

K-Nearest Neighbors (KNN)

- Supervised
- Classification & Regression
- Non-parametric Algorithm
- Lazy Learner Algorithm

K-Nearest Neighbors (KNN)



How does K-NN work?



The K-NN working can be explained on the basis of the below algorithm:

Step-1: Select the number K of the neighbors.

Step-2: Calculate the Euclidean distance of **K number of neighbors**.

Step-3: Take the K nearest neighbors as per the calculated Euclidean distance.

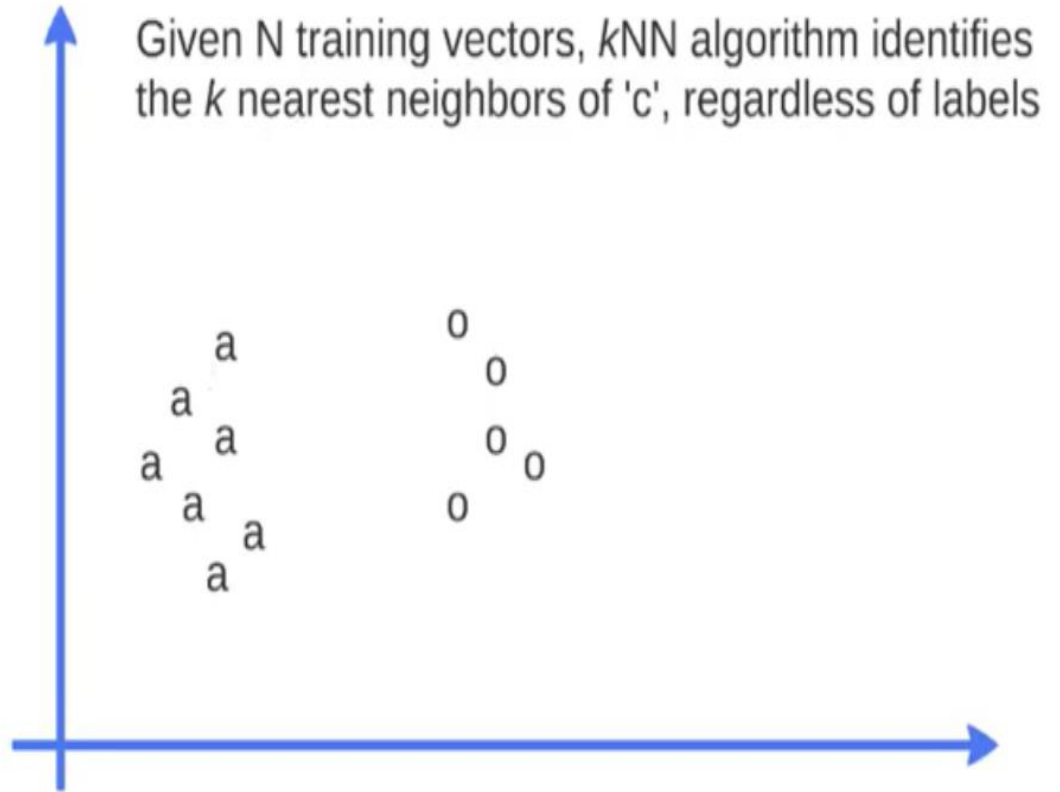
Step-4: Among these k neighbors, count the number of the data points in each category.

Step-5: Assign the new data points to that category for which the number of the neighbor is maximum.

Step-6: Our model is ready.

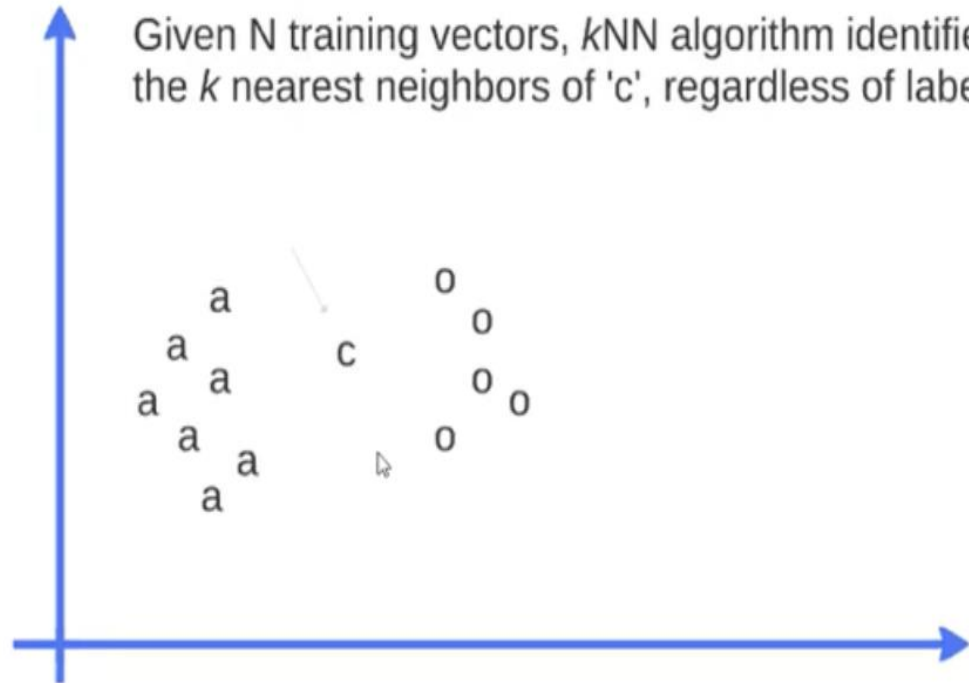


K-Nearest Neighbors (KNN)



