The Impact of Driverless Cars on Society

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1. Introduction

Driverless cars are an emerging technology that has been in development for a few years. Driverless cars as the name implies is car that is capable of driving by itself using Artificial Intelligence (A.I). The main use and implementation of driverless cars is to reduce the human error as much as possible, which is the result of around 1.3 million cases of deaths in the world each year.

To better understand the impact of driverless cars, this report will discuss the ethical, economical, environmental, security and social impacts of this emerging technology and what it means for us.

2. Ethical impacts of driverless cars

There are several ethical and moral issues involving driverless cars, such as the trolly theory, hackers controlling the car and predetermined decisions by the car. Driverless cars are robots with predetermined rules that they must follow. If an unexpected event occurs and some casualties would be responsible? Even if the manufacturers can prepare the car for countless possibilities, there is always the chance that a situation arises that was unaccounted. These moral and ethical dilemmas keep driverless cars from being introduced to the public. (Joshi, N., 2022)

2.1 Driverless cars and the trolly theory

The trolly theory has been around since 1967 this problem has been difficult to solve as there were many different possibilities that need to be considered. This theory is about a runaway trolly and on the track, there are 5 people tied up so if the trolly carries on its course the 5 people will be killed. The driver has the option to pull the lever in which the trolly will change tracks but in that track, there is 1 person tied up. (Andrade, G., 2019) In driverless cars, this is the same but instead of a person pulling the lever, it is the driverless car that decides what course of action to take. For driverless cars, there are more factors involved from people inside the car to bystanders, people crossing the road to animals are also subject to casualty. If the choice was a small child running onto the road to pick up a ball and there is 5 or 6 older people in their 60s walking by, is it right to kill the child or save the child and kill the older people. Some people argue that a human driver is

considered reasonable because it is randomised as the decision was predetermined by people who created the car. (Lau, A., 2020)

2.2 The hacking Dilemma

In the modern world, everything connects to the internet, including cars. When connected to the internet, it becomes a risk of getting hacked. If a hacker can gain access to a vehicle can cause severe incidents because they have access to components like brakes and steering wheel, which can put occupants and other road users at risk. Driverless cars have a possibility of getting hacked from another country, which is fatal because finding the person who did it would become harder to find. (Bowles, J., 2018) Not only the reason above hackers will be able to know all the places you have visited this; can then be a violation of privacy. This data can be used for other malicious purposes or stalking people. (Soare, B.,2019) Some could argue that it can help the police to find criminals quicker as the data is collected and monitored.

3. Economical Impact of Driverless Cars

The prosperous future involving the everyday use of driverless cars raises many questions about how their usage can & will impact the economy. While there are obvious benefits to this such as decreased costs of fines and penalties regarding reckless driving behaviour. (Maan, S. 2022) On the other hand, many negative economic impacts will be caused by many will be caused using driverless cars. These will affect society in terms of economic collapse probability due to factors such as employment and costs.

3.1 Decline in employment

Those that will be affected the most by this implementation are people working in the transportation sector. This includes workers such as truck drivers, taxi drivers, bus drivers, heavy machine operators and other examples such as chauffeurs. (Hayes, A. 2022) The estimated figures show that up to 4 million job types would no longer be needed, removing a large part of the economy and potentially to millions of people losing their profession & jobs. This is due to our society and way of living being reliant on the automobile industry, which is (as of now) operated by humans. The loss of employment is predicted to contribute an increase in the unemployment rate of 0.12%. (Rapier, G. 2018). While this figure is predicted to go lower with time, there is no confirmation on the exact figures on how this can impact the economy, both for the sake of people and their way of living, while also for the functionality of the economy and preventing potential recessions.

3.2 Increase in costs of materials & fuels

Driverless cars will operate on renewable energy, such as electricity. This will cause an increase in costs if they are to become mass-produced and available to society due to the higher cost of materials required to make renewable energy. While similarly a situation such as the increase of price in petrol, due to the continuous increase of cars. It is predicted that by 2030, materials such as electronics will amount to 50% or more of the costs for car production. This is a 30% increase in the costs of manufacturing. This can lead to potential scarcity of materials which in turn will only increase the costs to higher levels. (Maan, S. 2022)

4. Environmental Impacts of Driverless Cars

Driverless cars have been made to reduce the environmental impacts which combustion-based vehicles bring, however, there are still some significant impacts that cannot be fully disposed of. As hard as scientists have worked, they have not managed to fully get rid of the pollution that vehicles bring. When driverless vehicles get fully introduced on the road, they will still have an insane amount of carbon emissions, due to the increased number of miles drivers that will be appealed by the technology. In addition to the carbon emissions, as the batteries run out on these vehicles, if no recycling policies get introduced, they will end up in the landfill or underwater, causing an influx of harmful materials that could negatively impact the flora and the fauna around. Lastly, more mining for natural resources used to manufacture the parts of the vehicles will be done due to the high demand, therefore resulting into the depletion of many compounds and metals.

