

# **A Modern Methodology Preventing Vehicle Accident and Attacker Identification System using Black Box in Cars**

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**ABSTRACT:** It is known that the population is increasing at very peak ranges all over the world. But also the deaths are exponentially increasing. Among them most of the deaths occurs due to accidents and diseases. Since we are on the era of advanced technology, we can utilize these technological growths to enhance the safety and security towards death causing crisis like accidents and spreading of disease. These technologies also provide some aids to prevent us from experiencing major problems caused by accidents. Among accidents vehicles are becoming the major source of accidents. So here we utilize the technological advancement to enable an accident prevention and information extraction system.

**KEYWORDS:** Vehicle Accident, Attacker Identification, Black Box.

## **I. INTRODUCTION**

The development of automation systems to support rather than replace human drivers has become a trend in current intelligent vehicle research. These systems support drivers by strengthening their sensing ability, warning in case of error, and reducing the controlling efforts of drivers. Such automation systems are called advanced driver assistance systems. The initiation, development, deployment, and tremendous growth of intelligent transportation systems and their significant impact on our life and society. Today, transportation research and development is no longer a field dominated by civil, mechanical, operations research, and other traditional engineering and management disciplines. Rather, computer sciences, control, communication, the Internet, and methods developed in artificial intelligence, computational intelligence, web sciences, and many other emerging information sciences and engineering areas have formed the core of new ITS technology and become integral and important parts of modern transportation engineering. The advanced driver assistance systems are expected to cooperatively work to implement mutual understanding between drivers and vehicles, thus reducing or avoiding conflict.

To this goal, driver understanding and modeling in advanced driver assistance systems has gradually become a hot topic not only in ergonomic research but in the intelligent vehicle field as well. The causes of driver distraction are diverse and pose large risk factors. More than half of the crashes that involve inattention were caused by driver distraction. After an intensive study on the various definitions of driver distraction appeared in the literature, "Driver distraction is a diversion of attention away from activities critical for safe driving toward a competing activity." Thirteen types of potentially distracting activities are listed in eating or drinking, outside person, object or event, talking or listening on a cellular phone, dialing a cellular phone,

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using in-vehicle-technologies, and so on. The existing system uses vibration sensor for detecting the occurrence of accident. But there is no system to prevent accident from occurring. Only accident indication is performed. Also the attacker is not identified in this system that causes an accident. The drawbacks of the existing system are accident prevention is not performed. And attacker identification is not performed.

## II. LITERATURE SURVEY

Parallel control and management have been proposed as a new mechanism for conducting operations of complex systems, especially those that involved complexity issues of both engineering and social dimensions, such as transportation systems. The work presents an overview of the background, concepts, basic methods, major issues, and current applications of Parallel transportation Management Systems (PtMS). In essence, parallel control and management is a data-driven approach for modeling, analysis, and decision-making that considers both the engineering and social complexity in its processes. The developments and applications described here clearly indicate that PtMS is effective for use in networked complex traffic systems and is closely related to emerging technologies in cloud computing, social computing, and cyberphysical-social systems. A description of PtMS system architectures, processes, and components, including OTSt, Dyna CAS, aDAPTS, iTOP, and TransWorld is presented and discussed. Finally, the experiments and examples of real-world applications are illustrated and analyzed [1].

The work mentioned in [2] provides a survey of recent works on cognitive cars with a focus on driver-oriented intelligent vehicle motion control. The main objective here is to clarify the goals and guidelines for future development in the area of advanced driver-assistance systems (ADASs). Two major research directions are investigated and discussed in detail: (1) stimuli-decisions-actions, which focuses on the driver side, and (2) perception enhancement-action-suggestion-function-delegation, which emphasizes the ADAS side. The work addresses the important achievements and major difficulties of each direction and discusses how to combine the two directions into a single integrated system to obtain safety and comfort while driving. Other related topics, including driver training and infrastructure design, are also studied.

