Machine Learning's Impact on Business

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The world of business is shifting from making decisions based on instinct to making decisions based on data and analytics. The goal for many companies is to leverage analytics to make assets perform better, to reduce costs and to create new value. According to Forbes, 53% percent of companies were using big data analytics in 2017, up from 17% in 2015, and this number is growing exponentially. When companies started integrating analytics, it was a competitive advantage, a magical force that separated companies from their competitors. However, things have changed. Analytics have now become an expected and necessary part of a company's bottom line[4]. With the constant advancement of technology, companies need to be using more comprehensive analytic strategies[4]. This article will focus on the emergence of analytics, particularly machine learning, into the corporate world through examples of how industry-leading companies are using machine learning to enhance their performance.

Machine learning has been around in the academic world for over 70 years. If any of you have seen the 2014 movie "The Imitation Game", then you are familiar with Alan Turing, who is one of the founders of machine learning. However, in only the last decade has machine learning become prevalent in the non-academic world as "data storage and data processing capabilities have grown tremendously"[4]. So, what exactly is machine learning? Professor Arthur Samuel famously said in 1959, that machine learning is the field of study that gives computers the ability to learn without being explicitly programmed. Before we move on let's just give AI (artificial intelligence) a quick definition. According to computer scientist John McCarthy in 1965, AI involves machines that can perform tasks that are characteristic of human intelligence. Putting the definitions for AI and machine learning together, machine learning is an optimal way of achieving AI.

For a computer to learn, it needs data, and according to IBM, 90% of the data in the world today has been created in the last two years alone, and our current output of data is roughly 2.5 quintillion (10^18) bytes a day. With all this data to be harnessed, machine learning is already, and will continue to be, a big part of business.

A phrase I often hear is "data is gold". Let's run with this analogy for a minute. This would mean that all of these huge corporations have a massive amount of gold within their grasp. All they need to do is start mining and they will be rich in gold. As simple as that sounds, I'm sure any gold mining expert would tell you that it's a bit more complex. Long before any gold can be extracted, significant exploration and development needs to take place, both to determine, as accurately as possible, the size of the deposit, as well as how to extract and process the ore efficiently, safely and responsibly. On average, it takes between 10-20 years before a gold mine is even ready to produce material that can be refined. Back to the data… It may not take 10-20 years for material results to come from data, but you get the point; there is a complex process that must occur to translate unstructured raw data into business decisions, with several challenges that need to be dealt with along the way.

Now that we have discussed data and the machine learning process, how does this apply to the business world? Machine learning gives organizations the potential to make more accurate data-driven decisions and to solve problems that have stumped traditional analytical approaches, such as those involving new sources of unstructured data, including graphics, sound, videos, and other high-dimensional, machine-generated data[4]. More and more companies are modernizing their technology and using machine learning to optimize business decision-making. These analytically enhanced companies adopt emergent or deliberate strategies[6] that allow them to be agile and make business decisions quickly.

Recommendation systems are "a subclass of information filtering system that seeks to predict the "rating" or "preference" a user would give to an item"[3]. Collaborative filtering and content-based filtering produce the recommendations using machine learning. For example, collaborative filtering will build a model using a users historical behavioural data and historical decisions made by other users. After the machine learning "filtering" process occurs, the filter will then predict items that the user may be interested in. These recommender systems have grown in popularity and are used by companies across the business world, such as Amazon, Netflix, LoyaltyOne and Walmart. An example we will discuss is the music company Spotify, which is known to provide good recommendations to its customers for music playlists. Through the use of machine learning, Spotify has built music recommending systems. Every Monday, hundreds of millions of Spotify users have a new playlist waiting for them in a feature called Discover Weekly, "It's a custom mixtape of 30 songs they've never listened to before but will probably love".[9] Spotify uses "Collaborative filtering models, Natural Language Processing models and audio models"[7] to make a connection between data from two billion playlists and your personal taste profile. Matthew Ogle, who oversees the service at Spotify, said "We now have more technology than ever before to ensure that if you're the smallest, strangest musician in the world, doing something that only twenty people in the world will dig, we can now find those twenty people and connect the dots between the artist and listeners".[7] Since the service quietly launched in June, songs from its playlists have been streamed 1.7 billion times.[7] This use of machine learning for Spotify has helped launch them to the top of the music providing world.

