OPEN ACCESS INTERNATIONAL JOURNAL OF SCIENCE & ENGINEERING

SURVEY ON VEHICLE COLLISION DETECTION AND AVOIDANCE WITH POLLUTION MONITORING SYSTEM USING IoT

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Abstract— **Advancement in technology makes great efforts in vehicle Assistive system. Smart vehicles will reduce effort of people by automating the vehicle monitoring task which improves vehicle work flow management. This study reviews enhancement in smart vehicle system. It focuses on accident detection, accident avoidance and pollution monitoring using Internet of Things Technology. This study reveals different approaches for vehicle monitoring.**

Keywords: *Smart vehicle monitoring, accident avoidance system, pollution monitoring, Driver assistance system (DAS) , IoT*

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I INTRODUCTION

With rapid increment in population every year approximately 1.24 million people around the world die on roads and between 20 and 50 million withstand non-fatal injuries [1]. If the current trend continues, road accidents are predicted to increase by 65% and become the fifth major cause of death by 2030 [2]. In economic terms, the direct costs due to road accident injuries have been estimated at US$518 billion, which is about 1% of gross national product (GNP) of low income countries, 1.5% in middle income and 2% in high motorized countries [3]. This high fatality rate and economic costs have prompted the United Nation (UN) to launch a global program—"Decade of Action for Road Safety 2011–2020" in May 2011 [4]. Driver inattention, fatigue and immature behavior are the main factors causing road accidents.

Car collision avoidance system (CCAS) considered as system to alert the driver and take decision to take proper action in avoiding the accidence. Safety applications for vehicles are requirement for intelligent transportation systems. Safety applications are essential part in order to minimize the chances of accident. There are different safety vehicular application which includes as :

- Vehicle Detection: The application for vehicle detection aim to reduce the collision of vehicle and Define size and distances with shape in order to avoid collision of vehicle.

- Road Detection: In road detection include track which are safe and drivable in order to avoid accidents.

- Drowsiness Detection: Driver monitoring systems constitute a key component of vehicular safety applications, which enables the detection of any drowsy and fatigue state of a driver or any distraction

- Pedestrian Detection: Detecting and tracking people on road environment by means of vehicle-mounted sensors has a significant potential in improving safety by preventing any possible collision between host vehicle and pedestrians.

- Collision Avoidance: A collision avoidance system is on the actions taken after the detection process.
  Technology to overcome the problem of vehicle collision as well as detection Advancement of embedded technologies in automotive industries makes the human life safer and convenient for living

II OVERVIEW OF VEHICLE SAFTY SYSTEM

During last few decades, advancement in vehicular system growing rapidly. These systems plays crucial role in reducing collision and accidents. With human errors, road and environmental conditions may leads to cause traffic accidents. Again street lights and climatic conditions, e.g., foggy and rainy weather reduces the visibility and makes roads slippery. The former may include the places where there are sharp turns, intersections

or junctions. Roughly one-third of accidents take place at intersections.

The safety system in order to avoid collision and accident they are of two types [2].

The safety systems are of two types as shown in figure1.Active system includes driver assessment system (DAS) which are further having different categories as:

- Collision avoidance system
- Automatic breaking
- Adoptive cruise control
- Lane departure warning

Passive system contains seat belt, air bags, crumble zones etc.

In this paper, we provide overview of different sensors and techniques for vehicle collision detection and avoidance to reduce the possibility of an accident and vehicular safety.
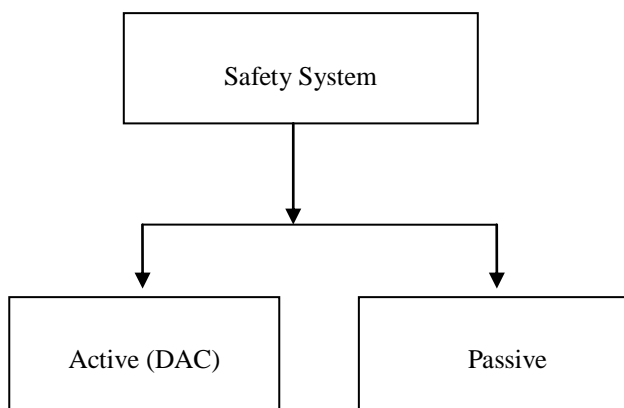

Figure 1. Vehicle Safety Systems

(Source: Amir Mukhta et.al. 20)

III LITERATURE SURVEY

In this section we concentrate on different approaches used for Vehicle collision detection and accident avoidance. Various techniques to improve the automotive systems with the consideration of various parameters mention.

