Assignment A3

Title: KNN Classifier

Problem Statement:
In the following diagram let ● circles indicate positive example and ○ circles indicate negative examples. We want to use k-nn algorithm for classifying the points. If k=3 find the class of point (6,6). Extend the same example for distance weighted knn and locally weighted knn. averaging.
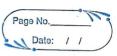

Objectives:
to implement KNN algorithm
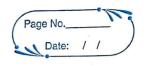to assign unseen data to appropriate classes.

Outcomes:
Student will implement KNN algorithm and classify unseen data.

Software Requirements:
- Jupyter notebook
- Python 3.8.5
- 64 bit operating system

Hardware Requirements:
- Computer with 64 bit processor

Theory:

KNN

- KNN is a non parametric, lazy learning algorithm. Its purpose is to use a database in which the data points are separated into several classes to predict the classification of a new sample point
- KNN is non-parametric means it doesn't make any assumptions on the underlying data distribution.
- KNN assumes similar things are near to each other
- It captures the idea of similarity by e.g. calculating the distance between points on the graph. Euclidean distance is the popular choice.

Weighted KNN

- Weighted KNN is a modified version of KNN
- In weighted KNN, the nearest k points are given a weight using a function called as the kernel function.
- The intuition behind weighted KNN is to give more weight to the points which are nearby and less weight to the points which are further away.

Algorithm:

1) Load the data

2) Initialize the value of K.

3) Iterate over all the training points

   3.1) Calculate the distance between each datapoint and test data.

   3.2) Sort the calculated distance in ascending order.

   3.3) Get top K rows from sorted array.

4) Get the most frequent class from these k rows.

5) Return the predicted class.

For weighted KNN at step 4 if all K classes are different then the class point with highest weight i.e. the point which is nearest is selected as the predicted class.

Test Cases:

Description	Expected O/p	Actual O/p
Predict class of data given test data	Prints class negative	Successful.

by algorithm with

Conclusion:

Conclusion:

    Studied KNN classification algorithm and implemented it successfully.