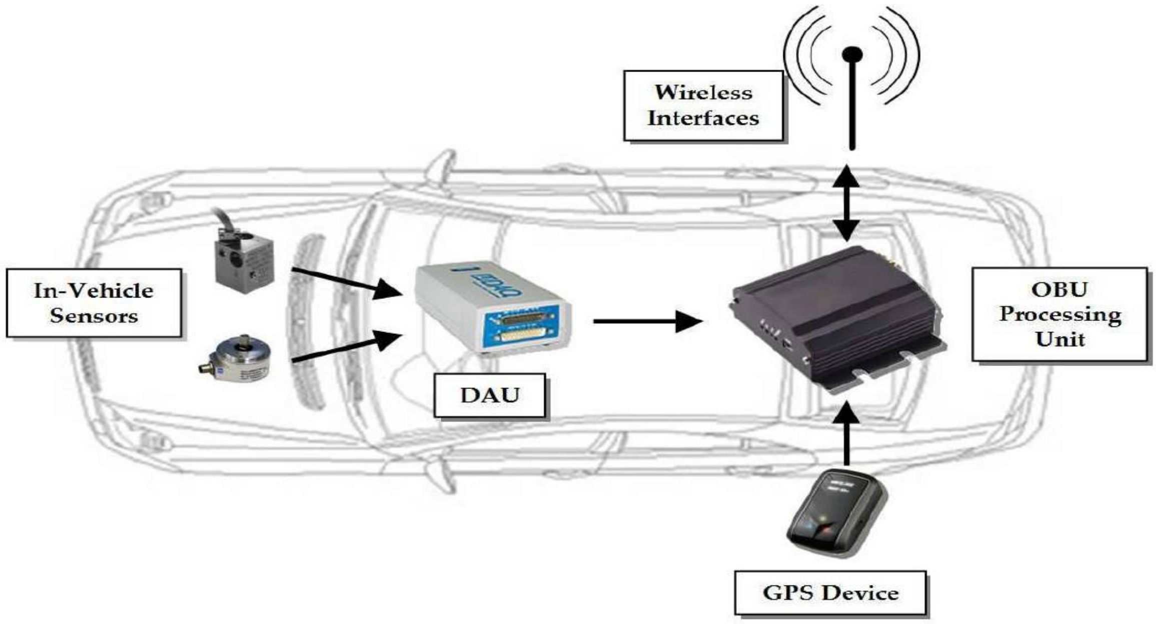

Figure 2 On-Board Unit structure

Figure 2 shows the OBU system, which relies on the interaction between sensors, the data acquisition unit, the processing unit, and wireless interfaces.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

- Data Acquisition Unit (DAU) is responsible for collecting data (airbag triggers, speed, fuel levels, etc.) from the sensors available in the vehicle & converting it into a common format, and providing the collected data set to the OBU Processing Unit.
- OBU Processing Unit is in charge of processing the data coming from sensors, which determines whether an accident occurred, and notifying dangerous situations to nearby vehicles, or directly to the Control Unit. The information from the DAU is collected, processed and used to determine the vehicle's current status. This unit must also have access to a positioning device (such as a GPS receiver), and to different wireless interfaces which enables communication between the vehicle and the remote control centre [6].

c. *CONTROL UNIT (CU) DESIGN*

The Control Unit (CU) is connected to the response center in charge of receiving information of accidents from the OBUs installed in vehicles. The Control Unit is responsible for dealing with warning messages, gaining information from them, and notifying the emergency services about the conditions under which the accident occurred. The Control Unit prototype has been structured as shown in Figure 3.

After receiving the message, the CU must store the crash data in a database to record that the accident information has been successfully delivered. The CU should have an available database providing information on different manufacturers and models of existing vehicles. The critical areas of the vehicle to be avoided during rescue procedures (e.g., fuel tanks) are not marked in most vehicles and could cause a hazard to the emergency teams. Thus, when the emergency services receive an accident alarm, they can obtain the information regarding the damaged vehicle (manuals, information on hazardous areas, etc.) before rescuers arrive to the area where it happened.

