NEWERA

MASTERRING LOGISTIC REGRESSSION

BUILD YOUR OWN BREAST CANCER DETECTION SYSTEM

Classification is another supervised learning Approach, In Classification our output value **y** will be in discrete value like 0 or 1.

1

0

Logistic Regression

Logistic Regression tell you the probability that an instance belong to this class or not with some threshold.
If our probability is greater than 0.5 or 50 % then we will say this belongs to the class, means positive_label 1 ot if lesser we denote negative class or vice versa **0**.

1

0

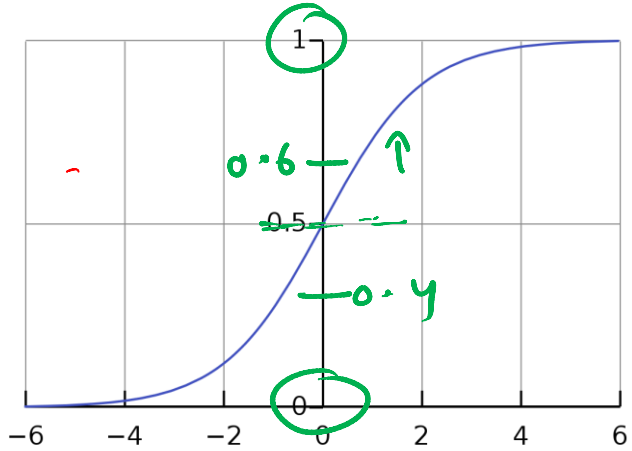
Hypothesis Function

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

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

$$\hat{y} = h_\theta(x) = \sigma(x^T \theta)$$

$$\hat{y} = h_\theta(x) = \sigma(z) = \frac{1}{1 + \exp(-z)}$$



Cost Function

$$J(\theta) = -1 \times \left(y^{(i)} \log \left(h_\theta(x) \right) + (1 - y^{(i)}) \log \left(1 - h_\theta(x) \right) \right)$$

Predicted

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

$y^{(i)}$ = actual

$h_\theta(x^{(i)})$ = model predictions

$1 \approx 0$

Gradient Descent

Hypothesis $= \sigma(z) = \frac{1}{1+\exp(-z)}$

$\nabla J(\theta) = \frac{1}{m} \sum_{i=1}^{m} (x^{(i)} - y^{(i)}) \cdot x_j$

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

$\theta_j := \theta_j - \alpha \nabla J(\theta)$

Gradient

Guide on Implementing vectorized things :

Hypothesis

$z = X^T\theta$, $x \cdot \theta$

$(m, 1)$

↑

No. of many Exm

$sig(z)$

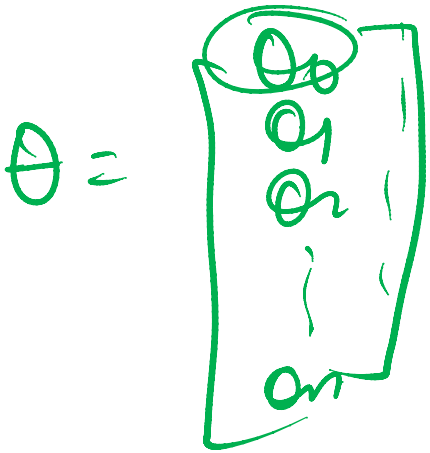
Guide on Implementing vectorized things :

Cost Function

$$J(\theta) = -\frac{1}{m} \times \left(y^{T} \cdot \log(h) + (1-y^{T}) \cdot \log(1-h) \right)$$

y &

Guide on Implementing vectorized things : Gradient Descent



$$\theta := \theta - \frac{\alpha}{m} \times (x^T \cdot (h - y))$$

Thanks ☺

Now, download the jupyter notebook and start building your system.