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Advanced Driver Assistance System using Vehicle to Vehicle communication

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Abstract — *Increasing numbers of vehicles on the road are adding to the problems associated with road traffic. Efficient monitoring of vehicles is need of time for smooth traffic flow. Safety system for Vehicle collision avoidance is prime challenge to be met. Many technologies are in action for collision free traffic. Pertaining to this, Intelligent Collision Avoidance (ICWA) system based on V2V (Vehicle to vehicle) Communication is proposed which addresses the issue of collision avoidance. ICWA is one of the leading research feature of advanced driver assistance system (ADAS). In this paper optimized algorithm is developed for collision avoidance, safety zones are created for each vehicle. Overlapping of these safety zones found by this algorithm. It establishes Vehicle to Vehicle communication through wireless protocol Wi-Fi. In this frames Contain vehicular parameters (speed, location of car, turn signal etc.). Each car can transmit and receive the frames from other cars which are within the communication range. This information is takes as input to collision avoidance warning system algorithm. If there is accidental situation, system gives warning to the driver. Apart from this, Android application is developed to make the system more secure and user friendly. The system is implemented on Virtual car environment with street map and gives the warning based on the accidental situation predicted by the algorithm using vehicular information of all cars within the range of communication.*

Keywords- **:** *Vehicle to vehicle communication, Android application, Virtual car environment, intelligent collision avoidance warning system, Wi-Fi.*

I. INTRODUCTION

Invention of vehicles was one among the best industrial achievements of human beings in the past century and has contributed ton in several ways in which to the expansion of a nation. Perhaps, we tend to cant ignore the actual fact that a lot of of individuals lose their life or suffer life dynamic accidents owing to conveyance collisions each year. Causalities in traffic accidents area unit mainly caused by collision between vehicles owing to the lack of the drivers to determine the perimeter of their vehicles. This can be notably accentuated in giant vehicles like trucks wherever there area unit several blind spots. Thus Advanced Driver help system (ADAS) comes in to image. ADAS helps drivers in driving method for safe driving. ADAS has received widespread attention with active work being distributed for over four decades. ADAS consists of tons of adaptational control, adaptational lightweight management, automatic parking, automotive night vision etc. The analysis goes on the key feature of ADAS that's collision dodging warning system.

Fig-1. Vehicle to Vehicle Communication

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A vehicle collision rejection system supported wireless communication and GPS will eliminate the drawbacks of the optical primarily based technology even underneath high speeds or underneath near-zero visibility [1].

In this thesis, we tend to square measure introducing to Intelligent Collision rejection Warning System using Vehicle to Vehicle (V2V) Communication, and it primarily employs with the assistance of wireless communication protocol. We tend to square measure transferring in addition as receiving the transport parameters like speed, location of car, visual signal data etc. through protocol frames at intervals its vary not like current measuring system, camera, and different sensors, it will grasp what oncoming vehicles square measure doing-or even those around corners and out of sight. The idea is to use this data to assist electronic safety systems work a lot of swimmingly and safely. Excluding this we've got provided further security to avoid cyber-attack by developing automaton application for log in to the system. conjointly this can be provided as if anyone don't need to use this warning system as a result of if he gets irritated then he/she will build it off, still there vehicle will transmits the transport data.

II. LITERATURE SURVEY

Early warning systems are tried as early because the late 1950s. Cadillac for instance, developed a epitome vehicle named the Cadillac Cyclone that used the new technology of microwave radar|radio noticeion and ranging|radiolocation |measuring instrument| measuring system |measuring device to detect objects within the front of the automobile with the radar sensors mounted within the "nose cones". It absolutely was deemed to expensive and therefore the model was later dropped.

The first trendy demonstration of forward collision rejection was performed in 1995 by a team of scientists and engineers at Hughes analysis Laboratories in Malibu, California. The project was funded by Delco physics, and was semiconductor diode by HRL man of science Ross D.Olney. The technology was tagged for promoting functions as "Forewarn". The system was radio detection and ranging based mostly - a technology that was pronto offered at Hughes physics, but not commercially elsewhere. A little custom made-up radar-head was developed specifically for this automotive application at seventy seven GHz. The forward radar-head, and the signal processing unit and visual-audio-tactile feedbacks were initial integrated into a Volvo S40, and shortly thenceforth into a Cadillac STS.

