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?

As a savvy, up and coming IT executive, having an autonomous vehicle would be a fairly substantial boost to my productivity. It would allow me to use the hour or so of travel time to and from work each day as a distraction free environment, I would be able to check my calendar, send emails, draft reports, initialise performance management proceedings for underperforming colleagues, the sky’s the limit!

## What will be different for me?

Once I’m hooked up with an autonomous vehicle and have the correct laws regulating its use on the road, I’ll be able to direct the energy and concentration I put into driving into something more productive. Whether it’s sending emails, running reports or working on documentation while I am driven to or from work or sending texts, confirming plans or watching Netflix on my phone while I’m driving on the weekend, my self-driving car will help me make the most of my transit time.

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

My friends and family will also share the benefits of autonomous vehicle travel, as they too will be able to maximise their productivity during their travel time.

Parent friends of mine will also have the added advantage of being able to take care of their child’s needs while they are being driven to their destination, whether it’s

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.

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**Future of Robotics**

**What does it do?**

Robots are quickly becoming a huge part of how society functions throughout their day to day life. For decades, the age of the robot has been predicted with the term ‘robot’ first used to mean automated labour and the term becoming popularised through science fiction films since the 1920’s (The One Brief n.d.). While the introduction of robots has had mostly positive impacts on society there is also some concern about what the future of robotics will look like.

Robots are designed to aid people in doing tasks that are either not suitable or too dangerous for humans, tasks that are far too repetitive and dull for humans (Mendes 2014) or tasks that require more precision that human error cannot provide, Mendes (2014) states that robots are suitable for these kinds of jobs as they lack emotional feeling, meaning any adverse emotional effects that these kinds of jobs may have on humans do not apply.

In todays world the most current state of the art development in robotics is humanoid robots, these humanoid robots are being developed to walk, talk, act and even look just like us. Dang (2019) states that humanoid robotic technology was originally used for research purposes, being used to develop better prosthetics for humans but the technology has been shifted to develop and create humanoid automatons. In the future humanoid robots in combination with artificial technology are intended to be used as companions or assist humans in daily life and act as helpers in time of disaster (Humanoid n.d.). While considerable progress has been made in the field of robotics there is still a long way to go before we can expect a humanoid robot in our own home.

Robots have allowed us to develop our knowledge of differing fields by aiding us in some way, All On robots (n.d.) states that there are many possible ways to define different types of robots. Industrial robots have allowed us to produce products in large scale with robots being designed to wield, paint and handle different materials to build things such as cars or electronics, All On robots (n.d.). Medical Robots have been developed to undertake precise surgical procedures or even help ease a patient’s recovery, All On robots (n.d.). Military robots have been developed and used to carry out different tasks required on the battle field, from disposing bombs to being used to scout enemy locations via drones, All On robots (n.d.). Space robots have been used to journey throughout our solar system to explore regions of our solar system that would not be feasible for humans, All On robots (n.d.). These are just a handful of current services that robots can provide society, with their ability growing every day.

Robots are continuously developing, they are becoming more intelligent and efficient with each passing day. There is plenty of progress happening within the robotics industry currently and we can expect to see the resulting development over the next few years. FutureForAll.org (n.d.) State that the next generation of robots is being designed to look feel and act more human, work is being done to create socially acceptable robots, creating realistic looking hair and skin and even going so far as to designing eyes that move and blink, a moving chest to simulate breathing and incorporating different facial expressions.

As more work gets put into artificial intelligence we will start seeing robots that begin to act like real humans and think and learn for themselves. Techopedia (n.d.) defines artificial intelligence as the ‘area of computer science that emphasizes the creation of intelligent machines that work and react like humans’. The continued development and improvement to AI will help produce robots with more human like abilities and will lead to robots being developed for more and more job types, Martin (2014) states that jobs such as; lab technicians and scientists, teachers and lecturers, pharmacists and airplane polit could be taken by automatons in the near future. For these reasons the development of AI has become the most controversial topic of discussion within the field of robotics (Harris n.d.).

**What is the likely impact?**

In terms of the labour market, as robots advance beyond human capabilities more and more jobs will be carried out by automatons, Harris 2018 suggests that by 2034 it is predicted that 35% of jobs that are done in the United Kingdom will done by robots instead, this would lead to mass unemployment within the nation. Throughout recent history there have been many examples of machines taking jobs. In the past jobs like, a lift operator or a film projectionist were taken over by machines and even in more recent times machines have taken over jobs such as a bridge toll collector or check-out cashier, Harris (2018). As robots and AI evolve this trend of machines taking jobs that has been evident throughout the past to the current day and is set to become an even bigger issue as time progresses.

While robots will take many jobs in the future it is predicted that 133 million jobs will be created compared to the 75 million jobs that will disappear all coinciding with the with the introduction of advanced robots, The Guardian (n.d.). While robots are expected to take over more physical jobs as well as many office-work positions, the evolving technology will create more jobs within the technology sector revolving around robotics as well as the technology sector in general. With the retraining of current employees to accommodate these future job roles, the introduction of more robot workers could potentially only have small adverse impacts.

Regarding robotic impact on society the introduction of more robots in everyday life will lead to more efficient living, research according to London (2018) states that 60% of British people believe that there will be a robot in every home within 50-years’ time. These robots would provide general help to their owners with mundane tasks allowing for more free time. Robots can even be used to provide their owner with companionship, 13% of people believe the introduction of a robot in their life would mean they would never feel lovely again (London 2018).

