IST Assessment Planning: Autonomous Driving

Part A

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Introduction

An autonomous vehicle is a vehicle (usually a car, plane or motorcycle) that can take in information about its surroundings and use the information to operate with little/no human help.

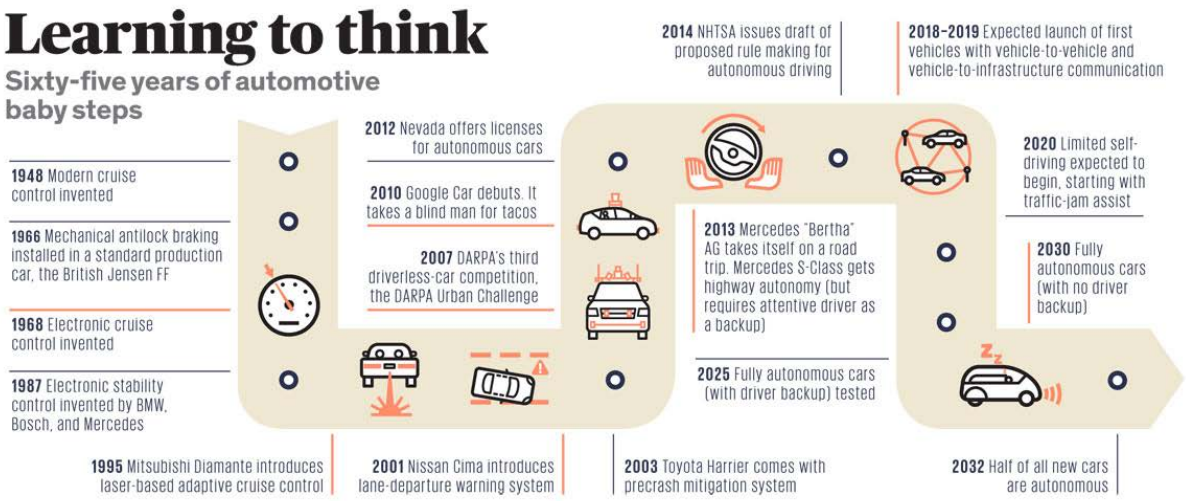
In 1925, roughly 40 years after the first motorised vehicle was invented, inventor Francis Houdina created the first radio-controlled car. The car was able to do all the mechanical things a human driver would be able to do, but without a human at the steering wheel; start the engine, sound the horn, and shift gears.

In 1933, an autopilot system for aircraft was created. Extended travel times in the air forced this development. The autopilot system was first used by Wiley Post, an American aviator, during a roughly 13,000 mile around-the-world journey in 1933.

DARPA (Defence Advanced Research Projects Agency) announced a challenge in 2004, offering a $1 million prize to researchers if they were able to successfully build a vehicle that could navigate through the Mojave Desert for 150 miles without a human driver. The winning entry barely made it 8 miles, and eventually caught fire.

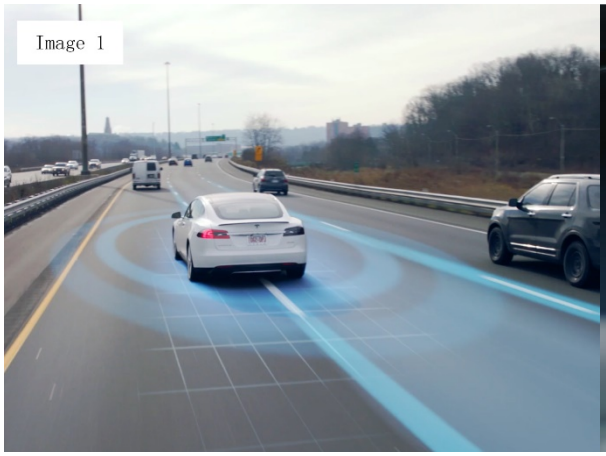
In the late 2000's, self-parking systems started to appear on the roads – a significant milestone for autonomous technology.

