

COM2004/3004

Data Driven Computing

A Toy Example about Non-parametric classifiers

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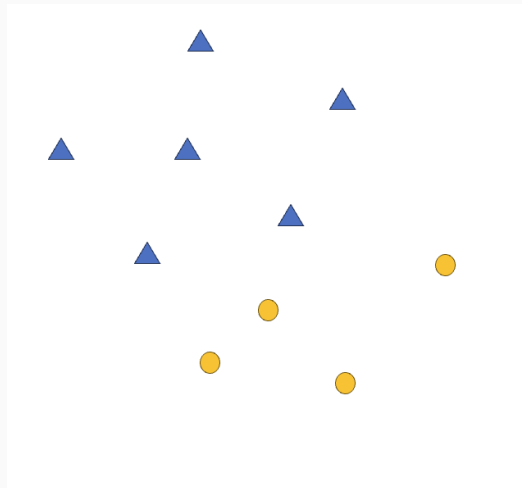
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## A toy example for nearest neighbour classifier

The whole procedure of nearest neighbour classifier:

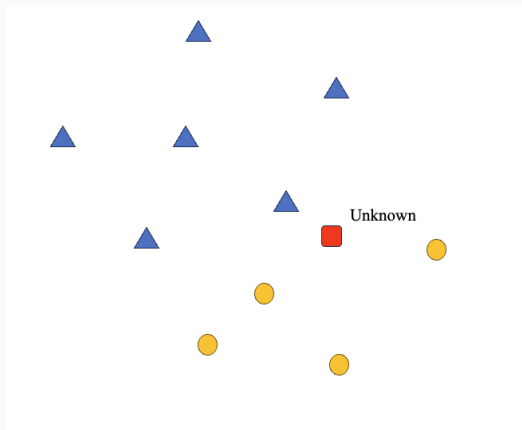
1. There are two classes



## A toy example for nearest neighbour classifier

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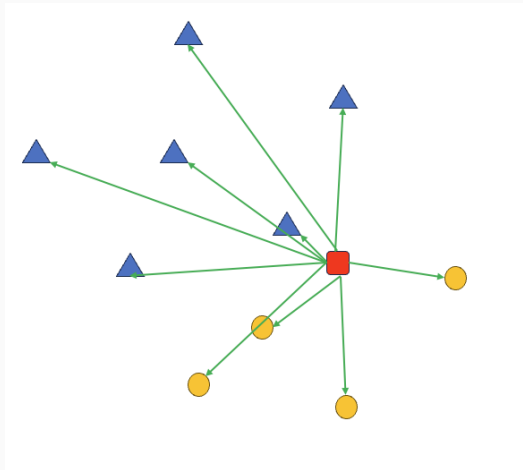
1. There are two classes
2. Try to classify the unknown **red** one



## A toy example for nearest neighbour classifier

The whole procedure of nearest neighbour classifier:

1. There are two classes
2. Try to classify the unknown **red** one
3. Select a similarity measurement, e.g., Euclidean distance.

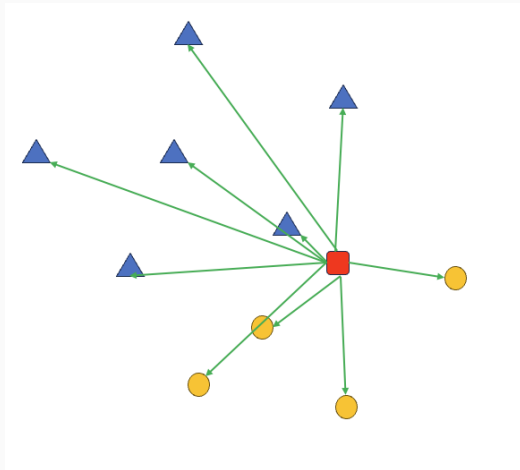


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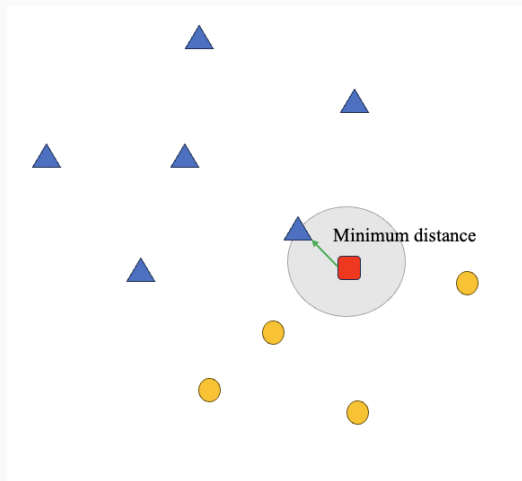
**Attention:** Calculate all distances between any pair samples, possibly resulting in heavy computational cost, especially when the dataset is very large.



## A toy example for nearest neighbour classifier

The whole procedure of nearest neighbour classifier:

1. There are two classes
2. Try to classify the unknown **red** one
3. Select a similarity measurement, e.g., Euclidean distance.
4. Apply nearest neighbour classifier. Find the minimum distance.  
**The unknown **red** one is classified into **triangle**.**



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- Does different  $k$  affect the result of  $k$ -nearest neighbour classifier?

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Yes, possibly.

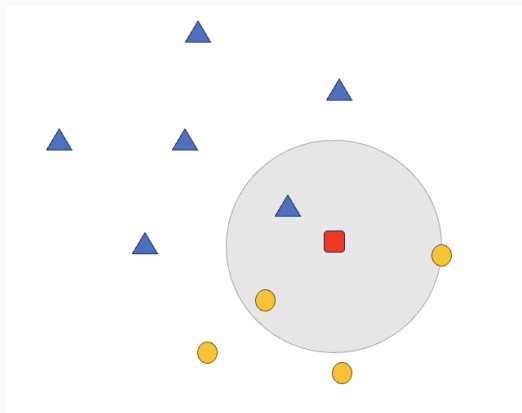


## A toy example for nearest neighbour classifier

The whole procedure of nearest neighbour classifier:

1. There are two classes
2. Try to classify the unknown **red** one
3. Select a similarity measurement, e.g., Euclidean distance.
4. Apply **3**-nearest neighbour classifier.  
**The unknown red one is classified into circle.**

The classification result has changed due to the different  $k = 2$ .



For more complex case, refer to <https://www.youtube.com/watch?v=Mhv-HxGSgHU>