International Journal of Engineering Sciences Paradigms and Researches (IJESPR)
(Vol. 37, Issue 01) and (Publishing Month: December 2016)
(An Indexed, Referred and Impact Factor Journal)
ISSN: 2319-6564
www.ijesonline.com

Autonomous Vehicle Control Challenges and Characteristics

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Publishing Date: December 27, 2016

Abstract

The safety of the human or reduce the vehicles accident it is very important topic in the intelligent transportation society because the Autonomous vehicles will improve safety on roads as they more closely observe their surroundings using technologies such as radar, lidar, GPS, and computer vision. These will be more reliable than the human eye and the system will not be subject to slow human reaction times. As a result these drivers-less cars will be able to travel closer together and operate at higher speeds, thus increasing capacity on roads. However the improved comfort ability to better use the time while travelling and reduced complexity of parking will make road-based travel more attractive. This paper is review paper which discussed many methods to reduce the vehicles accident.

Keywords: *ITS, GPS, LIDAR, NHTSA, AV, UAV, ADAS, ICT.*

1. Introduction

Autonomous vehicle is vehicle that supported by electronic devices that can be act like humans. also can say software that gather the information by scanning the environment from the obstacles to facilitate the motion of the unmanned vehicle without incident [1] for instance, 93% of road traffic accident are caused by human error with 1.3milion fatalities and 50 million injuries every year globally or we can say that vehicle can be controlled be remote from the (control room) by using communication media[2] figure below showing the Autonomous Vehicle.

Figure 1: The Vehicle with Equipments [17]

2. Autonomous Vehicle

2.1 ("Information and communications Technology (ICT) is the key enabling technology of autonomous functions. because Human drivers will want to engage in other tasks while the vehicle is driving, Black box: Applying this principle to manufacturers of autonomous vehicle technologies one of the best defences for liability and improve the capabilities And by using smart phone The car an oeuvres into a parking space and sends a message to the driver informing them of its location. The driver can collect the car in person or use the phone to request the car comes back to where the driver was dropped off. ICT makes it Possible for automated functions to be added onto the existing motor vehicle") [7]

2.2 ("Method of Nevada law requires the new license to anticipate that drivers will be operating the Driverless vehicle while inattentive. Due to Advantages. Autonomous vehicles will return time to the driver that might otherwise be wasted behind the wheel; Shared cars or driverless taxis may be safer, cheaper and more efficient than personal vehicles. And those unable to drive due to old age or disability will enjoy increased mobility, especially those eligible for but unable to afford conventional mobility solutions. The remaining technical obstacles to widespread adoption") [8]

2.3 Improving the (ITS) by using suitable communication types to get highly scalable implementation the cloud operator can support sudden changes in computational requirements. The Cloud operator handles back-up and software upgrades with resulting economies of scale, all users can access the latest data Terminals & user devices can be of lower computing power There is less need for specialist IT skills in then organization and no need to understand how the service is provided and There is no need for large capital outlay, resources can be provided on a (pay as you go) basis [10]

2.4 Gathering the data of the environment to reduce the number of traffic accidents and their subsequent fatalities and capable of detecting aggressive behavior of the road [13]

3. Autonomous Vehicle Characteristics

3.1 Willing of testing the autonomous vehicle on the National Highway Traffic Safety Administration (NHTSA) and using as general transportation the way to reduce the pollution and increase the safety of human by reducing the accidents and economic cost suffered in the United States as result of crashes totals upward of $300 billion per year. By this companies increasing interest in automated driving technology [4]

3.2 Using the unmanned vehicle in our life mean that the final outcome such as capacity and speed improvement, more travel but less crowded, reduced private ownership with commensurate decrease in costs, improved road safety, leading to reduced insurance cost and savings in medical costs also by the reduce accident will reduce insurance costs but also largely eliminate the car insurance and crash repair industries so that better than conventional cars [5].

