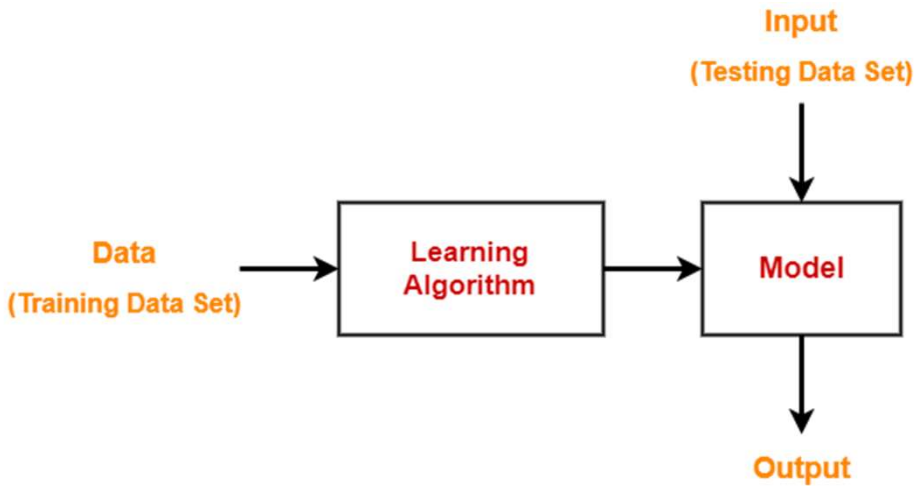
Forms of Learning

Machine Learning

- Learning is a continuous process of improvement over experience.
- Machine learning is building machines that can adapt and learn from experience without being explicitly programmed.

Machine Learning (cont..)

- In machine learning,
- There is a learning algorithm.
- Data called as training data set is fed to the learning algorithm.
- Learning algorithm draws inferences from the training data set.
- It generates a model which is a function that maps input to the output.



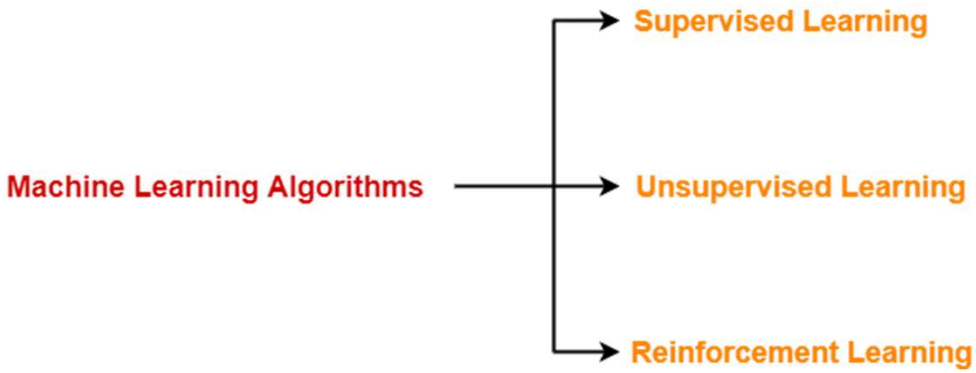
Machine Learning Applications-

Some important applications of machine learning are-

- Spam Filtering
- Fraudulent Transactions
- Credit Scoring
- Recommendations
- Robot Navigation

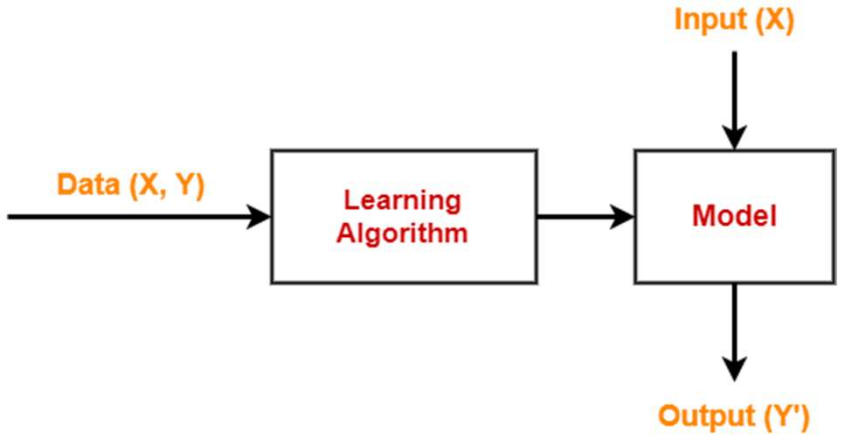
Machine Learning Applications (cont…)

