The choice of algorithm depends on the nature of the problem, the type of data available, and the desired outcome. Here are some of the main types of machine learning algorithms:

1) Supervised Learning Algorithms:

   Data is provided with correct labels (Regression , Classification)

2) Unsupervised Learning Algorithms:

   Data is provided without labels (Clustering , Dimensionality Reduction)

3) Semi-supervised Learning Algorithms:

   Combines elements of both supervised and unsupervised learning, where the model is trained on a dataset with both labeled and unlabeled examples.

4) Reinforcement Learning Algorithms:

   Learns through interaction with an environment to achieve a goal. An agent makes decisions and receives feedback in the form of rewards or penalties (e.g., game playing, robotic control).

5) Ensemble Learning Algorithms:

   Combine multiple models to improve overall performance. Examples include Random Forests and Gradient Boosting.

6) Deep Learning Algorithms:

   Neural Networks with many layers (deep neural networks). Examples include Convolutional Neural Networks (CNNs) for image processing and Recurrent Neural Networks (RNNs) for sequence data.

7) Instance-based Learning Algorithms:

   Make predictions based on similarity measures between instances. The k-Nearest Neighbors (k-NN) algorithm is an example.

8) Association Rule Learning Algorithms:

   Identify interesting relationships or patterns within large datasets. Commonly used for market basket analysis and recommendation systems.

9) Anomaly Detection Algorithms:

   Identify unusual patterns or instances in data. Used for fraud detection, network security, etc.

10) Transfer Learning Algorithms:

    Leverages knowledge gained from one task to improve performance on a different, but related, task.

The most three popular algorithms in machine are:

1) Random Forest:
   Random Forest is an ensemble of decision trees. An ensemble combines the predictions of multiple models to improve overall performance and generalization.
   During the training phase, Random Forest creates multiple decision trees by using bootstrapped samples from the original dataset. Bootstrapping involves sampling with replacement, which means some data points may be repeated while others may be left out.
   For classification tasks, the final prediction is determined by a majority vote among the trees. For regression tasks, the predictions are averaged.
   Random Forest can be applied to various types of data and tasks, including classification and regression. It has been successfully used in fields such as finance, healthcare, image analysis, and more.

2) Support Vector Machines (SVM):
   Support Vector Machines (SVM) is a supervised machine learning algorithm used for both classification and regression tasks, it aims to find a hyperplane in an N-dimensional space (where N is the number of features) that best separates the data points of different classes.
   SVM can handle both linear and non-linear decision boundaries through the use of kernel functions. Kernels transform the input features into a higher-dimensional space, allowing SVM to find a hyperplane in that space.
   SVM has been successfully applied in various fields, including image classification, text categorization, bioinformatics, and finance.

3) Convolutional Neural Networks (CNN):
   Convolutional Neural Networks (CNNs) are a class of deep neural networks designed for processing structured grid data, such as images and videos. CNNs have proven highly effective in various computer vision tasks, including image classification, object detection, and image segmentation.
   CNNs take advantage of the local connectivity in input data. Instead of connecting every neuron to every part of the input, neurons are connected to only a local region, allowing the network to focus on local patterns.
   Stride refers to the step size at which the convolutional kernel moves across the input. A larger stride reduces the spatial dimensions of the output feature maps.
   Feature Map Size=1 + (W –F +2P) / S , where W (input size) , F (filter size) , P (padding) , S (stride)

How to convert equation from non-linear to linear:

1) Substitution
2) Logarithmic or Exponential Transformation
3) Power Transformation
4) Linearization Near a Point
5) Change of Variables
6) Taylor Series Expansion
7) Rearrangement