Autonomous Vehicles

# What does it do?

## What is the state of the art of this tech?

Research into autonomous cars is currently being undertaken by a large number of manufacturers but mostly is still only in the testing phase.

Tesla is a perfect example of one of these companies and they’re striving to develop and roll out fully autonomous driving capabilities with all of their vehicles however full autonomy will not be rolled out until the laws concerning self-driving vehicles have been put in place.

Einride a Swedish company and is another example of a company trying to develop their own autonomous vehicle except this company is focussing on a truck.

The “T-Pod” is being tested as an all-electric self-driving truck capable of carrying 15 pallets of goods almost 200km while producing zero emissions.

## What can be done now?

Tesla vehicles are manufactured with all the sensors they will need to facilitate fully autonomous driving however more testing a legal regulations are required before Tesla can start sending out the updates OTA.

At present, Tesla vehicles are only capable of semi-autonomous driving and only when their ‘Enhanced Autopilot’ update has been purchased.

The additional features you get once EA has been updated are as follows:

1. Having the Tesla match speed to the car in front
2. It will keep the car within a lane
3. It can change from one lane to another without requiring any driver input
4. The system can exit the highway you’re driving on when you start to approach your destination
5. It can also self-park itself (which many other cars can already do)
6. There’s also “Summon”. This allows it to go in/out of a garage or parking spot while you’re not even in the car

## What is likely to be able to be done soon? (say in the next 3 years)

Once the testing is complete and the laws are in place, we should see fully automated vehicles on the roads shorty after. Primarily they will be used for highway driving, for both commercial and private use.

## What technological or other developments make this possible?

Among the mountain of tech that make self-driving cars possible is a complex mixture of sensors and actuators, highly sophisticated algorithms, and powerful processors used to execute software.

The sensors and actuators in an autonomous vehicle fall into three broad categories:

1. Navigation and Guidance (Where you are, where you want to be, how to get there)
2. Driving and Safety (Directing the vehicle, making sure it vehicle acts properly under all circumstances, and follows the rules of the road)
3. Performance (Managing the car's basic internal systems)

# What is the likely impact?

## What is the potential impact of this development?

Autonomous vehicles will bring enormous benefits to anyone trying to get from A to B.

For example, you’re in your self-driving car on the way to work and you wanted to get a head start on the day. While your vehicle takes care of all of the work of getting you into the office on time, you could check your emails, draft reports and perform some of your normal duties. It would allow you to turn the hassle of peak hour traffic into a more productive use of your time.

Autonomous trucks would also bring a benefit to the supply chain industry, as it would eliminate driver fatigue related deaths.

## What is likely to change?

With autonomous vehicles having a faster reaction time than humans, plus are not effected by lapses in concentration, there would be a significant reduction on vehicle related accidents.

## Which people will be affected and how?

Basically anyone who currently uses cars to get from one place to another would benefit from autonomous vehicles, it would increase their safety and increase their potential productivity, depending on if the drive was for business or pleasure.

## Will this create, replace or make redundant any current jobs or tech?

Once full autonomy hits, there will be a reduction of jobs in the supply chain industry, especially if all of the trucks on the road are replaced with/given self-driving capabilities.

There will conversely be an increase in tech jobs, as autonomous vehicles would require specialised maintenance and repairs compared to a regular human driven vehicle.

# How will this affect me?

## In my daily life, how will this affect me?

## What will be different for me?

## How will this affect members of your family or your friends?

Machine Learning

# What does it do?

​​In 1938, when Konrad Zuse built Z1, the very first programmable computer, he effectively created the computer era which arguably is one of the main factors to shape the modern world we are living today. Compared to humans, computers are unquestionably fast at calculational and repetitive tasks. Since then, computer programs may have evolved greatly but shared the same basic principle: generating result following a set of instructions.