In [3] reviewed the state-of-the-art technologies for driver inattention monitoring, which can be classified into the following two main categories: 1) distraction and 2) fatigue. Driver inattention is a major factor in most traffic accidents. Research and development has actively been carried out for decades, with the goal of precisely determining the drivers' state of mind. Summarize these approaches by dividing them into the following five different types of measures: 1) subjective report measures; 2) driver biological measures; 3) driver physical measures; 4) driving performance measures; and 5) hybrid measures. Among these approaches, subjective report measures and driver biological measures are not suitable under real driving conditions but could serve as some rough ground-truth indicators. The hybrid measures are believed to give more reliable solutions compared with single driver physical measures or driving performance measures, because the hybrid measures minimize the number of false alarms and maintain a high recognition rate, which promote the acceptance of the system. Also discuss some nonlinear modeling techniques commonly used in the literature.

In [4] great advances in simulation-based vehicle system design and development of various driver assistance systems have enhanced the research on improved modeling of driver steering skills. However, little effort has been made on developing driver steering skill models while capturing the uncertainties or statistical properties of the vehicle-road system. In this work, a stochastic model predictive control (SMPC) approach is proposed to model the driver steering skill, which effectively incorporates the random variations in the road friction and roughness, a multipoint preview approach, and a piecewise affine (PWA) model structure that are developed to mimic the driver's perception of the desired path and the nonlinear internal vehicle dynamics. The SMPC method is then used to generate a steering command by minimization of a cost function, including the lateral path error and ease of driver control. In the analyses, first, the experimental data of Hongqi HQ430 are used to validate the driver steering skill controller. Then, the parametric studies of control performance during a nonlinear steering maneuver are provided. Finally, further discussions about the driver's adaption and the indication on vehicle dynamics tuning are given. The proposed switching-based SMPC driver steering control framework offers a new approach for driver behavior modeling.

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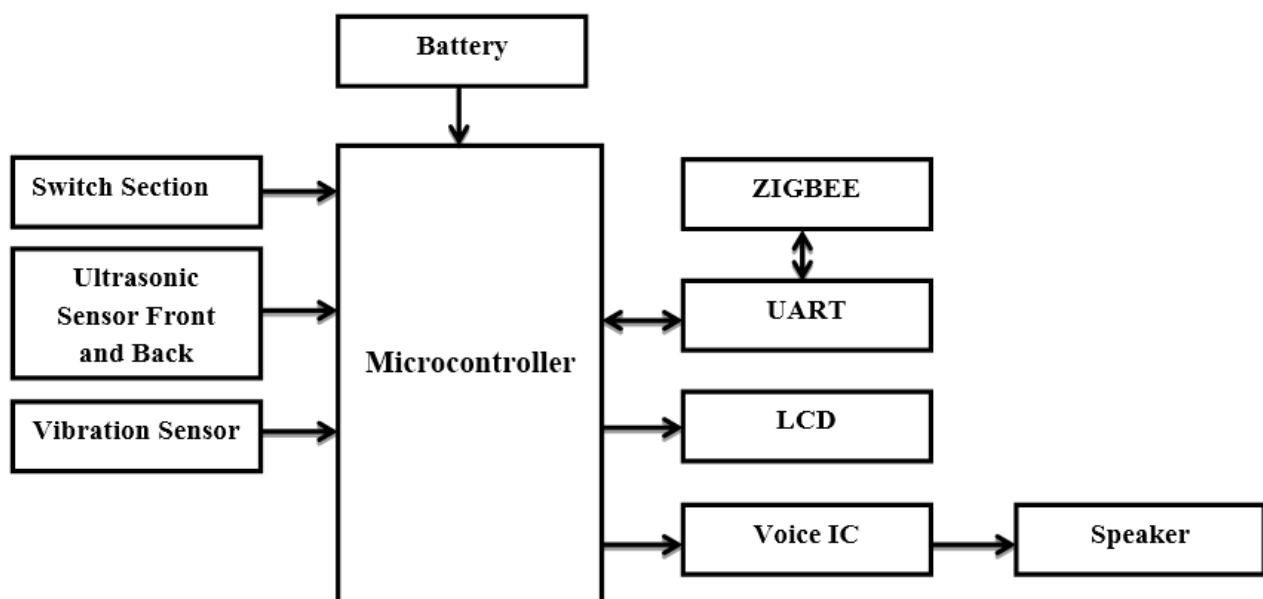
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In [5] addition to decentralized controllers, the information flow among vehicles can significantly affect the dynamics of a platoon. This studies the influence of information flow topology on the internal stability and scalability of homogeneous vehicular platoons moving in a rigid formation. A linearized vehicle longitudinal dynamic model is derived using the exact feedback linearization technique, which accommodates the inertial delay of powertrain dynamics. Directed graphs are adopted to describe different types of allowable information flow interconnecting vehicles, including both radar-based sensors and vehicle-to-vehicle (V2V) communications. Under linear feedback controllers, a unified internal stability theorem is proved by using the algebraic graph theory and Routh-Hurwitz stability criterion. The theorem explicitly establishes the stabilizing thresholds of linear controller gains for platoons, under a large class of different information flow topologies. Using matrix eigenvalue analysis, the scalability is investigated for platoons under two typical information flow topologies, i.e., 1) the stability margin of platoon decays to zero as  $O(1/N^2)$  for bidirectional topology; and 2) the stability margin is always bounded and independent of the platoon size for bidirectional-leader topology. Numerical simulations are used to illustrate the results

