PART 1. THE FUNDAMENTALS OF MACHINE LEARNING

1. THE MACHINE LEARNING LANDSCAPE

What is machine learning?

general definition:

Machine Learning is the field of study that gives computers the ability to learn without being explicitly programmed.

engineering-oriented one:

A computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance on T, as measured by P, improves with experience E.

The system learns from the example known as training data, training instance, or sample.

EXAMPLE: Spam Filter

By the engineer-oriented definition, task T is to flag a new mail as spam with the experience of the training data E, the performance measure P we can define it as the ratio of correctly classified. (that is spam or not spam)

This performance measure is called accuracy and it is used in the classification task.

Why use machine learning?

Using the above example of spam filters traditional programming needs a detection algorithm for every spam word. Basic examples of spam words in emails include 4U, amazing, free, etc.

Let's say that the sender notices that the emails with 4U are always spammed then the sender might start writing emails with “ for U” ".In traditional programming, the code must be altered every time this happens for every word that might need your attention.

In the case of a machine learning algorithm, the system automatically dedicates that the emails containing the word “for U “are spammed then learns and flags them automatically without the intervention of the programmer making it simple and more accurate.

Areas where ML shines are where traditional coding is hard and complex.

Consider speech recognition that differentiates between “one “ and “ two”. The word “two” starts with a high pitch of “T” so traditionally, we may need to write code that recognizes the intensity of the two words to differentiate them. These are just two words. imagine the different languages and dialects. it is too hard to do something like this in traditional programming.

Machine learning can be inspected to see what they have learned through the experience that is the training. For example, once the spam filter is trained, it can be inspected to reveal the set of words or combinations of words in the spam emails. This will also reveal unexpected patterns or new trends thereby leading to a better understanding of the problem.

Applying ML techniques to dig into large amounts of data can help discover patterns that were not immediately apparent. This is called data mining.

SUMMARIZE:

Machine learning is great for:

* Tradition problem solving is complex and ML can simplify the code and improve the performance.
* Complex problems with no good solution in traditional methods where ML can find a solution.
* Fluctuating environment Where an ML system can adapt and find a solution.
* Getting insights about complex problems and large amounts of data.