Autonomous Vehicles

***What does it do?***

Autonomous vehicles is the technology that allows for the existence of fully automated, self-driving vehicles that require little to no human interaction[1]. With the use of various types of sensors, such as distance sensors, proximity sensors, GPS…, these vehicles are able to automatically transport passengers from a location to the desired destination, effectively choosing the route, accessing current traffic situation, obeying traffic laws… like a human would, or even better than a human driver.

This technology adopts several different characteristics. Based on the environment around the vehicle, it could moderate and control the vehicle’s movements and paths, effectively moving the vehicle through unusual, complex terrain, as well as planning out the most optimal route to reach the designated location. Between autonomous vehicles, there is a vehicle communication system, which transmits data between different vehicles at close proximity, allowing for smooth, seamless travel between different vehicles going on different routes. This means there could be conjunctions without the existence of traffic lights, road signs… as the vehicles have already done the communication with each other, eliminating the need for guidelines for humans. Another characteristic of automated vehicles is that as they use software and AIs that drive the vehicle, this means they can also be re-programmed, edited, adapted to fit users’ needs through manual work, or by machine learning. This way, smart self-driving vehicles are able to get and install updates, for example, a new, preferred route to a regularly visited location, or a software update that better accommodates disabled people. This also means autonomous vehicles are in a way never finished, as there are always new ways to improve and update the vehicle[2].

However, there are still various challenges that currently prevent automated vehicles to be widely used. Most notably, AIs are still not well-developed enough for them to be able to function effectively in complicated environments, such as the inner-city. Several complex situations may occur, such as an accident in the middle of the road, children running carelessly, a fallen tree blocking the way… that AIs are still not able to process effectively, and thus requires human decisions to deal with. In addition, the communication system between vehicles, as well as the computer of the vehicles themselves, is vulnerable to compromises. Given them being software that connects to the internet, there is a risk that attackers can target these vehicles, causing unpredictable consequences. The durability and susceptibility of the sensors used by these smart vehicles also need to be considered carefully, as these sensors regularly come into contact with various different types of weather and environment, such as snow, heat, water, dust… Human factors and moral issues also arise following the development of autonomous vehicles, for example, the infamous ethical dilemma, the trolley problem. Therefore, it will still be a considerable amount of time before self-driving cars are to be used by the common people.

Currently, there have been implementations of self-driving trucks for transportation purposes in real-life uses. A number of companies, such as Otto and Starsky Robotics, have begun focusing on implementing the use of automated trucks and vans[3]. Starsky Robotics developed their proprietary technology that allows drivers to remotely drive trucks from an office, similar to a central command center, achieving 85% autonomy[4]. Furthermore, autonomous transport systems are also being trialed and considered to be implemented in various countries, such as automated buses in China and transport systems for automated cars in Europe[5].

***What is the likely impact?***

The development of autonomous vehicles is sure to have an impact on society. Following the surge of automated vehicles in the future, massive economic shifts are likely to take place, as a new section of the car market will be born and grow significantly. Many jobs currently held by human workers, such as taxi drivers, public transport operators, will be most likely replaced following the use of self-driving vehicles[6]. Public transits and crash repair services are also to be affected. However, a number of new jobs can also be created as a result of the growth of autonomous vehicles usage, as the newly created industry can generate jobs relating to producing and training autonomous systems[7]. Car insurance companies may also have to change their policies and the way the company works, as automated cars are presumed to cause fewer accidents, possibly making these companies opt out of traditional business models[8]. Most noticeably, accidents are bound to happen less once self-driving vehicles are widely used, as a result of near-flawless AIs that operate vehicles, greatly contributing to driving safety over the world. Furthermore, once fully automated vehicles come into, there can be higher speed limits, larger roadway capacity, and decreased traffic congestions, as a result of the redundancy of safety gaps and safer, slower speeds[9].

***How will this affect you?***

Personally, I believe that the use of autonomous vehicles will greatly benefit me and my family, as there will be a much more reliable, safe, and leisure way to travel compared to traditional traveling methods. If automated cars are to be widely used in the near future, I may not have to learn to drive a car and get a driving license anymore, as my car will be doing the driving from then on. This technology will also be very convenient for my family. My grandparents will be able to travel much more freely without the help of another family member. Adults can save more time by doing work on the way, and those returning home from drinking alcohol can safely travel by car without risking their and others’ safety, all thanks to the technology’s ability to self-drive without the help of humans. Smart autonomous public transport systems can also be very useful, as there can be online booking services for this type of public transport, possibly eliminating the need for a personal vehicle for me and my family.

***Citation:***

[1][2][5]"Self-driving car - Wikipedia", *En.wikipedia.org*, 2021. [Online]. Available: https://en.wikipedia.org/wiki/Self-driving\_car. [Accessed: 19- Dec- 2021]

[3]"Self-driving truck - Wikipedia", *En.wikipedia.org*, 2021. [Online]. Available: https://en.wikipedia.org/wiki/Self-driving\_truck. [Accessed: 19- Dec- 2021]

[4]"Starsky Robotics - Wikipedia", *En.wikipedia.org*, 2021. [Online]. Available: https://en.wikipedia.org/wiki/Starsky\_Robotics. [Accessed: 19- Dec- 2021]

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[7][9]"Impact of self-driving cars - Wikipedia", *En.wikipedia.org*, 2021. [Online]. Available: https://en.wikipedia.org/wiki/Impact\_of\_self-driving\_cars. [Accessed: 19- Dec- 2021]