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Realistic Mobility Model of AVCSS (Advanced Vehicle Control and Safety System) for Accident Detection with Tracking Technology

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Abstract*: In most countries, economic losses due to road accidents are increasing. Although the number of road fatalities has declined since 2001, much improvement is required. A facility to provide emergency services after an accident is still not up to the mark due to lack of information. Hence we introduce automation in the vehicle which will help the emergency team to reach in time and save lives. Automobile industries are more concern about human safety. This paper represents a vehicular automation, in which a network can be used for vehicle tracking after the accident and reporting particular information about the vehicle to deliver emergency services. To demonstrate the functioning of this system, emergency services or an SOS system is considered. If a vehicle meets with an accident, the system sends the geographical coordinates and by using these coordinates tracking of Vehicle position on Google map using the internet is delivered to hospitality services. The message contains the details of the vehicle and also the accurate location of the vehicle. From where the ambulance or emergency medical support can be rushed to the accident site.*
Keywords: AVCSS (Advanced Vehicle Control and Safety System), GPS, GSM, Vehicle tracking, Accident detection Introduction.

I. INTRODUCTION

As per the National Highway Traffic Safety Administration (NHTSA) was established by the Highway Safety Act, represents to carry out safety programs. According to NHTSA's standards Vehicle manufacturers trying to introduce safer vehicles or safety technology, vehicles has different facilitates like airbags and advance equipments to protect occupants during crash thus due to advanced structural techniques these systems more stringent crashworthiness standards which aim to prevent disaster. However, accidents and crashes continue to occur, with property damage, serious injuries, and lack of emergency systems. Thus linearly improvements in vehicle safety systems will help to reduce serious injuries, and human death. NHTSA believes that greatest improvement in vehicle safety will result from the broad-scale application of crash avoidance as well as accident detection and quick emergency assistance technologies. Automobile safety is the study and practice of design, creation, equipment, and regulation to minimize the incidence and consequences due to accidents and crashes.

The proposed systems aim at implementing the utility of a low-cost accident detection safety system. Accident Detection with Messaging System is the simplest form of practically feasible model by using GSM and GPS technologies. For recording the coordinates GPS is used while for sending the coordinates GSM is introduce. To make this process all the controls are made using a microcontroller which responses faster to communicate. The reasons for accident can be the driver's mistake or any other consequence but delivering proper emergency service is a necessity after an accident.

The goal of this system is to reduce various disadvantages of automobile sector relating to unknown disaster by providing appropriate service within a shorter time. Our system implemented to overcome economical losses due to lack of information and emergency service.

II. LITERATURE SURVEY

1) Luo Yong, and Luo Xia provided a framework of emotions, perception, decision-making, and decision-implementation unit to overcome the problem of modelling human-like behaviours on simulated highway systems. Luo Yong, and Luo Xia [1] also researched on the automatic vehicle-driving mode at the four-lane highway. This research also shows the decision-making procedure in an automated vehicle. Thus the name "AVCSS" (Advanced Vehicle Control and Safety System) comes from this paper which relates to vehicle safety.

2) Hoang Dat Pham et al [2] has proposed the vehicle tracking system by developing the connection between GPS and GSM] module [2] which is captured with the aim of enabling users to locate their vehicles with simple, fastest and in a convenient manner. Through the mobile network, the system will provide the capability to track vehicle remotely.

3) Martin Lindfors et al [3] has provided the idea about vehicle vibration and acceleration using an accelerometer, these vibrations can be undertaken to estimate vehicle speed while other sources of vibrations act as a disturbance. Minor crash produces some unrealistic vibration on chassis which can be collected or process appropriately with vibration sensor and accelerometer.

4) C. Mohamedaslam et al [4] has provided to construct an intelligent automotive system by minimizing the limitations of existing methods. The security as well as, safety of vehicles and human beings, can be reduced by appropriate sensors which sense different parameters in the vehicle are attach to a controller which detects when the hazardous conditions may occur or any accident disaster may occur. This paper represents ideas about a smart vehicle and sensing technology.

