

# The impact of autonomous vehicles

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Technology has been expanding in many parts of the world. One of the technologies, which will most likely be effective in the future, is autonomous vehicle. Autonomous vehicle can be defined as a thing that is used for transportation that can guide itself without human conduction. One of the most popular vehicles, which use autonomous system, is car. According to Klaus Frohlich, a member of the Board of Management of the Bayerische Motoren Werke (BMW) Group who is responsible for Development, he stated that ‘ the car of the future don’t need rigid programs; they need a kind of artificial intelligence that learns with every mile and takes the owner’s habits into account’.

Decades ago, the first car which was created by Carl Benz which was just a one-cylinder two stroke which ran for the first time on New Year’s Eve 1879. The differences between the features of cars years ago and current cars are significant. The foundations of the mobility; the designs; the materials used to create a car; all differs as technology before is not as advanced as ones we have nowadays. Based on experts, they stated that autonomy systems contain six levels including level zero. There are few components in autonomous cars, which are in-vehicle data collection and communication systems, autonomous driving platform (cloud), and artificial intelligence or AI-based functions in autonomous vehicles.

Today, car producers such as Tesla and Google have created their products, which have reached until level 4 of the autonomy system. There are several impacts that will be discussed are sustainability and ethics. There are few autonomous cars that have been tested in order to monitor the stability of the system. For example, Tesla car has been test drive only when it has

reached 50 kilometers because the car is only a prototype and it has yet to be proven that it can maintain its performance beyond the current limit. As for Google, they tested 3 Waymo with several people setting the destination they want to go, without sitting at the driver's seat. If the producers decided to start producing more autonomous cars, which will eventually, eliminate manual and automatic transmission cars, there is a high chance that they are trying to make the system more sustainable with every experiment and they are very confident with foreseeable outcome that they might have require from researches. As the sustainability of the current system is still vague, people might not consider to use the vehicle as the safety of the passengers which should be verified by the producers.

Is it damaging the environment? Yes it does. According to a study, autonomous cars were found to be responsible for contributing up to 20% of greenhouse gas emissions, which are carbon dioxide comparing to human-driven vehicles. This shows that the system is not sustainable and compatible with the environment as it is not eco-friendly.

Autonomous transportation is ethical on another level. Cars with self-less driver are able to run the system itself using artificial intelligence. They are able to estimate the distance of other cars if they get too close and they are also able to change lane itself without being controlled by humans.

Autonomous vehicle makes this possible as it contains all possible sensory information for every decision it makes. This includes radar sensors, lidar sensors, video cameras, accelerometers, and ultrasonic sensors. This will help reduce accidents on the road as well as traffic jams. Avoiding congestions is one of the most serious problems that people want to stay

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away from. However, Nowak stated that no one believes accidents will be eliminated entirely that brings up ethical dilemma. Artificial intelligence is unreliable as insufficient data are not available to implement such technology into a machine. On top of that, as for people who participated in the experimenting session of the prototype, they stated that it is hard to get permission, as the procedure is complicated especially when government is involved. However, the sensors installed are highly vulnerable as most of them need Internet in order for it to work, hence, if there are hackers trying to steal autonomous car, it may succeed in doing so. Overall, based on the information gathered and analyzed above, it leans more towards the net problem to humanity.

In this era of technology, the growth in advanced machinery is rapid which could cause a much higher rate of casualties. In that context, machines are still tools of man that cannot make a decision of their own which proves that they are unreliable in tight situations. It also could cause distress to humans if they are unaware of its behavior or its capability in handling tasks.

Furthermore, malfunctions could happen anytime during the usage of the technology and assuming the person are not able to control the vehicle then it could cause a serious danger towards them. In addition to that, it is unsure if the technology could be continued in the future as few experiments has been done and the results are not satisfactory. Another reason why it is a net problem is the people would be unemployed. This will forward the poverty of the society and not even a quarter of them could afford such products. It is said that this type of product has been developed to be affordable in the future, but products, which are new to the mobility market, will tend to be

pricey. Furthermore, this is a contradictory of the main point of the advancement of technologies where it focused on making a better life for the people. Apart from that, environment is also threatened with the pollution coming from autonomous vehicles. Cars being autonomous do not change the fact that it still uses fuel, which is petrol to move. Hence, the carbon dioxide gas will contribute to global warming which increases the temperature of the surrounding that will lead to melting of the glacier and results in the rise of water level. As it is also unclear whether the technology of autonomous vehicle is able to reduce the rate of deaths due to accidents on the road or the other way around, it becomes a problem if the technology actually contributes.

To conclude, autonomous vehicle can be a promising tool in the future, which can help people in various ways. It has also changed in many aspects as the technology grows and develops. However, with the current level of technology and discovery, it might just be a problem that needs to be solved. Level six of autonomy system has yet to be developed due to artificial intelligence and the impacts of the current autonomous systems we are having have more negative affects.