

Experimental Evaluation of Safety through Automatic Identification of Drunk Driving (DD) and Road Accidents (RA) as a part of Vehicular Ad Hoc Network (VANET)

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Abstract- VANET is a wireless network system that gives driving support and motorway wellbeing. Road accidents assert a staggeringly high number of lives each year. As is needless to say; a majority of accidents, which occur, are due to drunk driving. Accordingly, there is no compelling component to keep this. Here we have a designed framework to monitors the driver's state using various sensors and searches for triggers that can cause accidents. When an alert situation is distinguished, the framework informs the driver and tries to caution him. On the off chance that the driver does not react in a stipulated time, the framework controls the speed of the vehicles. An SMS (Short Message Service) which contains the present GPS (Global Positioning System) area of the vehicle is sent via GSM (Global System for Mobile communication) module to the police control room to alarm the police. Here we also intersection the new thought for recover the general population at the time of crisis to overcome such risky accidents and correspondence issues in VANET (Vehicular Ad Hoc Network); we have utilized sensors hubs as a part of the vehicles. Once the vehicle meets an accident, the sensor will inform about the accidents to the nearest health center with the help of RSUs (road side sensor units) and Base Stations (BS). Furthermore, it gives the new route to vehicles to keep away from traffic blockage with the assistance of sensor cooperation situation. In this way, it gives a feasible and effective solution for the issue of intoxicated driving and Accidents Notification in VANET.

Keywords- VANET (Vehicular Ad Hoc Network), SMS (Short Message Service), GPS (Global Positioning System), GSM (Global System for Mobile communication), RSUs (road side units) and Base Stations (BS).

I. INTRODUCTION

These days the majority of the nations are forcing not to utilize the vehicles when the individual is in drunken condition. Yet at the same time in many places, the rules are being abused by the clients. Driving while either drunk is risky and drivers with high blood alcohol content (BAC) are at expanded danger of auto crashes, expressway wounds and vehicular deaths. Avoidance measures include license suspension, seizing vehicle plates, expanding fine punishments, prison, ordering instruction for youth and bringing down legal BAC's. Despite the fact that these much obstacles made by powers to plastered drive, it is as yet proceeding with like serial scenes. All things considered there is no viable component to keep this. Here, we have wanted to outline Automatic Alcohol Detector (AAD), which is coordinated with the steering wheel. Keeping in mind the end goal to beat this issue, an intelligent framework has created with different preventive components against intoxicated driving. The idea is intended to identify the driver's condition, to set the driver free from manual operation. In the event that the framework identifies that there is a probability the driver has smashed, warnings

are issued to the driver to stop the vehicle. Car crashes brought about by drunk drivers not just speak to a noteworthy segment of all car crashes, yet they every now and again include fatalities. In any case, a successful device for prevention such sorts of accidents has not yet been produced. An object of this innovation is to give a novel and avoidance drunken driving of a Motorcar by actuate the alarm & Indicators, additionally it empowering a man who is not drunk to drive the same Motorcar.

For this accomplishment, the accompanying fundamental hardware's are required:-

- ✓ IR Detector
- ✓ IR Sensor
- ✓ Proximity Sensors
- ✓ A GPS Receiver
- ✓ A GSM Mobile

The automatic accident detector issued to make an automatic call to the rescue vehicle when the accident has happened. The auto dialer and the Microcontroller play a vital role in this location. The principle working is that the circuit is associated with the vehicle and when the accident has happened there is a striking vibration in the vehicle. The

vibration makes the auto dialer to enact. The auto dialer then makes a call to the number spared in its memory. The number spared might be the contact number of the closest health center. At that point the rescue vehicle can have the capacity to touch base to the fancied area as quickly as time permits

Primary segments utilized:

- ✓ Micro controller PIC16F877A
- ✓ 3202 Vibration sensor

1.1 ACCIDENT STATISTICS

Each and every injury and demise brought about by drunk driving is absolutely preventable sadly more than twenty percent of all traffic fatalities in the India every year are created by drunk drivers. In this way, drunk driving remains a genuine national issue that deplorably influences a huge number of victims yearly.