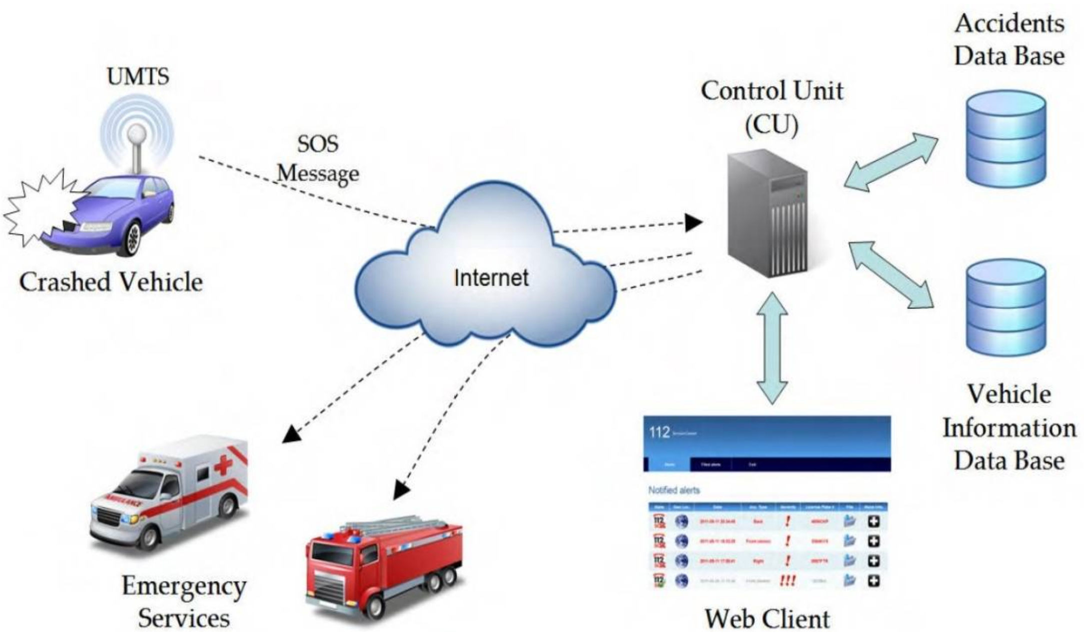

Figure 3 Control Unit Prototype Structure

The CU prototype includes a web interface or portal which provides (with prior authentication) information about the different notifications received so far. The user can then obtain detailed and visual information about the position where accident happened and conditions of passengers (seat belt use, airbag deployment, cutting areas for the release of the occupants, etc.), date and time, location of accident (with visualization through Google Maps API [11]), etc. [2].

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

V. ACCIDENT DETECTION ALGORITHM

The first goal of our OBU consists of determining when a dangerous accident occurs. In the traffic accidents domain, there are two main events that could cause severe damage to the passengers in a vehicle: rollovers (overturns) and strong impacts. We are currently working with the Applus+ IDIADA Automobile Research Corporation [12] to develop a realistic accident detection algorithm based on information which characterizes different types of accident.
The equipment used by IDIADA to record all this information is not affordable in a standard vehicle. Therefore, our detection system should be based on an affordable on-line system, but still accurate to detect when an accident occurs. So, e-NOTIFY OBUs use a reduced sampling frequency compared to the configuration under IDIADA tests. The new sampling frequency is selected so that it is possible to handle it in real-time while being precise enough to classify the different types of accident pulses [4].

A. MODELS FOR ACCIDENT SEVERITY ESTIMATION

Accident Type	Description
Front accident	Light condition, Speed limit → Speed
	Speed → Rollover, Vehicle role
Side accident	Body type → Speed, Trailer, Rollover
	Speed limit → Speed
	Speed → Rollover, Vehicle role
Rear end accident	Light condition, Surface condition, Speed limit → Speed
	Speed → Rollover
	Body type → Trailer
	Weather → Surface condition

Table 1 Main condition dependences between variables used to estimate the damage on vehicles.

