< Multivariate Linear Regression >

- until now, we learned about univariate linear regression which uses only 1 variable (feature)

- Multiple features (variables)

size in feet^2 x_1	Number of bedrooms x_2	Number of floors x_3	Age of home in years x_4	Price ($) in $1,000's y
2104	5	1	45	460
1416	3	2	40	232
1534	3	2	30	315
852	2	1	36	178
⋮	⋮	⋮	⋮	⋮

$m = 47$

(notation)

- x_j = j^{th} feature
- n = number of feature
- m = number of training example
- $\vec{x}^{(i)}$ = feature of i^{th} training example
- $x_j^{(i)}$ = value of feature j in i^{th} training example

(example)

- $j=2 \rightarrow x_2$ = column of number of bedrooms
- $n=4$ (4 features)
- $m=47$
- $\vec{x}^{(2)} = [1416, 3, 2, 40]$
- $x_3^{(2)} = 2$

- Model (hypothesis)

① linear regression with single feature : $f_{w,b}(x) = wx + b$

② linear regression with multiple features : $f_{w,b}(x) = w_1x_1 + w_2x_2 + \cdots + w_nx_n + b$

(example with sample training set)

$f_{w,b}(x) = 0.2x_1 + 4x_2 + 10x_3 + -2x_4 + 80$

$w_1 = 0.2$ = 제곱미터 당 가격 (가중치 = 0.2배)

$w_2 = 4$ = bedroom 개수 당 가격 (가중치 = 4배)

⋮

80 = 기본 집값