- ✓ Nearly 60% of all accidents which happens because of drunk driving.
- ✓ Each year, around 14000-15000 individuals die.

From this we effortlessly infer that designing a productive framework to prevent drunk driving is of Global Importance. Till now, there are no different frameworks which are for all intents and purposes execute capable this new framework can be effortlessly settled in existing vehicles and is very cost effective.

A device that automatically calls the emergency services after a road accident will be fitted to all new cars within three years. The European Parliament has today voted for the "eCall" alert system to be mandatory across the European Union from March 2018. The measure is designed to enable ambulances and other emergency responders to reach crash scenes more quickly. All new cars and light vans will be fitted with sensors that automatically transmit the location and time of any accident, the number of people inside the vehicle and the direction it was headed in. The UK government had objected to the plans, saying they would cost "£370-odd million" which would far outweigh the benefits.

(Source:

<http://www.standard.co.uk/news/transport>)

Table No.1 – Accident Statistics

| Number of Accidents and Number of Persons Involved: 2005 to 2014 | | | | | |
|--|---------------------|----------------|-------------------|----------|--------------------|
| Year | Number of Accidents | | Number of Persons | | Accident Severity* |
| | Total | Critical | Killed | Injured | |
| 2005 | 4,07,497 | 73,650(18.1) | 84,674 | 4,08,711 | 20.8 |
| 2006 | 4,06,726 | 73,589(18.1) | 85,998 | 4,35,122 | 21.1 |
| 2007 | 4,29,910 | 79,357(18.5) | 92,618 | 4,64,521 | 21.5 |
| 2008 | 4,39,255 | 83,491(19.0) | 94,968 | 4,65,282 | 21.6 |
| 2009 | 4,60,920 | 93,917(20.4) | 1,05,749 | 4,96,481 | 22.9 |
| 2010 | 4,79,216 | 1,01,161(21.1) | 1,14,444 | 5,13,340 | 23.9 |
| 2011 | 4,84,704 | 1,06,591(22.0) | 1,19,860 | 5,23,193 | 24.7 |
| 2012 | 4,86,384 | 1,10,993(22.8) | 1,25,660 | 5,15,458 | 25.8 |
| 2013 | 4,99,628 | 1,19,558(23.9) | 1,34,513 | 5,27,512 | 26.9 |
| 2014 | 4,97,686 | 1,21,618(24.4) | 1,42,485 | 5,11,394 | 28.6 |

*Accident Severity: No. of Persons Killed per 100 Accidents

2. LITERATURE REVIEWS

2.1 Literature Survey

The recent report says [1] says that 40 individuals less than 25 years old pass on in street accidents all around the globe. It expresses that the tanked driving is a main consideration for the ascending of death on streets. The vast majority of the accidents happen outside the urban areas are because of inebriated driving and no testing approach is embraced to maintain a strategic distance from these fatalities in thruways. In Indian street framework, extending of the street is not an option solution to evade activity in such a urban communities [2]. HongjieLeng and Yingzi Lin [3] built up a novel carbon nanotube (CNT)- based liquor sensor with a specific spotlight on the reaction delay issue introduced in CNT based sensors. Shegeyuki Kojima et al [4] outlined another calculation to distinguish between the ordinary and inebriated condition of a man which is proposed as the essential hypothesis of the detecting framework. The whole arrangement requires just a cellular telephone set in vehicle and with accelerometer and introduction sensor. An ace gram introduced on the cellular telephone processes increasing velocities in view of sensor readings, and contrasts them and average smashed driving examples removed from genuine driving tests. Jiangpeng Dai et al [5] concentrated on tipsy driving, or officially driving impaired (DUI) of liquor, which is a noteworthy reason for car crashes all through the world Aditya et al [6] recommended that biometrics can be utilized as a part of the security component for the engine vehicles, as a hostile to robbery gadget. At present, there are several ways to detect an accident. Most discovery modules utilize just the Micro-Electro Mechanical Sensor (MEMS) and the Vibration sensor [7]. The MEMS will distinguish numerous elements, for example, any sudden deceleration/speeding up, move

