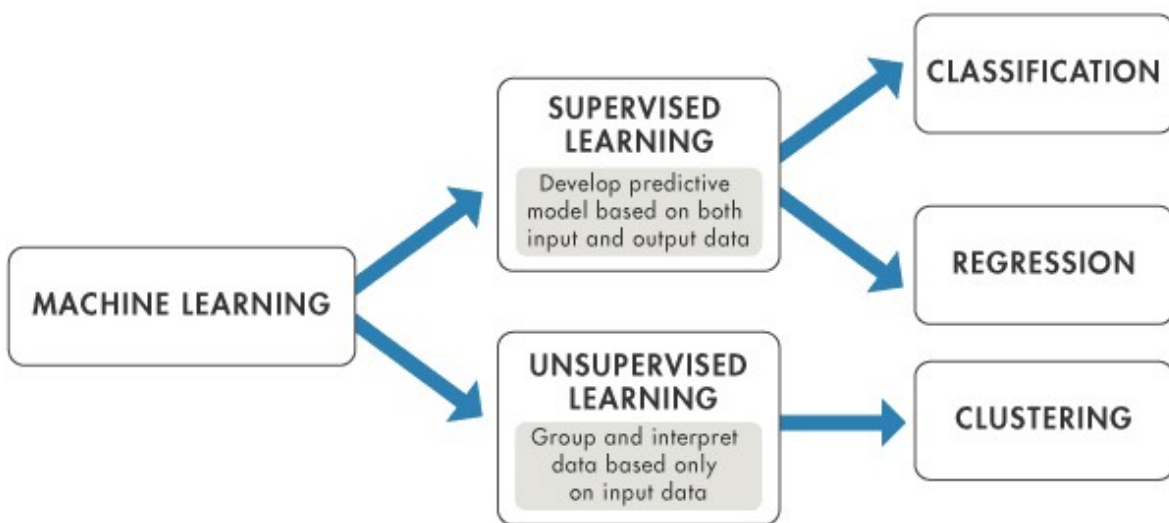


## ASSIGNMENT 02

### Topics:

- *Supervised Machine Learning*
- *Unsupervised Machine Learning*
- *Limitations of Supervised and Unsupervised Machine Learning*
- *Types of Supervised Machine Learning and Uses.*

### MACHINE LEARNING



### Supervised Machine Learning

*Supervised machine learning learns patterns and relationships between input and output data. It contains a model that is able to predict with the help of a labeled dataset. A labeled dataset is one where you already know the target answer.*

*It is defined by its use of labeled data. A labeled data is a dataset that contains a lot of examples of Features and Target. Supervised learning uses algorithms that learn the relationship of Features and Target from the dataset. This process is referred to as Training or Fitting.*

*Example:* suppose you are given a basket filled with different kinds of fruits. Now the first step is to train the machine with all the different fruits one by one like this:

- If the shape of the object is rounded and has a depression at the top, is red in color, then it will be labeled as –**Apple**.
- If the shape of the object is a long curving cylinder having Green-Yellow color, then it will be labeled as –**Banana**.

## ***Unsupervised Machine Learning:***

- *No need of target and explicit algorithm*
- *It requires unstructured data*
- *Unsupervised learning is the training of a machine using information that is neither classified nor labeled and allowing the algorithm to act on that information without guidance. Here the task of the machine is to group unsorted information according to similarities, patterns, and differences without any prior training of data.*

*Examples:* suppose it is given an image having both dogs and cats which it has never seen. the machine has no idea about the features of dogs and cats so we can't categorize it as 'dogs and cats'. But it can categorize them according to their similarities, patterns, and differences, i.e., we can easily categorize the picture into two parts. The first may contain all pics having **dogs** in them and the second part may contain all pics having **cats** in them.

## ***Limitations of Supervised and Unsupervised Machine Learning***

In supervised learning, the algorithm "learns" from the training dataset by iteratively making predictions on the data and adjusting for the correct answer. While supervised learning models tend to be more accurate than unsupervised learning models, they require upfront human intervention to label the data appropriately. For example, a supervised learning model can predict how long your commute will be based on the time of day, weather conditions and so on. But first, you'll have to train it to know that rainy weather extends the driving time.

*Unsupervised learning models, in contrast, work on their own to discover the inherent structure of unlabeled data. Note that they still require some human intervention for validating output variables. For example, an unsupervised learning model can identify that online shoppers often purchase groups of products at the same time. However, a data analyst would need to validate that it makes sense for a recommendation engine to group baby clothes with an order of diapers, applesauce and sippy cups.*

## ***Types of Supervised Machine Learning and Uses.***

*Supervised learning can be further divided into two types:*

- *Classification*
- *Regression*

*Classification:* Classification is a type where algorithms learn from the data to predict an outcome or event in the future. *Classification algorithms are used for predicting discrete outcomes, if the outcome can take two possible values such as True or False, Default or No*

*Default, Yes or No, it is known as Binary Classification. When the outcome contains more than two possible values, it is known as Multiclass Classification. There are many machine learning algorithms that can be used for classification tasks. Some of them are:*

- Logistic Regression
- Decision Tree Classifier
- K Nearest Neighbor Classifier
- Random Forest Classifier
- Neural Networks

*Regression :where algorithms learn from the data to predict continuous values such as sales, salary, weight, or temperature. There are many machine learning algorithms that can be used for regression tasks. Some of them are:*

- Linear Regression
- Decision Tree Regressor
- K Nearest Neighbor Regressor
- Random Forest Regressor
- Neural Networks