Accident Type	Description
Front accident	Speed → Restraint system, Vehicle damage
	Body type → Speed, Airbag
Side accident	Speed limit → Speed, Restraint system, Vehicle damage
	Speed limit → Rollover, Vehicle damage
	Speed → Airbag, Restraint system, Trailer, Seat position
Rear end accident	Speed limit → Vehicle damage, Vehicle role, Light condition, Body type
	Body type → Airbag, Rollover

Table 2 Main condition dependences between variables used to estimate the injuries of the passengers.

Tables II and III show the conditional dependences found on the variables selected when estimating the severity of a road accident. In the Bayesian models, all the variables have at least one parent: the value of the class (severity of the damage on the vehicles or the passengers' injuries, respectively) [6].
After receiving an accident notification, the Control Unit must determine the severity of the traffic accident to adjust the available resources to each situation. In particular, the questions that must be answered to obtain useful information are: (i) How damaged are the vehicles involved in the accident? And (ii) How severe are the injuries suffered by the passengers? The first question will determine the need of machinery such as cranes to restore normal traffic flow or the probability for the vehicle to catch fire and cause additional dangerous situations. The second one is related to the health equipment and vehicles necessary to increase the probability of survival of the vehicle occupants.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

Using the data contained in the database, we classify the damage in vehicles in three categories: minor, moderate, and severe damage, depending on whether the vehicle can be driven safely or not. Focusing on passenger injuries, we also use three different classes to determine their severity: no injury, non-incapacitating injury, and incapacitating or fatal injury [4].

Accident Type	Vehicle segment	Severity	Speed	Pulse	Acceleration	Pred. Accuracy
Front accident	Large family car	Severe acc.	64 km/h	110 ms	23-28 G	80%
	Large MPV	Minor acc.	36 km/h	100 ms	15-21 G	90%
	Small family car	No acc.	15 km/h	110 ms	4-9 G	100%
Side accident	Small Off-road 4x4	Severe acc.	29 km/h	90 ms	14- 21 G	80%
	Supermini	No acc.	12 km/h	90 ms	3-6 G	100%
Rear end accident	Small MPV	Severe acc.	21 km/h	110 ms	8-12 G	73.33%
	Supermini	No acc.	10 km/h	70 ms	2-6 G	93.33%

Table 3 Validation test performance and accident detection parameters of the proposed system.

B. WARNING MESSAGE STRUCTURE

The messages communicated between the vehicle and the Control Unit should be concise& accurate, avoiding irrelevant&ambiguous information, but they should not ignore any possible& crucial information that might be useful for the emergency services to determine& deploy the necessary resources. Thus, the information delivered to the response point should include data about the conditions under which the accident occurred, the passengers of the vehicle and the different security systems available in a vehicle. These data are sent to the emergency services to provide a more detailed view of the conditions of the accident before they arrive at the affected area [10]. For the designed system, we implemented a message containing the following fields, accessible via the sensors included in the vehicle (see Figure 4):

- Time: To inform exactly when the accident occurred.
- Location: Geographical position of the vehicle, to determine the exact location of the injured.
- Vehicle-Occupants: Number of passengers, to adequate the medical team required to attend them.

