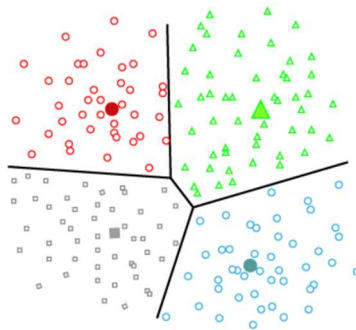# Clustering

A way of grouping the data points into different clusters, consisting of similar data points. The objects with the possible similarities remain in a group that has less or no similarities with another group.

Types of Clustering

Hard clustering datapoint belongs to only one group and **Soft Clustering** data points can belong to another group also.

Partitioning Clustering

It is a type of clustering that divides the data into non-hierarchical groups. It is also known as the centroid-based method. In this type, the dataset is divided into a set of k groups, where K is used to define the number of pre-defined groups. The cluster center is created in such a way that the distance between the data points of one cluster is minimum as compared to another cluster centroid.

Partitioning clustering algorithms divide the data into a predefined number of clusters. Each data point is assigned to one cluster, and the aim is to minimize the within-cluster variation while maximizing the between-cluster variation.

How it works: The K-Means algorithm partitions data into K clusters. It iteratively assigns data points to clusters based on the mean of the points in each cluster, then updates the cluster means until convergence.