

A Guide to Machine Learning: Understanding the Fundamentals and Techniques

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In our modern day society artificial intelligence has become a very significant topic due to its recent advancements, affecting many workplaces and how we educate our future generations. Artificial intelligence is composed of many different branches including machine learning, but what is machine learning? How does it work? What are some algorithms of machine learning? These fundamental questions will be covered in this essay.

What is Machine Learning?:

Machine learning is the process where a model uses data and algorithms to learn and improve its accuracy of statements. According to IBM, its history begins in the 1950's when an IBM employee by the name of Arthur Samuel invented a self-sufficient checkers program, known today as the first ever machine learning system. In 1962, this checkers program competed against Robert Nealey, a self-proclaimed checkers master, and won which was a massive milestone for the future of not just machine learning but artificial intelligence as a whole.

How does Machine Learning work?:

According to the University of California Berkeley, machine learning uses three main learning methods: supervised learning, unsupervised learning, and semi-supervised learning to excel at a variety of tasks.

Supervised learning is the process where algorithms use labeled datasets to learn to classify data or accurately predict results. It begins with a set of training data that is inserted into an algorithm to teach the model how to sort data based on pre-set characteristics. Once the model has received enough training, it should be able to sort raw data that hasn't been pre-sorted into categories. One way we use supervised learning daily is in our mailbox to detect spam or junk emails.

Unsupervised learning uses algorithms to analyze, cluster, and sort unlabeled data sets. This method is used to discover hidden patterns in the data without human intervention. Making the method highly effective in situations where there isn't a clear representation between different data categories. One way we see unsupervised learning being used daily online is product recommendation based on user behaviors throughout a website.

According to Altexsoft, semi-supervised learning is the combination of both supervised and unsupervised learning. The model gets trained through a small number of labeled data to form basic rules and structure to then sort and identify a large number of unlabeled data. This method can be found in technology among a variety of topics such as speech recognition, image analysis, and web content classification.

Types of Machine Learning Algorithms:

Through machine learning's many methods we are able to express the use of many algorithms machine learning was programmed to offer. Some commonly used algorithms include linear regression, clustering, and k-nearest neighbor.

The linear regression algorithm used during the method of supervised learning, can establish the relationship between an independent and dependent variable on a graph using the line of best fit. For example, if the data was about the relationship of height and weight we could use an equation formed by the algorithm after it has processed the dataset to predict somebody's weight if given their height.

Clustering, used in unsupervised learning, can identify patterns throughout data to be grouped into clusters. By being able to discover hidden structures in data, tasks such as customer segmentation become easily comprehensible to better improve the customer's experience benefiting the business.

Neural network's like linear regression are also used in supervised learning. The algorithm can train computers to interpret and process data simulating the way a human brain functions. A fantastic example of neural network's can be seen through the case of facial recognition where the algorithm quickly decides key features such as their gender or skin tone.

Conclusion:

As artificial intelligence continues to rapidly advance, by understanding the basics of machine learning's history, learning methods, and algorithms we can visualize the power it truly has to transform technology. Likely to affect many centuries to come, sending us into a new period of time throughout the evolution of the human species.

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