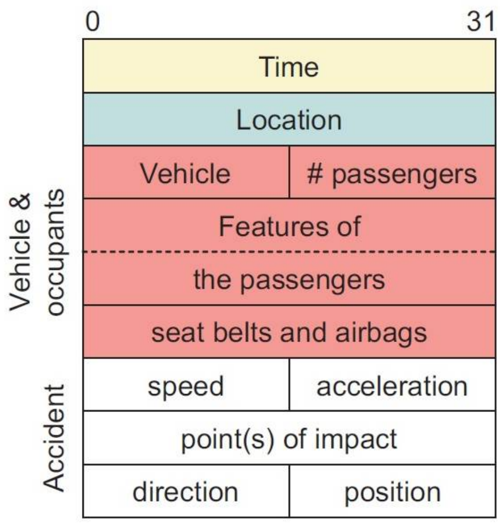

Figure 4 Warning message structure

- Features of the passengers: weight, height, age, etc. The more information, the better.
- Information about seat belts and airbags, to estimate the severity of the injured ones, how the accident occurred and the severity of the accident.
- Speed and acceleration of the vehicle just before the accident, to estimate the severity of the accident.
- point(s) of impact, i.e. exactly where the impact(s) has been produced.
- Direction of impact force. This is a mechanical concept. If we consider the top of the car as a clock, we can describe the direction of impact force as an hour. (12 for front side, 3 for right side, 6 for rear side, etc.).
- Position of the vehicle after the crash to estimate the severity of the accident and to warn the emergency team about the level of complexity of the rescue.

VI. CONCLUSION AND FUTURE WORK

In this paper we presented the e-NOTIFY system, which allows fast detection of traffic accidents, improving the assistance of injured passengers by reducing the response time of emergency services and the submission of relevant information on the conditions of the accident using a combination of V2V and V2I communications. This architecture replaces the usual mechanisms for notification of accidents, based on witnesses who may provide incomplete or incorrect information in an inappropriate time. The development of a low-cost prototype shows that it is feasible to massively incorporate this system in existing vehicles. We validated our prototype at the Passive Security Department of Applus+ IDIADA Corporation and showed how it can successfully detect traffic accidents, reporting all the detailed information to a Control Alert System on time.
Future work in this area includes deploying the system in a real environment with the OBUs installed in real vehicles to check the system behavior when moving at high speeds.

REFERENCES

1. Md. Syedul Amin, Mohammad ArifSobhanBhuiyan,Mamun Bin IbneReaz, Salwa Sheikh Nasir,'**GPS and Map Matching Based Vehicle Accident Detection System**', 2013 IEEE Student Conference on Research and Development (SCOReD), 16 -17 December 2013, Putrajaya, Malaysia
2. Manuel Fogue, PiedadGarrido, Francisco J. Martinez,Juan-Carlos Cano, Carlos T. Calafate, Pietro Manzoni, '**Prototyping an Automatic Notification Scheme for Traffic Accidents in Vehicular Networks**', 978-1-4577-2028-4/11/$26.00 c 2011 IEEE.
3. Tanushree Dalai,Emergency Alert and Service for Automotives for India', **International Journal of Advanced Trends in Computer Science and Engineering (IJATCSE)**, Vol.2 , No.5, Pages : 08-12 (2013) *Special Issue of ICETCSE 2013 - Held during October 21, 2013,Mysore, India*
4. Manuel Fogue, PiedadGarrido, Francisco J. Martinez, Juan-Carlos Cano, Carlos T. Calafate, Pietro Manzoni,**A Realistic Prototype for Automatic Accident Detection and Assistance through Vehicular Networks**', *IEEE Vehicular Technology Magazine.7(3):90-100. doi:10.1109/MVT.2012.2203877.*
5. VarshaGoud*, V.Padmaja ,' **Vehicle Accident Automatic Detection and Remote Alarm Device**', International Journal of Reconfigurable and Embedded Systems (IJRES) Vol. 1, No. 2, July 2012, pp. 49~54 ISSN: 2089-4864.
6. Manuel Fogue, PiedadGarrido, Francisco J. Martinez,Juan-Carlos Cano, Carlos T. Calafate, Pietro Manzoni,**'A System for Automatic Notification and Severity Estimation of Automotive Accidents**', IEEE Transactions on Mobile Computing. 13(5):948-963. doi:10.1109/TMC.2013.35.
7. Purva Javale1, Shalmali Gadgil2, Chinmay Bhargave3, Yogesh Kharwandikar4 , Prof. VaishaliNandedkar,'**Accident Detection and Surveillance System using Wireless Technologies**', *IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661, p- ISSN: 2278-8727Volume 16, Issue 2, Ver. X (Mar-Apr. 2014), PP 38-43 www.iosrjournals.org*
8. Francisco J. Martinez,Chai-KeongToh,Juan-Carlos Cano, Carlos T. Calafate,andPietro Manzoni, '**Emergency Services in Future Intelligent Transportation Systems Based on Vehicular Communication Networks**', IEEE INTELLIGENT TRANSPORTATION SYSTEMS MAGAZINE • 6 • SUMMER 2010
9. RafalGrzeszczyk, Jerzy Merkisz, Piotr Bogus, Tomasz Kaminski, "**METHODS AND PROCEDURES FOR TESTING THE E-CALL IN-VEHICLE UNIT FOR THE PURPOSE OF ITS PERFORMANCE ASSESSMENT AND CERTIFICATION**" , Motor Transport Institute, Warsaw, Poland
10. R. Bossom, R. Brignolo, T. Ernst, K. Evensen, A. Frötscher, W.Höfs, J. Jääskeläinen, Z. Jeftic, P. Kompfner, T. Kosch, I. Kulp, A. Kung, A.-K. Mokaddem, A. Schalk, E. Uhlemann, and C. Wewetzer, "**European ITS communication architecture — Overall framework — Proof of concept implementation,**" EC FP7 Deliverable, EC Information Society Technologies Programme, Tech. Rep., March 2009.
11. R. Grzeszczyk, J. Merkisz, P. Bogus, and T. Kaminski, "**Methods and Procedures for Testing the E-Call In-Vehicle Unit for the Purpose of Its Performance Assessment and Certification,**" in Proceedings of the 21st International Technical Conference on the Enhanced Safety of Vehicles (ESV), Stuttgart, Germany, June 2009.
12. Gustavo Marfia, Marco Roccetti, Alessandro Amoroso, and Giovanni Pau,'**Safe Driving in LA: Report from the Greatest Intervehicular Accident Detection Test Ever'**, IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, VOL. 62, NO. 2, FEBRUARY 2013