In the early-2000s, the U.S. National road Traffic Safety Administration (NHTSA) researched whether or not to create frontal collision warning systems and lane departure warning systems necessary. In 2011, the eu Commission investigated the stimulation of "collision mitigation by braking" systems. Necessary fitting (extra price option) of Advanced Emergency Braking Systems in business vehicles would be enforced on one November, 2013 for brand new vehicle sorts and on 1 November, 2015 for all new vehicles in the European Union. Per the impact assessment this may ultimately stop around 5,000 fatalities and 50,000 serious injuries annually across the EU.

Several work has propose completely different wireless technologies for vehicle communications based on existing wireless technologies that square measure standardized. In 2004, European Telecommunications Standards Institute (ETSI) has created standards to utilize DSRC in 5. 8 GHz band for Electronic Toll assortment [1]. Similarly, Federal Communications Commission (FCC) has discharged the quality for DSRC in 5.9 GHz band to guard the security of the traveling public, and conjointly for business use [2]. IEEE 802.11p may be a draft change to IEEE 802.11 to evolve the wireless transmission in 5.9 GHz band to support vehicles of speed but two hundred kilometer/hr and in communication vary of 1 km [3], and therefore the framework and application for vehicle communication square measure outlined in IEEE P1609 Wireless Access in the transport surroundings (WAVE) [4]. Li et al. has projected the study of victimisation IEEE 802.15.4 low rate, low power, and low price self-organized wireless transmission to produce fault-tolerance for in-car management devices or to find vehicles [5].

The unit sixteen of ISO TC204 is made to outline the uniform set of protocols and interfaces for vehicle communications known as Communications, Air-interface, Long and Medium (CALM). It aims to unify numerous wireless technologies like Infrared, GSM, DSRC, Wi-Fi, WI-Max, Bluetooth, RFID, etc. for communication beneath one umbrella for ITS [6]. The CVIS project (Cooperative Vehicle- Infrastructure Systems) has deployed the CALM design to produce the uniform network protocol stack for communication devices in vehicles and within the road infrastructure for real implementation and testing [7].

III. METHODOLOGIES

3.1. System Methodologies

- Design and develop the automaton application to avoid cyber-attacks.
- Development of virtual automobile setting victimization QT to produce real time traffic state of affairs to test our rule.
- Communication institution of virtual cars to share the conveyance data to predict the accidental scenario.
- Development of optimized intelligent collision rejection rule to relinquish the warning to the driving force if there's any accidental scenario.

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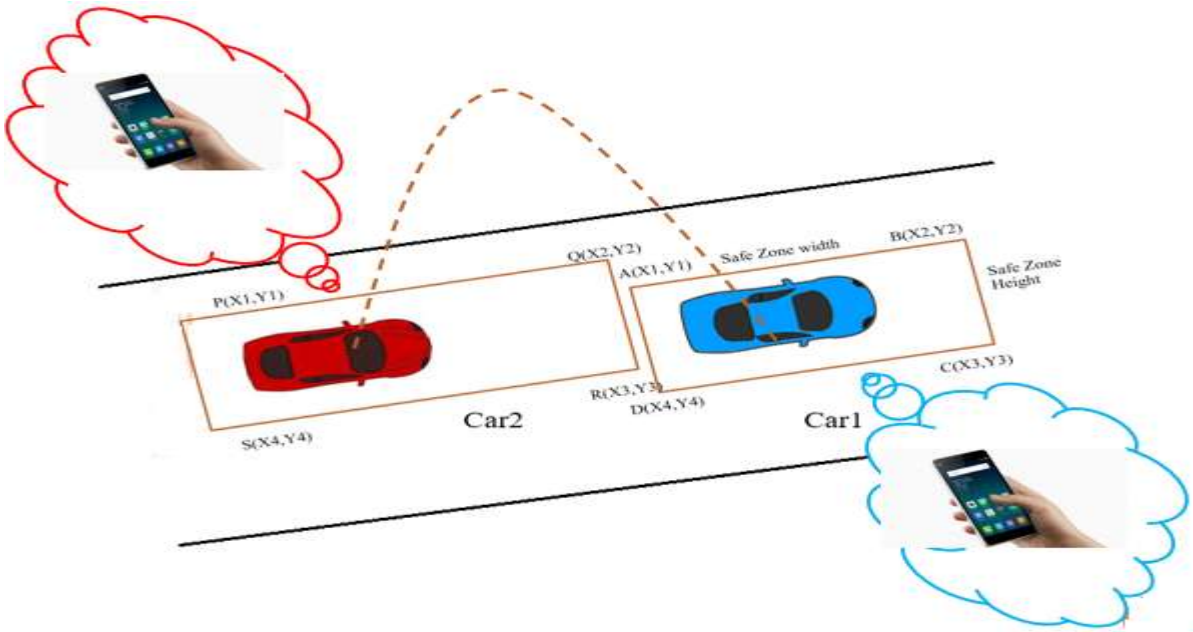

