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Academic Skills ACHA4005

Technical report writing

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Contents

1.	Introduction
1.2	aims
1.3	objectives.....
2.	levels of autonomous
2.2	PACT framework
3.	discussion
4.	conclusion
5.	references

1. Introduction

The ultimate solution to automotive engineering in the is thought to be autonomous vehicles (AV) ; However, the most significant obstacle to the AVs (autonomous vehicles)' commercialization and development is still their safety. As a result, it is becoming increasingly urgent to have a comprehensive understanding of the AV development status and reported accident. This article examine the levels of automation in relation to the automated system's role in the autonomous driving process, which will have an impact on the number of disengagements and accident that occur while driving in autonomous modes.

The automotive industry technology has improved and expanded significantly over time. Autonomous driving technology is recognized as one of the promising solution to the press social and environmental issues of traffic congestion, accidents, energy consumption, and emissions. Advanced technology is used to build an AV (automated or self-driving vehicle) that can assist the driver or even take full control of the vehicle without the need for human intervention. Depending on the degree of automation of the and the resulting perception of the environment, control decisions such as a acceleration, deceleration, lane changes and parking that may be made either by the human driver or by the autonomous system.

1.2 Aims

There are different kinds of advance driver assistance systems that offer lower levels of automation which can help a driver avoid danger by anticipating hazards and working to avoid it. Together, these technologies will assist in safeguarding from cyclists, pedestrians, drivers and even animals

1.3 objective

The objective of this report is to research the safety of autonomous vehicles and also have understanding of the features and the reasoning behind the factors of the safety on AV

2 levels of autonomous

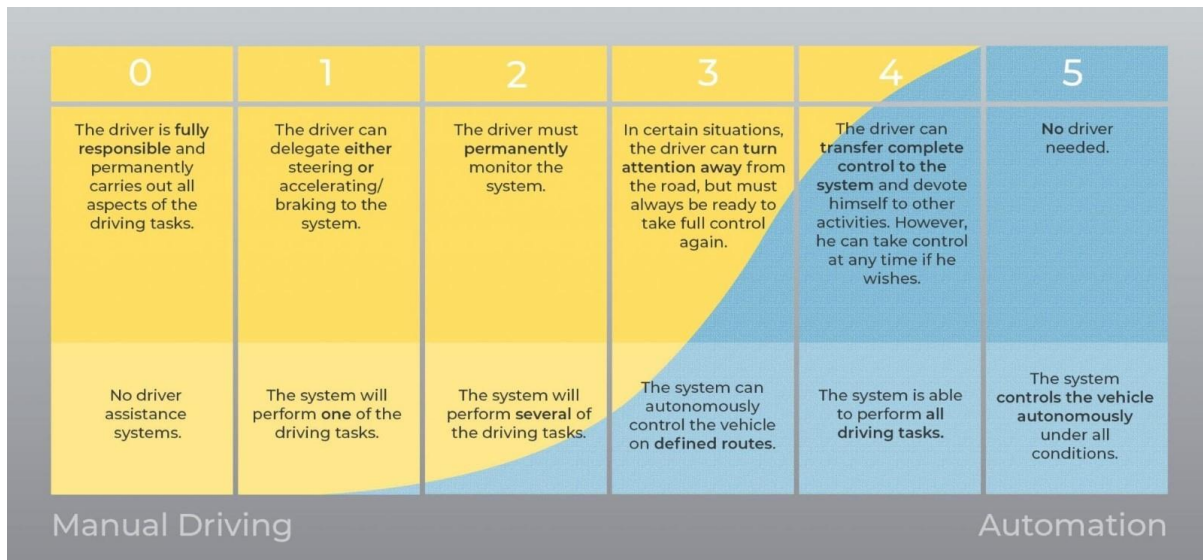
Many may question the safety of autonomous vehicles, however research has proven 'every day, an estimated 28 people die in drink-driving accidents, or 1 every 52 minutes. Statistics from 2019 indicate a downward trend for this offence' when for AV it is said 'overall, autonomous vehicles (AVs) were involved in more crashes: 9.1 crashes per million miles travelled, compared to 4.1 for conventional cars. However, as compared to injuries experience in traditional vehicle collisions, the ones involving injury were minor' as well to that

Sheridan and Verplank presented the traditional definition of automation levels in 1987, and Parasuraman et. Later modified it in 2000. The roles that the human operator and the vehicle system play in the driving process define each of the ten levels of automation. Level 1 indicated that there is no automation and that all decisions and actions are taken by human. Systems can suggest a complete set of alternative decision or action plans in levels 2 through 4, but human supervisors must decide whether or not to carry them out. From level 5, the framework is becoming fit for executing a choice with a human administrator's endorsement. At level 6, the system gives the human driver time to react before the automatic action takes effect. At level 7, the system will notify the human supervisor following an automatic action. On the other hand, at level 8, unless asked the system will not notify the human supervisor. At level 9, the vehicle system will decide whether or not it may be necessary to inform the vehicle driver. Level 10 has no complete involvement with human interaction and is completely electrical automation.

