K-means Clustering

@cambridgespark

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Brief Overview

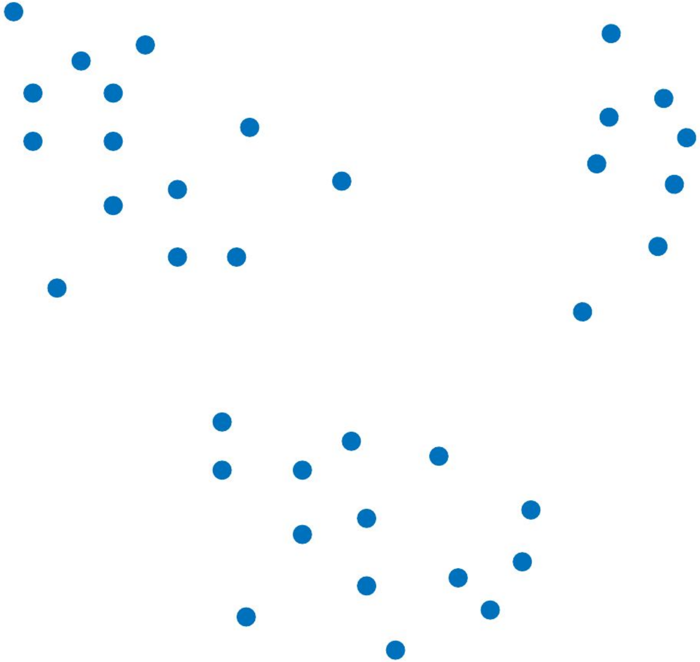
1. K-Means partition ***n*** data points into ***k*** clusters

2. Each data point belongs to the cluster with the nearest mean

3. The algorithm produces exactly ***k*** different clusters of greatest possible distinction

4. But the process is sensitive to our choice of ***k*** and the initialisation

K-means



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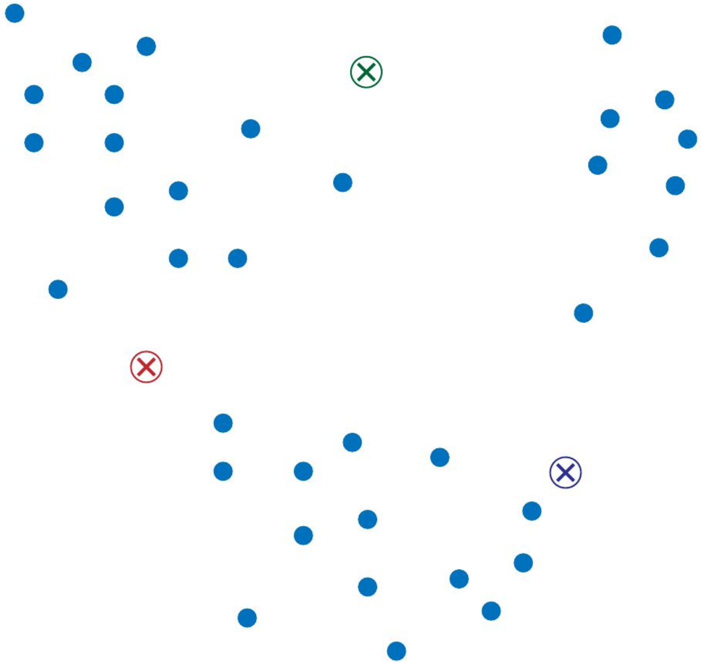
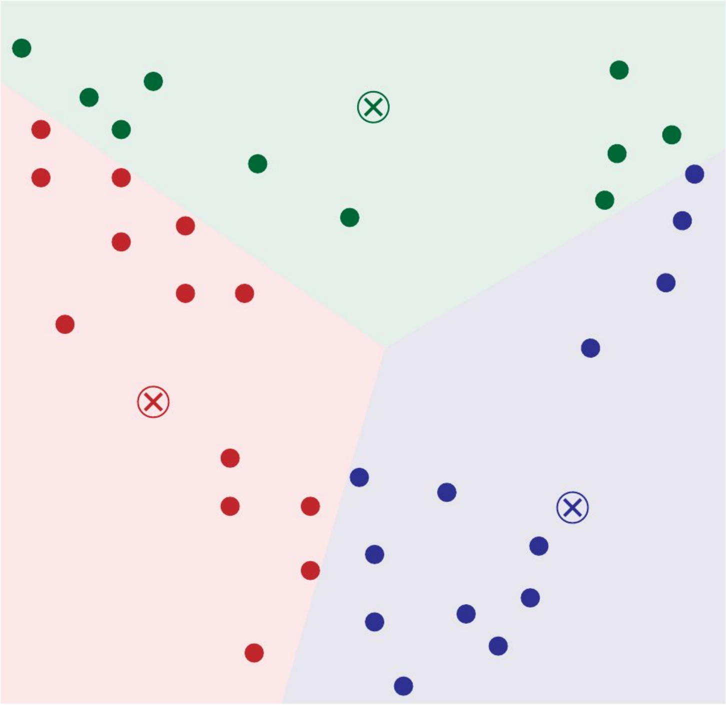
K-means



