**What it is:**

An “*algorithm*” in machine learning is a procedure that is run on data to create a machine learning “*model*.” **The best analogy is to think of the machine learning model as a “*program*.”**

* Machine learning algorithms can be described using math and pseudocode.
* The efficiency of machine learning algorithms can be analyzed and described.
* Machine learning algorithms can be implemented with any one of a range of modern programming languages.

A “model” in machine learning is the output of a machine learning algorithm run on data. A model represents what was learned by a machine learning algorithm. The model is the “thing” that is saved after running a machine learning algorithm on training data and represents the rules, numbers, and any other algorithm-specific data structures required to make predictions.

**Machine Learning algorithms are classified as:**

Supervised Machine Learning Algorithms

* Machine learning algorithms that make predictions on given set of samples.
  + Supervised machine learning algorithm searches for patterns within the value labels assigned to data points.
* Unsupervised Machine Learning Algorithms
  + There are no labels associated with data points.
  + These machine learning algorithms organize the data into a group of clusters to describe its structure and make complex data look simple and organized for analysis.
* Reinforcement Machine Learning Algorithms

These algorithms choose an action, based on each data point and later learn how good the decision was. Over time, the algorithm changes its strategy to learn better and achieve the best reward.

<https://medium.com/towards-artificial-intelligence/machine-learning-algorithms-for-beginners-with-python-code-examples-ml-19c6afd60daa>

Excerpt from above:

**Major Machine Learning Algorithms:**

**1. Regression (Prediction)**

We use regression algorithms for predicting continuous values.

Regression algorithms:

* Linear Regression
* Polynomial Regression
* Exponential Regression
* Logistic Regression
* Logarithmic Regression

**2. Classification**

We use classification algorithms for predicting a set of items’ class or category.

Classification algorithms:

* K-Nearest Neighbors
* Decision Trees
* Random Forest
* Support Vector Machine
* Naive Bayes

**3. Clustering**

We use clustering algorithms for summarization or to structure data.

Clustering algorithms:

* K-means
* DBSCAN
* Mean Shift
* Hierarchical

**4. Association**

We use association algorithms for associating co-occurring items or events.

Association algorithms:

* Apriori

**5. Anomaly Detection**

We use anomaly detection for discovering abnormal activities and unusual cases like fraud detection.

**6. Sequence Pattern Mining**

We use sequential pattern mining for predicting the next data events between data examples in a sequence.

**7. Dimensionality Reduction**

We use dimensionality reduction for reducing the size of data to extract only useful features from a dataset.

**8. Recommendation Systems**

We use recommenders’ algorithms to build recommendation engines.

Examples:

* Netflix recommendation system.
* A book recommendation system.
* A product recommendation system on Amazon.

Nowadays, we hear many buzz words like artificial intelligence, machine learning, deep learning, and others.

**Artificial Intelligence (AI):**

Artificial intelligence (AI), as defined by Professor Andrew Moore, is the science and engineering of making computers behave in ways that, until recently, we thought required human intelligence [4].

These include:

* Computer Vision
* Language Processing
* Creativity
* Summarization

**Machine Learning (ML):**

As defined by Professor Tom Mitchell, machine learning refers to a scientific branch of AI, which focuses on the study of computer algorithms that allow computer programs to automatically improve through experience [3].

These include:

* Classification
* Neural Network
* Clustering

**Deep Learning:**

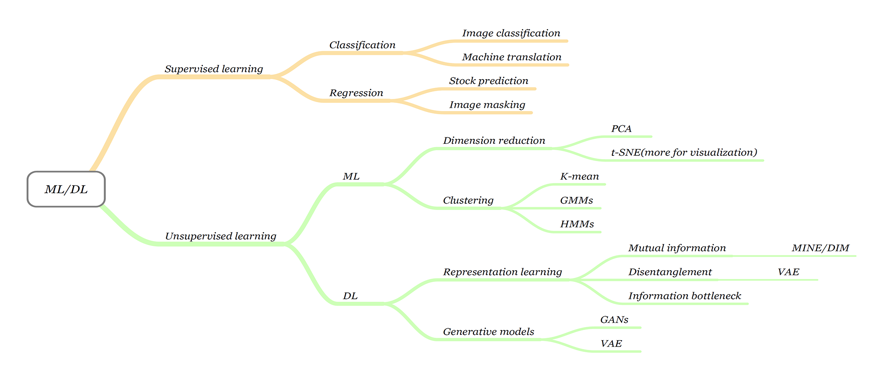
Deep learning is a subset of machine learning in which layered neural networks, combined with high computing power and large datasets, can create powerful machine learning models. [3]

**Use cases of Different Machine Learning Algorithms:**

<https://blog.usejournal.com/machine-learning-algorithms-use-cases-72646df1245f>

<https://www.ibm.com/cloud/learn/machine-learning>

Machine Learning Tree:



A screenshot of a cell phone

Description automatically generated