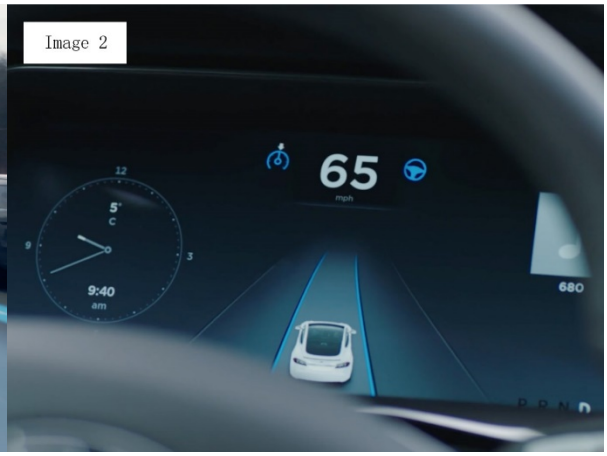
In 2014, Google unveiled a car which was 100% autonomous: it had no steering wheel, acceleration pedal or brake. This car wasn't available to the public. Since then, many car companies have claimed to be working on their own autonomous vehicles, with some car companies promising to have driverless cars available to the public by 2020.



Focus case

The Tesla Model X car has multiple sensors placed all around the vehicle. All the sensors assist the car in understanding its environment, so that when autopilot is activated, it can successfully steer the car in most situations on the highway (see image 1). When autopilot is turned on, the car is able to steer within a lane, change lanes, manage the speed of the car, and control braking, although autopilot should only be used on the highway. The sensors on the car are able to detect anything around the car in any direction within roughly 4.9 metres, and the autopilot system is then able to interpret whether there are any obstacles in close proximity that could be harmful (see image 2). The forward-facing sensor is the most important sensor in the whole car, as it is able to detect traffic, people crossing the road, signs on the road, road lines/marks, or any other thing which could be important for the passengers' safety. Activating autopilot is simple – pull the cruise control switch towards you two times, and the car will start steering for you (see image 3). To turn it off, you press the button located on the end of the switch, push the switch forward, push the brakes, or slightly turn the steering wheel. The autopilot system in the car is also always being updated – every time something goes wrong or something new is encountered, the data is sent to the developers and is used to improve the system. For example, if a Model X car encounters a situation where it hasn't been programmed with how to react, every single Model X will learn from that situation, instead of only one car.





Analysis

Autonomous driving technology has made significant impacts on society and individuals' lives. Even though the technology has quite a few benefits, there are also some significant negative impacts.

The creation of autonomous technology has made transportation a more accessible service for many people. Previously, people who were not confident in their driving abilities are now able to use autonomous driving to aid them in travelling. In the Tesla Model X, the autonomous technology is able to alert the driver if there are any obstacles nearby that could potentially harm the driver. This would be useful to unconfident drivers (as well as confident drivers), to be aware of obstacles on the road that they might not have noticed otherwise.

Cars with autonomous technology are often powered by electricity instead of petrol. This is seen in the Tesla Model X, where the car is completely battery powered. This alternative method of powering cars is significantly better for the environment, as there are around 50 percent less greenhouse gases being released, resulting in a much more sustainable method of transport. This means that world environmental issues such as global warming and climate change are slowed, which provides more time to come up with a more permanent solution for stopping those issues. This has an impact on society as it would change the environment that humans live in. The temperatures on Earth would be more stable, meaning the temperatures would be more comfortable for human life.

Another positive impact of autonomous technology is the convenience that it provides drivers. When driving for over an hour, autonomous technology would aid the driver, as they wouldn't have to be as alert as usual. This would be especially convenient if the driver was driving at night, as they would likely be tired and less aware of their surroundings.

Although there are many positives, autonomous technology and the Tesla Model X have a few disadvantages.

Firstly, autonomous technology, especially the Tesla Model X, is expensive. Many people in society wouldn't choose the Tesla Model X as a first choice for a car, as it would most likely be outside their budget (the most expensive model costs $209,880). This technology is part of the market that is cutting out a significant part of society (those with average or below average salaries). It is incredibly inconvenient for people who don't have above average salaries to obtain this car, as it would take a while to save up enough money to afford the vehicle.

