Machine Learning and Big Data

"Big data really is about having insights and making an impact on your business. If you aren't taking advantage of the data you're collecting, then you just have a pile of data, you don't have big data"

- Jay Parikh, VP of Engineering at Facebook.

WHAT IS BIG DATA?

The "Big Data" concept emerged as a result of the data science developments over the past 60 years. Big data refers to large amounts of data that require specialized solutions in order to be gathered, analyzed and implemented into the business operation. The name "Big Data" itself emphasizes on the huge size of the data in hand. It's known to grow exponentially with time and is to large and complex to be managed by the traditional data management tools. For example, according to guru99.com, The New York Exchange generates about one terabyte and Facebook's databases ingest 500+ terabytes of new data every day. Hence, there is an obvious need of at least some kind of base structure that's required to process and analyze it.

BIG DATA ANALYTICS

This is the process of studying large datasets to identify the hidden patterns, market trends, consumer preferences and other valuable information helping organizations to form strategic business decisions. According to TechTarget, data technologies and techniques provide a means to analyze data sets and draw conclusions about them which help organizations to make informed business decisions.
With Big Data Analytics, data scientists and other analytics professionals can examine huge sets of data in a structured form as well as the untapped data by implementing analytics and business intelligence.

- ### TYPES OF BIG DATA ANALYTICS

There are different types of Big Data Analytics depending on the type of usage:

1. Prescriptive Analytics

   Forward looking, focused on optimal decisions for future, simple rules to complex models.

2. Diagnostic Analytics

   Backward looking, focused on casual relationships, relative ranking of dimensions based on inferred explanatory power.

3. Descriptive Analysis

   Backward looking, focused on descriptions and comparisons, pattern detection.

4. Predicative Analytics

   Forward looking, focused on non-discrete predictions of future states and relationships, description of prediction result set probability distributions and likelihoods.

5. Outcome Analysis (Also referred to as consumption analytics)

   Backward looking, real time, and forward looking, focused on consumption patterns and description of usage thresholds.

- ### Importance of Big Data Analytics

As mentioned earlier, data analytics in big data helps the user to look at a more sorted and structured form of data which can thus be used to various benefits, especially in the business world. Some of them include new revenue opportunities, more effective marketing, better customer service and improved operational efficiency.

Once the data is ready after this, it can be analyzed with the software commonly used for advanced analytics processes. That includes tools for *machine learning* which taps algorithms to analyze large data sets.

What is Machine Learning and why is it important?

According to Microsoft, machine learning (ML) is one element of AI whereby a computer is programmed with the ability to self-teach and improve its performance of a specific task. It's all about analyzing big data – the automatic extraction of information and using it to make predictions decipher whether the prediction was correct, and if incorrect, learning from that to make a correct prediction in the future.

ML algorithms are applied to increase efficiency and insightfulness of this data. ML algorithms provide effective automated tools for data collection, analysis, and integration. They can be applied to every element of Big Data operation including data labeling / segmentation, and data analytics.

ML is helping businesses analyze bigger, more complex data to uncover hidden patterns, reveal market trends, and identify customer preferences for faster, more accurate results. By automating analytical

model building, the insight gained is deeper and derived at a pace and scale that human analysts can't match.

MACHINE LEARNING APPLICATIONS

- ML can be used in education, Teachers can use machine learning to check how much of lessons students are able to consume, how they are coping with the lessons taught and whether they are finding it too much to consume.
- Search engines rely on machine learning to improve their services is no secret today. Implementing these Google has introduced some amazing services. Such as voice recognition, image search and many more.

WHAT ARE SOME POPULAR MACHINE LEARNING METHODS?

Two of the most widely adopted ML methods are supervised learning and unsupervised learning.

1. Supervised learning: The learning algorithm receives a set of inputs along with the corresponding correct outputs, and the algorithm learns by comparing its actual output with correct outputs to find errors. It then modifies the model accordingly through methods like classification, regression, prediction and gradient boosting, supervised learning uses patterns to predict the values of the label on additional unlabeled data.
2. Unsupervised learning: The system is not told the "right answer." The algorithm must figure out what is being shown. The goal is to explore the data and find some structure within. Unsupervised learning works well on transactional data.

HOW HAS MACHINE LEARNING CHANGED OVER THE YEARS?

Because of new computing technologies, ML today is not like machine learning of the past. It was born from pattern recognition and the theory that computers can learn without being programmed to perform specific tasks; researchers interested in artificial intelligence wanted to see if computers could learn from data. The iterative aspect of ML is important because as models are exposed to new data, they can independently adapt. They learn from previous computations to produce reliable, repeatable decisions and results.

SCOPE FOR THE FUTURE

It allows software applications to become accurate in predicting outcomes. ML focuses on the development of computer programs, and the primary aim is to allow computers to learn automatically without human intervention. ML already is and will change the course of the world in the coming decade. Based on how far we've come from the starting of the technological world in less than 50 years, even sky is not the limit for the future.

Works cited:

- https://theappsolutions.com/blog/development/machine-learning-and-big-data/
- https://www.sas.com/en_us/insights/analytics/machine-learning.html
- https://www.business2community.com/big-data/5-types-big-data-analytics-help-customer-success-01519563
- https://www.entrepreneur.com/article/312016