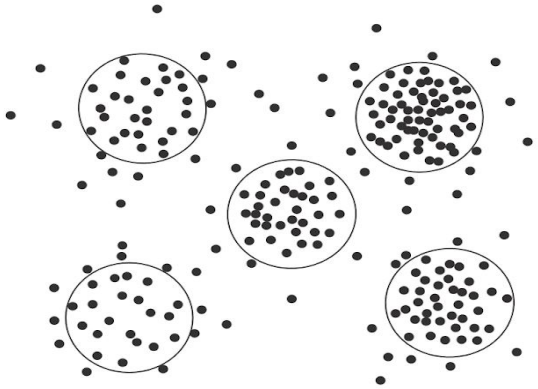
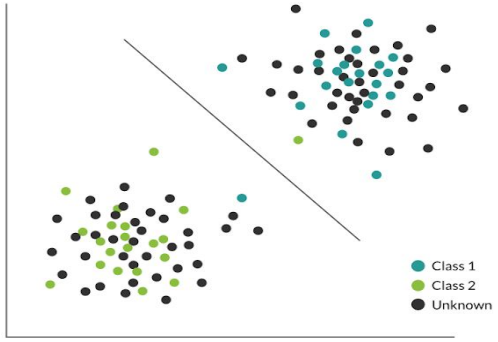
Unsupervised Learning

- Unsupervised learning where you allow the model to work on its own to discover information. It mainly deals with the unlabelled data.
- Unsupervised learning algorithms allows you to perform more complex processing tasks compared to supervised learning.
- Although, unsupervised learning can be more unpredictable compared with other natural learning m

Unsupervised



Supervised



Why Unsupervised Learning?

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- Unsupervised machine learning can detect all kind of unknown patterns in data.
- This methods help you to find features which can be useful for categorization.
- It is done in real time, so all the input data to be analyzed and labeled in the presence of learners.
- It is easier to get unlabeled data from a computer than labeled data, which needs manual intervention.

Types of Unsupervised Learning

Unsupervised learning problems further grouped into:-

- Clustering problems
- Association problems

Clustering

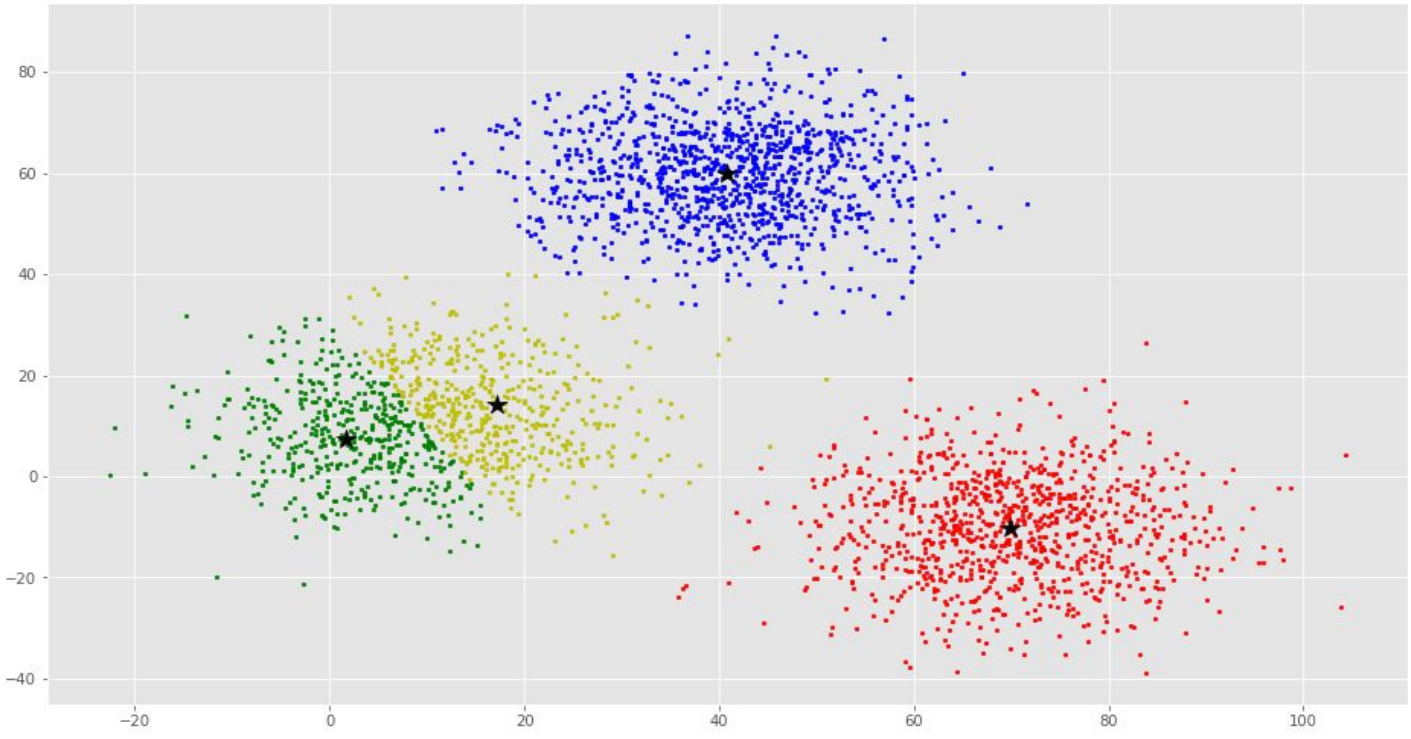
- Clustering mainly deals with finding a structure or pattern in a collection of uncategorized data.
- Clustering algorithms will process your data and find natural clusters(groups) if they exist in the data.
- You can also modify how many clusters your algorithms should identify. It allows you to adjust the granularity of these groups.

