Introduction to
K Nearest Neighbors

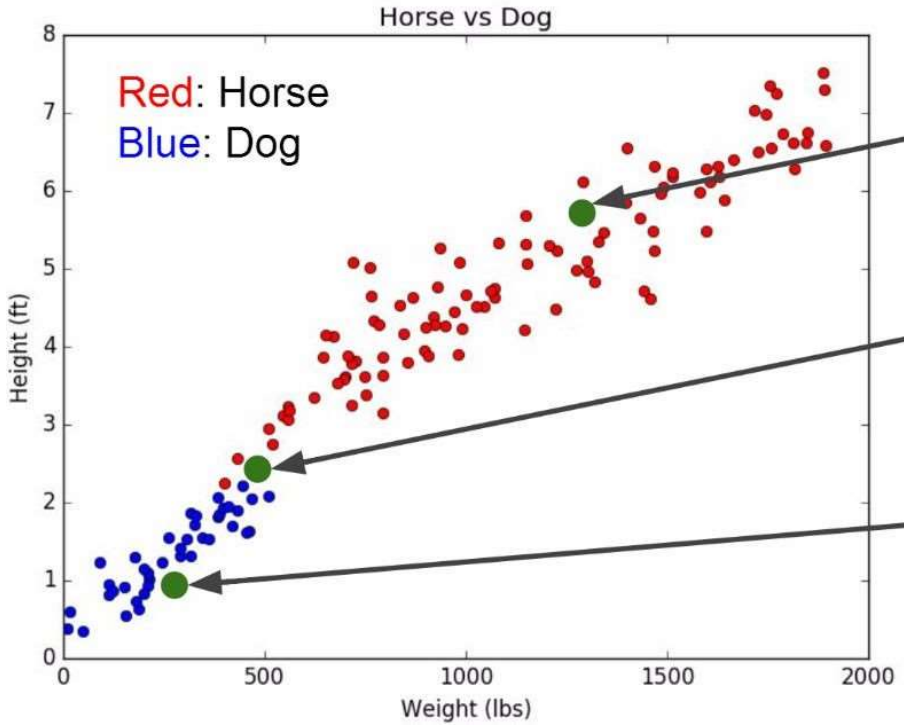
KNN

K Nearest Neighbors is a **classification** algorithm that operates on a very simple principle.

It is best shown through example!

Imagine we had some imaginary data on Dogs and Horses, with heights and weights.

KNN



New datapoint:
Is it a horse or a dog?