K-means



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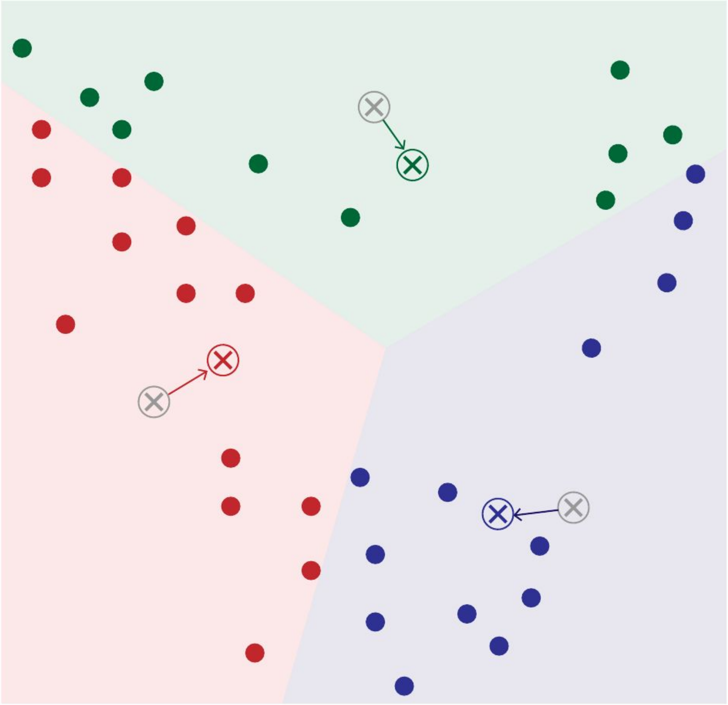
K-means



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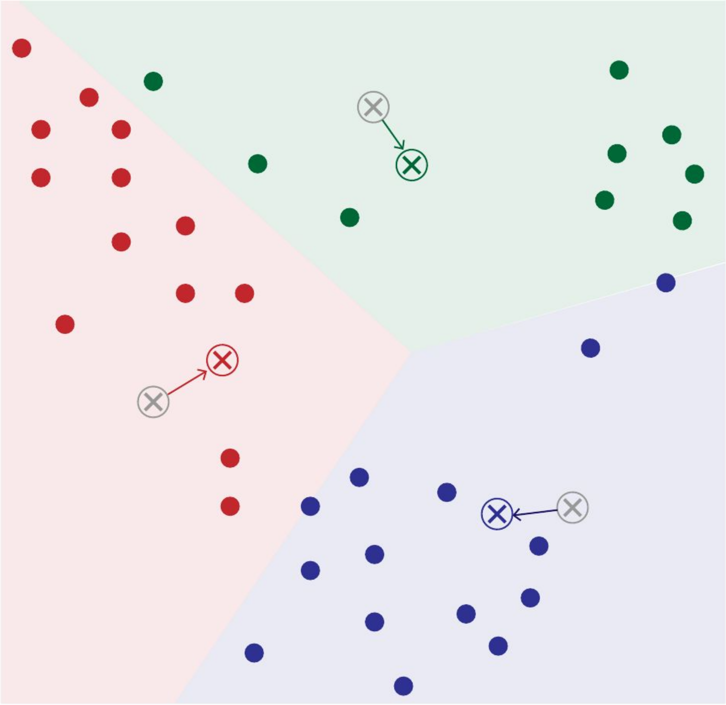
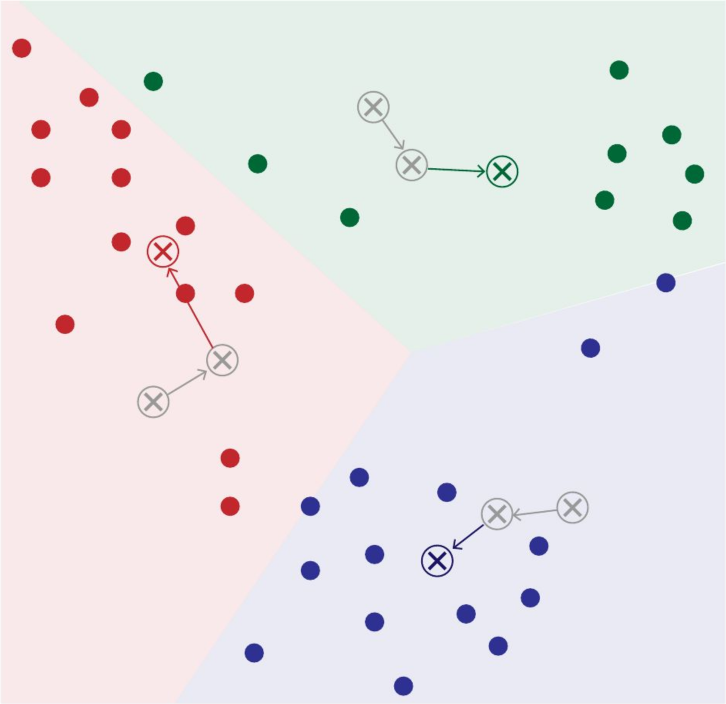
K-means