There are three types of machine learning algorithms-



1. Supervised Learning-

- In this type of machine learning algorithm,
- The training data set is a labeled data set.
- In other words, the training data set contains the input value (X) and target value (Y).
- The learning algorithm generates a model.
- Then, new data set consisting of only the input value is fed.
- The model then generates the target value based on its learning.



Supervised Learning

1. Supervised Learning- (cont…)

- **Example-**
- Consider a sample database consisting of two columns where-
- The first column specifies mails.
- The second column specifies whether those emails are spam or not.
- In this training data set, emails categorized as spam or not are done by a supervisor's knowledge.
- So, it is supervised learning algorithm.

Mails (X)	IsSpam (Y)
Mail-1	Yes
Mail-2	No
Mail-3	No
Mail-4	No

- **Applications-**

Some real-life applications are-

- Spam Filtering
- House Price Prediction
- Credit Scoring (high risk or a low risk customer while lending loans by the banks)
- Face Recognition etc

Types of Supervised Learning Algorithm-

- There are two types of supervised learning algorithm-

Regression-

Here,

- The target variable (Y) has continuous value.
- Example- house price prediction

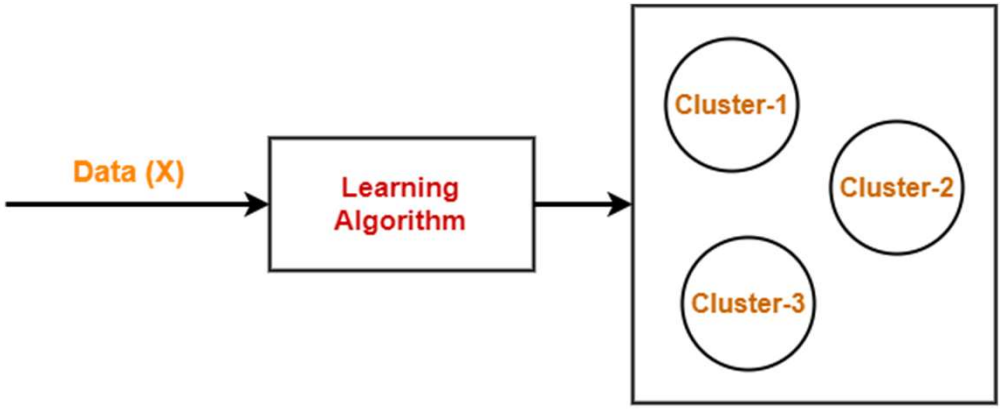
Classification-

Here,

- The target variable (Y) has discrete values such as Yes or No, 0 or 1 and many more.
- Example- Credit Scoring, Spam Filtering

2. Unsupervised Learning-

- In this type of machine learning algorithm,
- The training data set is an unlabeled data set.
- In other words, the training data set contains only the input value (X) and not the target value (Y).
- Based on the similarity between data, it tries to draw inference from the data such as finding patterns or clusters.



Unsupervised Learning

Applications

- **Example 1**: groups people of similar sizes together to make “small”, “medium” and “large” T-Shirts.
  - Tailor-made for each person: too expensive
  - One-size-fits-all: does not fit all.
- **Example 2**: In marketing, segment customers according to their similarities
  - To do targeted marketing.
- **Example 3**: Given a collection of text documents, we want to organize them according to their content similarities,
  - To produce a topic hierarchy

Applications of Unsupervised (cont…)

Some real-life applications are-

- Document Clustering
- Finding fraudulent transactions

3. Reinforcement Learning-

In this type of machine learning algorithm,

- The agent acts in an environment in order to maximize the rewards and minimize the penalty.
- Unlike supervised learning, no data is provided to the agent.
- The agent itself takes action or sequence of actions whether right or wrong to perform a task and learn from the experience.
- **Applications-**

- Some real-life applications are-
- Game Playing
- Robot Navigation