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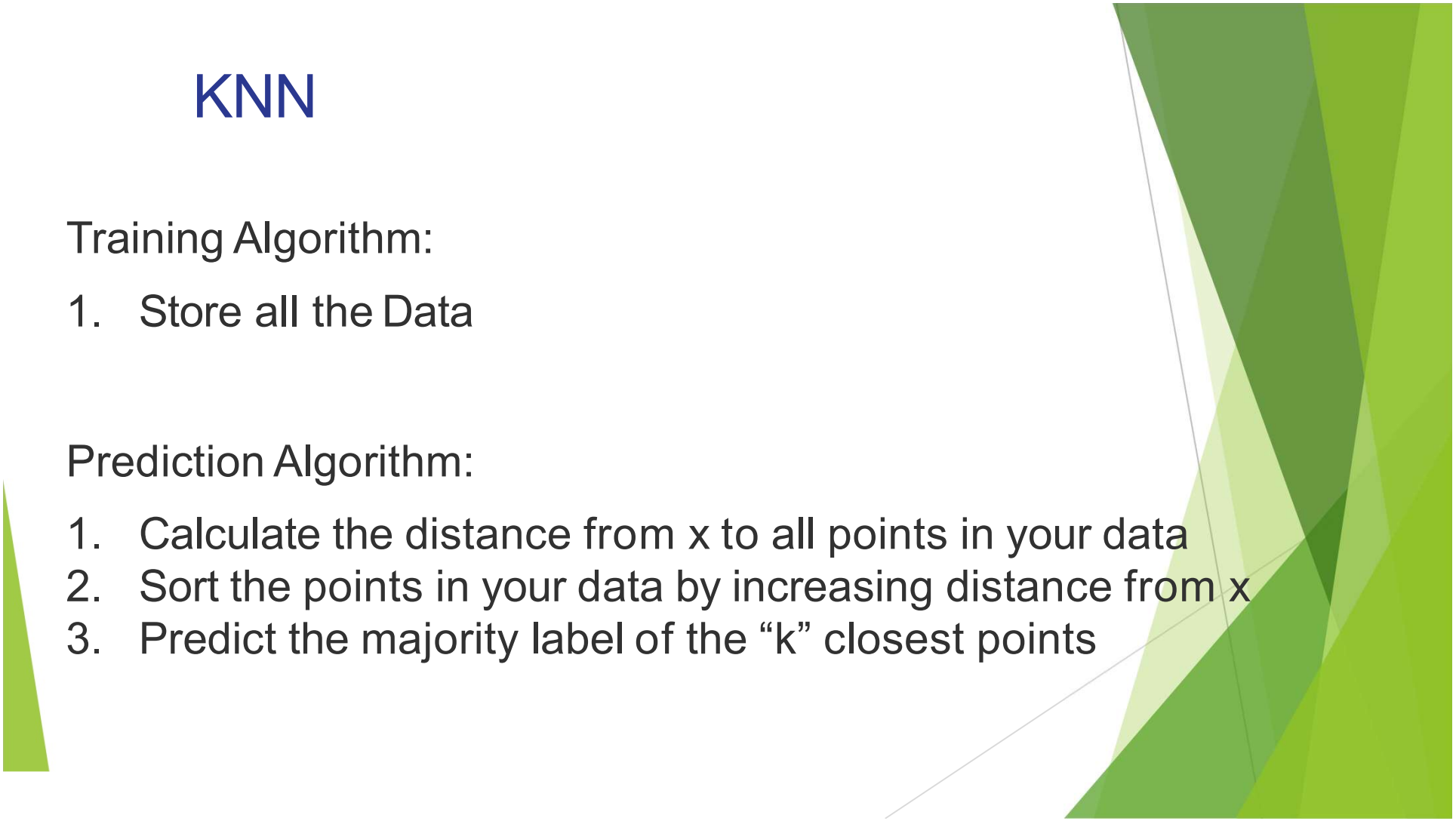
KNN

Training Algorithm:

1. Store all the Data

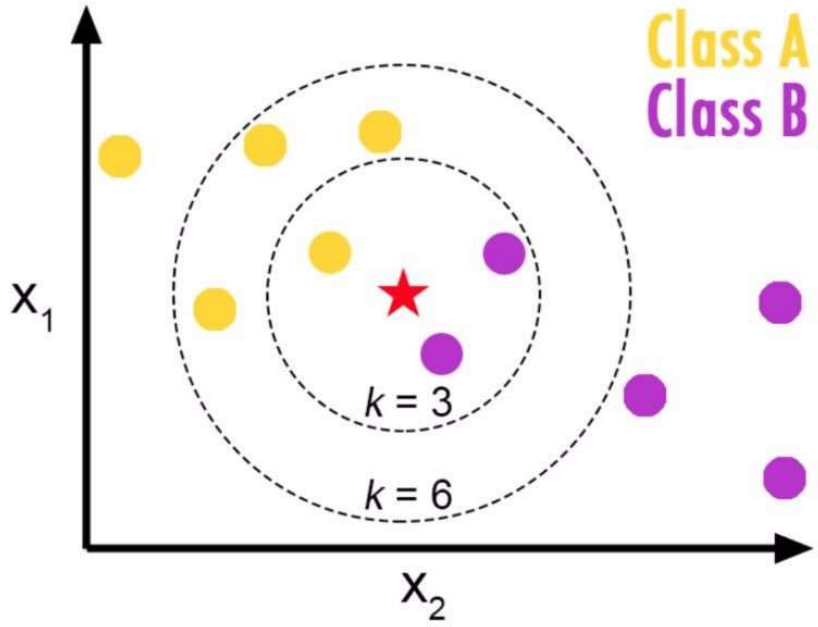
Prediction Algorithm:

