Multiple Linear Regression

Size (feet^2)	No. of bedrooms	No. of floors	Age of home	Price ($)
2104	5	1	45	460
1416	3	2	40	232
1534	3	2	30	315
852	2	1	36	178
x_1	x_2	x_3	x_4	y

$$h_\theta(x^{(i)}) = \theta_0 x_0^{(i)} + \theta_1 x_1^{(i)} + \theta_2 x_2^{(i)} + \dots + \theta_n x_n^{(i)}$$

(1)

$(n$ = no. of features)

$x^{(i)}$ = input (features) of ith training example

$x_j^{(i)}$ = value of feature j in ith training example.

$\left(m = \text{no. of input rows}\right)$

$(i \to 1 - m)$

Cost function:-

$$J(\theta_0, \theta_1, \dots \theta_n) = \frac{1}{m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)}\right)^2$$

$$\Rightarrow \frac{1}{2m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)}\right)^2$$

$$\theta_0 = \theta_0 - \alpha \frac{1}{m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)}\right) x_0^{(i)}$$

$$\theta_1 = \theta_1 - \alpha \frac{1}{m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)}\right) x_1^{(i)}$$

VVI $\theta_j = \theta_j - \alpha \frac{1}{m} \sum_{i=1}^{m} \left(h_\theta(x^{(i)}) - y^{(i)}\right) x_j^{(i)}$ $(j = 0 \text{ to } n)$