**Machine Learning**

1. **What does it do?**

Machine Learning is a subset of Artificial Intelligence. Machine learning can be thought of as software 2.O. Traditional programming (software 1.O) uses a set of inputs and a programmed instruction to produce the desired output. Machine learning has a different approach where it uses a set of inputs and desired outputs which are then converted into numbers so that the machine learning algorithm looks at their patterns to “learn” the corresponding algorithm.

**What is the state of the art of this new technology?**

There is no doubt that artificial intelligence, machine learning and data science have become the most powerful and forward-looking force in technology over the past decade. These technologies have allowed for breakthrough insights and applications that may truly change the world for the better. This is, of course, thanks to the symbiosis of data collection, hardware innovation, and driven researchers that have taken hold over the 2010s. This has led us to bestow computers mind boggling abilities in everything from vision to natural language processing to audio understanding to complex signal processing.

AI and machine learning have expanded to a multitude of industries and enterprise use cases, with more and more companies adopting these approaches every day.

As evidence of this, a recent study found that 49% of organizations reported they were exploring or “just looking” into deploying machine learning, while a slight majority of 51% claimed to be early adopters (36%) or sophisticated users (15%).

This data, while not completely comprehensive, is indicative of the growing trends in 2020 and beyond for machine learning and AI applications. Certain aspects of machine learning (data mining, advanced algorithms, and predictive analytics) are in particular demand, reflective of the growing role that information processing and analysis plays in the 21st century business environment.

**What can be done now?**

Machine learning has become so pervasive that most of us use it daily without noticing. Whether you’re searching the web, consuming weather reports, driving a car or using speech recognition on a smartphone, you’re most likely benefiting from machine learning. Digital businesses are increasingly adopting machine learning, driven by the availability of sensor data, expanding bandwidth and sinking storage costs.

There’s an abundance of examples across organizations that demonstrate what we can do with machine learning. Here are just a few:

* **Sales and marketing** – Machine learning models used for product recommendations are constructed to predict which product a customer is most likely to buy. They take a customer profile as input (customer activities, recent purchases and personal information) and map this to the predicted likelihood of the customer responding to a given offering.
* **Risk and fraud management** – Machine learning in fraud detection is typically used to map descriptions of transactions to their likelihood, indicating whether an ongoing transaction has a high likelihood of being fraudulent. In credit risk, it can map the loan applicant’s details (demographics and credit/payment history) to the likelihood of them defaulting on the given loan.
* **Smart transportation** – Traffic optimization can be achieved through an understanding of traffic patterns using sensor data, accidents and roadworks. A machine learning model predicts delays or road obstructions and recommends a faster route for public buses, as well as consumer and commercial vehicles.
* **Supply chain processes** – Machine learning models in asset performance management take the operating conditions of assets, such as wind turbines, solar panels and nuclear reactors, as input and predict when failures will occur. The objective is to decrease maintenance costs and minimize downtime.
* **Healthcare** – Machine learning models in early-warning systems for employees will analyse sensor data in hazardous environments — such as measurement of air quality, equipment performance or employee productivity, or even atypical behaviour — to predict the likelihood of accidents. This application has been widely adopted to alert truck drivers to potential accidents.

**What is likely to be done soon (say in the next 3 years)? What makes this possible?**

Machine Learning is shaping the future of almost every company and every citizen on the planet. It has served as the guiding force behind new technologies such as big data, robotics, IoT, and it will continue to do so for the near future. Here are some predictions about Machine Learning, based on current technology trends and ML’s systematic progression toward maturity:

* 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.

To make all this possible 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.

1. **What is the likely impact?**

**What is the potential impact of this development? What is likely to change?**

As with most changes in life, there will be positive and negative impacts on society as artificial intelligence and machine learning continues to transform the world we live in.

Artificial intelligence and machine learning can dramatically improve the efficiencies of our workplaces and can augment the work humans can do. When AI takes over repetitive or dangerous tasks, it frees up the human workforce to do work they are better equipped for—tasks that involve creativity and empathy among others. If people are doing work that is more engaging for them, it could increase happiness and job satisfaction.