2.1 PACT framework

The pilot authorization and control of tasks (PACT) framework is a framework that defines six levels of automation in aerospace engineering. Although the level of automation in aerospace engineering vary, the levels of this automation system range from 0 to 5. starting at level 0, this indicates that the computer has no autonomy, while level 5 indicates that the systems can be completely automated but also still allowing the systems , in addition to human-commanded and automatic modes. The subtitles of the six levels can be see as in

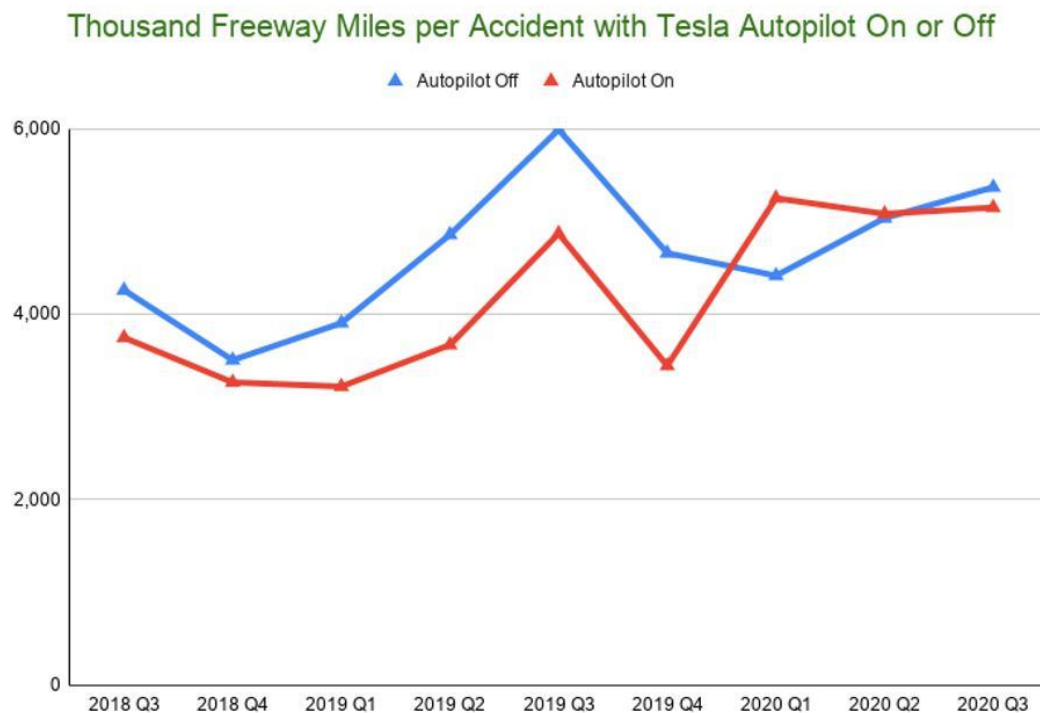
- (i)level 0: there is no automation. The human operator completes all driving tasks
- (ii) driver assistance, level 1 . The vehicle is operated by a human operator , but the automation system provides assistance with driving
- (iii)level 2 (partially automated driving) the vehicle uses a combinations of automated functions , but the human operator keeps and eye on the surrounding and steers the vehicle
- (iv)level 3 (automation of conditional driving) the human operator needs to be ready to handle the vehicle at any time
- (v) level 4 (high autonomous driving). Under certain conditional, the automation system can drive on its own but the human driver may still be able to steer the vehicle
- (vi) level 5 (full autonomous driving) the automation system can drive itself in any situation but the human driver may still be able to steer the vehicle



3. Discussion

Autonomous vehicles system and the whole aspect of driving assistance have been a very controversial topic over the past three decades with many questions about whether it is the way forward or not

Although statistics show many crashes happen, it is also proving that safety and Technologie have been developed, there for in the near future we might be able to see a fully self-operating vehicle at its finest level



This is a tesla autopilot statistics graph that shows it is almost as safe as driving with it as without

We can't forget that self-driving cars can prevent accidents caused by human error but unfortunately, it could cause technology-related accidents such as failed software updates or technical glitches and we still have the danger of being hacked since with any computer software and over-air communication, the risk of hacking is always present. Hackers, who may have the ability to take control of the vehicle while it is in motion, will become more likely to target connected automobiles as their connectivity expands. Hackers have the ability to locate locations and possibly steal your personal information, which raises privacy concerns as well.

4. conclusion

The ability to fully autonomous vehicles (AV) to be entirely operated by automated systems will make it easier for human drivers to engage in activities other than driving. The community as well as individuals will gain from AV Technology; However, the technical obstacles to the successful commercialization of AV continue to be safety concerns. At the end of the day, many people think of it in a sense of putting their lives in the hands of computers and most of them would never go for that, well at least for now. I believe there is a bright future for autonomous vehicles but I guess we will have to wait and see

5. References

'everyday, an estimated 28 people die in drink-driving accidents, or 1 every 52 minutes. Statistics from 2019 indicate a downward trend for this offence' hohol uddin-(Uddin,july 11, 2022)

'overall, autonomous vehicles (AV) were involved in more crashes 9.1 crashes per million miles travelled, compared to 4.1 for conventional cars. However, as compared to injuries experienced in traditional vehicle collisions, the ones involving injury were minor'-garber injury law(law,june 25 2021)

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