



Machine Learning

# Linear regression with one variable

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## Model representation

# Housing Prices (Portland, OR)

Price  
(in 1000s  
of dollars)



## 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 <sup>2</sup> ( $x$ )	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

$(x, y)$  - one training example

$(x^{(i)}, y^{(i)})$  -  $i$ th training example

$$\left\{ \begin{array}{l} x^{(1)} = 2104 \\ x^{(2)} = 1416 \\ y^{(1)} = 460 \end{array} \right.$$

Training Set

Learning Algorithm

Size of house  
x

h

Estimated price  
(estimated value of y)

hypothesis

h maps from x's to y's.

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