sample

Cluster/group

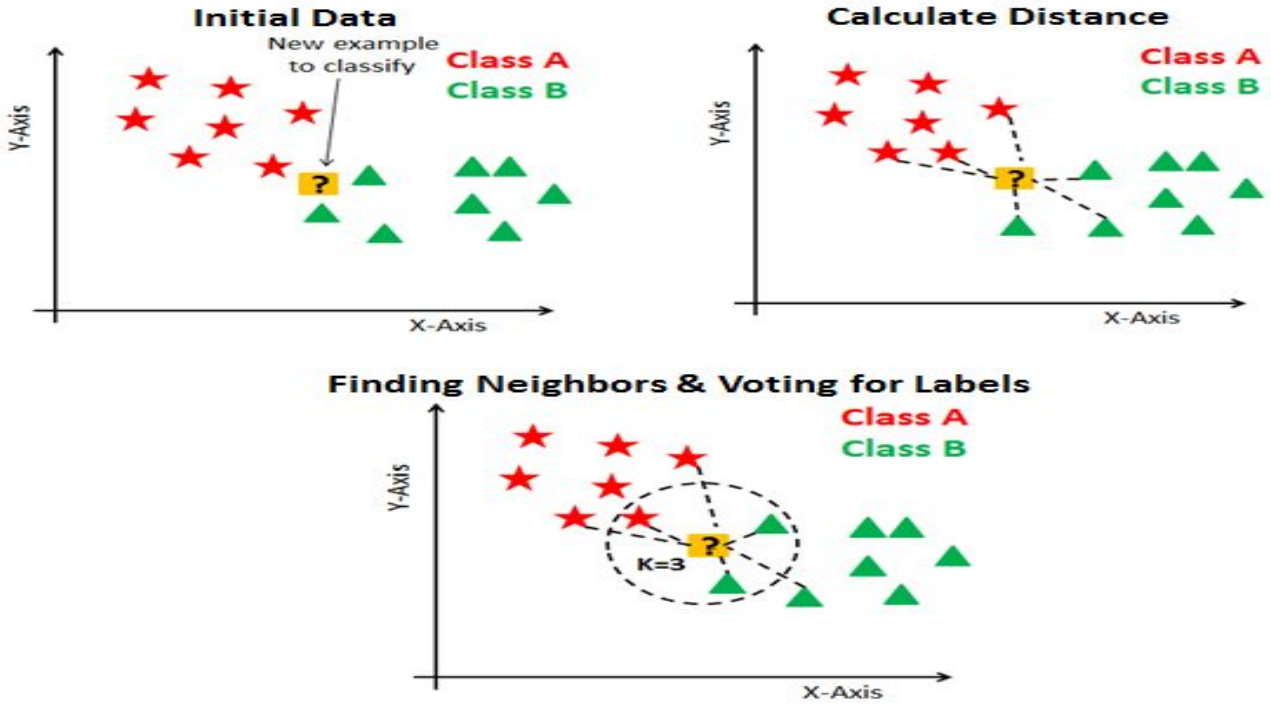
K-means Clustering

- K means it is an iterative clustering algorithm which helps you to find the highest value for every iteration.
  - Initially, the desired number of clusters are selected and need to cluster the data points into k groups
  - A larger k means smaller groups with more granularity in the same way. A lower k means larger groups with less granularity.
- The output of the algorithm is a group of "labels." It assigns data point to one of the k groups. In this, each group is defined by creating a centroid for each group.



K- Nearest neighbors

- K- nearest neighbor is the simplest of all machine learning classifiers.
- It is a simple algorithm which stores all available cases and classifies new instances based on a similarity measure.
- It works very well when there is a distance between examples. The learning speed is slow when the training



Association

- Association rules allow you to establish associations amongst data objects inside large databases. This unsupervised technique is about discovering interesting relationships between variables.
- For example, people that buy a new home most likely to buy new furniture.

Other Examples:

- A subgroup of cancer patients grouped by their gene expression measurements
- Movie group by the rating given by movies viewers
- Gr and pu

TID	Transaction (basket)
1000	Apples, Celery, Diapers
2000	Beer, Celery, Eggs
3000	Apples, Beer, Celery, Eggs
4000	Beer, Eggs

Applications of Unsupervised machine learning

- Clustering automatically split the dataset into groups base on their similarities
- Anomaly detection can discover unusual data points in the dataset. It is useful for finding fraudulent transactions
- Association mining identifies sets of items which often occur together in your dataset
- Latent variable models are widely used for data preprocessing. Like reducing the number of features in a dataset or decomposing the dataset into multiple components

Disadvantages of Unsupervised Learning

- Difficult to get precise information regarding data sorting, and the output as data used in unsupervised learning is labeled and not known
- Less accuracy of the results is because the input data is not known and not labeled by people in advance. This means that the machine requires to do this itself.
- The user needs to spend time interpreting and label the classes which follow that classification.
- Spectral properties of classes can also change over time so you can't have the same class information while moving from one image to another.

Machine learning

INTERNSHIPSTUDIO

- Q.1 Explain Unsupervised Learning in ML?
- Q.2 Why do we use Unsupervised Learning in ML?
- Q.3 Explain clustering in Unsupervised Learning ?
- Q.4 Explain K-mean clustering ?
- Q.5 Define K-nearest neighbors?
- Q.6 What is Association. What is its examples?
- Q.6 What are the advantages and disadvantages of Unsupervised Learning ?