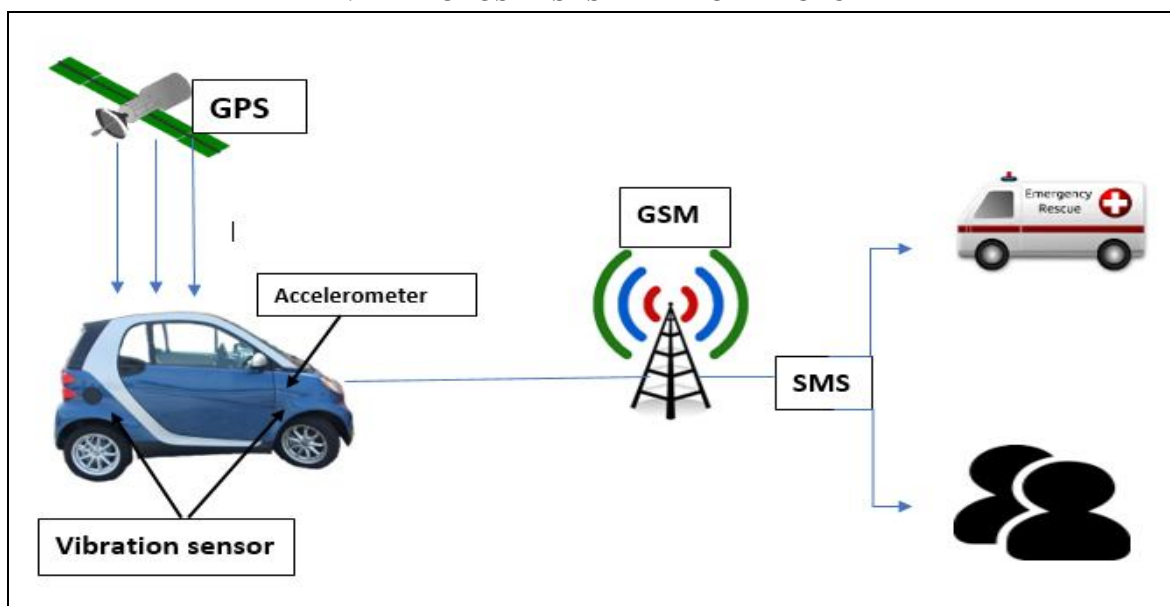## III. PROPOSED SYSTEM ARCHITECTURE

Fig.1. System Architecture

The main objective AVCSS is to control an accident turning into a disaster. The paper proposed a system to give quick assistance to the people who meet with an accident. The architecture consists of micro-controller unit, accelerometer, vibration sensor, GPS device, and GSM module. Power supply and all other circuitry including GPS, GSM, controller, and alarm are fixed into the brittle box and sensors located at the critical point of a vehicle where the impact of tilt and vibration are more conserved. A high performance (16/32) bit microcontroller unit is used to process and store the real-time signal from the accelerometer and vibration sensor. An accelerometer is the main sensor used to detect the major crash [6] and vibration sensor attached to detect normal crash as well as to warn the driver before any major accident.

Once the accident is detected GPS collect the current position values which include latitude (N or S), longitude (E or W). The geographical coordinates are collected by the microcontroller and that information will be sent to the mobile phone under the assist of GSM. Thus, message on the mobile screen contains accurate location will redirect to Google map and alert the operator to provide hospitality services as well as the interrupts or signal from vibration sensor in case of simple crash happens from current driver will also sent message to the family members/vehicle owner that "your car has been crashed".

The platform of this system is IDE in which user can able to add different mobile numbers for accident assistance.

IV. CONCLUSION

This paper represents the design with the features like practical feasibility, inexpensive, movability, and compact nature. The system with the accelerometer, vibration sensor, GPS and GSM which reduces the disaster to a large extent. Lack of automation system in automobile can be overcome by this system. The time for searching the accident site is minimized and the person will be cure as soon as possible which will help to save many lives. The main aim of the accident AVCSS system is to decrease the chances of casualties in an accident and also to aware the user about condition of a vehicle. Whenever an accident occurs, emergency systems are alerted and they can able to reach the particular location on time. This implementation is much more suitable for the deserted places where the accident rapidly occurs and accidents that occur during the night time.

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