4.1 Other Negative Environmental Impacts

Other negative environmental issues would be increased congestion. As said previously, there will be high a demand for driverless vehicles, resulting in the overcrowding of roads and junctions. This may cause major accidents which could result in technological disasters, such as explosions or chain fires on the roads.

In addition, to maintain a driverless car accordingly, owners must always recharge them. This would not be an issue for energy-recycling countries such as the United Kingdom or Australia, which would burn waste to produce the required amount. For countries that do not follow these practices, energy would be obtained the old fashion way; burning fossil fuels. This could heavily deplete resources from the environment, causing these specific countries to be forced to either burn trees, or mine for more coal to sustain their needs. This would also result in increased prices on energy in homes, as it would be in high demand.

5. Benefits of Driverless Cars

On the other hand, there are several benefits to driverless cars. One benefit would be the safety side of driverless cars as they have active prevention such as adaptive cruise control and because of the hardware of sensors dotted around the car, it can maintain a safe distance from the car Infront. Another benefit of driverless cars for society is increased accessibility for those who cannot drive. This is because there would be no need for human intervention allowing those who cannot physically drive be able to travel freely allowing for their own independence. Another benefit driverless cars would introduce is less congested traffic on the roads as the built-in AI manoeuvres the roads more efficiently.

5.1 Safety Aspects of Driverless Cars

One example of the active prevention driverless cars can do is the onboard sensors running concurrently with the driver's senses such as actuators, complex algorithms, machine learning systems and powerful processors to execute software (What is an autonomous car? 2022). This in addition to onboard hardware such as cameras actively mapping the car's surroundings and lidar allows the car to actively anticipate what is coming up making driving safer for not only the driver and passengers but also the people around them. Driverless cars can also save other road users' lives such as cyclists and pedestrians as they can automatically stop the car in the event a road user

unexpectedly is in a direct collision course with the driverless car. In addition, self-driving cars have quicker reaction times compared to humans. If a child runs onto the road, it will take an average of 1.6 seconds for a human driver to hit the brakes. Self-driving cars have a reaction time of 0.5 seconds. (Yuen, D. 2022). As milliseconds are crucial in reaction time in determining the likelihood of avoiding serious injuries or even preventing a crash altogether, it would mean that driverless cars would prevent more car crashes/injuries in comparison to humans operating the vehicle. Furthermore, human drivers are constantly distracted and they are not always driving with the best possible awareness. More than 400,000 motorists were injured in accidents caused by distracted driving and 2,800 deaths occurred as a result. (Covington, T. 2022). This is contrasted by driverless cars being always on and ready during the drive in the event of a potential crash which further conveys the safety driverless cars carry.

5.2 Social Benefits of Driverless Cars

The use of driverless cars can provide several social benefits, including, as mentioned before, improved accessibility for those who cannot drive. (Klaver, F. 2022) As many are not licensed to do so, commuting may prove to be a challenge for them; however, these cars do not require manual operation, making it easier for individuals to travel to and from. No license nor prior driving knowledge is required; thus, they can safely be used by all. Additionally, since driverless cars are operated by artificial intelligence (AI) accidents, in general, can be significantly reduced due to the elimination of potential human error. (Marr, B. 2020) Humans can experience fatigue and get distracted whereas AI does not. AI can detect things humans cannot and tend to not make mistakes when programmed correctly. They follow rules and, this aids as a benefit since not all individual does — for example, drunk driving is presently a great issue still which leads to fatalities. Robots are constantly in focus thus lives are saved since no foolish mistakes can occur. They use motion detection technology and recognise people and objects which is a prevalent help in preventing such a thing. (Thierer, A. and Hagemann, R. 2016). Furthermore, driverless cars use less fuel which results in reduced carbon emissions which will benefit society. The price of insurance to is noted to be lower. (Ryan, M. 2020) Cars are globally one of the greatest pollutants, therefore using ones which pollute much less is better for society, both in terms of health and global warming.

