Machine Learning is one of the many factors that contribute to the greater concept of artificial intelligence, particularly concerning the ways computers learn from prior experiences to improve their own abilities of thinking, planning, deciding and acting. Essentially, its goal is to teach computers to learn autonomously. Many fields fall under the umbrella of AI as its foundations are rooted in mathematics, logic, philosophy, linguistic, and neuroscience to name a few.

Currently technologies such as social media marketing tools, online recommended offers from shopping portals, and fraud detection services revolve around the ability of computers to automatically apply complex mathematical calculations, identify patterns and then decide with minimal human involvement.

These complex algorithms can be grouped into certain categories: supervised, unsupervised and reinforcement. Supervised learning uses labelled data to sort, associate and recommend a course of action with the associated input. The supervised learning algorithm is fed with an example input, then the associated output. This is repeated many times so that the algorithm can form a pattern with the inputs and outputs. After feeding it a brand new input, it will then predict the output. Ta-dah! Machine learning.

Alternatively, the unsupervised learning algorithm is fed an example input (without the associated output) and again, is repeated many times. Eventually, the algorithm groups the inputs into clusters. Now, when fed a new input, the algorithm will predict which cluster it belongs to. Bam. Machine learning.

Reinforcement learning works on the principle of feedback. For example, the system is provided with an image of a dog and is asked to identify it. The system identifies it as a cat. The user will then provide negative feedback, saying it is a dog’s image and the machine will learn from the feedback. Over many iterations, the machine will be able to identify differences between images. Maybe from cars, traffic lights or street signs. Seem familiar?

Google Duplex is a new project from Google that is currently live in the majority of the U.S. Duplex allows users, with the help of Google Assistant, speak for the user when making reservations at a restaurant. Duplex has a human sounding voice that interacts with the voice-based AI assistants and implements conversational, natural language processing.

Duplex is a recurrent neural network that has the ability to be trained to complete highly specialised tasks. It also incorporates speech recognition technology so the user can interact with it. WaveNet is an AI-based generative program that is currently a part of Google that allows Duplex to sound as human than ever before, complete with ‘umm’s and ‘aah’s.

These are examples of ‘artificial narrow intelligence’ (ANI). ANI can perform tasks that are narrowly defined. Concurrently, we are continuing to make foundational steps forward toward human-level ‘artificial general intelligence’ (AGI) or ‘strong AI’. This is defined as an AI performing tasks that a human being can, such as learning, telling jokes, manipulating people or even reprogramming itself.

Quantum Computing will greatly enhance the speed of execution of Machine Learning algorithms and as such, this should be the next conquest in the field of Machine Language research. Future advancement in “unsupervised Machine Learning algorithms” will also lead to higher business outcomes.

Based on current technology trends and Machine Learning’s systematic progression toward maturity, these predictions are a safe bet:

* ML will be an integral part of all AI systems, large or small.
* As ML assumes increased importance in business applications, there is a strong possibility of this technology being offered as a Cloud-based service known as Machine Learning-as-a-Service (MLaaS).
* Connected AI systems will enable ML algorithms to “continuously learn,” based on newly emerging information on the internet.
* There will be a big rush among hardware vendors to enhance CPU power to accommodate ML data processing. More accurately, hardware vendors will be pushed to redesign their machines to do justice to the powers of ML.
* Machine Learning will help machines to make better sense of context and meaning of data.

[1]

The likely impact of Machine Learning in our society in the near future is huge. In only a few years, machine learning will become a part of nearly every software application. Much like virtualisation, these capabilities will be directly inbuilt into our devices. Online services already recommend products and services on our computers – why not our TVs, mobile phones or even fridges?

Machine learning as a service becomes increasingly valuable as the technology develops. This allows a wider range of companies to utilise the benefits of machine learning without investing in infrastructure, large hardware investments or making their own algorithms.

Organisations will gain access to more and more powerful machines as specialised hardware becomes both more affordable and more effective. This improved hardware will be able to enable breakthroughs not only machine learning but in all areas of AI.

With strong AI becoming better and better, the need for a personal assistant might become obsolete as you would be able to speak to an almost human AI that lives in your pocket. This extends to jobs that traditionally only humans could perform. For example, the driverless cars of Google could replace a whole industry by making decisions even faster than a human driver, resulting in safer and possibly more efficient roadways.

An average day in the life of someone living 30 years in the future may incorporate a whole host of devices and services that utilise Machine Learning. They may awaken to their smart home gently waking them up with personalised lights and tones. They may then be greeted by a personalised, itemised list of what the day brings whilst a voice reads the daily headlines in a nuanced, human-like voice. They may order a car to drive them to work/ to do errands which will arrive promptly and without any true human interaction, they might arrive at work to start their day. Completely automated, seamless experience that helps ease the stressors that compound daily.

This is one of the biggest reasons why I’m so interested in the next 30 or so years of IT, as I believe the intersection of technologies, both hardware and software, is reaching a boiling point with a greater paradigm shift developing behind the scenes.

[1] M. Johnsen, "5 predictions for the future of machine learning", IBM Big Data & Analytics Hub, 2019. [Online]. Available: https://www.ibmbigdatahub.com/blog/5-predictions-future-machine-learning. [Accessed: 03- Jul- 2019].