
Relating Machine Learning Techniques to Real-Life.

Explaining types of ML models as easy as it could be.



Machine Learning

In this article we'll cover how machine learning works and what are the different types of machine learning algorithms; for a detailed explanation about each algorithm I will be starting a series that will be known by "*everything about <algorithm_name>*". So, let's get started.

To keep it simple, I will explain the technical definitions first and then will try to relate that technique to our daily life routine for better understanding.



So, we know what machine learning is (if not check “[What exactly machine learning is?](#) for detailed explanation”) but still let’s recap; machine learning is an ability we provide to computer to learn without being programmed explicitly; too formal? so in laymen words, consider yourself as guardian and your machine as your child; now, as usual, you must teach him how to do different chores? Now either you’ll teach your child through your experience or let him survive based on his ups and downs.

And just like us, the more we train(experience in human terms) our

machine, better the accuracies will be.

So in simple words, machine learning is simply teaching our computer how to perform data-driven formulation without being programmed again and again.

Tasks done by Machine Learning

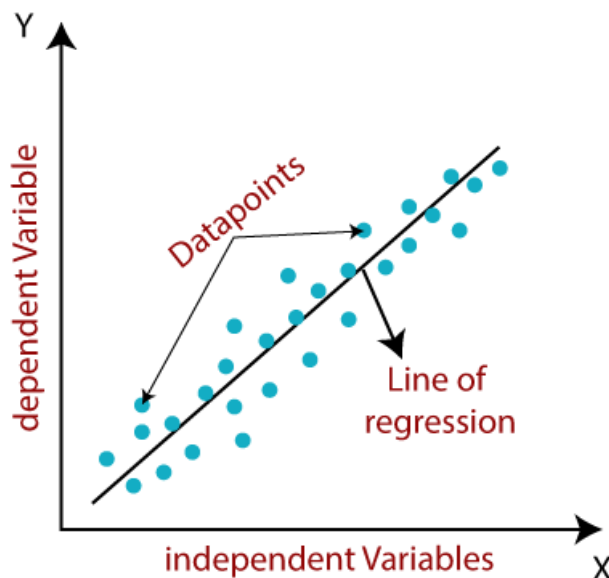
We know that Data Science industry is growing exponentially, there is hardly any industry which still hasn't opted for futuristic techniques to use data optimally. And thus this is said that ,*"Data is the new fuel"*.

From predicting house prices, weather forecast to self-driving cars, the range of Machine Learning is vast. So, in general, it can either predict or classify or cluster data based on similarities or differences.

Prediction:

This type of task is usually done by Regression algorithms. It involves anticipation where based on given data we predict future values that is forecasting upon concealed data.

Linear Regression produces such outputs.



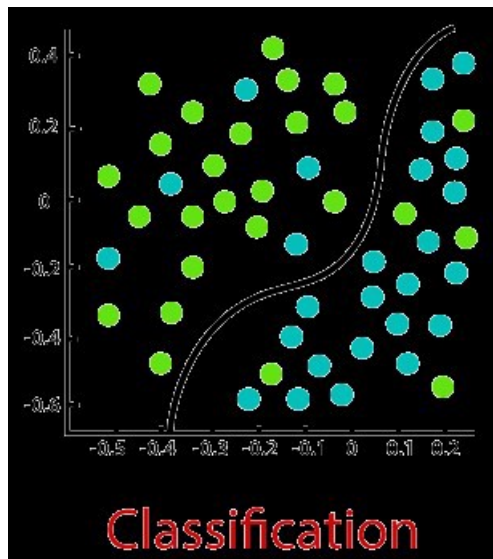
Linear Regression

e.g. recording weather conditions for a particular day for last 50 years and predicting the same for current year.

Classification :

This type of task involves classification of our points/data into different classes based on difference in their features.

Support Vector Machine, Naive Bayes, Neural Networks produces such outputs.



