**Brief History of Machine Learning**

* **Maybe add timeline of events**
* **What is machine learning**

Machine learning is an algorithm programmed to ‘learn’ i.e. the algorithm is fed feature vectors and labelled data (supervised) or just the feature vectors (unsupervised) and ‘learns’ from the data in order to make predictions.

**First case:**

Machine learning has exploded as a field in the last decade however it has been applied for a lot longer than most people think (over 60 years ago). Much of the math used in the field was proven even earlier than this, they just lacked the machines to run the algorithms.

Warren McCulloch (neurophysiologist) and Walter Pitts (mathematician) worked together to bring machine learning from theory to reality. In 1943 they co-wrote a research paper on how neurons in the brain work and then applied their theory by modelling the neural network using electrical circuits, thus the study of neural networks began.

The next massive breakthrough in the field came in 1952 where Arthur Samuel designed a program that learned to play checkers from experience. I.e. The program got better as it played. The program was set up in such a way as to pick moves that were recommended by experts (using strong moves from books) where it could. Arthur challenged the Connecticut checker champion with his checker player and won thus proving the ability of the program.

In 1959 the system MADELINE was created which filtered echoes from phone lines, this was the first neural network that helped many people in everyday life (anyone using phone lines). This method is currently still in use, showing just how big an impact it had on the world.

DeepBlue one of the most famous AI of all time was able to beat a chess world champion Gary Kasporov in 1997. It was programmed to examine 200 million chess moves per second and won the 6-game match in the final game signifying a big step in computer science industry. This was programmed using ‘brute force’ which technically isn’t artificial intelligence but it got a lot more people interested in the power of computing and thus would help increase funding into areas like machine learning.

In the year 1999 machine learning shows how effective it can be in the world of medicine where a study of the accuracy of breast cancer detection was conducted on 22 000 women using a computer-aided diagnosis (CAD) system. These women had regular checkups in the prior 5 years to the study. The CAD system found 52% of the missed cancers a year before they were identified by a radiologist.

Most recently Pluribus the AI created by Facebook was able to beat five professional poker players including some of the best in the world in No-Limit Hold’em. This was an especially difficult task as you are playing against five people simultaneously instead of one on one. Therefore there are many more ways the game can play out thus making the problem more complex. The game of poker also is very challenging in its own right as much of the information is hidden during the game. It was described as being better than humans at bluffing. The bot beat the professionals by $5 dollars each hand and close to $1000 per hour.

Many of these breakthroughs show how a program can be written to beat any human at a game if programmed correctly.

Many people still dislike the ideas of machines learning, however theses studies are very important if we want the human race to continue advancing technologically and in terms of quality of life, e.g. higher detection rate of cancer compared to human doctors means that patients can be treated earlier and thus have a much better chance of survival. Pride must be put aside and we must work alongside these kinds of technologies to achieve the optimum result for humanity.

Artificial intelligence has already improved many people’s lives over the past few years. A large portion of them don’t know that machine learning has played a big role in this endeavour. Some examples of this include self-driving cars, fraud prevention, music or film recommendations and security. Self-driving cars developed by Google have already been proven safer than standard drivers. Music and film recommendations have made it much easier to find your style, as an algorithm has been programmed to find links between shows/music you tend to watch. Security cameras have been improved to use facial recognition to work out if a person approaching your home is a stranger or a frequent visitor. An example of fraud prevention is when there is an unusually large transaction taking place with your account you will be notified and asked to confirm it. This is detected by analysing your transactions and figuring out a pattern, if a large outlier comes along then you will be notified.