Features ⇒ X ⇒ Vector ⇒ Array ⇒ $[x_1, x_2, x_3, \ldots x_n]$

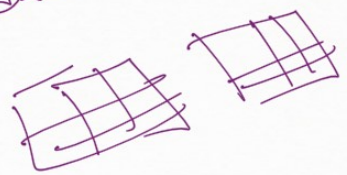
Labels/Targets ⇒ Y ⇒ Vector ⇒ Array ⇒ $[y_1, y_2, y_3, \ldots y_m]$

$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n \Rightarrow \beta = [\beta_0, \beta_1, \beta_2, \ldots \beta_n]$

$\therefore \hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x_1 + \hat{\beta}_2 x_2 + \ldots + \hat{\beta}_n x_n \Rightarrow \hat{\beta} = [\hat{\beta}_0, \hat{\beta}_1, \hat{\beta}_2 \ldots \hat{\beta}_n]$

Hypothesis ⇒ Null Hypothesis ⇒ Improve the Hypothesis.

$h_\theta(x) = \theta_0 + \theta_1 x_1 + \ldots + \theta_n x_n$ ⇒ Reduce the Error.



$h_\theta(x) = \theta^T X$ $\quad X = [1, x_1, x_2, \ldots x_n]$ $\quad \theta = [\theta_0, \theta_1, \ldots \theta_n]$

$h_\theta(x) = \theta_0 + \theta_1 x_1 + \ldots + \theta_n x_n$

$h_\theta(x_i)$ => Predicted Value

y_i => Actual Value

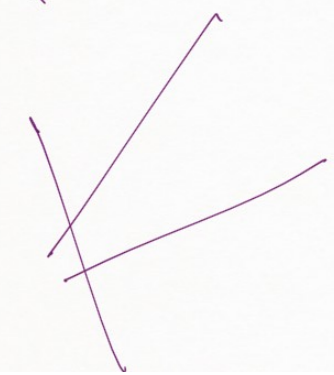
$(h_\theta(x) - y)$ => Actual

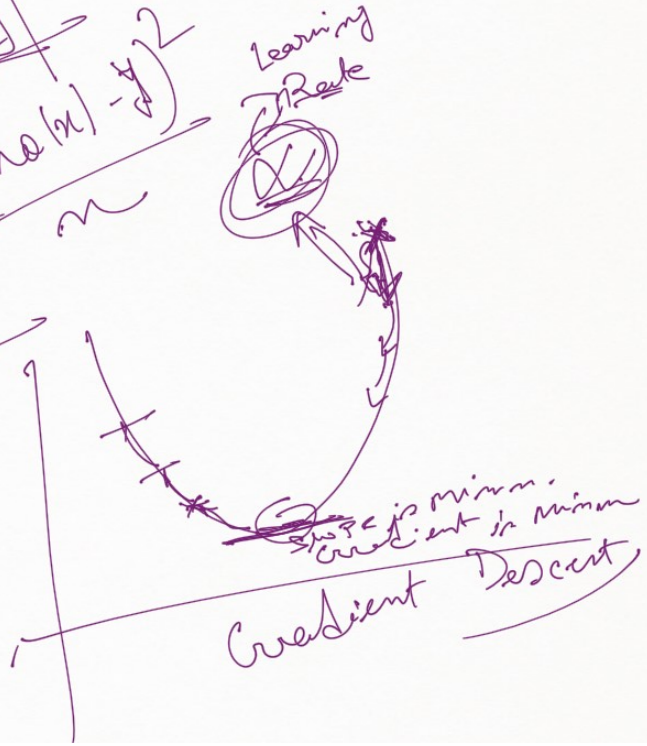
Predicted

Mean Absolute Error => $\frac{|h_\theta(x) - y|}{n}$

Mean Squared Error => $\frac{(h_\theta(x) - y)^2}{n}$

$J(\theta) = \frac{\sum_{i=1}^{n} (h_\theta(x_i) - y_i)^2}{n}$





$h_\theta(x) = \theta^T x$

$\Rightarrow \theta_0 + \theta_1 x_1 + \theta_2 x_2 + \cdots \Rightarrow \theta_n x_n$

$\theta_j = \theta_j - \alpha \frac{\partial J(\theta)}{\partial \theta}$

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

$\frac{\partial J(\theta)}{\partial \theta_j}$

$$J(\theta) = \sum_{i=0}^{n} \frac{(h_\theta(x_i) - y_i)^2}{n} \Rightarrow \text{Mean Squared Error}$$

$$h_\theta(x_i) = \theta^T x$$

$$\theta_j = \theta_j - \alpha \frac{\partial J(\theta)}{\partial \theta}$$

$$\theta_j = \theta_j$$