over and edge of the hit. There are thoughts that as of now exist to advise the emergency vehicle utilizing GSM to send ready message [8]. GSM module is not all that solid since it doesn't work in spots where there is no sign. This implies there could be no entrance to correspondence, which makes GSM modules not totally dependable. Finally, the Dijkstra's Algorithm was proposed by numerous papers to make the salvage administrations achieve the mischance spot. In any case, it is to be noticed that this calculation is utilized to distinguish the briefest way just [9], where the movement component is not thought about. By and large the most limited way may have overwhelming activity, amid which it would bring about postponement of the emergency vehicle to achieve the accident spot.

(Source:<http://www.dw.com/en/india-has-the-highest-number-of-road-accidents-in-the-world/a-5519345>)

India has the highest number of road accidents in the world. With over 130,000 deaths annually, the country has overtaken China and now has the worst road traffic accident rate worldwide. This has been revealed by the World Health Organization (WHO) in its first ever Global Status Report on Road Safety. The report pointed to speeding, drunk driving and low use of helmets, seat belts and child restraints in vehicles as the main contributing factors.

- ✓ Drunken driving is a major factor
- ✓ Inefficient law enforcement

(Source:<http://www.scroll.in>)

India's daily death toll due to road accidents is more than four times the annual death toll from terrorism. As many as 139,671 people lost their lives on India's roads during 2015 – 382 deaths every day. For comparison, the total number of deaths (civilians and security personnel) due to terrorism-related incidents was 83 in all of 2015.

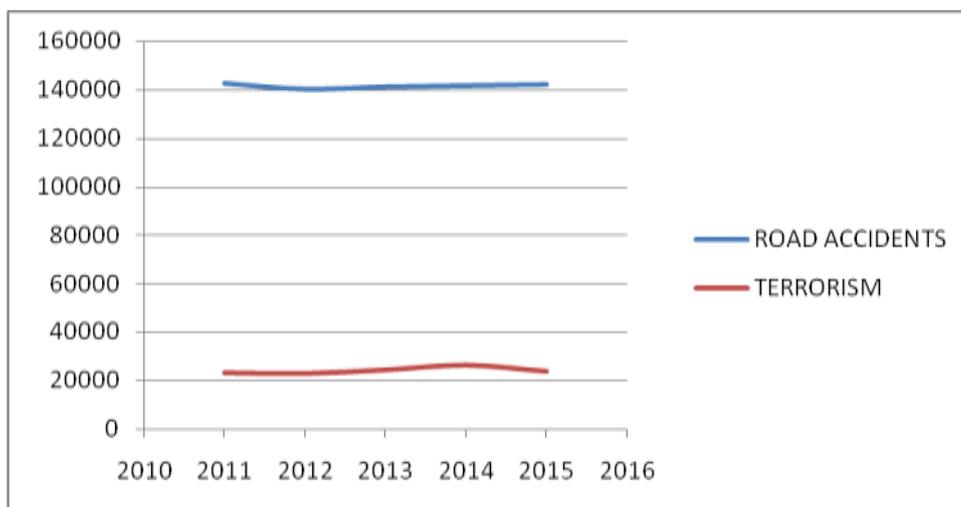


Figure No. 1 – Road Accidents vs. Terrorism

2.2 Methods

The fundamental involving authorities in road accidents include emergency response centers, rescue service providers and police. What's more, private towing service providers are involved in the rescue operation, and in addition the Road Administration's Traffic Information Center, which collects and conveys information via media to other drivers. Emergency calls are gotten by an administrator in the nearby emergency response center. If the caller cannot identify his or her location, the emergency centers currently receive an area of the mobile phone in view of the nearest tower. Since the precision of the area data relies on upon the density of towers, the location information ranges from tens of meters in urban areas to kilometers in meagerly populated rural regions.

