KIET GROUP OF INSTITUTIONS

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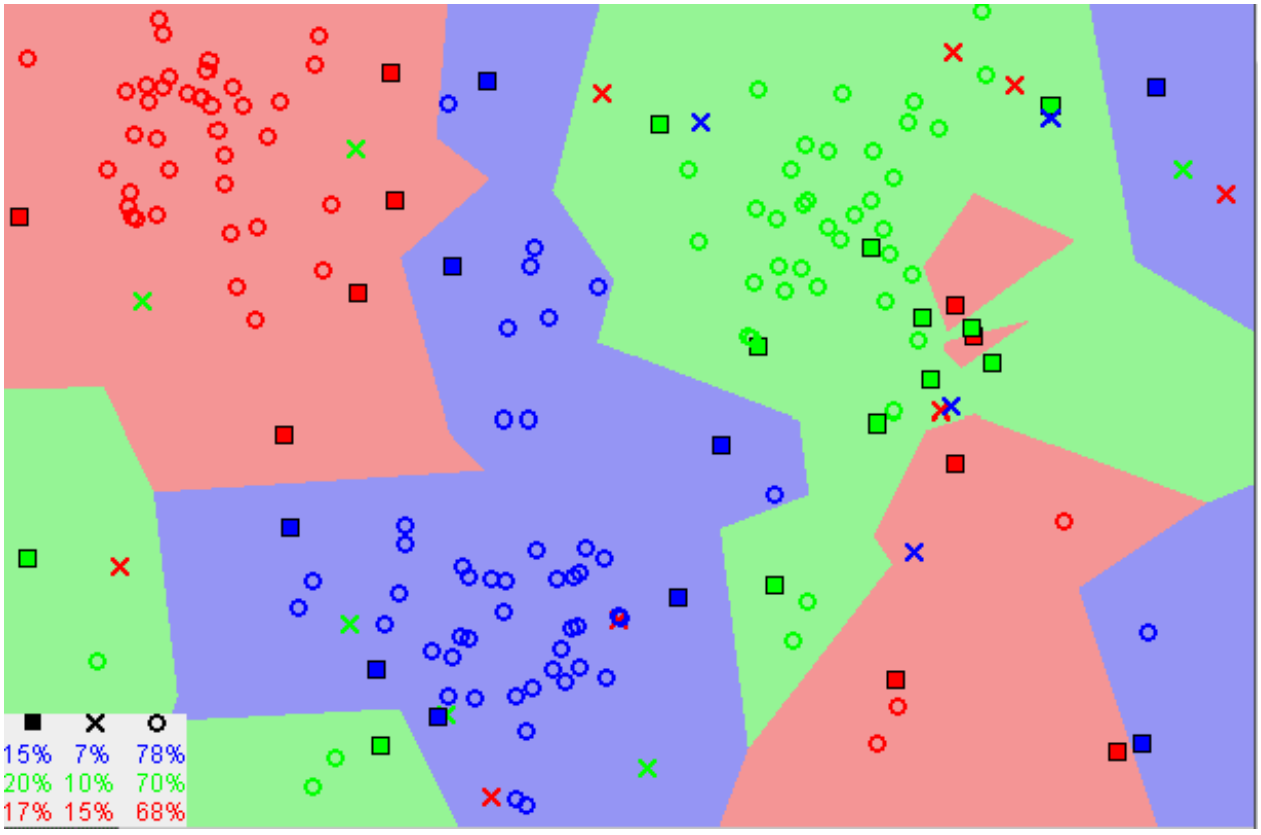
TOPIC :- K- Nearest Neighbors Algorithm

The KNN Algorithm assumes that similar things exist in close proximity. This is an image showing how similar points exist close to each other.



The k-nearest neighbors (KNN) algorithm is a simple and easy-to-implement supervised machine learning algorithm that can be used to solve both classification and regression problems.

When can we use KNN ALGORITHM ?

KNN can be used for both classification and regression predictive problems. However, it is more widely used in classification problems in the industry. To evaluate any technique we generally look at 3 important aspects:

1. Ease to interpret output

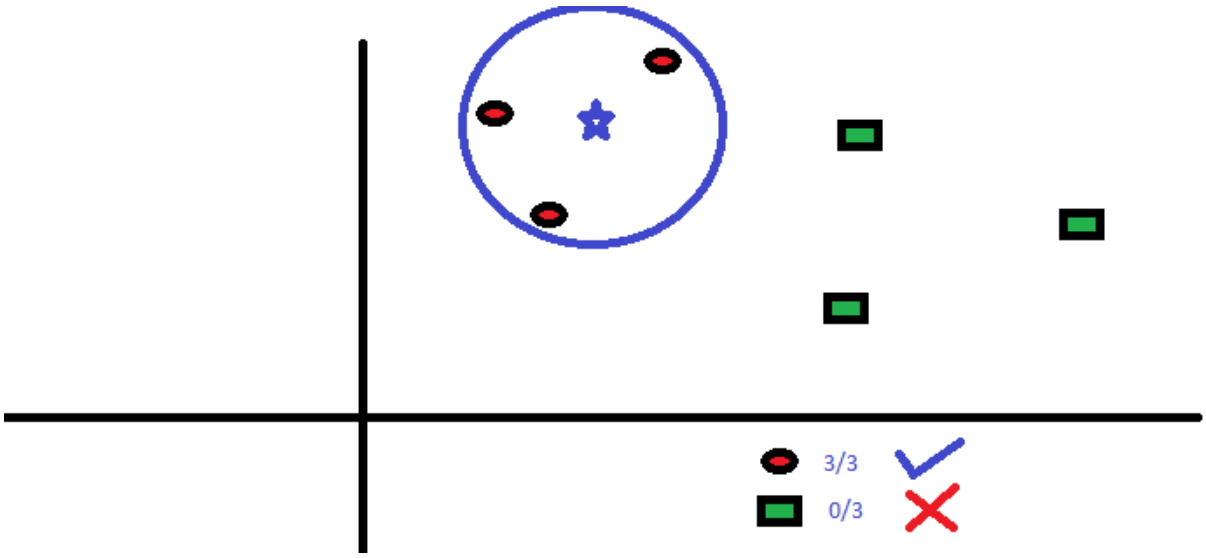
2. Calculation time

3. Predictive Power

How does the KNN ALGORITHM work ?

KNN works by finding the distances between the query and all the examples in the data, selecting the specified number examples (K) Closest to the query, then votes for the most occurring label in the case of classification and averages the labels in the case of regression.

This is an image showing three closest points.



Steps of KNN Algorithm -

1-Load the data

2-Initialize K to your chosen number of neighbors

3- For each example in the data

3.1- Calculate the distance between the query example and the current example from the data.

3.2 -Add the distance and the index of the example to an ordered collection

4- Sort the ordered collection of distances and indices from smallest to largest (in ascending order) by the distances

5- Pick the first K entries from the sorted collection

6- Get the labels of the selected K entries

7- If regression, return the mean of the K labels

8- If classification, return the mode of the K labels

Choosing the right value for K :-

1 - As we decrease the value of K to 1, our predictions become less stable.

2- As we increase the value of K, our predictions become more stable.