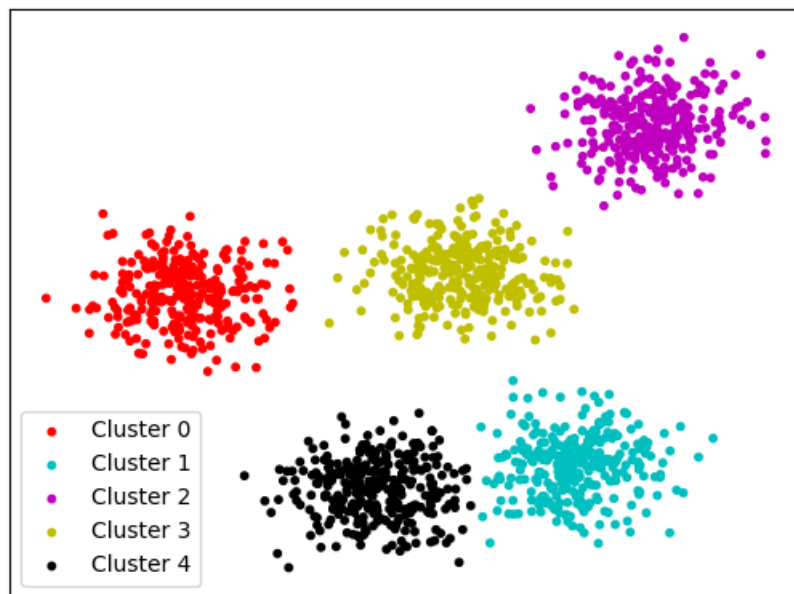
Classification; the left side of hyperplane contributes to cluster 1 and right side contributes to cluster 2

e.g. classifying movie reviews as positive or negative, classifying photos in different classes.

Clustering:

This type of task includes clustering the data into different groups according to the similarity in their features. This mostly involves unsupervised learning.

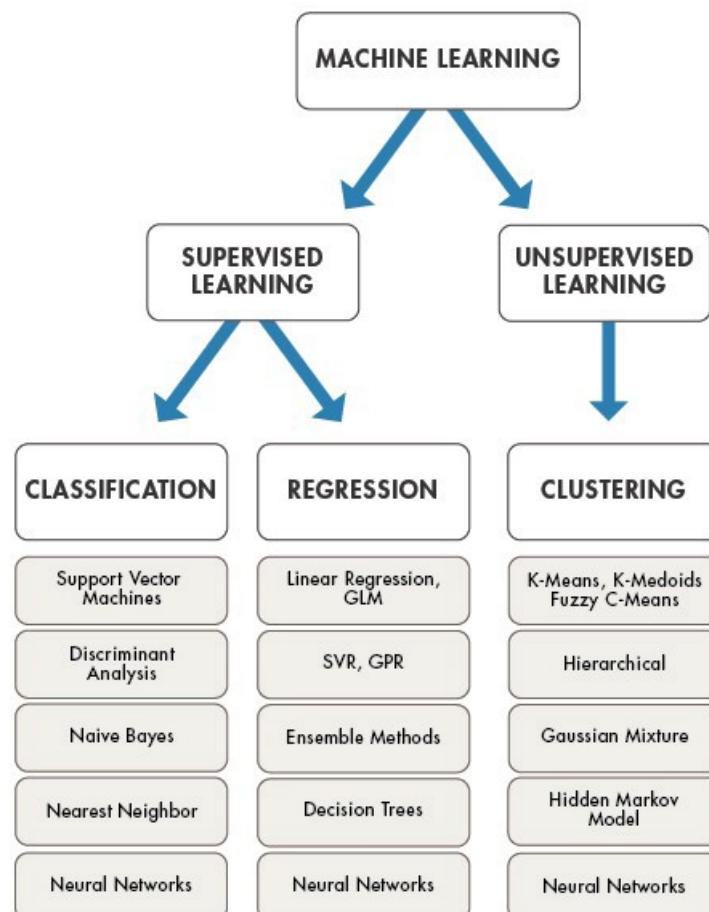
K-means, KNN produces such outputs.