### III. SYSTEM DESIGN

In the proposed system the drawbacks of existing system is overcome. We are using ultrasonic sensor in the front and backside of the vehicle which is used to find whether any vehicle is nearing the user's vehicle. If any vehicle is nearing the user vehicle, it will have identified by the ultrasonic sensor and the number plate details will be send to the user and the nearby vehicle through ZigBee module. This setup will also be placed in all vehicles so, there won't be any misunderstanding. There is a switch section in the car; in that 3 pre-assigned voice will be stored. If any switch is pressed, then the voice will be played in the nearby vehicle through speaker. The vibration sensor is used to find if any accident occurs and if anything is occurred, then the number plate details will be transmitted and stored in the EEPROM and displayed in the LCD. The advantages of the system are to prevent accident prevention and the attacker is easily identified. The hardware required for the implementation of the circuit is an ultrasonic sensor, vibration sensor, Zigbee module, microcontroller, LCD Module, Voice IC, Speakers, and Switches. The block diagram of the system is shown in the figure

Car Section 1



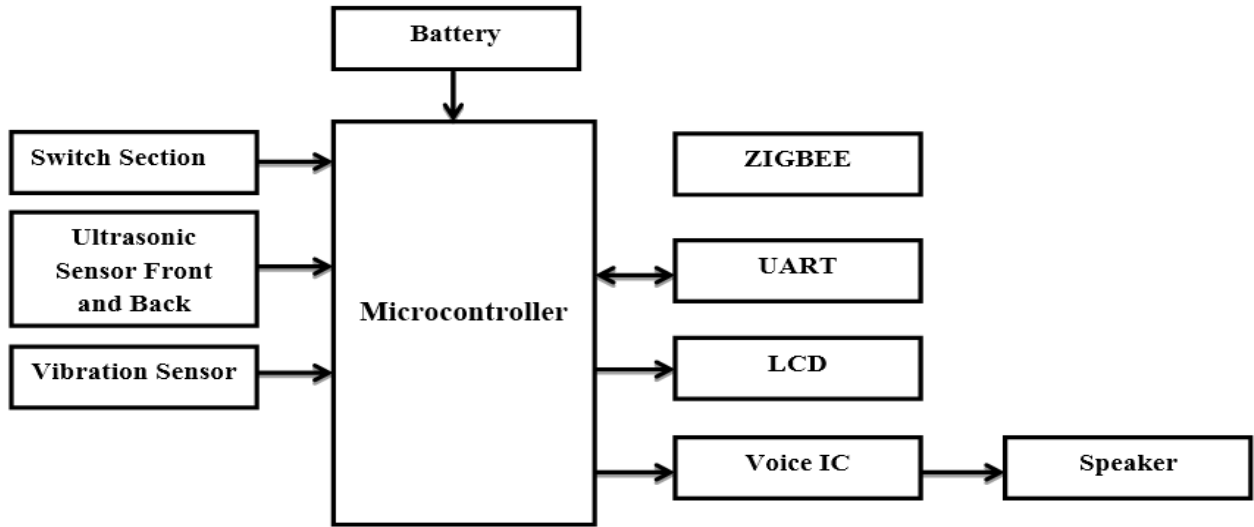
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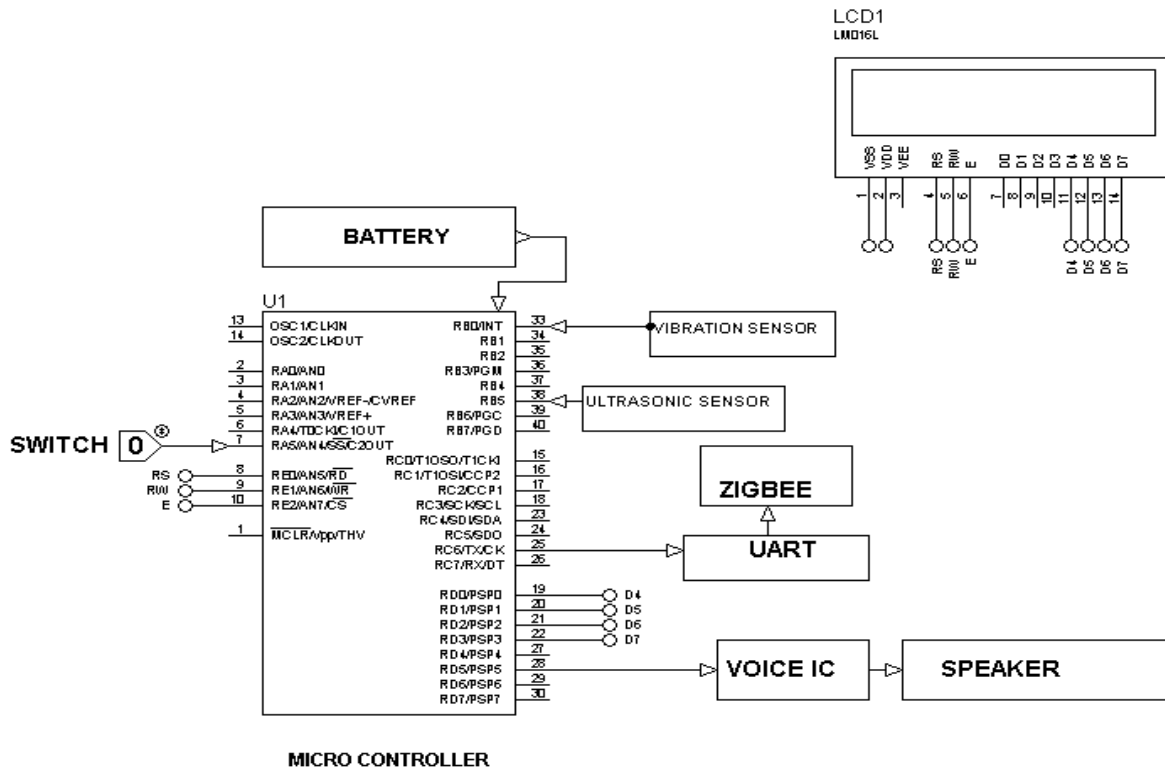
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## Car Section 2



