Logistic Regression

→ A regression algorithm which does classification.

⇒ Calculates probability of belonging to a particular class

→ if $p > 50\% \rightarrow 1$

→ if $p < 50\% \rightarrow 0$

How does Logistic Regression works?

→ It takes your features & labels [Training Data]

→ fits a linear model (weights & biases)

→ And instead of giving you the result, it gives you the logistic of the result.

Note: $\hat{p} = \sigma(\theta^T x) = \frac{1}{1+e^{(-\theta x)}}$ (sigmoid fun')

Training a Logistic Regression model?

→ We need values of parameters in θ

→ We need high values of probabilities near 1 for positive instances.

→ We also want low values of probabilities near 0 for negative instances.

→ cost for single training instance

cost(θ)

$$C(\theta) = \begin{cases} -\log(\hat{p}) & \text{if } y = 1 \\ -\log(1-\hat{p}) & \text{if } y = 0 \end{cases}$$

cost for all training instance

$$J(\theta) = -\frac{1}{m}\left[\sum_{i=1}^{m} y^i \log\left(\hat{p}^{(i)}\right) + (1-y^i)\log(1-\hat{p}^i)\right]$$

m = no. of training data