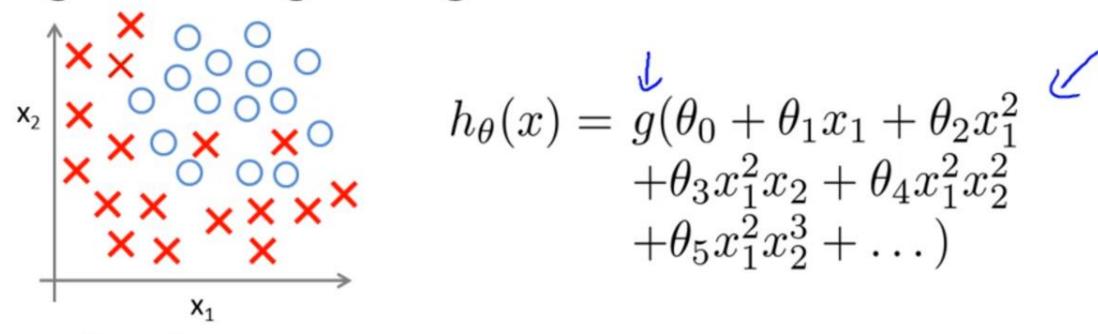
Regularized Logistic Regression

Solving the Problem of Overfitting Regularization

Regularized logistic regression.

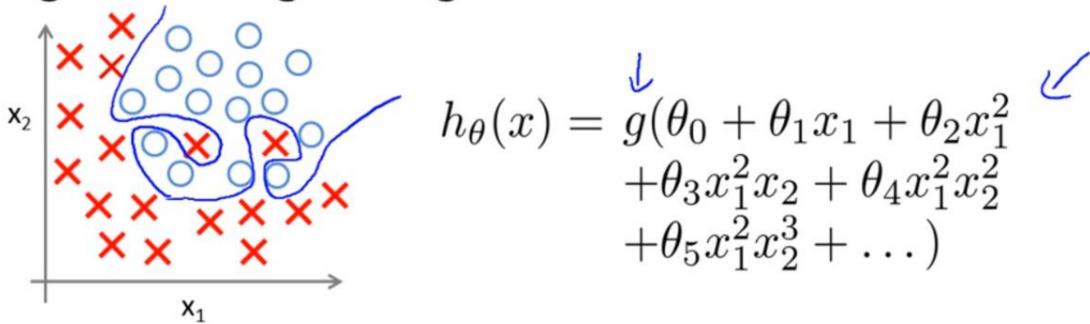


Cost function:

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

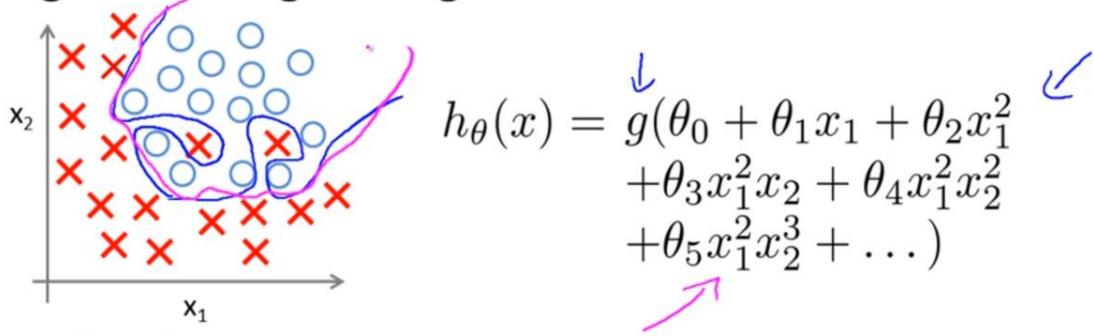
Windows'u Etkinleştir Windows'u etkinleştirmek için Ayarlar'a gidin.

Regularized logistic regression.



Cost function:

Regularized logistic regression.