Clustering

e.g. clustering different blood groups

Types of Machine Learning algorithms



Types of Machine Learning Algorithms

Supervised learning

These types of algorithms require input-output pairs and by using different functions we try to predict, classify and cluster undiscovered

inputs. The data is labeled here. The goal is to approximate the mapping function so well that when you have new input data (x), you can predict the output variables (Y) for that data.

In simple words, this is the guided part. For illustration you are teaching your child some problems from the book, the scope of questions in the book is limited but in practicality, you might experience some different question and if you're able to get them right then you're properly trained. That's what supervised learning is; you train your model and provide problem as well as solution and then once trained, you present a completely different problem at our model and expect it to predict/classify correctly.

Linear Regression, Logistic Regression, Support Vector Machine, Naive Bayes, Decision Trees are all examples of Supervised Learning.

Unsupervised learning

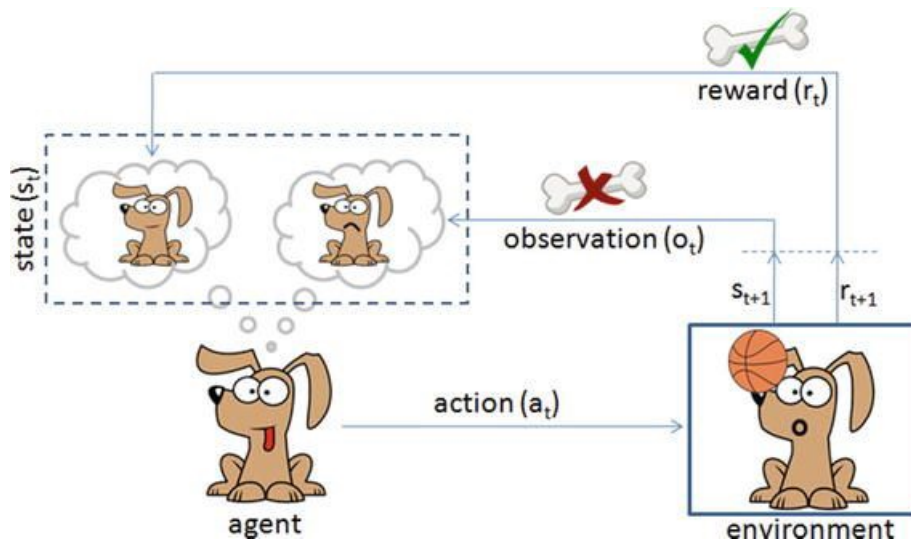
These type of algorithms requires data with no label and machine tries to cluster on basis of similarities in data; it requires minimum human supervision and is also known as self-organization as it allows modeling of probability densities over inputs.

The goal is to extract information that makes sense. This usually involves Clustering of data.

K-Means, KNN, K-Means++, DBSCAN are examples of Unsupervised Learning.

Reinforcement learning

This type of learning is also known as semi-supervised learning that is we give it few labeled data and expect our machine to operate with least human cooperation. Every-time our agent takes correct action we reward it but if the action taken is incorrect, we punish our model.



As you can see in the image, we try to teach a new trick(juggling) to our agent(dog); but we can't tell it what to do but rather can reward/punish it if it does right/wrong thing. It has to figure out what it did that made it get the reward/punishment and is expected to perform better in the next iteration.

Relating it to our daily life, it is like when we tempt our child to get good marks we'll buy them expensive toy but if they fail we will ground them.

Autonomous cars, Self Playing games are example of Reinforcement learning.

Conclusion

Hopefully, this article has not only increased your understanding about machine learning but also made you realize machine learning is not difficult and is already happening in our daily life.

As always, thank you so much for reading, and please share this article if you found it useful! :)

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Cheers.

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