Data Science KNN and SVM

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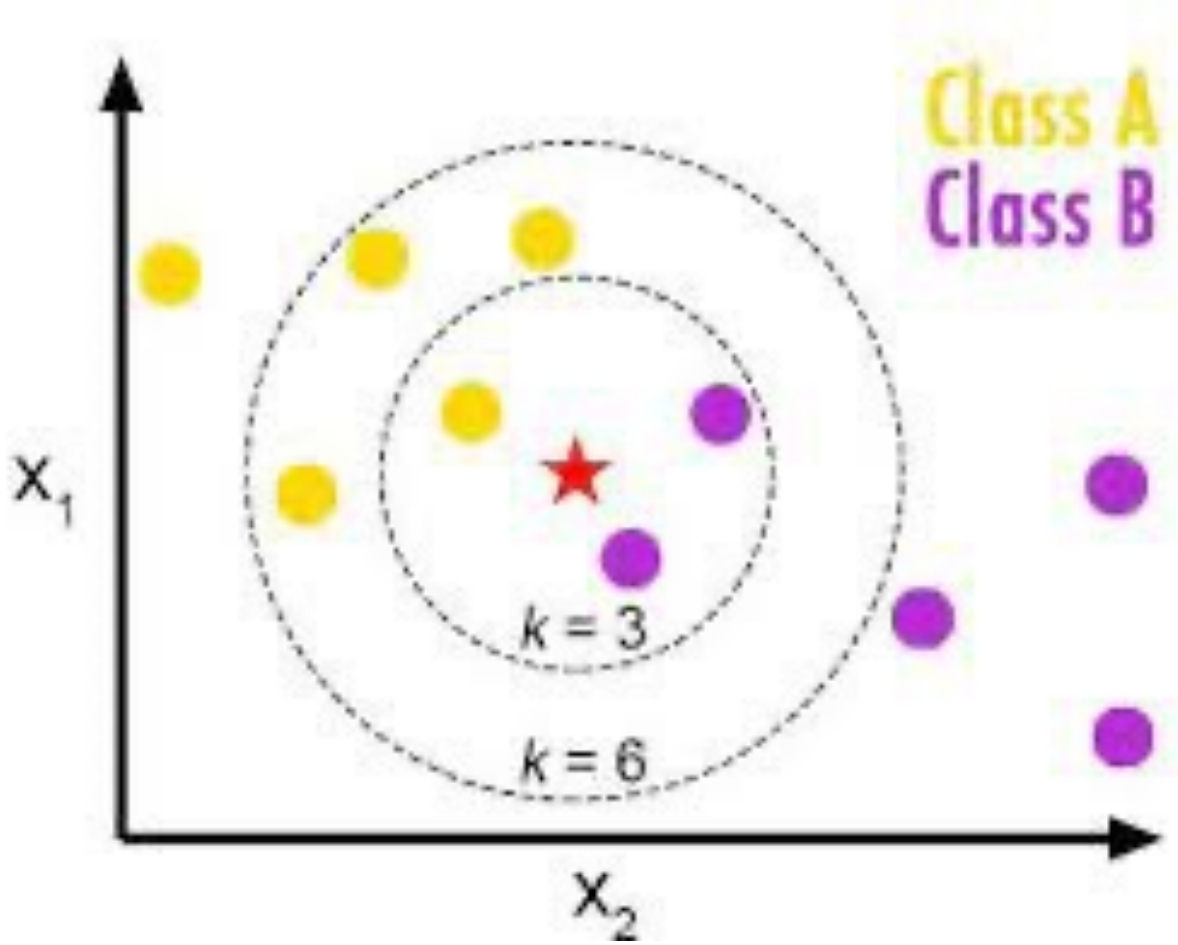
KNN – K-Nearest Neighbours

- Supervised Learning
- Non Linear
- Simple model but powerful for
  - Categorisation
  - Regression
- Not so good in situations where the data is complex as can take a long time to model (e.g computer vision)

KNN – basic idea (from towardsdatascience.com



KNN basic idea

- Looking for a target variable (usually called y)
- New data is compared to nearest k data points
- The new data point is predicted based on the classification of those nearest k data points.
- Based on the idea that things nearby will be similar
- A majority voting system is used
  - If there is a tie various techniques can apply including reducing / increasing k

KNN Tasks

- Towardsdatascience tutorial https://towardsdatascience.com/machine-learning-basics-with-the-k-nearest-neighbors-algorithm-6a6e71d01761
- RealPython.com tutorial https://realpython.com/knn-python/#a-step-by-step-knn-from-scratch-in-python

- Ch 12 of book – write your own classifier

See Moodle

SVM Support Vector Machines

- A binary linear classifier (things are above or below a threshold level)
- Maximises distance between the two parts of a hyperplane
- Can use the ‘kernel trick’ to increase dimensions where no line can be drawn to separate the two parts – massively complicates measuring distance
- A useful guide to working with SVMs
  - https://towardsdatascience.com/understand-support-vector-machines-6cc9e4a15e7e

Visualising SVM (from towardsdatascience.com