6. Conclusion

In conclusion, the future involving automated cars will have a monumental impact on our society and the way we adapt to it, both based on our expectations and the potential instability of such technology and its implementation. There are large uncertainties based on the safety of the AI technology and how it will prevent human error, alongside with the ethical/moral issues that arise with decision-making involving potentially dangerous scenarios, both for the driver and outside sources. Additionally, the potential impact on the environment and the materials which are used to construct such technology may prove detrimental to the climate.

On the other hand, with such innovative technology, there is great improvement in terms of the potential safety features and the social benefit of such technology, including a decrease in accidents,

reducing human errors & decreasing the overall negative impact on our climate. It is all a matter of time and technological advancement until we can truly discover how Driverless Cars will impact our society.

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Appendix A: Mind Map

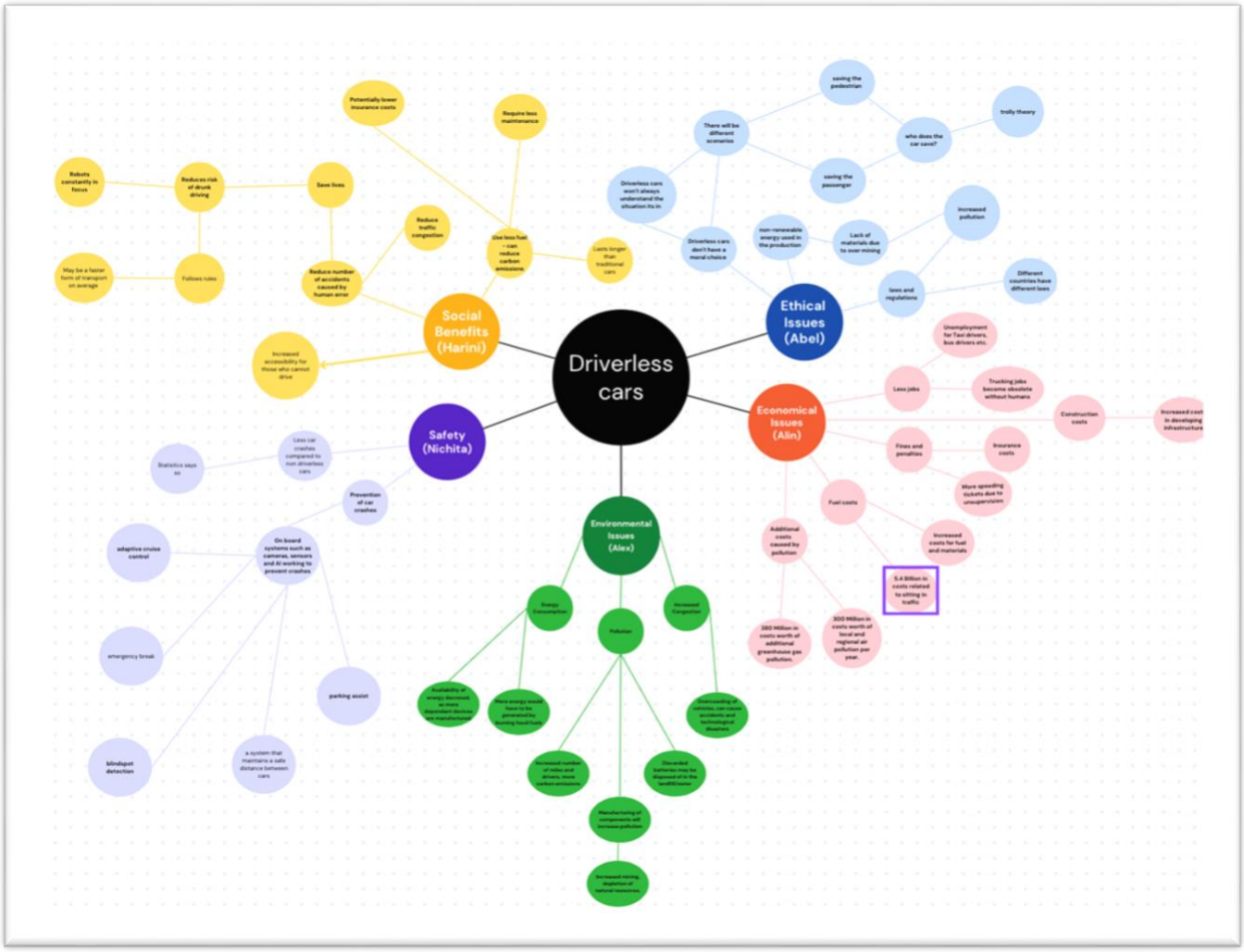

Figure 1 Mind map on Driverless Cars