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 2, February 2017

13. Y. Li, and M. McDonald , ―Motorway incident detection using probe vehicles,‖Proceedings of the Institution of Civil Engineers, Transport, vol.158, pp.11-15, February 2005.
14. Emergency Alert and Service for Automotive for India Tanushree Dalai PG Student, NIT Calicut, 673601, India, tanushreedalai@gmail.com
15. R. Grzeszczyk, J. Merkisz, P. Bogus, and T.Kaminski „„Methods and Procedures for testing the E- call in-vehicle unit for The purpose of its performance assessment and certification,"" in Proc. 21st Int. *Technical Conf. Enhanced Safety of Vehicles (ESV), Stuttgart*, Germany, June 2009, *Paper 09- 0332*
16. R. Bossom, R. Brignolo, T. Ernst, K. Evensen, A. Frotscher, W. Hofs , J. Jeaeaskeleainen, Z. Jeftic, P. Kompfner, T.Kosch, I. Kulp, A. Kung, A.-K. Mokaddem, A. Schalk, E. Uhlemann, and C. Wewetzer, „„European ITS communication Architecture—Overall framework—Proof of concept implementation,"" *EC FP7 Deliverable, EC Information Society Technologies Programme, Community Research and Development Information Service (CORDIS)*, European Union, Tech Rep., *Mar 2009.*

BIOGRAPHY

Hemantkumar G Sarodeis a student ofMaster of Computer Engineering in the Computer Engineering, in Mumbai University. He received Bachelor Degree in Computer Engineering degree in 2011 from North Maharashtra University, Jalgaon, MS, India. His research interests are Mobile Computing.

Prof. Sonal Bankar has received B.E. degree in Computer Science and Engineering from Amravati University in 2000 and M.E. (Computer Engineering) in 2009 from Mumbai University. She has 16 years of total experience as a lecturer, published 09 International papers and 06 National papers related to Computer Engineering Stream. Currently working as an Assistant Professor at Lokmanya Tilak College of Engineering, Sector-4, Koparkhairane, Navi-Mumbai. 400 709