**How will this affect you?**

As the development of robotics continues we will begin to see the changes to our society and personal lives. I believe that my day to day routine will be simplified, the addition of a companion robot or such would give myself more time to do other important tasks and more free time for leisure. Overall the implementation of automatons would make the personal lives of myself and society much more efficient and enjoyable in the long run.

As robots advance they will gain the functionality to take a wider array of jobs, while jobs within the technology field will still be in high demand for the future, more physical and office-based jobs will become more accessible for robots and AI. The employment of robots to our workforce will result in the elimination of human error, while some other potential errors could be introduced such as breakdown or malfunction this elimination of human error would result in society becoming more efficient. My future career path involves working within the IT sector, so the introduction of more advanced robots will not be an issue for myself, whereas some of my friends or members of my family may need to be retrained or reskilled in order to join the workforce again.

To conclude, the age of the robot is coming and while it may be a scary to some, it is inevitable. The addition of automatons with advanced AI will require a big transition to current everyday life, many people will need to change careers or be reskilled in order the remain relevant within the future robotic age. While robots will take a range of jobs they will also provide a wide range of new jobs within the technology sector and provide support to humans to improve their quality of life overall.

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**Blockchain and cryptocurrencies**

**What does it do?**

Blockchain is a decentralized, incorruptible public ledger or also known as distributed ledger technology (DLT). In 2008 a person or persons known as the pseudonym Satoshi Nakamoto released a whitepaper called “Bitcoin: A Peer-to-Peer Electronic Cash System”. Cryptocurrencies are a byproduct of the blockchain, with Bitcoin being the first mainstream use case.

The current state of blockchain and cryptocurrencies is very much in its infancy. As mentioned earlier Bitcoin is the first real use of blockchain technology. Bitcoin is a currency and payment system which is not issued by a central authority, instead it is a distributed network that maintains the public ledger. There is a limit of 21 million Bitcoin with just over 17 million in circulation. There are a number of things that can be done with Bitcoin:

* Mining - Anyone has the ability to mine Bitcoin as long as they have the appropriate hardware. Mining Bitcoin is the process of adding a block to the blockchain, with each block being a transaction in the Bitcoin network. Computers will be used to solve numeric puzzles, the first to do so win the block reward. Miners can operate solo, or they can join mining pools which will split rewards amongst all participants.
* Trading – you can trade bitcoin for other alternate cryptocurrencies or standard currencies such as USD, AUD, etc. With high volatility, trading can be quite profitable for those with trading knowledge. There are hundreds of exchanges available for cryptocurrency trading.
* Investing - You can buy cryptocurrencies and hold onto it. Some predict that bitcoin’s value will continue to rise long-term.
* Buying - It can used to pay for goods or services. There is an increasing number of businesses which accept bitcoin (and other alternate cryptocurrencies) as payments. Worldwide, cryptocurrencies can be used to buy houses, and even pay taxes.

Blockchain doesn’t really require any particular technical advancements to work, it’s peer to peer decentralized network structure means it can run on anyone’s device. However, the emergence of blockchain it has made cryptocurrencies possible and depending on the consensus mechanism used could depend on the hardware required to encrypt and process new blocks. With higher hash rates, GPU sales have increased substantially since cryptocurrencies emerged.

**What is the likely impact?**

The possible impact of the blockchain is vast, it has the potential to disrupt many sectors, such as:

* **Finance sector** – With a faster and cheaper way of transferring money/assets. Blockchain is also a more secure way of storing transactional data through the decentralization provided by blockchain. There are dozens of cryptocurrencies that have been created for payment services, the leaders in this field are:
* Bitcoin
* Dash
* Litecoin
* Monaro
* **Real Estate** –Buying and renting a home involves lots of documentation and can be an expensive process when engaging lawyers, property managers, etc. Blockchain could be used to simplify the process by using smart contracts which execute when the criteria are met. There are a number of projects that are looking to digitize rental assets, giving anyone the opportunity to own an investment project anywhere in the world. They also give potential developers to raise funds. Current real estate projects:
  + Brickblock
  + Propy
  + Rentberry
* **Voting** –Having an electronic decentralized incorruptible platform makes blockchain seemingly the perfect solution for voting. Using verification systems for voters, the blockchain would ensure that all voting is above board. Having votes digitized, voting could be down with extreme efficiency, while keeping costs down, whilst remaining secured by blockchain. Current project of this nature:
  + ClearPoll
  + Horizon State
  + Vote Coin

With its security and transparency blockchain technology is often referred to as the new internet, so it has the potential to affect anyone who uses an internet connected device. On the face of it, the everyday user may not realize the impact of the blockchain, however it has the capacity to make processes more efficient and services cheaper having an impact on everyone.

Blockchain effectively cuts out the middleman, so any manual processing could become redundant. Blockchain will also result in job creation, as there will be a larger need for blockchain engineers, smart contract developers, and general blockchain expertise.

**How will this affect you?**

I’ve hardly scratched the surface of the industries blockchain could disrupt. The biggest impact it could have on me could be due to the transparent nature of blockchain could make governments and organizations more accountable. Decisions would be made based on what’s best for the public, rather than driving personal agendas. Organizations will offer cheaper and faster solutions, resulting in better and more value for money products and services.

With the emergence of cryptocurrencies fiat currencies could be digitized. If a cryptocurrency such as bitcoin became a worldwide currency it would eliminate conversion fees, remove inflation as there is a maximum supply of 21 million, and essentially remove the stranglehold banks have on society.