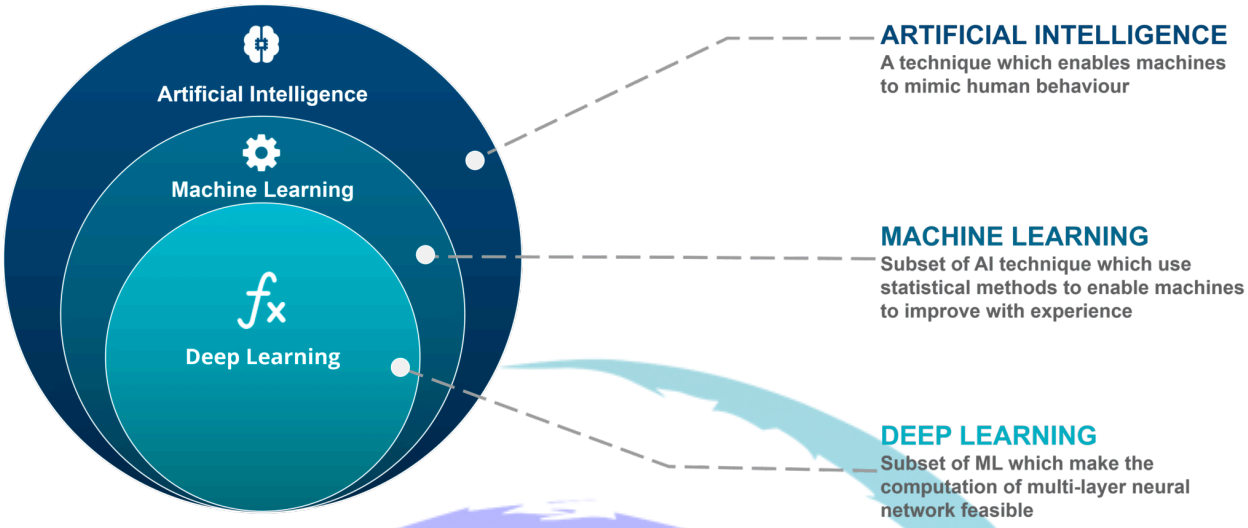
Deep Learning



In simple terms Deep learning is subset of machine learning.

Before going into details we have to recall concept of Machine Learning.

Machine learning :
"Algorithms that parse data, learn from that data, and then apply what they've learned to make informed decisions".

Example :
- Iris species predictor
- Ball Predictor
- Brest Cancer detector
- Play predictor
- Height Weight analytical
- Diabetes predictor
- Titanic Survival prediction
- Wine Classifier
- Advertisement agency predictor
- Head brain predictor etc

are all the examples that we cover comes under Machine Learning.

Deep Learning:

"Deep learning is a particular kind of machine learning that achieves great power and flexibility by learning to represent the world as nested hierarchy of concepts, with each concept defined in relation to simpler concepts, and more abstract representations computed in terms of less abstract ones."

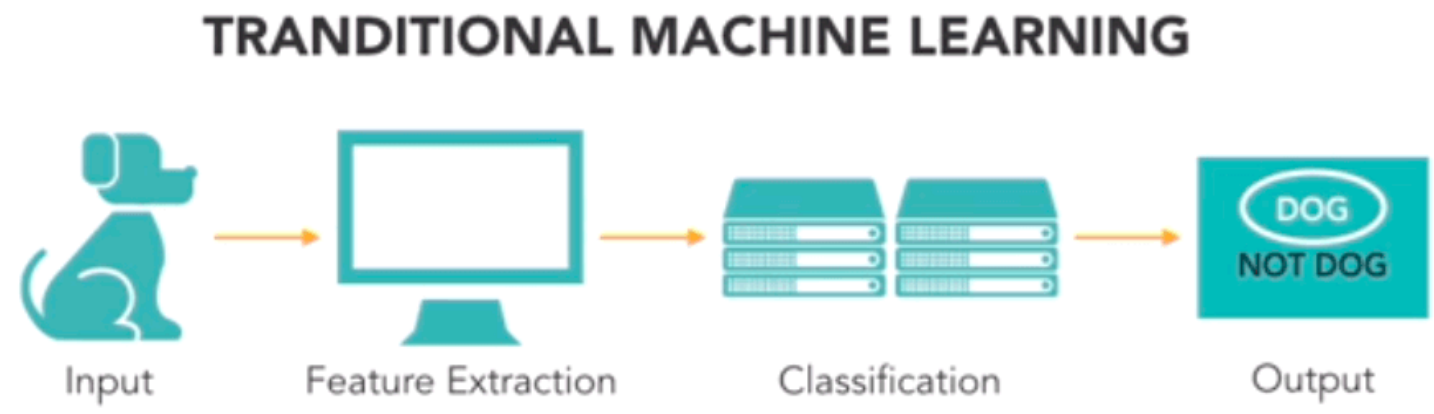
How does deep learning work?