3.3 autonomous vehicle technologies one of the best defences for liability and improve the capabilities And by using smart phone The car an oeuvres into a parking space and sends a message to the driver informing them of its location. The driver can collect the car in person or use the phone to request the car comes back to where the driver was dropped off. ICT makes it Possible for automated functions to be added onto the existing motor vehicle [7]

3.4 Coupling the telecommunication technology with autonomous vehicles allows individual vehicles to communicate with other nearby vehicles (vehicle to vehicle or V2V) and connected infrastructure (V2I) with Mobile Ad Hoc Networks and the parents could even monitor their child with an in-vehicle video camera. This would be far more secure than the school buses and carpools children are now using [11]

3.5 Discovering of the autonomous vehicle and information technologies can increase mobility for those who are currently unable or unwilling to drive addition to that when some element of the system fails in the middle of the road or

busy traffic there is sufficiently robust back-up system to help the vehicle to stop safely [12]

3.6 The impacts of the Autonomous vehicles will appear in our life dramatically reduce crashes, improve fuel economy and parking needs [15]

3.7 Appling the method of the safety and liability the result increasing passenger safety. Technologies have helped reduce accidents with features such as dynamic brake support, forward collision, lane departure warning, blind spot assists and adaptive headlights assisting drivers on roads today [16]

4. Autonomous Vehicle Pros

4.1 Autonomous vehicle it's become really in our life and the children in safe while playing near by the road due to cameras the speed of the car slow down to avoid the accident [5]

4.2 Using the unmanned vehicle in our life mean that the final outcome such as improved road safety, leading to reduced insurance cost and savings in medical costs also by the reduce accident will reduce insurance costs but also largely eliminate the car insurance and crash repair industries so that better than conventional cars [8]

4.3 driver less car increased mobility for those unable to drive due to old age or unable to afford conventional mobility [9]

4.4 Implementation of the autonomous vehicle technology we can get some benefits such as reduce traffic, parking cost , accidents and carbon emission also reduce the stress of driving addition to that some activities can be done during the travelling time[12]

4.5 Discovering of the autonomous vehicle and information technologies can increase mobility for those who are currently unable or unwilling to drive, enable transportation for the blind, disabled or those too young to drive [14]

4.6 Focuses on the system development and standardization of AVS to improve safety and security for all transport, reduce traffic congestion. Also improve the impact of transport on the environment [15]

4.7 Refining transportation mobility and improving the living Environment. Gain some benefits such as performing extensive tests to validate the design choices is considered as a hard requirement and different tests have been organized and reducing both travel delays and traffic emissions of different gases [17]

5. Autonomous Vehicle Obstacles

5.1 facing some obstacles such as lack of development of standards for AV technologies present challenges for the industry. Without standardization in components like processors and communication plat-forms [4]

5.2 testing the autonomous vehicle on the street need permission from the top government [6]

5.3 The autonomous vehicles system facing the problem of the kit nap and data hacker

6. Summary of the Work

Ref No	Contribution & opportunities	Limitations
[4.1]	• Safe for the children while playing near by the road due to cameras the speed of the car slow down to avoid the accident	• Development of standards for AV technologies present challenges for the industry. Without standardization in components like processors and communication plat-forms
[4.2]	• Improved road safety, leading to	• Testing the

	reduced insurance cost and savings in medical costs also by the reduce accident will reduce insurance costs but also largely eliminate the car insurance and crash repair	autonomous vehicle on the street need permission from the top government
[4.3]	• Car increased mobility for those unable to drive due to old age or unable to afford conventional mobility	• The conventional car drivers become jobless
[4.4,4.7]	• Reduce traffic, parking cost , accidents and carbon emission also reduce the stress of driving addition to that some activities can be done during the travelling time	• Need training for those using the AV due to ICT technology
[4.5]	• Increase mobility for those who are currently unable or unwilling to drive, enable transportation for the blind, disabled or those too young to drive	
[4.6]	• Development of the AVS to improve safety and security for all transport, reduce traffic congestion. Also improve the impact of transport on the environment.	• Problem of the kit nap and data hacker

7. Conclusion

This paper is review paper discusses many concepts in autonomous vehicles by using different methods to eliminate the car crashes, bring mobility to those unable to drive, improve fuel consumption and increase the capability of the driverless car.

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