



Nearest-neighbour methods

Learning outcomes



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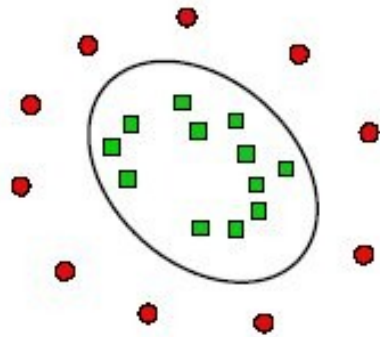
- Describe the difference between parametric and non-parametric approaches
- Apply k-nearest neighbour to a small dataset (without using KD-trees)

Parametric approach: choose a parametrized function with a certain structure, and learn the parameters.

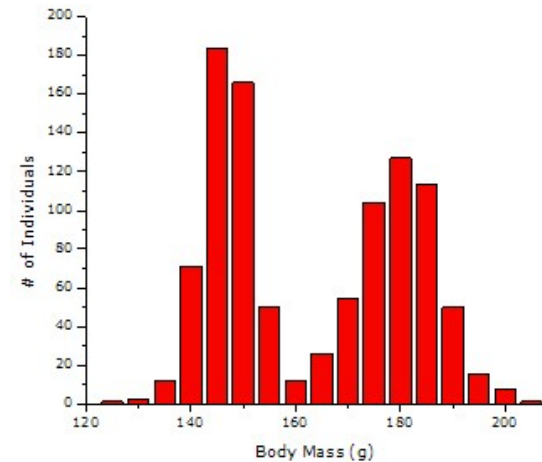
Example: we want a separating hyperplane, and learn its parameters.

Example: we model the data with a gaussian, and learn its parameters

Non-parametric methods



No separating hyperplane!



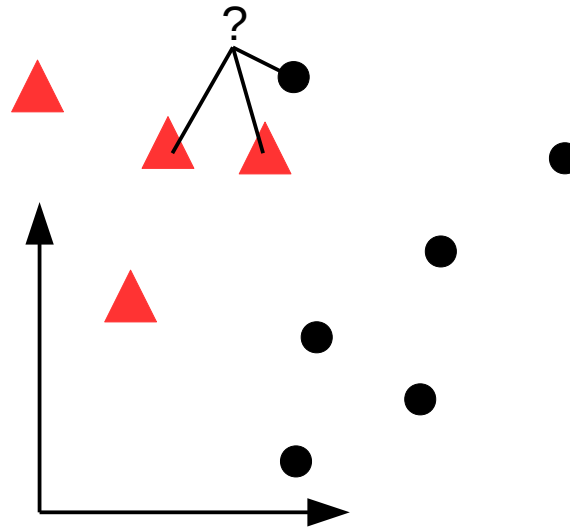
Bimodal data!

The chosen structure may not fit the data very well

Non-parametric: focus on the data rather than a particular structure

K-nearest neighbour

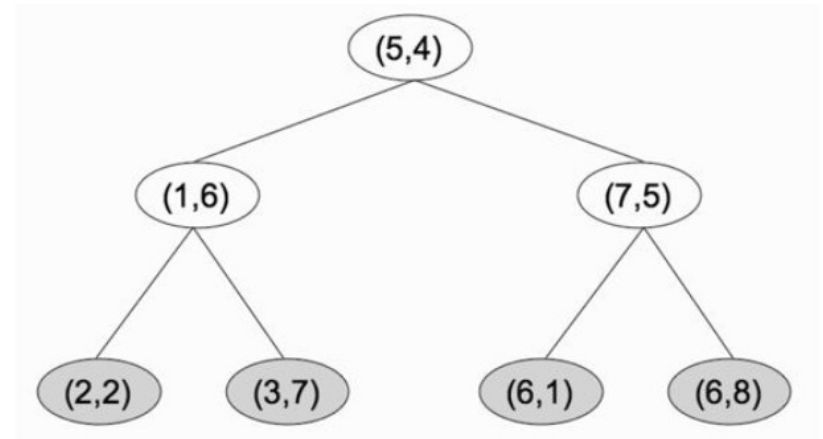
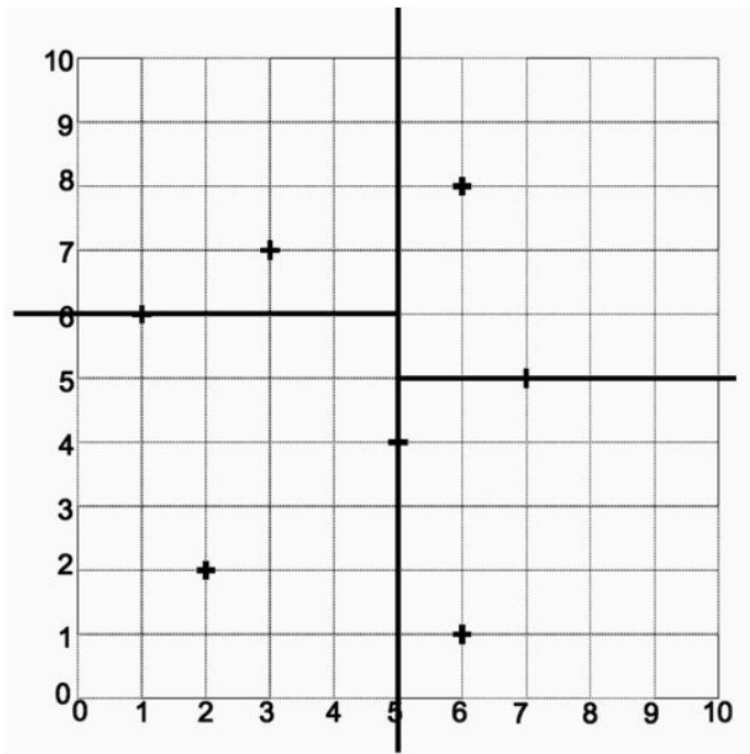
Look at the k-closest points (here $k=3$):



