

Will DL replace ML in near future?

Machine learning is a subset of artificial intelligence associated with creating algorithms that can change themselves without human intervention to get the desired result – by feeding themselves through structured data.

Deep learning is a subset of machine learning where algorithms are created and function similarly to machine learning, but there are many levels of these algorithms, each providing a different interpretation of the data it conveys. This network of algorithms is called artificial neural networks. In simple words, it resembles the neural connections that exist in the human brain. The main difference between deep learning and machine learning is due to the way data is presented in the system. Machine learning algorithms almost always require structured data, while deep learning networks rely on layers of ANN (artificial neural networks). Machine learning models become better progressively but the model still needs some guidance.

If a machine learning model returns an inaccurate prediction then the programmer needs to fix that problem explicitly but in the case of deep learning, the model does it by itself. Automatic car driving systems are a good example of deep learning. ML cannot be wiped out completely by DL, because of its intricate algorithm.

DL relies heavily on complex datasets to increase its efficiency. ML solves minor problems by accepting structured data and betters itself progressively with minor interventions from the programmer. ML is capable of tackling simpler tasks with smaller structured data-sets and whereas DL might go wrong if the data quality does not match with the standard of the algorithm in place. Also, developing a DL algorithm is an achievement in itself due to the intricacies involved in the concept of deep learning networks. ML models are relatively easier to develop and implement. ML cannot handle unstructured/complex data, whereas DL is meant to handle this type of data

As explained in Session 1, DL is an evolution of ML and deals with "advanced stuff" as against ML. The sheer ability of DL to identify data features and output sounds, images, free text, etc instead of working with plain old numbers puts it in a different category altogether.

Pros and Cons of the 3 types of ML

Part 1 : SUPERVISED LEARNING

Pros

1. Supervised learning is a simple process with full control of variables and progress with the developer.
2. You can find out exactly how many outputs you could expect.
3. It is possible for you to be very specific about the definition of the classes, i.e. you can train the algorithm to make a perfect "*decision boundary*" to distinguish different classes accurately.
4. After the entire training is completed, you don't need to keep the training data with you. Instead, you can keep the decision boundary as a dictating rule.
5. Supervised learning can be very helpful in classification problems, or problems with one "play" variable.

Cons

1. Supervised learning is limited to handling classification easily but not used much for other ML applications.
 2. Supervised learning cannot give you unknown information from the training data like unsupervised learning can.
 3. In the case of classification, if we give an input that is not from any of the classes in the training data, then the output may be a wrong class label.
 4. Similarly, let's say your training set does not include some examples that you want to have in a class. Then, when you use those examples after training, you might not get the correct class label as the output.
 5. Usually, training needs a lot of computation time, so do the classification, especially if the data set is very large. This will test your machine's efficiency and your patience as well.
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Part 2 : UNSUPERVISED LEARNING

Pros

1. Since no class labels are provided for classification, the algorithm will look for input features and learn to give an appropriate output.

2. The potential of hidden patterns can be very powerful for the business or even detect extremely amazing facts, fraud detection etc.
3. The algorithm might provide an insight not normally thought about by humans as "puzzle pieces" to solve problems.
4. If you want to do grouping of some data that you don't know much about, then, in that case, unsupervised learning will be useful.

Cons

1. As seen in above explanation unsupervised learning is harder as compared to supervised learning.
 2. As your input is unlabeled, your results will be less accurate.
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Part 3 : REINFORCED LEARNING

Pros

1. Reinforcement learning can be used to solve very complex problems that cannot be solved by conventional techniques.
2. This learning model is very similar to the learning of human beings. Hence, it is close to achieving perfection. The model can correct the errors occurred during the training process.
3. You are saved that pain to find a training data-set for your problem, which can be really difficult sometimes.

Cons

1. Reinforcement learning is not preferable to use for solving simple problems.
2. Reinforcement learning needs a lot of data and a lot of computation. That is why it works really well in video games.
3. Reinforcement learning assumes the world is Markovian, which it is not. The Markovian model describes a sequence of possible events in which the probability of each event depends only on the state attained in the previous event, which is false many times. Hence, many initial "specimen" grow in generations which loads the physical system.