KB-74
Applied Data Science

Math behind Machine Learning 1

variable, function, first order functions, gradient, intercept

THE HAGUE
UNIVERSITY OF
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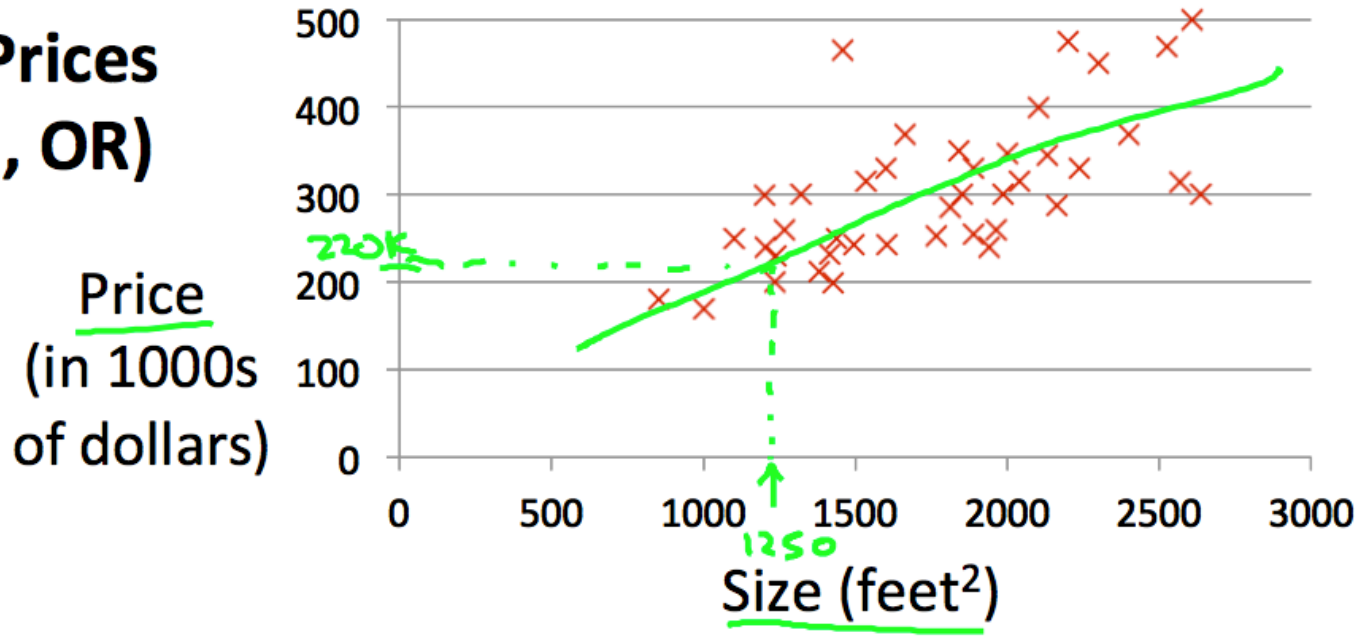
Housing Prices (Portland, OR)



Supervised Learning

Given the "right answer" for each example in the data.

Regression Problem

Predict real-valued output

Classification: Discrete-valued output

Training set of housing prices (Portland, OR)

Size in feet^2 (x)	Price ($) in 1000's (y)
2104	460
1416	232
1534	315
852	178
...	...

m = 47

Notation:

- **m** = Number of training examples
- **x**'s = "input" variable / features
- **y**'s = "output" variable / "target" variable

i:

m:

$x^{(i)}$:

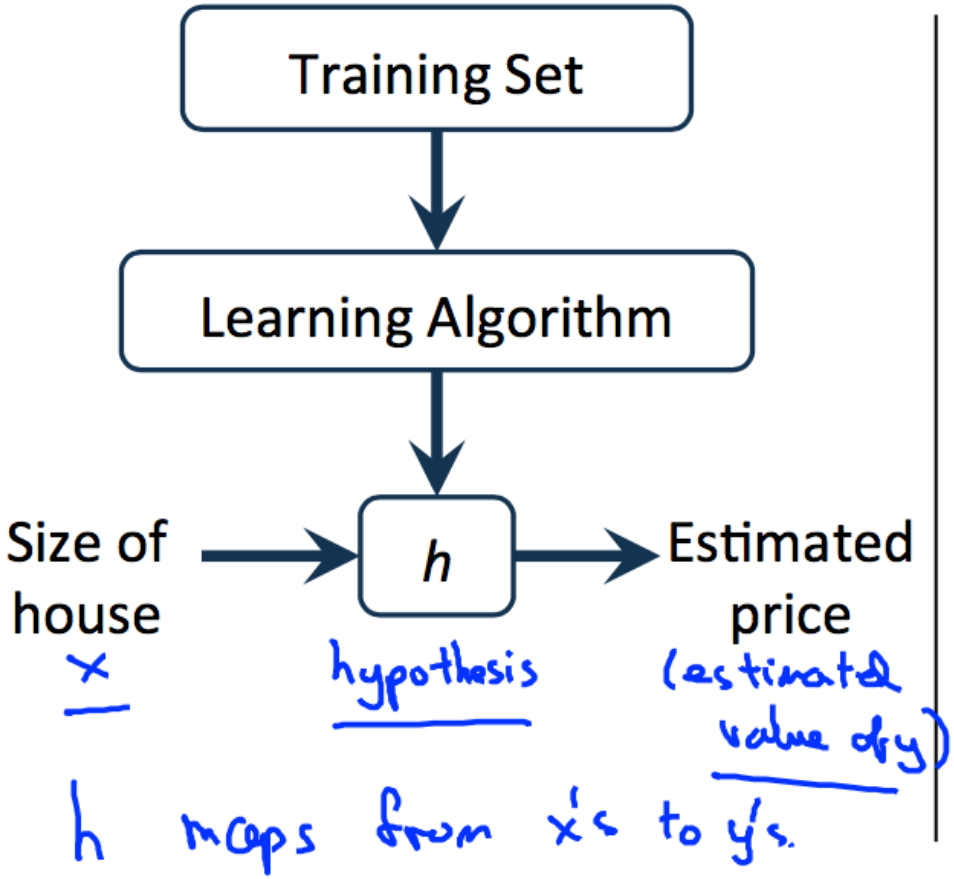
$x^{(1)} =$

$x^{(2)} =$

$y^{(1)} =$

$(x^{(i)}, y^{(i)})$:

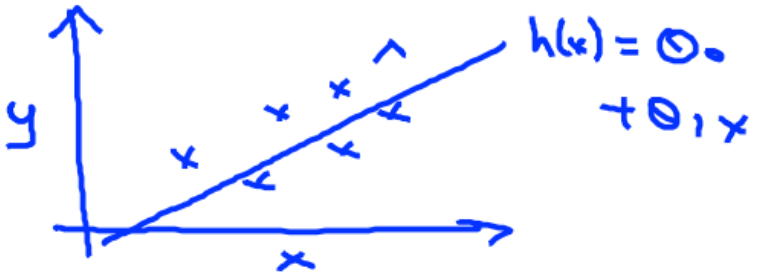
Functie



How do we represent *h* ?

$h_\theta(x) = \theta_0 + \theta_1 x$

Shorthand: $h(x)$



Linear regression with one variable. (x)

Univariate linear regression.

└ one variable

θ:

$h(x)$:

$h_\theta(x)$:

Parameters

Training Set

Size in feet² (x)	Price ($) in 1000's (y)
2104	460
1416	232
1534	315
852	178
...	...

$m = 47$

Hypothesis: $h_\theta(x) = \theta_0 + \theta_1 x$

θ_i's: Parameters

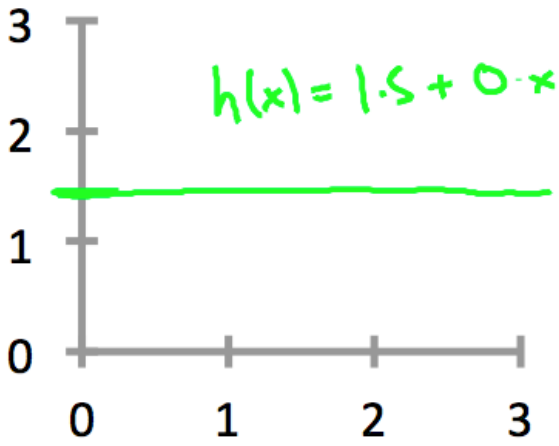
How to choose θ_i's ?

$h_\theta(x) = \theta_0 + \theta_1 \cdot x$

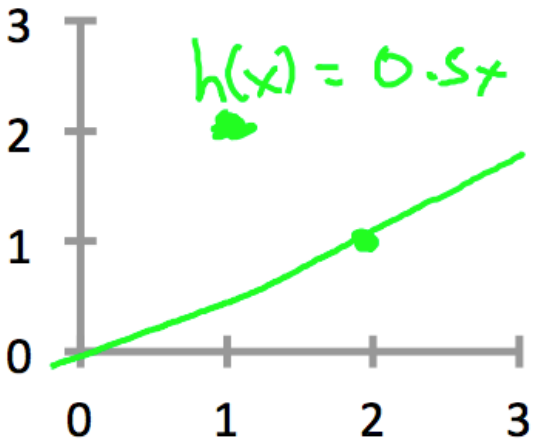
θ_i:

Eerstegraads functies

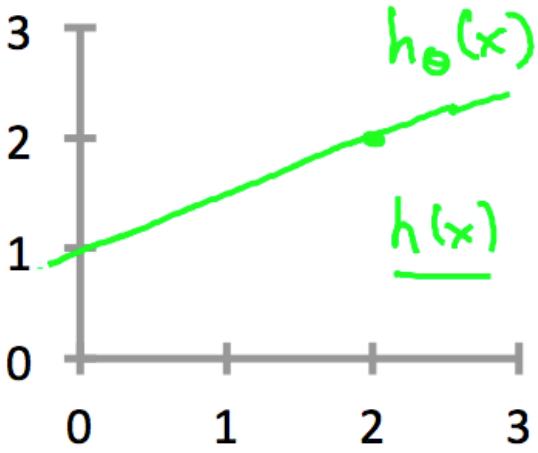
$$h_\theta(x) = \theta_0 + \theta_1 x$$



→ $\theta_0 = 1.5$
→ $\theta_1 = 0$



→ $\theta_0 = 0$
→ $\theta_1 = 0.5$



→ $\theta_0 = 1$
→ $\theta_1 = 0.5$

First order function