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Given N training vectors, k NN algorithm identifies the k nearest neighbors of 'c', regardless of labels

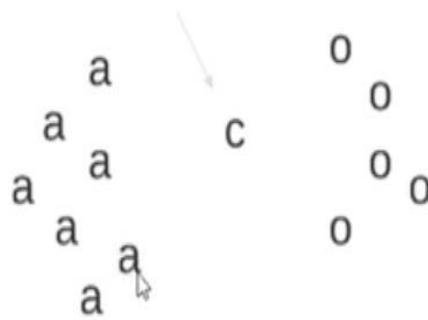


WE can find K by rooting total numbers. Here our total number are 12, so the output is $3.46=3$.

Note: We should select K as Odd number.

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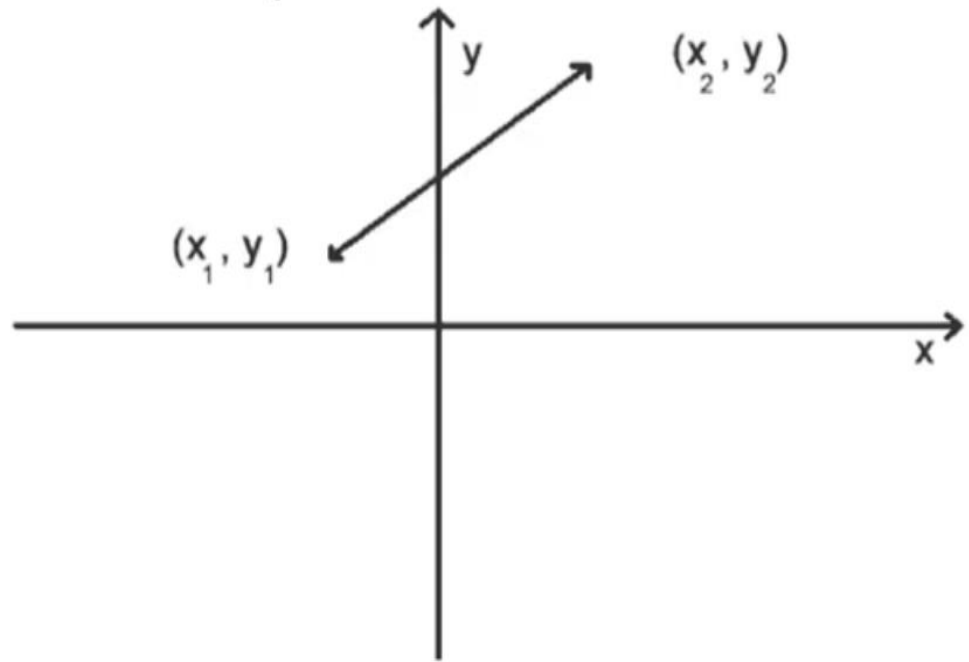


Example

- $k = 3$
- classes 'a' and 'o'
- find class for 'c'

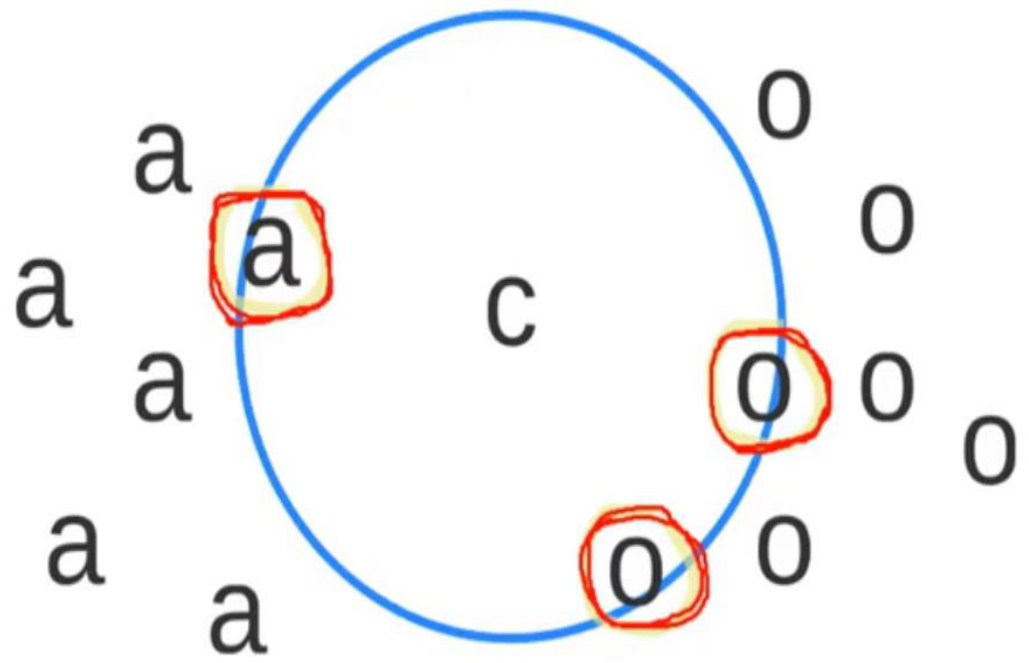
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$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$



Euclidean Distance

K-Nearest Neighbors (KNN)



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