Fig-2. Overview of system

3.1. System Flowchart

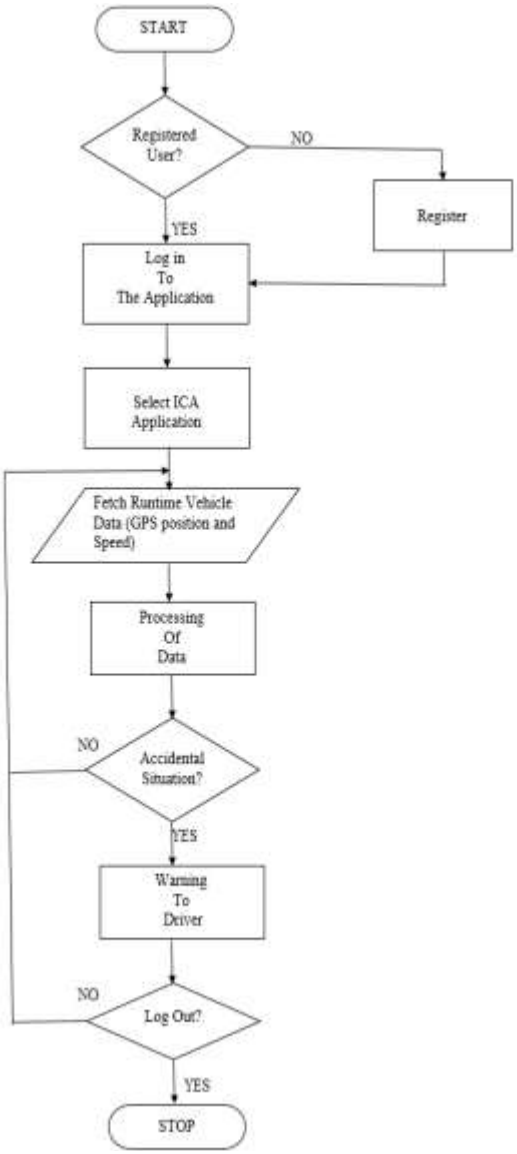

Fig-3. Flowchart of system

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Fig-3 shows the flowchart of the system. In this first of all user will click on his Ford safety application. If the user is new one he/she has to go to the register activity and register over there. Now user has to log in with his credential as log in id and password. After log in features activity will get appear. In that user has to select Intelligent collision avoidance (ICA) system. You will get connected to the intelligent collision avoidance platform and the street map will get display on your screen.

As soon as you connected to the system your car will send and receive the frames of vehicular information of cars in its zone. This vehicular information taken as input to our ICAW algorithm. This algorithm is continuously running and it will find out, if there is any accidental situation. If yes it will give warning to the driver and it will also check if
driver has logged out from the application. If logged out again it will check when user will log in and it will repeat the same flow.

IV. CONCLUSION

In this way the ICAW system is developed, which provides 360 degree view to the driver so that accidents are minimized. Addition to this android application provides cyber-attack security to avoid congestion of frames and to work system smoothly. It becomes easy and minimizes the time required to identify the accidental situation due to the safety zones overlap algorithm. It provides all the warnings like lane change collision, rear end collision, front end collision and intersection collision with the help of this algorithm. In this project my contribution is the Development of android application, Virtual car development, communication of cars and ICAW algorithm development.

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