With the modern computer world continuing developing, the amount of data generated, therefore, growing at an astonishing level. According to Domo.com (2019) latest report, the world creates 2.5 quintillion bytes of data, that is equivalent to 3.3 billion of CDs, every day. More significantly, the last two years alone has contributed 90 per cent to the total amount of data (IFLScience, 2019). The exponential growth in data generated far surpassed human ability to comprehend. The answer to that problem, hence called big data, lies in a new field of computer science, namely, machine learning. As the terminology implies, machine learning is a technique of using program algorithms to make a computer predict results without a specific set of instructions. By using its power to apply complex mathematical calculations to big data, computers can learn from the information and spotting specific patterns rather than depending on human instructions. As a result, this technology unlocks many possibilities for the future.

Machine learning is, in fact, not a new terminology to the computer word. In 1950, Alan Turing saw the capability of computer learning by itself, created the famous Turing Test in which if a computer can pass the test, it can be indistinguishable with a human. The first learnable computer program is a checker game written by Arthur Samuel in 1952, which continues improved the more it played. He also came up with the name machine learning.

The technology was nothing but a curiosity, thus did not have much progress until the start of the 21st century. With the advent of big data mining, businesses realised the potential of machine learning, therefore heavily invested in the technology to stay ahead. The technology has been researched more heavily than ever before and evolved into many new categories, for instance, artificial intelligence, data mining, deep learning. Large organisations beginning to build their machine learning platforms such as GoogleBrain, DeepMind by Google, DeepFace by Facebook, and OpenAI by Elon Musk.

Although machine learning has been around for decades, with the recently attained popularity and massively invested by large enterprises, the future of machine learning will be one of the important parts to modern technology.

# What is the likely impact?

Machine learning technology has already been subtly taking over the modern world. With help from corporations, machine learning integrated itself into many aspects of our society.

Businesses and retail industry are arguably the major benefiter from machine learning. Using algorithms to analyse customer data, retailers can set prices based on supply and demand, giving purchase recommendations or showing personalised advertisements. Overall this will increase customer experience.

Banks and financial services use machine learning to quickly and accurately calculate consumer credit scores, loan interest or to identify fraud. Data mining can be utilised to identify investment opportunities or help in predicting the market. Insurance companies also rely on machine learning to generate insurance premiums.

Health care industry can also get the benefits from the new field. By taking data from patients with wearable devices and sensors, medical experts can utilise algorithms to identify conditions and deliver diagnosis more accurately.

Some governments have started to incorporate facial recognition algorithms along with surveillance devices to detect and identify crime to improve public safety. Although it is questionable in legality and ethicality, machine learning technology can indeed impact on society.

# How will this affect you?

Transportation aspect will be faster and safer. With artificial intelligent, car manufacturers can research automotive that can operate without human intervention. Equips with advanced sensors and cameras, they can detect hazards and make critical decisions many times faster than the human eyes. In the sky, aeroplanes using automation systems to guide themselves when in cruise mode, saving pilots time to more critical tasks such as take-off and landing.

Everyday living elements can also be more convenient. Retailers can utilise customer data to provide more personal experience, giving purchase suggestions or integrate machine learning into logistics and distribution to improve delivery speed. Digital personal assistants in smart devices are proving their effectiveness in assisting daily tasks faster and more intuitive.

Moreover, healthcare with aids from machine learning allowing researchers to understand and predict genetic diseases, doctors can treat patients with more accuracy. Overall making people have a healthier life.

In conclusion, machine learning technology although still in controversial, it helps to pave the way toward many technological breakthroughs. Some may say the new industrial revolution lies in artificial intelligence.

References:

Domo.com. (2019). *Becoming A Data-Driven CEO | Domo*. [online] Available at: https://www.domo.com/solution/data-never-sleeps-6 [Accessed 3 Apr. 2019].

IFLScience. (2019). *How Much Data Does The World Generate Every Minute?*. [online] Available at: https://www.iflscience.com/technology/how-much-data-does-the-world-generate-every-minute/ [Accessed 3 Apr. 2019].