Firstly, the administrator evaluates the urgency of the case. On the off chance that the call is accepted to concern a noteworthy accident or individuals are injured, the salvage operation is propelled. The administrator means to distinguish the area of the accident and the quantity of injured persons. Furthermore, on the premise of the got accident data, the required number and nature of rescue units are sent to the site. The first rescue unit is normally alarmed inside 30–180s of the emergency call. The rescue units are relied upon to leave 1 min of being alerted.

The time delay between the accident and warning of the emergency response center was evaluated from data in the telephone log of the emergency response centers and from the data gave by the road accident investigation groups.

3. METHODOLOGY

3.1 Objectives of the Study

The assessment used inside and out accident reports gathered by the road accident investigation groups amid the period 2011–2015. The time delay between the accident and notification of the emergency response center was assessed from data in the telephone log of crisis reaction focuses and from the data gave by the road accident investigation groups. Exactness and potential mistakes by emergency callers in characterizing the accident site, and also potential issues with salvage units finding the accident site were analyzed with a review sent to emergency response centers.

The principle target of the study was to determine the quantitative effect of the Emergency Call system on the number of traffic fatalities. An additional objective was to estimate the impacts of precise accident location and other information obtainable from the Emergency Call system on

accident consequences. The other objects of the study were to:

- Gain data about postponements in crisis methodology and assessment by how much and in what number of accidents the framework would accelerate accidents calls and the entry of assistance
- Examine the effects of the framework on authority exercises in car crash circumstances
- Estimate the advantages of the framework against the expenses of the framework
- Suggest conceivably more successful procedures for the aggregating individual damage measurements if the current factual strategies don't empower solid effect assessment

3.2 Proposed Model

Discovery using liquor sensors

- A liquor sensor is incorporated with the steering, which can recognize the nearness of liquor in the sweat of the driver's palm as he or she endeavors to begin driving. At the point when the liquor level distinguished is over the pre-decided limit, the framework automatically locks the transmission, immobilizing the vehicle. A "drunk-driving" voice alert is additionally issued via the car navigation framework.
- Additional liquor sensors are likewise joined into the driver's and traveler seats to distinguish the nearness of liquor noticeable all around inside the vehicle lodge. At the point when liquor is distinguished, the framework issues both a voice alarm and a message caution on the route framework screen.

Detection utilizing facial monitoring framework

A camera is mounted on the instrument bunch confronting the driver to screen the driver's face. The framework is adjusted to screen the driver's condition of awareness through the flickering of the eyes. At the point when the framework recognizes indications of drowsiness, a voice and message caution is activated by means of the navigation framework. Also, a safety belt system is initiated which fixes around the driver to pick up his or her quick consideration.

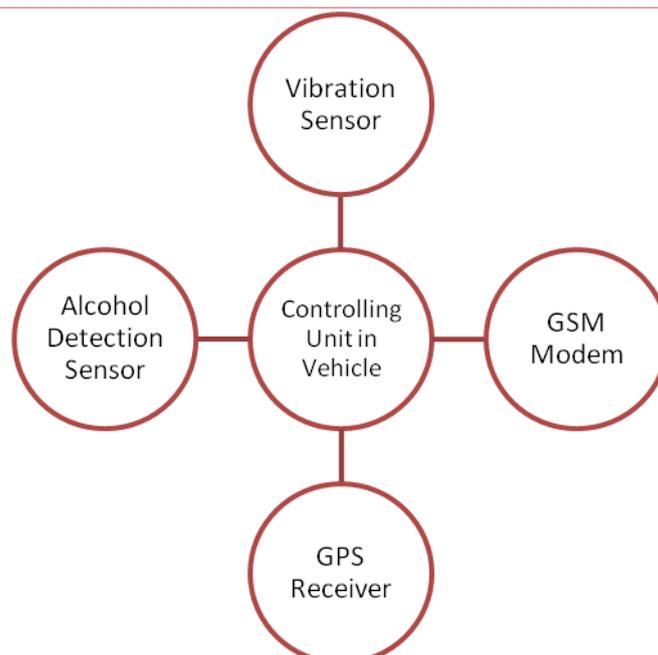


Figure No. 2 – Structure of AEC System

Finding of the driver's condition from the Driving behavior

By always observing the operational behavior of the vehicle (e.g. detecting if the vehicle is floating out of its driving path), the framework can recognize indications of heedlessness or diversion in the driver. At the point when

the framework distinguishes such behavior, voice and message alarms are issued through the navigation framework. The safety belt ready instrument is additionally initiated, fixing around the driver to increase immediate consideration.

