Road Accidents: Overview of its Causes, Avoidance Scheme and a New Proposed Technique for Avoidance

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Abstract – Accidents can cause loss of life destruction; they are the unwanted happening that can cause lifetime injuries. With the advancement of the world, accidents are increasing at an alarming rate. So there is an urgent call for stopping these accidents, so as to save mankind from destruction. This paper focuses on road accidents and throws light on various causes of road accidents, existing measures to avoid them and further there is a measure explained in detail.

Keywords – Accidents, causes, accident avoidance, WSN.

I. INTRODUCTION

With the changing trend of world, everything is changing except for the few that remains constant like birth and death. Increase in the population has even led to increase in death rate. One of the major causes for this is increase in accidents. Accidents are dangerous whether is be on road, on air, in water, all these cause a lot of destruction and can cause injuries and loss of life. In this paper I have focussed upon road accidents various causes and existing measures of road accidents have been discussed in detail in this paper. The road accidents are increasing at an alarming rate which are causing loss of many lives. Road accidents occur due to collision of vehicle with either another vehicle or any object or any people. Road injuries have resulted in death of many people the rate in 1991 was around 1.0 billion which has been increased up to 1.8 billion in 2013.

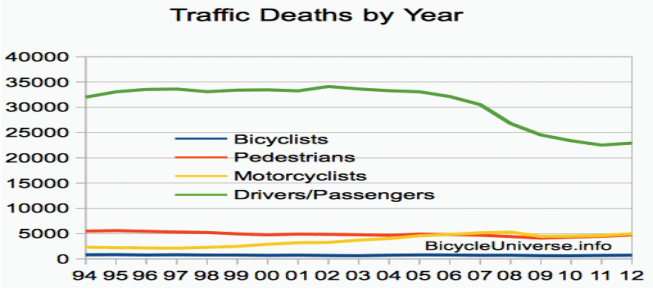

Fig. 1.Traffic deaths over years

Road accidents are responsible for almost 2.2 million of deaths all over the world each year. Death by accidents have increased to a greater level and has become the second largest reason for death after Heart disease. Major reason for road accidents is the driving at excess speeds, poorly under-developed highways, poor traffic rules, poor infrastructure and unattended zones. Figure below shows the death rate over years because of road accidents, source- Google.

II. LITERATURE SURVEY

TABLE I. VARIOUS PAPERS AND THEIR CENTRAL

Paper	Central idea
Protocols basically designed for nodes to effectively interact. The proposed system has active/sleep mode so as to make system energy efficient.	Protocols basically designed for nodes to effectively interact. The proposed system has active/sleep mode so as to make system energy efficient.
HYBRIST Mobility Model - A Novel Hybrid Mobility Model for VANET Simulations	Proposed Hybrist model is proved to be efficient and better than the VANET protocols.
An Integrated Network of Roadside Sensors and Vehicles for Driving Safety: Concept, Design and Experiments	Integration of VANET and WSN technique has proved to be more reliable, efficient and flexible than the traditional existing scheme.
Road Safety: Defeat, Complicity and the Bankruptcy of Science	The increase in dependency on vehicles leads to increase of road accidents. One should not be so dependent on vehicles so as to reduce the road accidents.
Road Accidents Prevention system using Driver's Drowsiness Detection	It has system that keep account of driver's face, eyes, mouth, yawn and alert the driver of the system finds the driver is feeling drowsy.

Road Accident Avoiding System using Drunken Sensing Technique	Alcohol detector are embedded on system, it indicates the level of drunkenness by displaying the information on the screen and if the driver is too much drunk the system will deactivate the vehicle ignition system and the vehicle won't get started, thus increasing safety.
Lateral Pre-crash Sensing and Avoidance in Emotion Enabled Cognitive Agent based Vehivle-2-Vehicle Communication System	IVC systems based on EEC are proposed that improves the safety on roads thus reducing road accidents.

III. CAUSES OF ROAD ACCIDENTS

Although, there are many reason that leads to road accidents. Major root causes are listed below:

- One of the reason for increase of road accidents is the growing prosperity of the world, which has resulted in increase in vehicles on roads, this in turn increase the traffic density, travelling distance and the time spend in travelling, thus increasing the chances of vehicle collision.
- *Over-speeding*: Driving vehicle with speed that is more than the safety limit. It can cause a lot of damage as driver can loose control while driving at such a high speed.
- *Obstacle*: Any sort of obstacle on road like animals, stone, etc. Occurring suddenly can cause collision.
- *Drunken driving*: Driving after drinking can lead to loss of human life and can cause serious injuries.
- *Collision*: Accidents caused by collision can cause lot destruction.
- *Distraction*: Any sort of distraction to drivers can cause collision of vehicles and can cause injuries.
- *Drowsiness*: Driver feeling drowsy can make vehicle go out of control and this in turn can
- *Avoidance* of safety measures: Safety belts should be put while driving by drivers as well as by the co driver; injuries can be reduced by putting up seat belt as it holds back the people.
- *Lack of traffic rules*: Vehicles generally not following traffic are subjected to accidents more that the one following traffic rules.
- *Lane changing*: Sudden change of lanes on highway can cause collision of vehicles which can cause massive destruction as well as loss of human life.

