AI, Machine Learning and Deep Learning: Explained in 5 minutes

AI, Machine Learning and Deep Learning, we have all heard of these terms in some capacity; however, if you find yourself to be one who is overwhelmed by the water hose of information, you are not alone.

As a Data & AI Technical Seller, I am here to help guide you towards a clearer understanding of these concepts. The journey into data science is exciting and my goal is to break it down into bite-sized pieces for you.

The story?
The best way to learn something and make it memorable is to first understand where it came from.
Here is a brief history lesson - In 1959 while at IBM, Arthur Samuel, an American pioneer in the field of computer gaming and Artificial Intelligence, introduced "Machine Learning". According to Wikipedia, the Samuel Checkers-playing Program was among the world's first successful self-learning programs and an early demonstration of artificial intelligence (AI).

An example of early AI deployment was in the entertainment industry with TIVO, a system that learned your preferences based on tv shows and movies that you watched. This system would then recommend a list of similar categories that may interest you. The more TV shows and movies you watched, the more defined and accurate the recommendations would be. Does this sound familiar? Netflix similarly uses this type of model.

As we can see, Machine Learning and AI are intertwined and sometimes it can be difficult to differentiate between the two, so, let's define them.

AI or 'Artificial Intelligence' is a branch of computer science that studies and researches how to emulate human beings (more specifically, how to think) through reasoning. AI enables systems to understand human language with Natural Language Processing (NLP), Machine Learning and planning.

Machine Learning is a subset of AI that focuses on using algorithms to provide the ability to learn without being explicitly programmed.

To get even more detailed, Machine Learning has three methods:

- **Supervised machine learning**

The method or system that uses some past, or labeled, data. Supervised Machine Learning is used when we know the output of the data. It conducts an iterative process of analyzing data without human intervention. The methods used are regression and classification.

As an example, any weather application uses the supervised method to provide a forecast. It uses regression analysis by taking into account known historic weather patterns and combining those with current conditions to predict the weather.
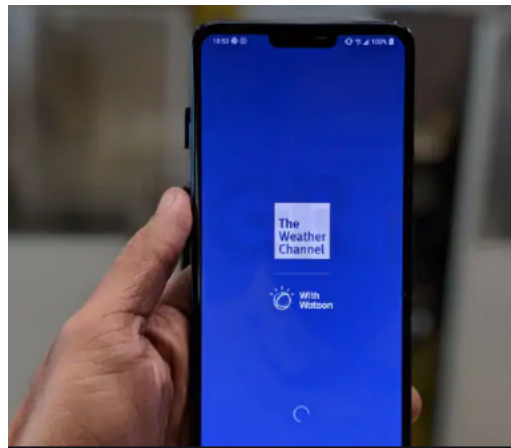
- **Unsupervised Machine learning**

This type of machine learning uses a method of clustering to work with the data. This is process is based on the similarity of the data ingested and then grouping that data.

Yes, you've likely seen this process at work with Twitter, Facebook, Snapchat, and more.

Unsupervised Machine Learning works to study and understand the meaning behind unlabeled data and then classifies it through algorithms; therefore, a sequence of successful decisions will result in the process being "reinforced" because it best solves the problem at hand. Unsupervised learning can determine the outcome when there is a massive amount of data. In this case, the developer doesn't know the context of the data being analyzed, so labeling isn't possible.

Unsupervised learning can be used as step one, before passing the data to a supervised learning process.

IBM Watson uses this form of Machine Learning in healthcare by collecting a large amount of data about a specific disease. This provides doctors the ability to gain

insights into patterns of symptoms and attempt to predict the outcomes for a given patient

- **Reinforcement Learning or semi-supervised Machine Learning**

In this system, some parts will be labeled, and some will not. The way it works is based on *past* data acquired, which then allows the machine learning model to make sense of any *new* data ingested.

One way to think of this is as a behavioral learning model, meaning this system learns through trial and error. For example, Elon Musk's Teslas embody this type of machine learning. As you can imagine training a self-driving car is no small feat, and the margin for error needs to be at an all-time low since this is literally a matter of life or death. However, over time "with enough trial and error", and after acquiring more data, the algorithm (likely) will be optimized to a point where we may see full-fledged automated vehicles in our day to day commute.

Deep Learning

We can't talk about machine learning and AI without mentioning deep learning, and deep learning was pretty much born through the booming explosion in data, specifically with unstructured data like digital pictures, streaming data (audio and video), social media feeds, MRI, and IOT (Internet of Things). In essence, this is a huge part of

Machine Learning that incorporates Neural Networks dedicated to mimic the human brain through a series of algorithms that allow computers to be trained to deal with high levels of complex and ambiguous problems.

Now that we have explored these concepts, my hope is that you feel more familiar with the terms, have a clear understanding of how they are connected to each other, and can identify the value each has on our lives and futures.
Stay tuned for my next post as I dig a little deeper, talk about IBM Watson Studio and how I have seen IBM shaping the world as a leader in Data Science and Machine Learning offerings.

With the power of AI, Machine Learning and Deep learning IBM is helping to transform business processes and modernize operations through IBM Watson Studio, have a glimpse:

https://www.ibm.com/cloud/watson-studio

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