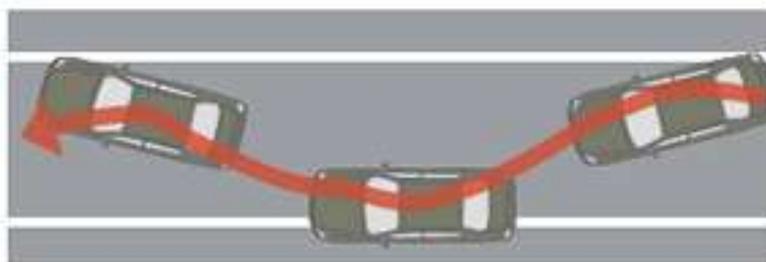


Figure No. 3 – Vehicle Behavior

When vehicle met an accident, then the accident will be distinguished by the vibration sensor. The vibration sensor can be utilized as a part of the vehicle alert application so that unsafe driving can be recognized. It can be utilized as an accident or rollover finder of the vehicle amid and after an accident. With signal from a vibration sensor, an accident can be perceived. As per this anticipate when a vehicle meets with an accident, promptly Vibration sensor will identify the signal or if an vehicle moves more than, a sensor will identifies the signal and sends it to micro controller quickly, microcontroller sends the signal to GPS module to give the precise estimation of the topographical co-ordinates which contains the estimation of longitude,

scope and elevation. After that the microcontroller sends the ready message through the GSM MODEM including the co-ordinates estimation of GPS to the rescue group and a police control room. At that point the therapeutic focus will accommodate the area of the accident by dissecting the co-ordinates estimation of GPS on a guide. Once the restorative focus gets the area of accident, it will illuminate the rescue group which in close to the area of the accident so that the casualty can get the treatment as quick as could be allowed. Additionally our framework will send the message to the police control room so that their required investigation should be possible in less time and the rescue group is permitted to give the treatment to the casualty.



Figure No. 4 – E-Call System

In the event that the individual meets with a little accident or if there is no genuine danger to anyone's life, then the ready message can be ended by the driver by a switch given keeping in mind the end goal to abstain from squandering the important time of the rescue group. For that when medicinal focus gets the principal message with respect to the accident, it will send a replay that do you require a restorative treatment? At that point if a casualty is having minor wounds and doesn't need a treatment then he can reject the treatment by squeezing a switch which sends the signal to the inside that there is no need of treatment. Be that as it may, if casualty is severely harmed and not able to send any sort of input then restorative focus will sit tight for 2-5 minutes, if there is no criticism then it is accepted that a

casualty is gravely harmed and rescue team will be sent as quick as could be expected under the circumstances. One more office is likewise given which can be exceptionally helpful amid the basic times. In the event that individual needs support, yet for different reasons like having side effects of heart assault, around then he should simply press a solitary switch given in the framework. By squeezing this switch a message is transmitted by the GSM module to the middle which contains the area of auto given by GPS the data of the client. What's more, the medicinal salvage group will reach to this area as quick as could reasonably be expected.

