

## Machine Learning

Machine learning is a data **analytics** technique that teaches computers to do what comes naturally to humans and animals: learn from experience. Machine learning algorithms adaptively improve their performance as the number of samples available for learning increases. They are used every day to make critical decisions in medical diagnosis, stock trading, and more. For example, media sites rely on machine learning to sift through millions of options to give you song or movie recommendations. Retailers use it to gain insight into their customers' purchasing behavior.

Machine learning algorithms parse data, learn from that data, and then apply what they've learned to make informed decisions. It involves two types of techniques (figure 1). **Supervised machine learning** builds a model that makes predictions based on evidence in the presence of uncertainty. A supervised learning algorithm takes a known set of input data and known responses to the data (output) and trains a model to generate reasonable predictions for the response to new data. Use supervised learning if you have known data for the output you are trying to predict. **Unsupervised machine learning**, which finds hidden patterns or intrinsic structures in input data, is used to draw inferences from datasets consisting of input data without labeled responses.

**Deep learning** is a supervised machine learning technique that teaches computers to do what comes naturally to humans: learn by example. In deep learning, a computer model learns to perform classification tasks directly from images, text, or sound. Deep learning models can achieve state-of-the-art accuracy, sometimes exceeding human-level performance. Models are trained by using a large set of labeled data and neural network architectures that contain many layers (figure 2).

Most deep learning methods use neural network architectures, which is why deep learning models are often referred to as deep neural networks. The term "deep" usually refers to the number of hidden layers in the neural network. Traditional neural networks only contain 2-3 hidden layers, while deep networks can have as many as 150.

Deep learning is a specialized form of machine learning. 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.

Mathworks.com  
Towardsdatascience.com  
Zendesk.com  
[Edited]

Figure 1: Supervised and Unsupervised Machine Learning.

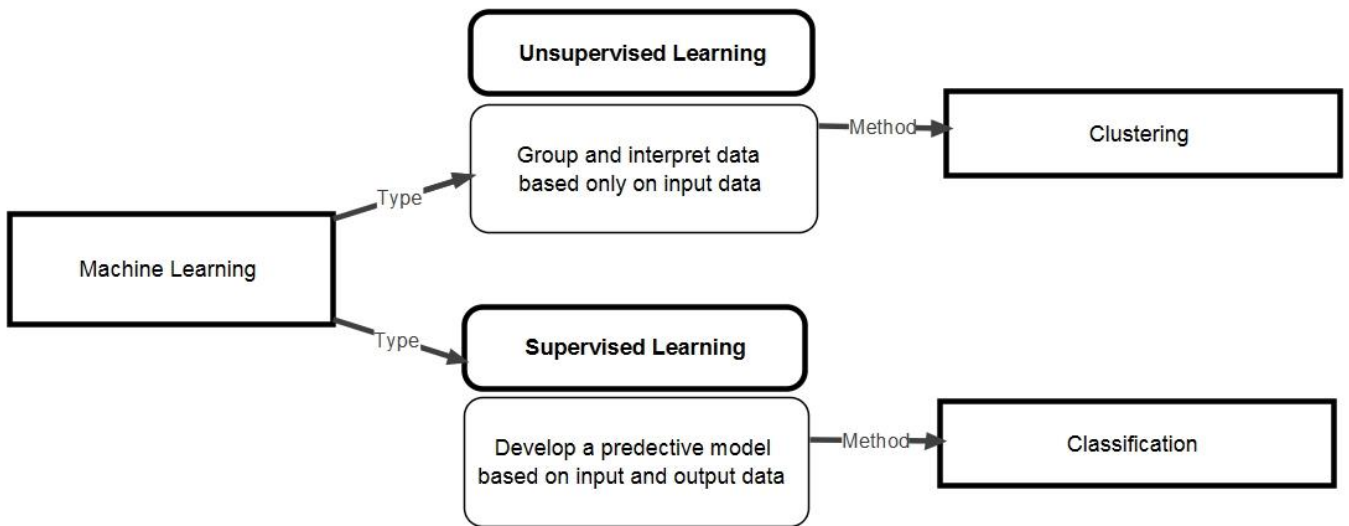


Figure 2: Deep Neural Network.