## Circuit Diagram



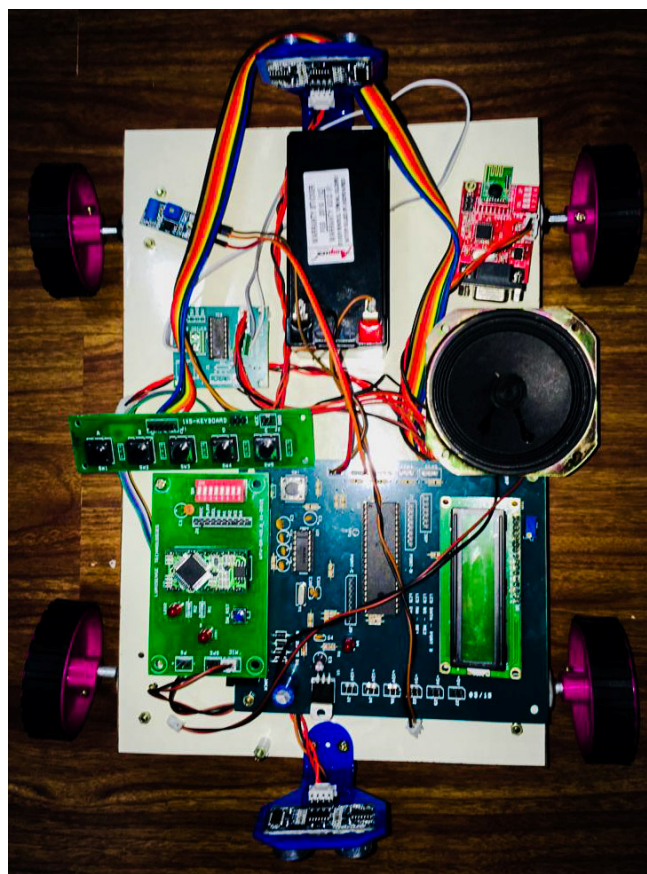
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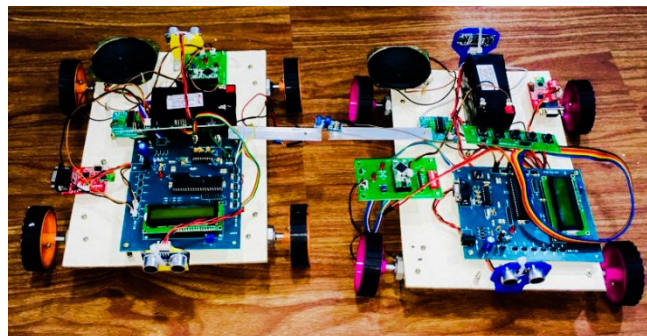
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The 'Accident Prevention in Cars' is implemented by placing ultrasonic sensor in the front and backside of the vehicle. 'Vehicle to Vehicle Communication' is established by using Zigbee Module and pre-assigned voice IC with Speakers. Attacker is identified using 'Black Box in Cars' which is implemented by placing the vibration sensor in the vehicle. When the accident occurs number plate details of the attacker is transmitted through Zigbee and stored in the EEPROM of the microcontroller in the victim's vehicle which is displayed in the LCD.



Single Vehicle



Two Vehicles

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Initial Display



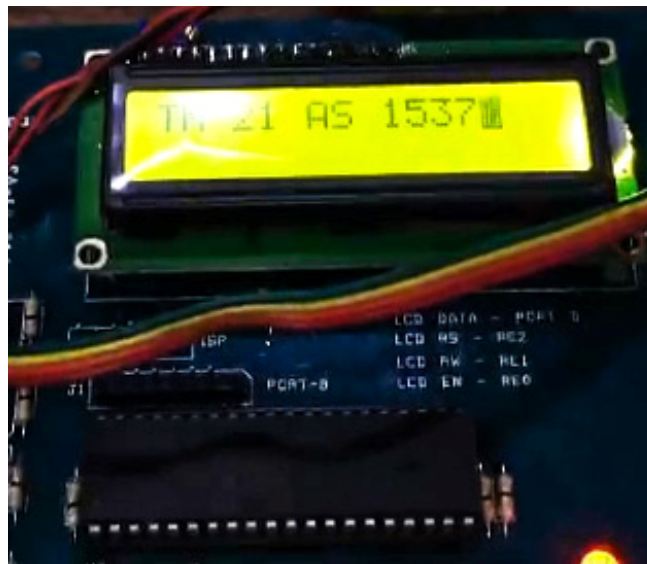
Black Box Vehicle 1

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Black Box Vehicle 2

### IV. CONCLUSION

This project reduces the number of accidents that takes place due to over speeding and negligence of drivers. It also deals with the communication between drivers using predefined voices. In future, the location of the accident and the detailed analysis of the Crash Report can be sent to the Web Server using IOT Module. This system can be implemented in all kinds of vehicles.

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