K-means



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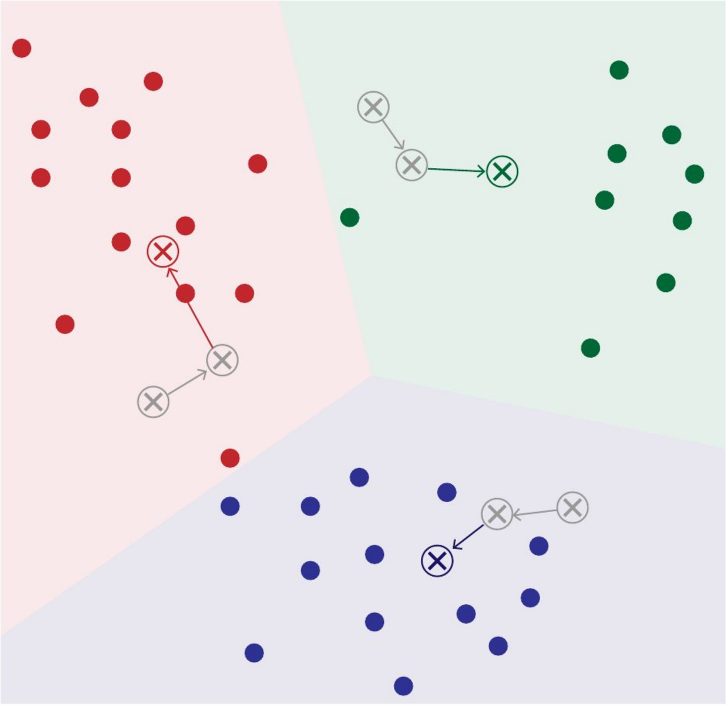
K-means



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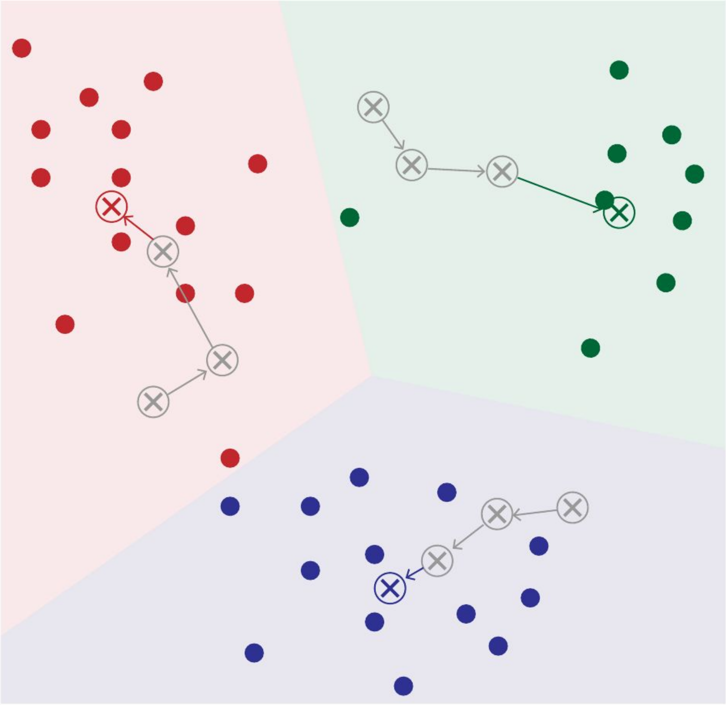
K-means