Nesreen Alsbou et al .[4] , Presented Vehicle Collision Avoidance System with the help of Wireless Sensor Networks. Author make use of the wireless sensor network (WSN) to transmit the measured data in avoidance system and the using the controller area network protocol (CAN) bus to revive the data and connect the data with the controller to controlling on the actuators. System consist of laser transmitter and receiver. And the laser transmit a burst of electromagnetic radiation and when this radiation reflect by the barrier then this reflect light transmitted by Zig Bee communication module to the controller In this case the driver able to take decission to avoid the accidence as much as possible.

In MAY 8, 2015 project by ARPN Journal of Engineering and Applied Sciences Presented predictive vehicle collision avoidance system using raspberry-pi it seemed like to avoid accidence in the blind spot area using ultrasonic sensor using raspberry-bi module. The ultrasonic sensor work like radar system to detect the obstacles In addition to that the ultrasonic sensor is used to measure the distance between the vehicle and the obstacles and saved the distance safe before fatalities happened and alerting the driver before the accidence using two ways visualization using light emitting diode (LED) and make a sound using buzzer and the driver alone apply the brake or steering to controlling on the speed. The main advantage of ultrasonic sensor is that it provides highest reliability in getting

Aishwarya S.R[4] et al presented Eye Blink Monitoring System (EBM) that alerts the subject during state of drowsiness. An embedded system based on psychological state of Subject by monitoring eye movements and head movements are useful in warning drivers duringinitial sleep cycle phase of drowsiness. The physiological sleep state analysis of subject can be determined by monitoring subjects eye-blink rate using an IR sensor and head movement using an accelerometer. A normal eye blinkrate has no effect on the output of the system. However, if subject is in extreme state of sleep-cycle, then IR sensor receives abnormal eye blinking rate & an alarm is initiated to wake the subject. An IoT enabled sensors are used to transmit the entire data collected by sensors over a smart grid network for quick response team to take actions under emergency conditions. The development of smart grids fascinates the overall process of communication between human and machine rather than machine to machine communication. Hence, IoT can revolutionize the way embedded systems interact and respond for variety of applications especially in case of vulnerable night drivers by monitoring the state of their drowsiness for a quick, safe and effective response for a safer road travel. Vishwajeet H. Bhide[5] proposed a survey on the smart homes using IoT which explains How to provide fully smart environment condition monitoring by various sensors like Temperature, Humidity, Light and Level for providing necessary data to automatically adjust the comfort level in homes by optimizing the use of energy. They also use prediction here for automatically detection and resolution of any problem in the devices. For that they are using Naïve Bayes Classifier algorithm for data mining. It will send email or SMS to required technician for service and it will also notify the owner. It gives a huge advantage on the smart home systems using IoT. The work is to planning to eliminate most of the human interaction by providing intelligent system. Development of such smart home achieve by using IoT

technologies. By using these system it can actually manage to make low cost, flexible smart homes to adjust its environmental conditions and resolve its errors with energy saving. Spurti Shinde[6] et al did a literature review on an Accident Detection and Alert Systems for Immediate Emergency Services which explains accidents are responsible for a large number of casualties each year. In some cases deaths are caused due to unavailability of immediate medical aid to the victim which can be avoided with the help of an automated system that will reduce the time consumed in activities such as taking the victim to the nearest hospital, completing formalities such as filling forms and also involving police in case of major crashes. This review compared various algorithms and technologies that have been developed for detecting different types of accidents. The purpose is to analyze various algorithms studied in this survey in terms of efficiency, advantages and disadvantages and enhance the best suited algorithm for developing an efficient system that synchronizes emergency services for accident detection.

IV CONCLUSION

This paper reviews advances in smart health monitoring system with their application especially in medical field.

Study of wireless, remote and mobile heath care systems emphasize effectiveness of system in hospital as well as home environment. Many researchers developed online or web based monitoring systems which plays crucial role to monitor patient by different approaches producing result with high quality data and accuracy.

Most monitoring system major vital signs and send it to remote station for further processing. Different communication protocols like Zigbee, Wi-Fi, Bluetooth are used in smart health monitoring.

Various health monitoring platform are validate by different experimental study and clinical trial. By validation procedure, one can easily understand accuracy, flexibility, precision rate etc. of various systems in depth.

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