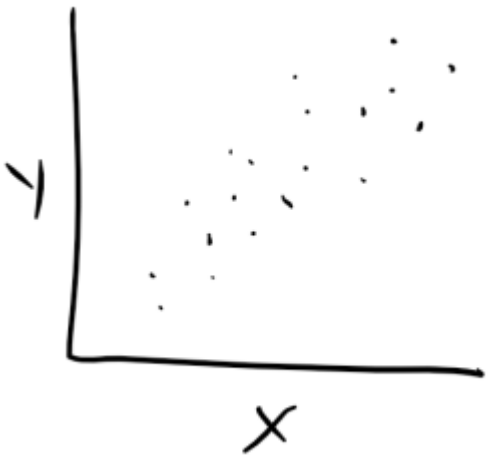
Fitting a Model to Data

What a model is?

- What do people mean when they tell you they're going to "fit a model"?
- Let's start with what a model is.
- A model is a description of a system, usually expressed as an equation of some kind.
- Let's say we have some data – measurements of variables x and y.
- We think that in the future, we'll have measurements of more x-like values, and we'd like to be able to predict those y values.

What a model is?

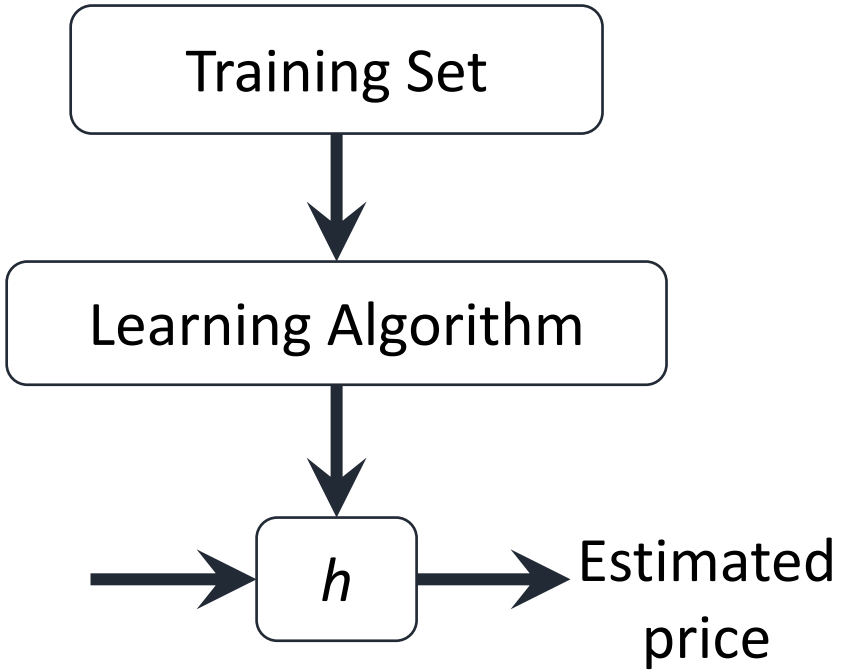
- It looks like you could draw a nice straight line through this cloud of points.
- That means that a linear model might be a good choice for this data.
- We've just done the first step in the model-fitting process:
  - we've decided to use a line – a simple linear model.
- Process of picking the correct line is called "fitting".
- There are different ways to do this –
  - least squares is possibly the most familiar one.
- That fitted line can be described with the equation y=mx+b.
- When we fit the model what we're really doing is
  - choosing the values for m and b –
  - the slope and the intercept.



Fitting a Model

- The point of fitting the model is – “to find this equation” –
  - to find the values of m and b such that y=mx+b describes a line that fits our observed data well.
  - In the case of the best fit model above, m is close to 1, and b is just a bit larger than 0.
- A large m implies that x may have a large effect on y, hence m is also sometimes called the effect size.
- It’s also sometimes called a coefficient.

Model representation



Cost function

- A cost function is something you want to minimize. For example, your cost function might be the sum of squared errors over your training set.
- Cost function is also called squared error function.

Thanks