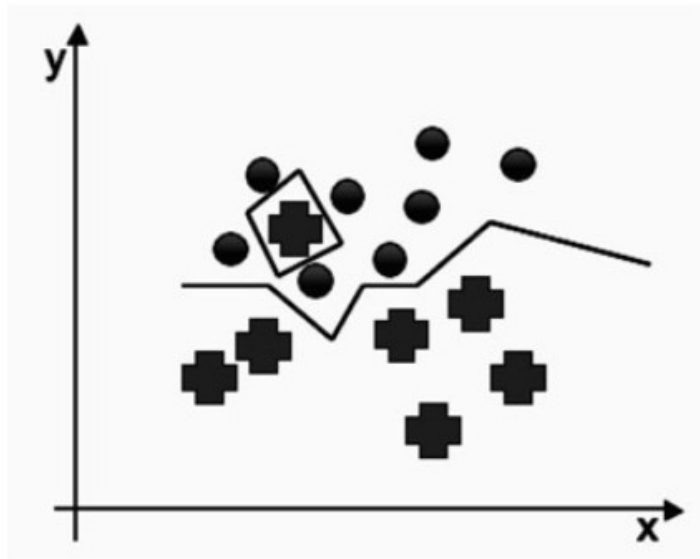
Classify like the majority of the points: ▲

If $k=1$ it's just called *nearest neighbour*

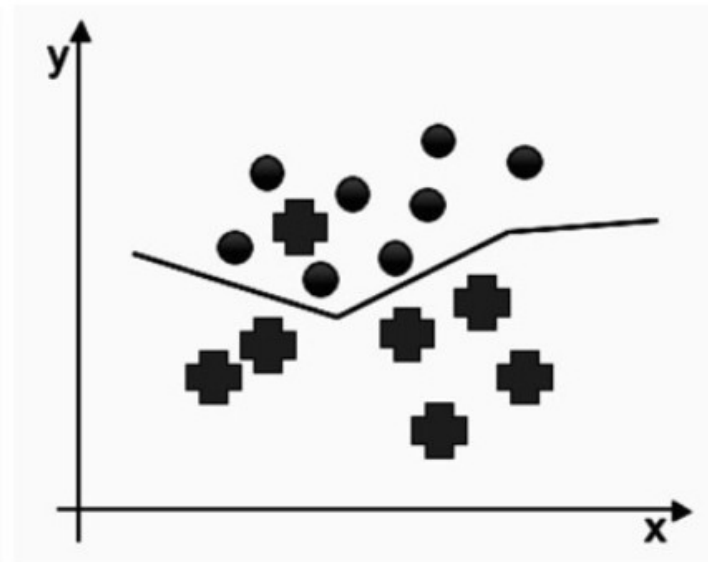
An efficient way to identify points that are close



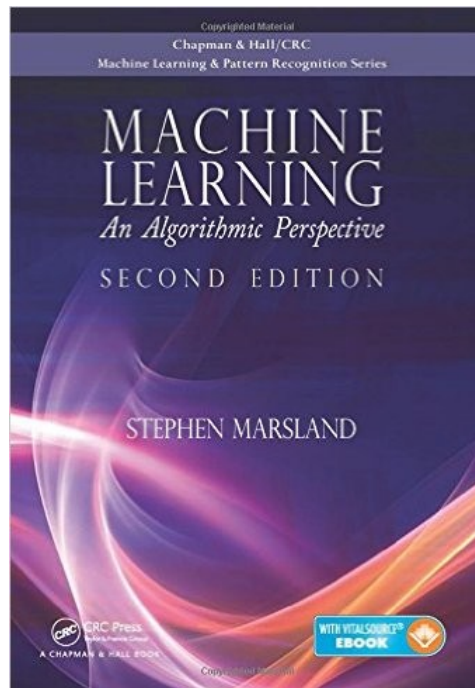
Effect of k



$k=1$



$k=2$



Chapter 7.2