IV. PREVENTION CONCEPTS

Prevention from accidents is an important measure for saving life. Prevention can be categorized as:

TABLE II. TYPES OF PREVENTIONS

Preventions	Deals with
Primary	It deals with preventing from the situations that can cause injuries like no over-speeding, no alcohols.
Secondary	It deals with reducing the severity of accident to occur like safety belts in care, fire alarms.
Tertiary	It deals with rehabilitation and treatment of injuries like first aid, hospital care.

V. EXISTING MEASURES TO AVOID ROAD ACCIDENTS

Prevention is better than cure- this phrase exactly fit in this case. It is advisory to be cautious beforehand in case of accidents as these can cause a lot of destruction. There are many techniques that can be put up in vehicle. Few of them are:

TABLE III. EXISTING MEASURES FOR ACCDENT AVOIDANCE

Systems	About	Technique involved
Driver alert system	This technique helps to remove the drowsiness of driver while driving. If the system detects the driver is shutting his eyes, it quickly alerts the driver and the driver is awaken.	Face recognition via camera.
Auto steering	Whenever any emergency need arises, the vehicle control is taken by the system in order to avoid any of miss-happening.	Motion detection of driven car.
Driver attention monitor	Whenever there is a situation like for a long time driver is concentrating in some other direction rather than concentration on their own lane, after certain point of time the monitor inside the care alerts the driver and the driver then focuses on his lane.	Face scanning via camera.
Blind spot management	It keeps an idea of the vehicles on side of one's vehicle in order to avoid collision while lane changing or turning.	Other vehicle detection through sensors.
Lane support system	This system helps to protect the vehicle from collision on sudden change of lane over highways.	Detection via sensors on outer side of vehicles.
Rollover system	A lot of destruction is caused when a vehicle roll over. So this type of system avoids rolling over ofvehicle in an accident.	In-built system.

VI. PROPOSED METHOD FOR ACCIDENT AVOIDANCE

By looking at above various techniques to avoid accidents, we put forward a new method which is by integrating VANET and WSN. Basic outline of our proposed technique is shown below:

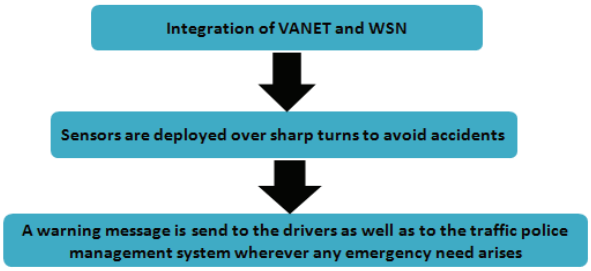

Fig. 2. Outline of proposed technique

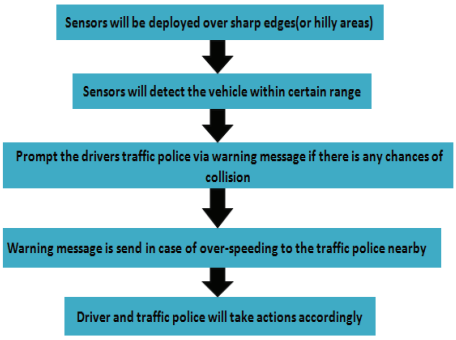

Fig. 3. Flowchart of the working

The actual scenario of invention has been divided into various phases for better understanding. The phases are:

- *Sensor Deployment*- It is the first step to determine the location for the deployment of the sensor. As per situation, sensors can be deployed over sharp/blind turns, over hilly areas or it can be deployed over the crowded roads as these areas or roads are accident prone and needs to be taken care off.
- *Vehicle Detection*- The sensors with their pre-defined range will sense all vehicles coming within its range. This vehicle information can be stored on an android based module developed specifically for the implementation of this application.
- *Data Sending/Receiving*- The data sense by the sensors will be transmitted to the server from where the vehicle information can be transmitted to other vehicles using android based application which is installed on their cell phones.
- *Alert indication*- Whenever there arises a situation where two cars are likely to collide; an alert alarm in the form of beep will be generated, so that the driver may become cautious about the approaching danger. After listening to the beep the driver can make decision accordingly either he will stop the car and look into the application to get information about the location of the vehicle along with speed or will slower down his vehicle.

VII. CONCLUSION

The above discussed technique is slightly different from existing techniques. While the existing techniques are in-built techniques and the technique proposed by us is the technique based on integration of VANET and WSN. The proposed technique will help the vehicle to move smoothly over blind/sharp without colliding thereby reducing road injuries in accident prone areas. In future we will be designing an android based application for this technique and will further try to model the above scenario via hardware.

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