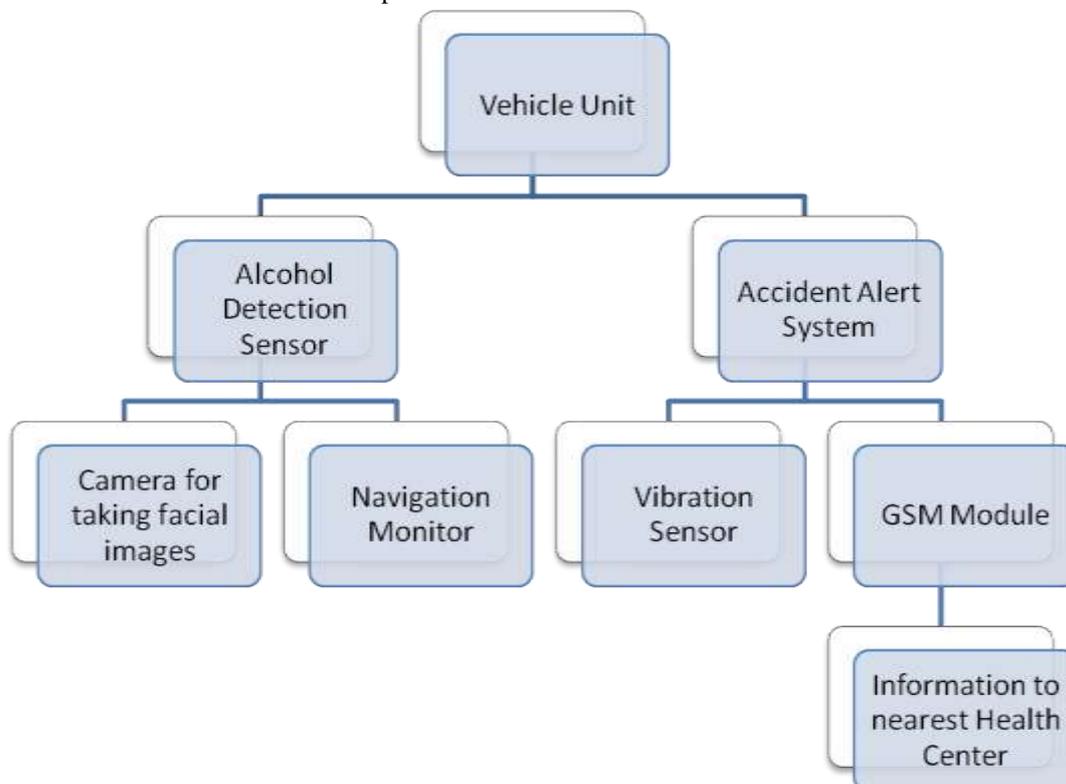


Figure No.4 – Block Diagram for Automatic Emergency Call System

4.eCALL: TIME SAVED = LIVES SAVED

eCall is an activity with the reason to convey fast help to drivers required in an impact anyplace in India. If there should arise an occurrence of an accident, an eCall-prepared auto consequently calls the closest crisis focus. Regardless of the possibility that no traveler can talk, e.g. because of wounds, a 'Base Set of Data' is sent, which incorporates the accurate area of the accident site. Not long after the accident, crisis benefits in this manner realize that there has been an accident, and where precisely. eCall cuts crisis administrations reaction time. It goes down to half in the wide open and 60% in developed zones. The speedier reaction will spare many lives in consistently. The seriousness of wounds will be extensively lessened in a huge number of cases. You can likewise make an eCall by pushing a catch inside the auto. Seeing a accident, you can accordingly report it and naturally give the exact area. As eCall ordinarily 'rests', it doesn't permit vehicle following outside crises.

5. CONCLUSION

Our system proficiently checks the drunken driving. By executing this framework a protected trip is conceivable which would diminish the accident rate because of drunken driving. This framework can abbreviate the alert time significantly and find the accident spot precisely, understanding the computerization of accident identification and data transmission. Thusly, it will spare the rescuers structure squandering their time in pursuit. The experiments of model car's crash and rollover demonstrated that this framework can consequently distinguish comparing accident and sent related data. Such capacities can be accomplished by catches speaking to "false alarm ", "help" and "wellbeing", individually.

6. FUTURE WORK

In future we wanted to manufacture our system in a compact size and also all inclusive satisfactory to inform the No entry and No stopping regions. Government must implement laws to implementing such framework in each vehicle. By executing such instrument, the deaths because of drunken driving and other road fatalities can be conveyed to zero percent.

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