There is also quite a significant legal issue that presents some complications. For example, if the Tesla Model X crashes, who is at fault? If the vehicle was being controlled by the driver when it crashed, then the driver is most likely at fault. However, if the crash was because of a design flaw, a bug in the system, or inadequate service of the vehicle, then it could be the manufacturer's fault, the software provider's fault, or the service centre's fault. It is extremely difficult to distinguish who is to blame if the vehicle malfunctions. Because Tesla describes its autopilot software as a feature that should only be used for assistance, this means that the driver of the vehicle is completely responsible for any faults that may happen while autopilot is engaged.

Characteristics of Tony Stark

- Egomaniac (very self-centred)
- Wants to save the world
- Slightly narcissistic
- Loves being in the spotlight

Conclusion (from the perspective of Tony Stark)

Autonomous driving technology should be developed and used for a number of reasons. Developing autonomous technology would provide various and significant advantages to Tony Stark, including growth in his personal wealth, an increase in his fame and reputation, and progress towards achieving one of his many goals: to save the world/make the world a safer place.

Autonomous technology is quite often significantly expensive, as seen in the example of the Tesla Model X. Developing autonomous technology would provide the significant advantage of increased financial growth, both for Stark and for his company overall. This would be an advantage to him because the money would help fuel his egotistical personality and love of being in the spotlight, as well as bringing more luxury and comfort to his life.

As well as finances and growth in personal wealth, being a developer of autonomous technology would increase Stark's reputation and fame. Since this technology is still very new and only just emerging, Stark could be considered a 'founder' of driverless cars if he were to further develop this technology. This would make him very well known, both in his lifetime and possibly even after his death. This is an obvious advantage to Stark, because of his slightly narcissistic and self-centred character – it would put him in the spotlight and make him the centre of attention.

Developing autonomous technology would also make the world a much safer place. With artificial intelligence controlling the roads when the driver isn't steering the vehicle, the number of car crashes and unexpected collisions would be significantly decreased, as the technology would be able to predict the issues and obstacles on the road as well as prevent those potentially harmful problems. Preventing collisions and crashes is one of the main features of the Tesla Model X's autonomous driving system. The technology would also be able to be manipulated, or hacked into, to prevent villains from using the technology for their gain. For example, the software could be hacked into so that the car takes the longest possible route to a destination, delaying the villain. The route of the car could also be manipulated to bring the villain to other places such as a police station. Developing software such as Tesla's and other autonomous technology would help Stark to make considerable progress of his goal of saving the world/making the world safer, which is a huge benefit for Stark. Even though it wouldn't make the world completely safe and free of harm, it is one step closer towards achieving that goal.

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Annotation: This website is a commercial website (as it ends in .com), meaning that the information on the website might not be completely accurate. This page was written in 2019, meaning that the information used in the website is very recent and therefore it is relevant and timely. This website has good integrity as the information matches up with other information of the same topic from different sites.

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Annotation: This website is an Australian network website (as it ends in .net.au). This means that the information from this website is fairly accurate. This page was written in 2018, which is still very recent, meaning that the information from the page is relevant and timely. This website has good integrity as the information from this page is similar/the same to information from other websites about the same topic.

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Part C

Research Process Reflection

An aspect of this project that has shaped my thinking is search strategies. Before I attended the search strategies workshop, I had no idea of any of the different commands that you could use on google. The search strategies workshop taught me quite a few things about using google, including how to search for specific terms (for example, using quotation marks) and how to use the advanced search option. This helped me in making better use of my time spent searching on google. This also shaped my thinking in a positive way, because now I am able to optimise the time that I have, even in research assessments in other subjects, and not waste time trying to find resources that are valid and good quality. The search strategies workshop was really helpful, and it assisted me to be more productive with my use of time, which means my project deliverables were completed in less time than if I hadn't known about the advanced search options on google.

Project Management Process Reflection

One aspect of the project management process of this task was keeping a log book/milestones page and updating it regularly (progress-tracking). This aspect of project management helped me quite a bit, in various ways. Firstly, it helped me to reflect on the work that I had done at the end of each day. By doing this, I was able to see how much work I had completed that day, and how much I still had left to do. It also helped me to feel more accomplished, and feel productive in my work. Tracking my progress each day also helped me to estimate how much work I had to do each day to be able to finish the task on time. While I was able to estimate how much time I would need for the task, I unfortunately was not able to put this into action. I was unable to work on the task regularly, which meant that instead of working on the task in small amounts more frequently, I worked on it in bigger amounts less frequently.