## Topic 3: Machine Learning

### What does it do

Machine Learning is the use of algorithms and statistical models to enable a computer to complete tasks without explicit instructions. Instead, computers often rely on the use of patterns and inference.

Machine Learning is a subset of Artificial Intelligence used to “teach” a computer to learn based on “previous experiences”. It is an iterative approach to learning, adapting its algorithm with each iteration. When initially learning a task, a machine learning program will likely attempt random approaches to the task. From this basis, the following iterations will take the most successful of the previous attempts and build upon it. Each repetition should be more successful than the previous one, eventually being successful at the task.

Using Machine Learning is very successful, completing the task most of the time, though very rarely 100% of the time. There is almost always a random variable that can affect the outcome, especially when dealing with external inputs such as audio or image inputs. Enabling the machine learning program to be connected to the internet allows it to have an incredibly large amount of input data. More input data greatly increasing the ability to “learn” and adapt.

Machine Learning has many current applications in a variety of fields including retail, financial services, entertainment and transport.

In retail, Machine Learning detects customer buying patterns. Then, sends the buyer personalised advertisements, showing items that they find more interesting than conventional advertisements, increasing the likelihood of them purchasing.

In Social Media, sites such as Facebook, Instagram and Twitter use a similar method to link users together. They offer up similar users/accounts to follow by comparing the users you follow, and posts you like with what other people doing, following and liking similar things.

Entertainment services, such as YouTube, Netflix and Spotify, have their algorithms which learn the type of content you are more likely to consume. Machine Learning tracks watch/listen time, attentiveness rate (what percentage of the content you get through before clicking something else) and likes/dislikes, to display things that it believes you will also enjoy.

Near future applications of machine learning include things such as a network of self-driving vehicles, allowing for things like autonomous delivery and taxi services. Machine learning is also progressing in voice and video synthesis, creating convincing fake audio and video of real people known as “deep fakes”. This has many applications some good, others questionable.

### What is the likely impact

MachineLearning will change industries. The progress in machine learning applications will allow some industries to run more autonomously. Other industries will be able to run more efficiently by being able to analyse data and predict future outcomes at a much more consistent rate. One sector likely to change in a big way is transport. Transport is a big industry. The introduction of self-driving vehicles may soon make truck driving mostly redundant, as autonomous trucks will be able to travel long-distance journeys without stopping, giving them a big lead over human drivers. They will also be more consistent, and predictable and therefore safer and less likely to be involved in trip delaying incident. While many drivers may be out a job, this will also likely create positions for maintaining the autonomous vehicles as without a human driver there is no one to correct any errors made during the journey, so maintaining the cars will be critical in ensuring they are functioning correctly. Driverless taxi and delivery services will also be much more consistent, able to give customers much more accurate time estimates for arrival and trip time, while also reducing the cost as there is no longer a 2nd human involved in the transaction (don’t need to pay a driver). Obviously, this will greatly reduce transport jobs, but it will also create additional jobs in the maintaining of these vehicles.

### How will this affect you

As someone who does not drive and relies a large amount on public transport, I see a lot of upsides. The increase in availability and affordability of the driverless transport services would mean that I could rely on a more consistent transport industry. This would also create safer road condition people who do drive as autonomous vehicles would drive in a much more consistent and predictable manner. A critical mass of autonomous vehicles would also allow for road speeds to increase as a network of vehicles would be unlikely to cause an accident with another vehicle within the network, reducing travel time for personal journeys and deliveries. Other applications of machine learning such as fraud detection will help in less visible helping to increase personal financial and digital account security.