With better monitoring and diagnostic capabilities, machine learning can dramatically influence healthcare. By improving the operations of healthcare facilities and medical organisations, AI can reduce operating costs and save money. The true impact will be in the care of patients. Potential for personalised treatment plans and drug protocols as well as giving providers better access to information across medical facilities to help inform patient care will be life changing.

Our society will gain countless hours of productivity with just the introduction of autonomous transportation and ML influencing our traffic congestion issues not to mention the other ways it will improve on-the-job productivity. Freed up from stressful commutes, humans will be able to spend their time in a variety of other ways.

The way we uncover criminal activity and solve crimes will be enhanced with machine learning. Facial recognition technology is becoming just as common as fingerprints. The use of ML in the justice system also presents many opportunities to figure out how to effectively use the technology without crossing an individual’s privacy.

In the other hand, the transformative impact of artificial intelligence on our society will have far-reaching economic, legal, political and regulatory implications that we need to be discussing and preparing for. Determining who is at fault if an autonomous vehicle hurts a pedestrian or how to manage a global autonomous arms race are just a couple of examples of the challenges to be faced.

Will machines become super-intelligent and will humans eventually lose control? While there is debate around how likely this scenario will be, we do know that there are always unforeseen consequences when new technology is introduced. Those unintended outcomes of artificial intelligence will likely challenge us all.

**Which people will be most affected and how? Will this create, replace or make redundant any current jobs?**

For many workers, the advent of AI-powered technologies seems to be synonymous with permanent lay-off. Factory workers will be replaced by much more efficient robots that will be able to work 24/7. Retailers [are already using robotic fulfillment systems](https://www.zdnet.com/article/retailer-or-future-unicorn-ocados-business-model-still-has-many-promises-to-keep/) to pick orders in their warehouses. Google's project to build autonomous vehicles, Waymo, has [launched its first commercial self-driving car service](https://www.zdnet.com/article/waymo-to-launch-self-driving-car-service-within-two-months/) in the US, which in the long term will remove the need for a human taxi driver. Ford is even working on [automating delivery services from start to finish](https://www.zdnet.com/article/ford-wants-this-two-legged-robot-to-deliver-packages-to-your-door/), with a two-legged, two-armed robot that can walk around neighbourhoods carrying parcels from the delivery vehicle right up to your doorstep. But off course not all jobs will be superseded by AI, according to consultancy McKinsey, fewer than 5% of occupations can be entirely automated using current technology. But over half of jobs could have 30% of their activities taken on by AI. Rather than robots taking over, therefore, it looks like the future will be about task-sharing.

Also McKinsey [estimates that automation will cause up to 800 million individuals](https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages) around the world to be displaced from their jobs by 2030 – a statistic that will sound ominous, to say the least, to most of the workforce. But the firm's research also shows that in nearly all scenarios there is sufficient investment and growth, most countries can expect to be at very near full employment by the same year

**In your daily life, how will this affect you? How might this affect members of your family**

**or your friends?**

Machine learning and algorithms are currently having a direct impact on many aspects of our lives. whether we're looking to check our emails, get use instructions, find a track, or get movie recommendations. Most of us have already figured out that when we use websites with recommendation engines such as YouTube, Netflix or Amazon, every selection we make from the videos we like and dislike to how long we watch a film for and the kinds of products we purchase are all being monitored and recorded. Driven by machine learning, these sites are using this data to “recommend” or “suggest” other similar products, videos, or films that we might like.There’s also Siri, a machine learning speech recognition program designed to let us talk to the internet and interface with the data it contains without the awkwardness of a keyboard. To sum up, there are many instances in our daily lives when we are involved in and surrounded by AI. Voice-powered personal assistants, music and movies recommendations, enhanced decision making, avoiding traffic or real-time manifestations, instant machine translation, self-driving vehicles, and other powerful predictive capabilities are several examples and applications of how Artificial Intelligence is used today.

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