1. Calculate the distance from x to all points in your data
2. Sort the points in your data by increasing distance from x
3. Predict the majority label of the “k” closest points



KNN

Choosing a K will affect what class a new point is assigned to:



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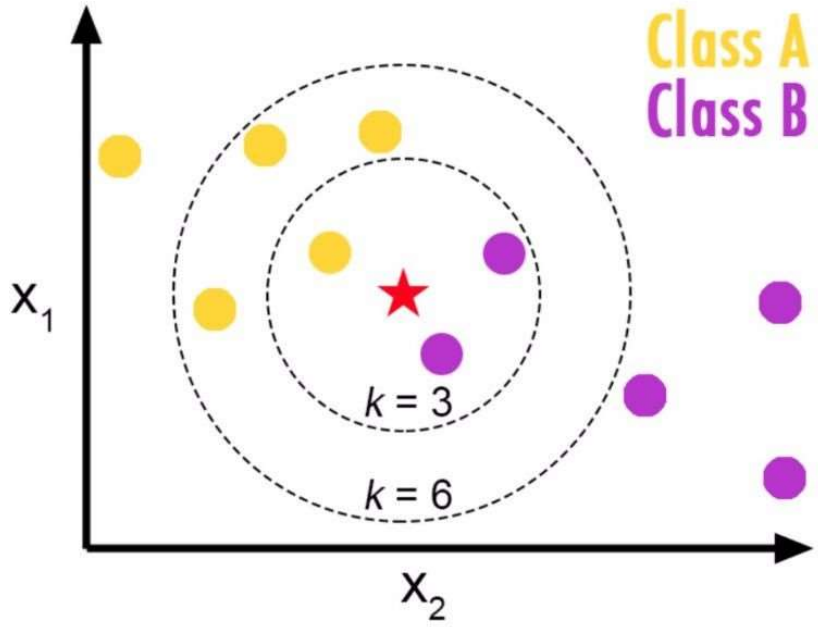

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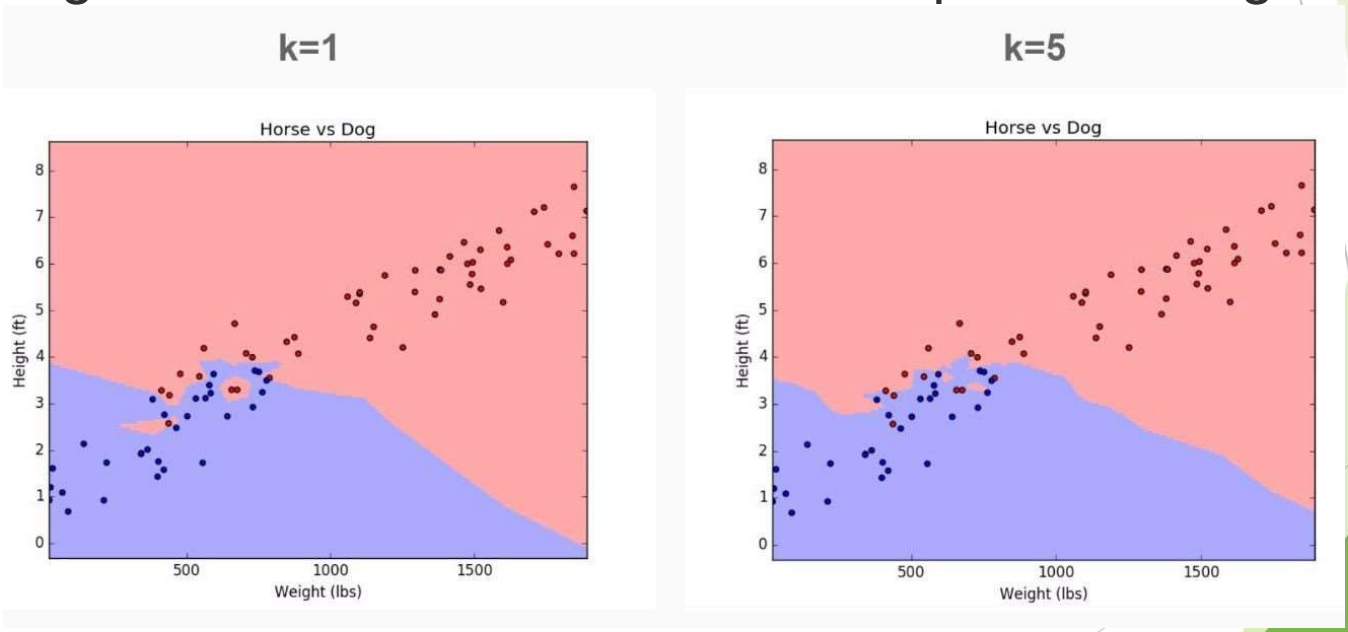

