1. **Machine Learning.**

Machine learning is part of computer science study, where a model is designed to learn by itself, iteratively, with availability of new data. With previous experience and new learning, models are reliable and repeatable in solving problems, without any explicit programming required for solving the problem.

A system needs to learn with each new experience and act in future when a similar problem is faced, if the model does not act or learn, then the model is not classified as part of machine learning model.

Example:



Chess:

Is not part of ML model, as it does not learn from the new user playing techniques.

Email spam filtering:

Is a ML model, as it learns with new data and also able to filter day to day incoming mails as “Spam” or “Not spam”, without any new programming modules added.

 Image processing:

Identifying the hand written numerals or text is part of ML models.

Recommendations:

Real time recommendations, of products to buy or people on social media sites suggested as “People you know”, displayed on the web page dynamically, is a ML model.

1. **Different types for Machine Learning.**

Learning can be categorized into two types

* **Supervised learning**
* **Unsupervised learning**

**Supervised learning:**

If for each input data we have defined output data labeled in training data, it is called supervised training. The input training data will have the input data and the target desired output, if the output is not as per the expected value; the data is corrected using the supervised response signal.

**Few example algorithms:**

* Linear Regression
* Logistic Regression
* Classification
* Support vector machines

**Unsupervised learning:**

In unsupervised learning we do not know the output in advance; the algorithm is executed to mine the hidden pattern from the data.

**Few example algorithms:**

* Clustering
* KNN
* Graph based clustering
* Density based clustering

1. **Machine Learning algorithm fail to learn.**

When there is noise in learning data, ML model fail while learning. When there is wrong data, learning will have negative impact.

**Example:**

**Wrong data:**

For example, the movie rating on Netflix is 5 stars and the feedback is below average, the score or weight will negate the result.

**Noise data:**

If there is noise in an image, the image processing, will not be able to recognize the data, and the weight of each pixel properly, which leads to wrong results.

1. **Data types**

Data cloud be classified into three types, which are used in Ml and data science study.

* Numerical data
* Categorical data
* Time series data

**Numerical data:**

Data which is nothing but in numbers, which we can count, arranged in ascending or descending order, perform mathematical operations on it.

Normally, data is some measurement; it could be height, weight, count of people.

Data could be discrete or continuous.

**Categorical data:**

The observed data collected can be grouped, into **male** or **female** based on gender. The data collected could be football **team**s.

The data collected can sometimes have numerical value as in position 1, 2, 3. However, they will not have any mathematical value.

The data collected could have ordinal category, meaning some order or ranking as High, medium, low.

**Time series data:**

A sequence of data points collected continuously over a time period. When the data is collected in a fixed interval over a time period, there would be a structure of the data collected and an implicit trend, provided the data is captured at every interval. This data can be useful for further analysis.

Time series are used in most of the planning and forecasting applications some few examples like weather forecasting, earthquake, sales, stock market analysis, and internet usage analysis.