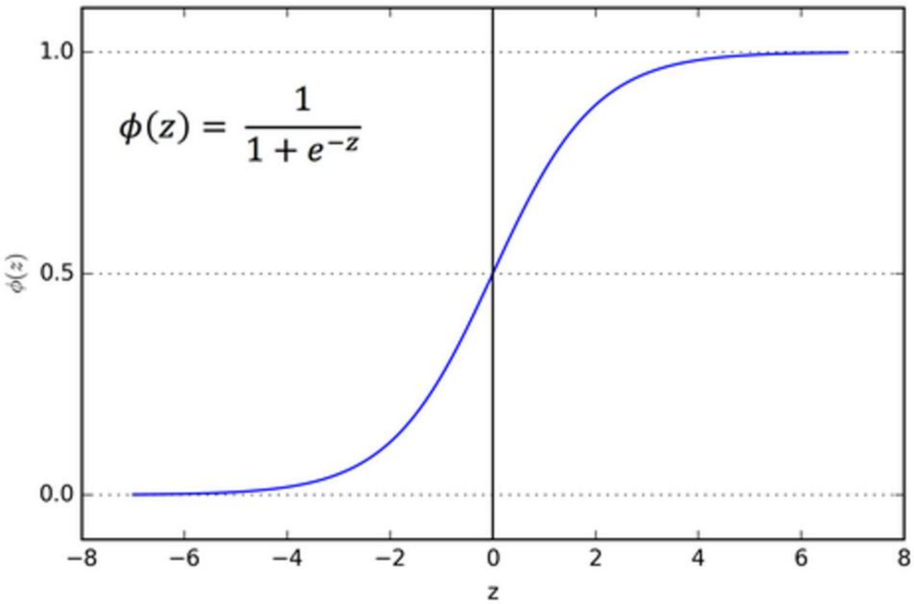
Logistic Regression

20 April 2018   22:12

Sigmoid Function

$$g(z) = \frac{1}{(1 + e^{-z})}$$



$$\hat{y} = g\left(\sum w_i \cdot x_i\right) = g(z)$$

Derivative of sigmoid

$$g'(z) = g(z) \times 1(- g(z))$$

Logistic Regression

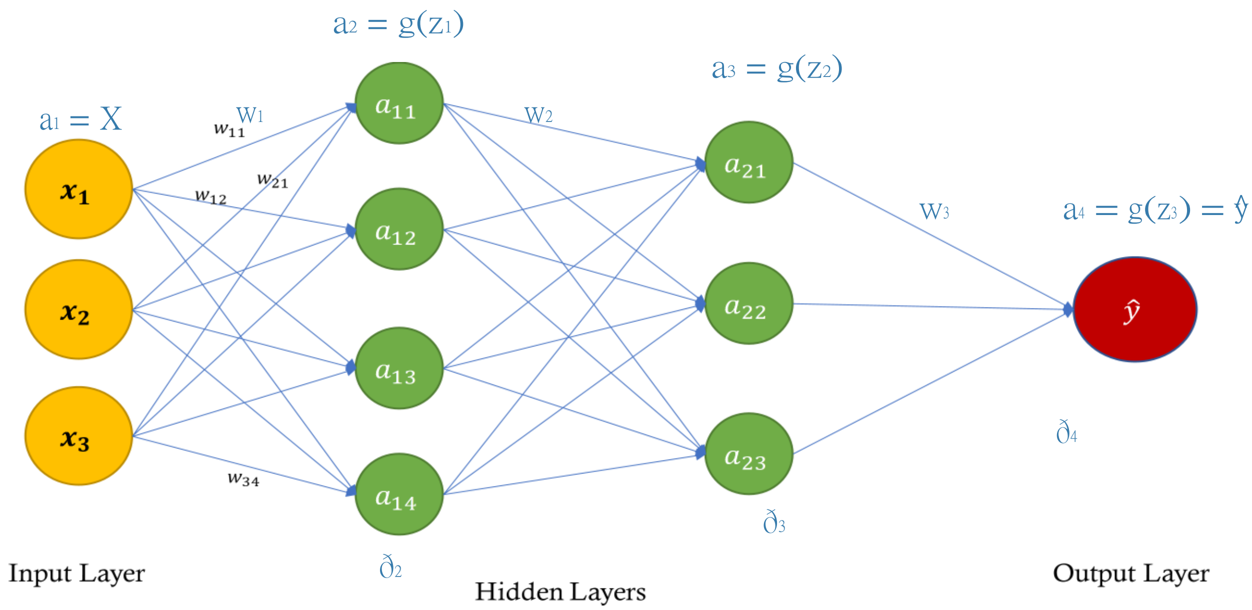
$P(Y|X) = \hat{y}^{y}(1 - \hat{y})^{(1-y)}$ Probability of y given x

Cost Function for Logistic Regression

$$C = -\sum y \log(\hat{y}) + (1 - y)\log(1 - \hat{y})$$

$$\frac{dC}{dw} = (\hat{y} - y)x$$

Multilayer Neural Network and Back Propagation



Multilayer Perceptron

Forward Propagation

$a_1 = x_i$

$z_1 = \Sigma\ w_{1\times}x_i$

$a_2 = g(z_1)$

$z_2 = \Sigma\ w_2 \times a_2$

$a_3 = g(z_2)$

$z_3 = \Sigma\ w_3 \times a_3$

$a_4 = g(z_3) = \hat{y}$

Backward Propagation

$\eth_4 = (\hat{y} - y)$

$\frac{\&c}{\&m_3} = a_3\eth_4$

$\eth_3 = (w_3\eth_4) \times g'(z_3)$

$\frac{\&c}{\&m_2} = a_2\eth_3$

$\eth_2 = (w_2\eth_3) \times g'(z_2)$

$\frac{\&c}{\&m_1} = a_1\eth_2$

we know that

$g'(z) = g(z) \times 1(— g(z))$

And Finally

$w_i = w_i — h\frac{\&C}{\&w_i}$ wMere fi is learning Rate.