Cost function:

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

$$+ \frac{\lambda}{2m} \sum_{i=1}^{m} S_{i}^{(i)}$$

$$\downarrow O_{i}, \text{ Windows'u Etherstime Right Ayarlar'a gidin.}$$

Repeat {

$$\theta_{j} := \theta_{j} - \alpha \qquad \frac{1}{m} \sum_{i=1}^{m} (h_{\theta}(x^{(i)}) - y^{(i)}) x_{j}^{(i)}$$

$$(j = 0, 1, 2, 3, \dots, n)$$
 }

Windows'u Etkinleştir
Windows'u etkinleştirmek için Ayarlar'a gidin.

Repeat {

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

$$\theta_j := \theta_j - \alpha$$
 $\frac{1}{m} \sum_{i=1}^m (h_\theta(x^{(i)}) - y^{(i)}) x_j^{(i)}$

$$(j = \mathbb{X}, \underbrace{1, 2, 3, \dots, n})$$

Repeat {

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

$$\theta_{j} := \theta_{j} - \alpha \left[\frac{1}{m} \sum_{i=1}^{m} (h_{\theta}(x^{(i)}) - y^{(i)}) x_{j}^{(i)} + \frac{\lambda}{m} \delta_{j} \right]$$

$$(j = \mathbb{X}, \underbrace{1, 2, 3, \dots, n})$$

$$\delta_{j} \dots \delta_{n}$$

Repeat {

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

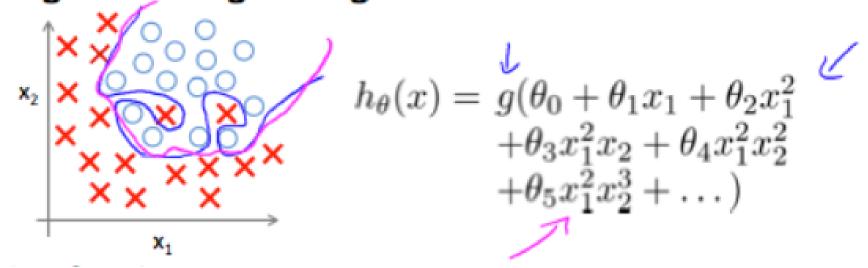
$$\theta_j := \theta_j - \alpha \left[\frac{1}{m} \sum_{i=1}^m (\underline{h_{\theta}(x^{(i)})} - y^{(i)}) x_j^{(i)} + \frac{\lambda}{m} \Theta_j \right] \leftarrow$$

$$(j = \mathbb{X}, \underline{1, 2, 3, \dots, n})$$

Windows'u etkinleştirmek için Ayarlar'a gidin.

Summary

Regularized logistic regression.



Summary

Recall that our cost function for logistic regression was:

$$J(heta) = -rac{1}{m} \sum_{i=1}^m [y^{(i)} \; \log(h_ heta(x^{(i)})) + (1-y^{(i)}) \; \log(1-h_ heta(x^{(i)}))]$$

• We can regularize this equation by adding a term to the end:

$$J(heta) = -rac{1}{m} \sum_{i=1}^m ig[y^{(i)} \; \log ig(h_ heta(x^{(i)}) ig) + ig(1 - y^{(i)} ig) \; \log ig(1 - h_ heta(x^{(i)}) ig) ig] + rac{\lambda}{2m} \sum_{j=1}^n heta_j^2$$

Summary

Gradient descent

Repeat { $\Rightarrow \quad \theta_0 := \theta_0 - \alpha \frac{1}{m} \sum_{i=1}^m (h_\theta(x^{(i)}) - y^{(i)}) x_0^{(i)}$ $\Rightarrow \quad \theta_j := \theta_j - \alpha \underbrace{\left[\frac{1}{m} \sum_{i=1}^m (h_\theta(x^{(i)}) - y^{(i)}) x_j^{(i)} + \frac{\lambda}{m} \odot_j \right]}_{(j = \mathbf{M}, 1, 2, 3, \dots, n)}$ } $\underbrace{\left[\frac{\lambda}{\partial \Theta_j} \underbrace{\mathsf{J}(\Theta)}_{(j = \mathbf{M}, 1, 2, 3, \dots, n)} \right]}_{(j = \mathbf{M}, 1, 2, 3, \dots, n)}$