A deep learning model is designed to continually analyze data with a logic structure similar to how a human would draw conclusions. To achieve this, deep learning uses a layered structure of algorithms called an artificial neural network (ANN). The design of an ANN is inspired by the biological neural network of the human brain. This makes for machine intelligence that's far more capable than that of standard machine learning models.

It's a tricky prospect to ensure that a deep learning model doesn't draw incorrect conclusions (which is probably what keeps Elon up at night), but when it works as it's intended to, functional deep learning is a scientific marvel and the potential backbone of true artificial intelligence.

Example Cat vs. Dog

Let's take an example of an animal recognizer, where our system has to recognize whether the given image is of a cat or a dog.



If we solve this as a typical machine learning problem, we will define features such as if the animal has whiskers or not, if the animal has ears & if yes, then if they are pointed.

In short, we will define the facial features and let the system identify which features are more important in classifying a particular animal.
Now, deep learning takes this one step ahead. Deep learning automatically finds out the features which are important for classification, where in Machine Learning we had to manually give the features.

Deep learning works as follows:

•It first identifies what are the edges that are most relevant to find out a Cat or a Dog

•It then builds on this hierarchically to find what combination of shapes and edges we can find. For example, whether whiskers are present, or whether ears are present, etc.

•After consecutive hierarchical identification of complex concepts, it then decides which of this features are responsible for finding the answer.

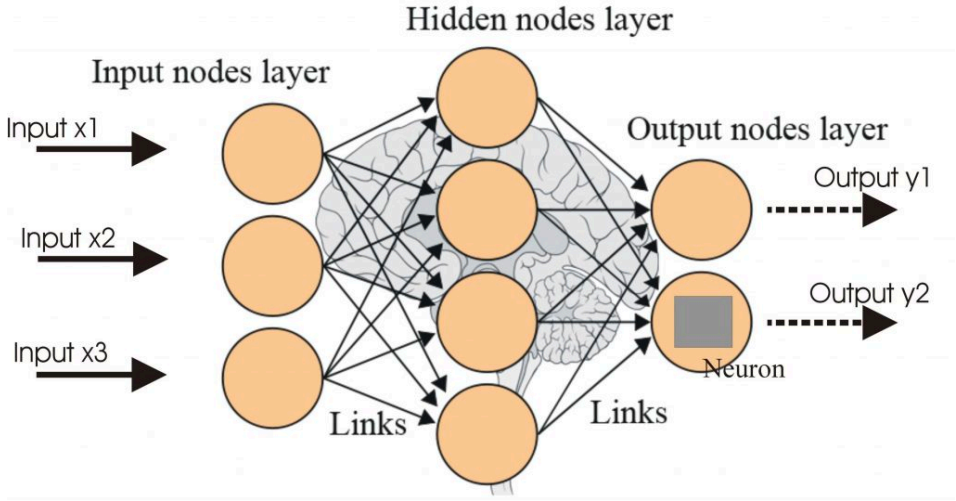
Deep learning vs machine learning

In practical terms, deep learning is just a subset of machine learning.
It technically is machine learning and functions in a similar way (hence why the terms are sometimes loosely interchanged), but its capabilities are different.
Basic machine learning models do become progressively better at whatever their function is, but they still some guidance.
If an ML algorithm returns an inaccurate prediction, then an engineer needs to step in and make adjustments.
But with a deep learning model, the algorithms can determine on their own if a prediction is accurate or not.

Finally we conclude that

- Machine learning uses algorithms to parse data, learn from that data, and make informed decisions based on what it has learned

- Deep learning structures algorithms in layers to create an "artificial neural network" that can learn and make intelligent decisions on its own



• Deep learning is a subfield of machine learning. While both fall under the broad category of artificial intelligence, deep learning is what powers the most human-like artificial intelligence