We can all agree that sales are a very important part of most modern companies. For any sales professionals reading this article, you may be wondering; how do sales benefit from machine learning? A few of the many benefits are: increased sales efficiency and productivity through the automation of simple administrative tasks; better forecasting accuracy and risk management; and increased customer acquisition. Accenture recently released a report claiming that "76% of companies using machine learning are doing so to increase sales growth and that 40% of these companies use machine learning to better sales and marketing performance".[1] AT Kearney also released an article that highlighted the importance of forecasting, "More accurate forecasting can reduce working capital up to 20 percent and reduce out-of-stock events by up to 6 percent".[8] This gives an idea of how much value machine learning can provide on the sales side of businesses.

As we now know, machine learning can be a big help to sales. The tech giant Salesforce claims they can improve prospecting, positioning, execution and closing of deals within sales. Their general goal is to help improve the average workday by making the sales process smarter. Salesforce is delivering a new product called Salesforce Einstein, "which is artificial intelligence for everyone". According to Salesforce, "Einstein is powered by machine learning, deep learning, predictive analytics and natural language processing".[5] Often when at work, people ask themselves what task they should move onto next, and that usually ends in some form of procrastination, that is where Salesforce's machine learning will step in and tell you what to do next. What they use is very similar to the recommender systems mentioned earlier, "the program studies the history of the data and figures out for itself which factors best predict the future—and then it keeps adjusting its model based on new information over time"[9]. Einstein can do a lot more than just recommend the best next thing to do. Einstein "will be embedded within the context of business, automatically discovering relevant

insights, predicting future behaviour, proactively recommending best next actions and automating tasks"[5].

In the first example, we looked at recommender systems. Specifically, one that allows Spotify to recommend music to individual customers by leverage big data and machine learning. Second, we discussed Salesforce's Einstein, which "automatically discovers relevant insights, predicts future behavior and proactively recommends best next actions"[5] in the context of sales leads and other sales-specific decision making. Now, in the final example, we are going to take a dive into the world of logistics and supply chain. Logistics and supply chains are an ever-present and important part of many successful businesses. Often riddled with vast amounts of repetitive and often mundane tasks, how can this sector benefit from machine learning and AI? AI and machine learning present "a significant opportunity to save time, reduce costs and increase productivity and accuracy with cognitive automation"[3]. Cognitive Automation "refers to the use of Robotic Process Automation". According to experts at IBM, DHL, and Singapore Management University, there are several ways to use cognitive automation in the context of supply chain and logistics (to read the entire report please see the reference number 3). The article describes, in detail, several areas that directly benefit from machine learning. These areas include cognitive contracts. Cognitive contracts allow users to review "contracts written in complex legal language often several hundred pages in length"[3] and, through natural language processing, these contracts "can be processed in a fraction of the time it would take a team of human experts".[3]

IBM is a big player in this industry with their product IBM Watson Supply Chain. According to IBM "Watson Supply Chain can elevate your existing systems to provide greater visibility, transparency and insight into supply chain data and processes".[11] They use cognitive customs

to provide this value to their customers. Cognitive customs use natural language processing and the self-learning capabilities of deep learning and have the function of "ingesting customs documents in myriad formats, extracting relevant information using its collected body of knowledge, and presenting an automatic declaration".[3] Another smaller Canadian player called Kinaxis specializes in supply chain optimization. It offers a software product called RapidResponse that helps companies around the world revolutionize planning. It provides a data and analytics model that can represent several states of the supply chain - historical, present, and future - to detect changes that could do harm to, or provide opportunity for, the business.[10] Their goal is to provide a "smart" supply chain that is always thinking and one step ahead of potential issues across the supply chain. In the exciting world of machine learning, you may wonder what is next for supply chain? There are several areas constantly being developed by industry-leading researchers, such as "route optimization, inventory management, autonomous fleets, a shift to proactive operations from reactive operations with predictive intelligence"[3]. The future is bright for machine learning and many of these new technologies are on the verge of release.

Machine learning solutions can help with two main things in businesses, cost reduction and new value creation. We have looked at examples of both. Spotify's recommender system created new value by delivering popular new playlists custom-tailored to unique users. Salesforces' Einstein created new value by automating some key sales decision-making processes and provided cost reduction to their business customers by reducing hours wasted on administrative activities. IBM Supply Chain and Kinaxis offer cost reduction to their customers by creating a smart supply chain system that can react quickly to costly situations. A final takeaway from this article should be that machine learning is always changing and growing, because data is always growing and changing. As Salesforce President of

Technology Srini Tallapragada eloquently states "At a certain point, a column of data can become useless—it becomes a best practice, so it loses predictive value. The model has to keep changing".

APA Style End Notes

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