A REVIEW ON AUTOMATED VEHICLE AND TECHNOLOGY

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ABSTRACT

When applied to vehicles, connected and automated vehicle (CAV) promises a significant shift to everyday life. As a result, the advancement of CAV-related research has greatly increased in the last several years. This article surveys the issue of vehicle-to-vehicle communication, security, and safety at the core of vehicle research: It is assumed that these themes are critical to ensuring the success of CAVs, and it is expected that people would devote time and effort to studying them. This paper covers four aspects: Dedicated Short Range Communications (DSRC), the future 5G cellular technologies, passive and active attacks, and existing solutions. This work not only demonstrates the present state of the art, but also offers new areas for future investigation. The article provides an illustration of how the different themes interact and are combined into a seamless user experience. This article is regarded to be very useful to CAV researchers, application engineers, and government policymakers.

KEYWORD: Automated Vehicle, Technology, IOT

INTRODUCTION

This technology has the potential to reduce traffic accidents, improve quality of life, and increase transportation system efficiency. The beneficial impact CAVs may have in comparison to today's experience was shown by. The result of greater vehicle density while keeping delay times constant is better throughput. Reduced number of emergency room patients, decreased automobile insurance rates, and smaller traffic enforcement agencies are just a few of the other advantages that are obtained by moving through with the change. To illustrate, Bajpai also said that sharing vehicles with firms or people through online car-sharing programmes will cut down on the number of vehicles possessed. As driver-less cars come home, they may lead to a decrease in the number of vehicles per family. In highly populated places, autonomous vehicle (AV) ride-sharing might have a bigger influence on available properties. Research from the MRCagney Institute found that those who are unable to get a driving licence would considerably benefit from CAVs since they are less reliant on conventional means of public transit. Once demand for autonomous vehicle sharing picks up, parking space requirements will disappear. Due to the increased demand for passengers, vehicle miles travelled per vehicle will be higher than existing requirements. In keeping with this, we expect road mishaps to be fewer after all human error is removed from autonomous vehicles. road fatalities are projected to decline by 70% in the next quarter-century

Even if future progress will be affected by CAVs, the deployment of this technology is still at a standstill because of the current issues. Using wireless networks and sensors, the CAV (Consolidated Automotive Vehicles) obtains important traffic and other critical information while it is on the road, which is done via the use of automated driving control on one of six levels (SAE International, 2016). The starting level is zero, which requires total human driving control, and then each step rises by one, leading to completely autonomous navigation with no human involvement. Level 5 incorporates technology that relieves drivers from navigation tasks and frees them up to focus on driving. Level 2 automation (adaptive braking and acceleration) is in automobiles now. There has been a high priority problem in terms of automobile or pedestrian accidents, and after solutions have been established and assessed, it will be a huge challenge to overcome. The issue of passenger and vehicle security continues to be an issue because of the physical and cyber threats that might lead to the loss of personal information or worse, CAVs that have been hacked and used by an unauthorised user.

TRAFFIC

An important component of this research is to draw attention to the possibilities for traffic crashes that include pedestrians or bicycles. Recently, a human-controlled CAV hit a jaywalking pedestrian in Tempe, AZ. The resulting disaster has forced Uber to halt their testing programme. Google, Blackberry, and GM all still do research and development. Not only must the vehicles and pedestrians cooperate to prevent harm or loss of life, but traffic control devices are also vital to minimise risk of injury or death. CAV evolution takes on the additional responsibility of communicating to the right authorities when an issue has occurred.

Many CAV-related research review papers are accessible in the literature. provide thorough studies of the basics of CAVs, while provide overviews of the cyber world of CAVs with concerns and tactical methods. Many review papers discuss a broad range of issues relevant to autonomous cars and emphasis on things like comfort and personalisation, whilst others concentrate on specialised and technical. The results of the study by describe how pedestrians are prepared to tolerate driverless cars on the roads. In a recent study, which investigated CAV control by way of, the researchers looked at on-board real-time control and remote planning and routing. Traffic control may be improved with the use of vehicles that are equipped with CAVs and vehicular communications, as shown in study by. Traffic at a junction is studied separately from the whole network traffic management. Non-cooperative and cooperative driving are also addressed in the paper. The results of the study done by state that coordination of CAVs on interchanges and merging at highway on-ramps occurs. Regardless of whether one chooses to have a centralised or decentralised approach, the works within that category are categorised into heuristic control and optimum control.

In the survey papers above, our contribution is to answer two separate questions. Our first step is to do a broad review of CAV research subjects that have the most bearing on our mission, focussing on five key

areas: inter-CAV communications, security and privacy, intersection navigation control, collision avoidance, and pedestrian detection. Another point to keep in mind is that the most current findings from any given scientific field are taken into consideration (we incorporate the latest study within the last 2,000 years). To ensure we are offering enough to a diverse group of scholars, we feel our survey study offers the depth and breadth required.

As previously said, we will cover the five subjects in many parts, however the ideas do not exist in a vacuum. Later in the article, we will show that the study fields that we are describing here are strongly interconnected and need comprehensive evaluations in real-world experiments. For example, inter-CAV communications is the enabling technology for improving CAV efficiency and safety.

COMMUNICATION

As a result of researching and testing, V2X may grow into other technologies and items, in addition to the four core categories. The study of focuses on vehicle-to-railroad (V2R) communication as a new safety alert method. There are two primary setups: direct and indirect. The warning communication is transmitted directly to the car in the direct situation. When the warning is issued in the indirect situation, the RSU first transmits the message to the OBU. Direct application (lower vehicle/locomotive speed): The direct approach is for lower vehicle and locomotive speed. Indirect application (higher vehicle/locomotive speed): The indirect method is for greater vehicle and locomotive speed. To see whether an omni-directional and bi-directional antenna performed, Choi et al. conducted an experiment. In urban areas, the bi-directional antenna proved to be beneficial since it enhanced coverage, but in rural regions, it didn't help much since it did not provide much coverage. While in the rural context, the counter-part thrived, they fell short in the urban setting. Many people ignore railroad crossings when it comes to both types of non-commercial vehicles, and vehicles such as buses. Nevertheless, they provide a greater danger to vehicle safety if they are treated as no big deal.

As populations and density in big cities rise, DSRC's effectiveness in providing services such as limiting invisibility and blind spots is made more difficult. the Vehicle and Traffic Simulator (VaTSim) from The Center for Automotive Research at Ohio State University, which started its testing in 2012 with the support of Honda R&D Americas. The study by Biddlestone et al. provided reliable data and may be used to further examine DSRC.

CONCLUSION

Improvement in CAV technology during the last decade has been rapid. While research conducted to yet and related trials we have mentioned have been successful, the next stage will be to merge all the components into a single platform that works seamlessly without security or operational issues. Making intersections less dangerous for pedestrians while keeping them less dangerous for drivers will be difficult for the general public. With such a big number of pedestrian and bicycle traffic as well as human-controlled cars and CAVs to contend with, there are certain to be chances for mishaps. It is critical that each component performs perfectly while maintaining full network speed. Inter-CAV

communication is the interconnecting point used by CAVs, junction managers, and RSUs to notify each other and pedestrians. Collision and pedestrian avoidance are crucial in ensuring that human life is preserved .

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