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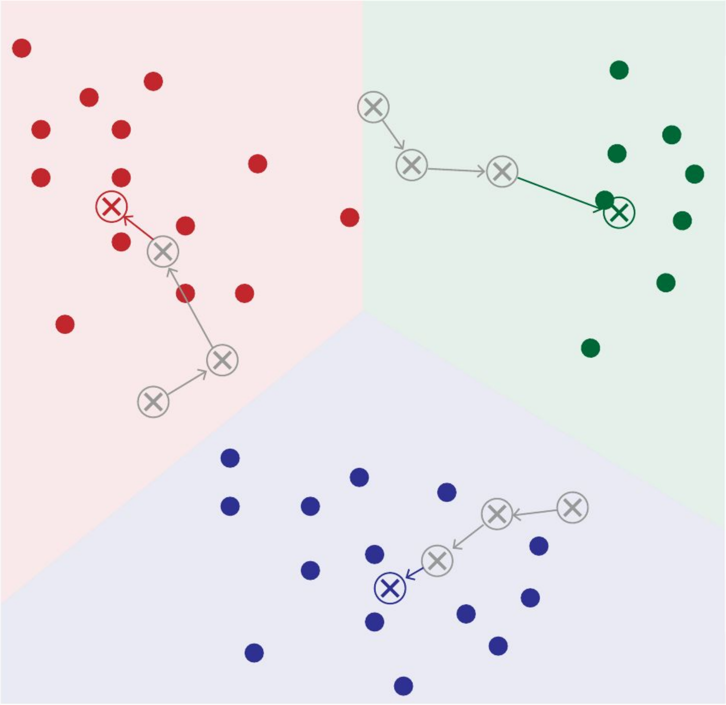
K-means



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K-means - Summary

- Start with ***k*** "means" drawn at random
- Assign data points to the nearest ***k***
- Update the position of each ***k*** to correspond to the mean of its assigned points
- Rinse and repeat...

K-means - Pros and cons

Pros

- Cheap to compute
- Easy to interpret
- Efficient implementations available
- Assigning a new point is straightforward

Cons

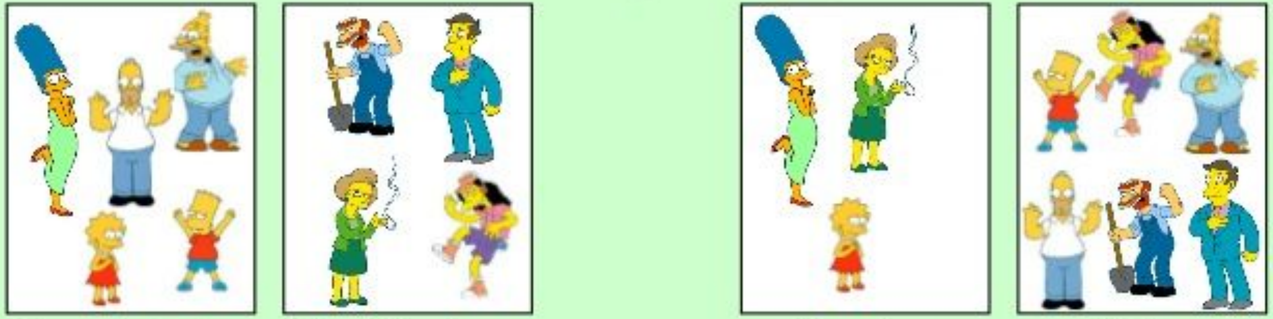
- Need to guess ***k***
- Clusters are globular
- Sensitive to initialisation
- Sensitive to noise

Hands-on session

kmeans.ipynb

What is a natural grouping among these objects?

Clustering is subjective



Simpson's Family

School Employees

Females

Males