IT Technologies 4: Machine Learning

What does it do:

Machine Learning is the use of algorithms and to statistical model that a computer can use to complete a certain task without explicit instructions, often relying simply on the use of patterns and inference instead. It is a way of “teaching” a computer to learn based on “previous experiences” or data. Machine Learning can be seen as a subset of Artificial Intelligence. Machine Learning uses an iterative approach to learning a given task, adapting it’s algorithm with each iteration. When initially learning a task, a machine learning program will likely attempt random approaches at the task, the following iterations will take the most successful of the previous attempts and progress with that. Each iteration should be more successful than the previous one eventually being successful at the task a large majority of the time, though very rarely do machine learning programs reach a 100% success rate as there is almost always a random variable that can affect the outcome especially when dealing with external inputs such as audio or image inputs. Allowing the machine learning program to be connected to the internet allows it to have an incredibly large amount of input data at it’s disposal, greatly increasing it’s ability to “learn” and adapt.

Machine Learning has many current applications in a variety of fields including Retail, Financial services, Entertainment, Transportation and many others. In retail Machine Learning is used for detecting customer buying patterns in order to send more personalised advertisements, showing them items that they are more likely to be interested in then conventional advertisements increasing the likelihood of them continuing to shop with that store. Social Media sites such as Facebook, Instagram and Twitter use a similar method by displaying similar users/accounts to follow by comparing the users you follow, and posts you like with what other people doing following/liking and will recommend you follow other users based on the similarity of their content to that which you already see and what other user similar to you follow/like. Entertainment services such as YouTube, Netflix and Spotify have their own algorithms which learn the type of content you are more likely to consume by tracking watch/listen time, attentiveness rate (what percentage of the content you get through before clicking something else) and likes/dislikes, displaying things that it believes you will also enjoy in their recommended sections/playlists. Financial services such as banks use Machine Learning to detect things such as fraud by tracking your purchase trends, and location and predicting whether or not it is actually making purchases. They can also use machine learning to track investment growth which can help when giving investment advice. The transportation industry makes use of machine learning by keeping track of traffic trends and predicting the most efficient routes to take, as well as predicting potential issues such as traffic hazards. The auto industry also uses machine learning to create driver assistance technologies such as lane departure alerts, automatic parking and automatic cruise control. While it is still in it’s infancy, autonomous driving technology heavily uses machine learning to predict driving patterns of other driving allowing them to coexist with regular vehicles on the roads. Home devices with digital personal assistants also use machine learning to learn things such as your accent, and speech patterns to be able to listen to your voice commands as well as your daily habits to help organise your everyday life.

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 “deepfakes”, this has many applications some good, others questionable.

What is the likely impact?:

The progress in machine learning applications will allow many more industries to be run more autonomously, while making many others able to run more efficiently by being able to analyse data and predict future outcomes at a much more consistent rate than before. This will alter the many industries will function, having more accurate data for predicting potential outcomes, having autonomous vehicles and enabling much more reliable fraud detection. The industry that is most likely to change in a big way is the transport industry, the introduction of self driving vehicle will heavily effect truck drivers and will likely make that position mostly redundant as autonomous vehicles will be able travel the long distance journeys without stopping (only to refuel/recharge). Not having to stop to rest give autonomous vehicles a big lead over human drivers, allowing for faster and more consistent deliveries. They will also more consistent, and predictable and therefore safer and less likely to be involved in trip delaying incident. Whilst 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 vehicles would important to ensure 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, whilst 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 reduce transport jobs greatly, 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 this would benefit me greatly as 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 a less visible helping to to increase personal financial and digital account security.