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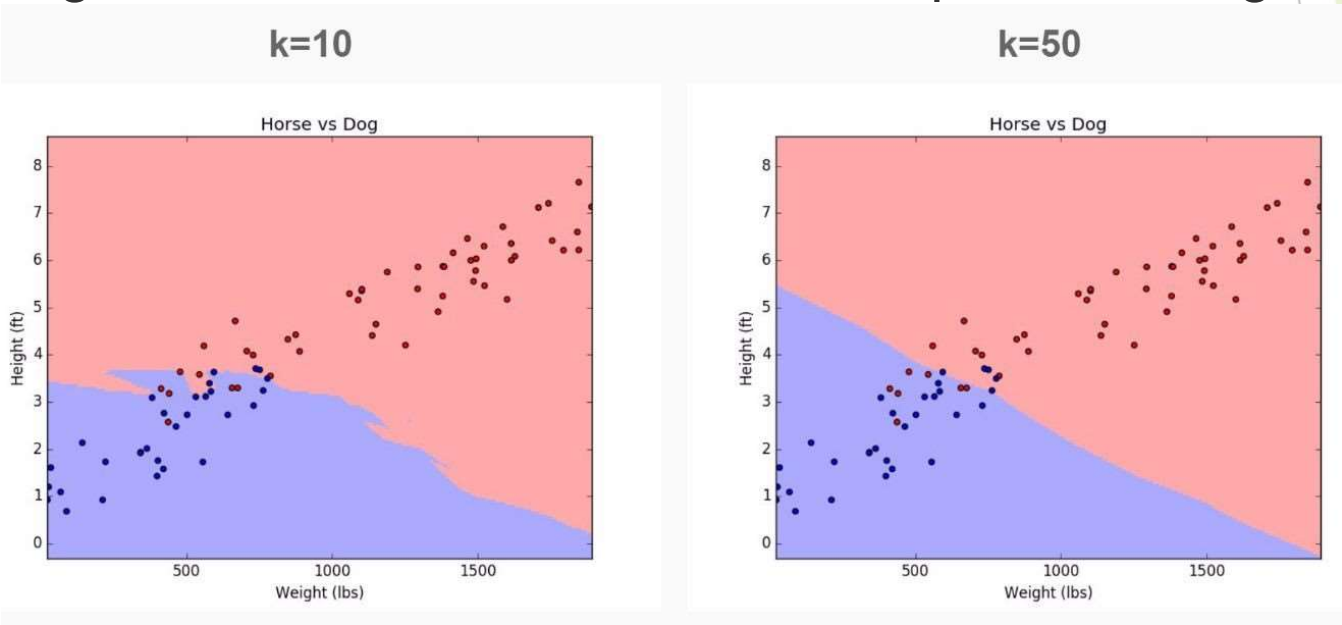

KNN

Pros

- Very simple
- Training is trivial
- Works with any number of classes
- Easy to add more data
- Few parameters
  - K
  - Distance Metric

KNN

Cons

- High Prediction Cost (worse for large data sets)
- Not good with high dimensional data
- Categorical Features don't work well