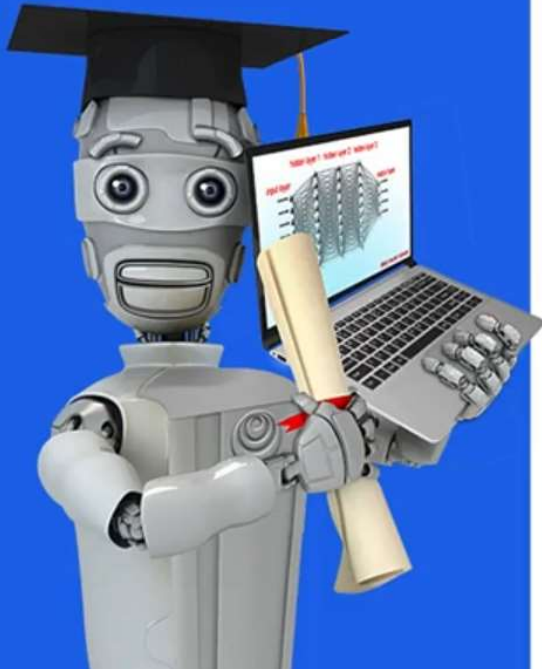


Stanford
ONLINE

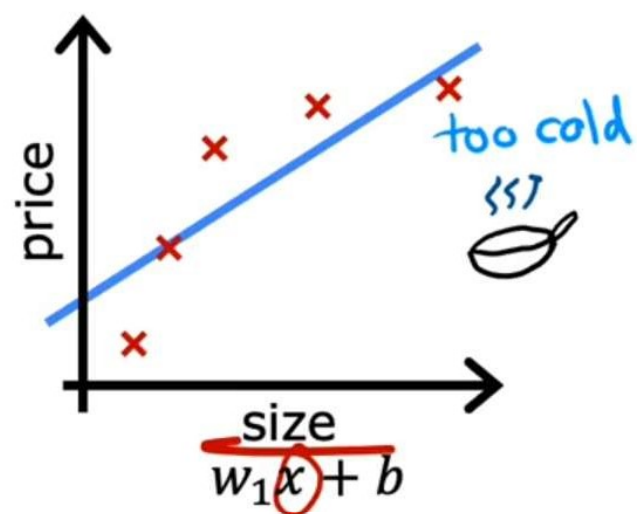
DeepLearning.AI



Regularization to Reduce Overfitting

The Problem of Overfitting

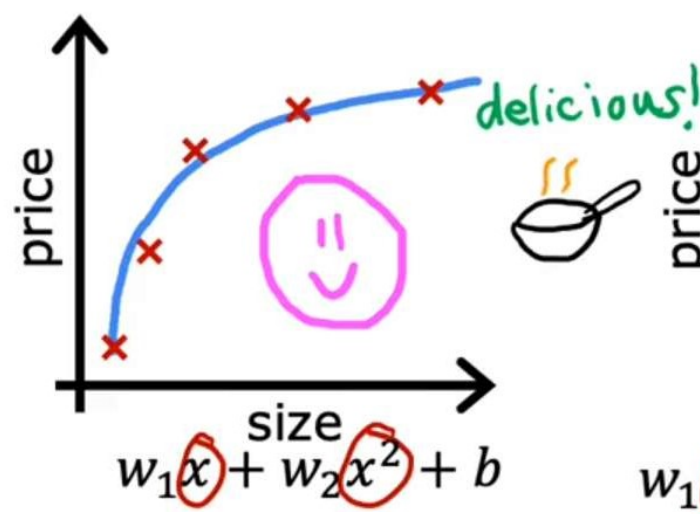
Regression example



underfit

- Does not fit the training set well

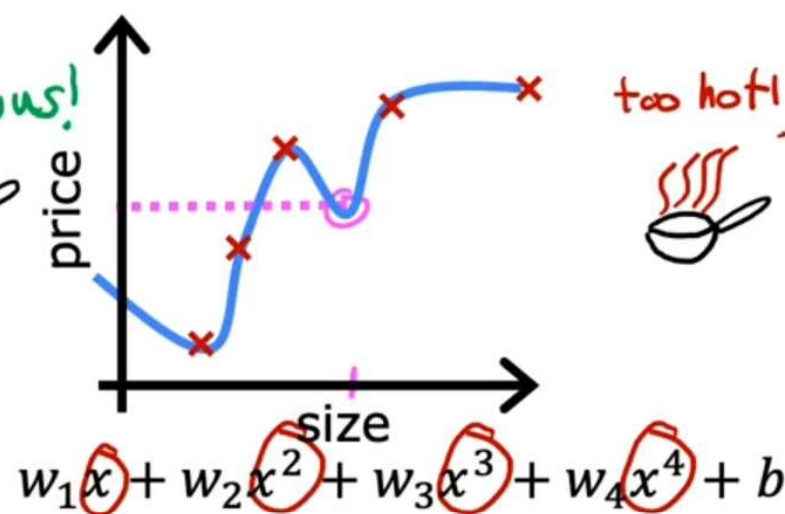
high bias



just right

- Fits training set pretty well

generalization

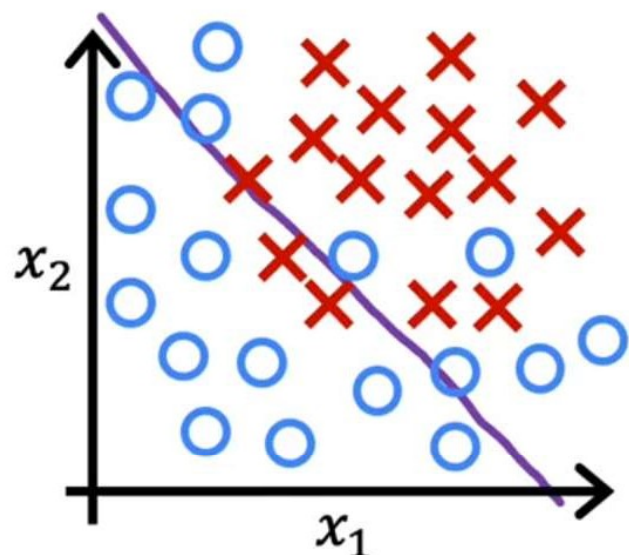


overfit

- Fits the training set extremely well

high variance

Classification

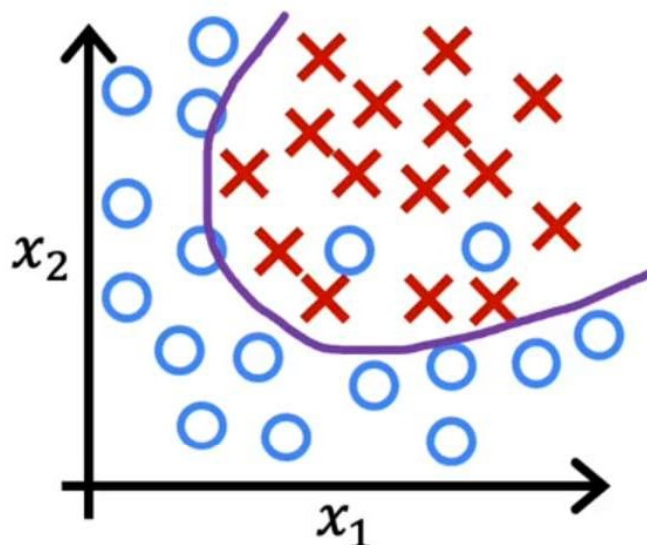


$$z = w_1 x_1 + w_2 x_2 + b$$

$$f_{\vec{w},b}(\vec{x}) = g(z)$$

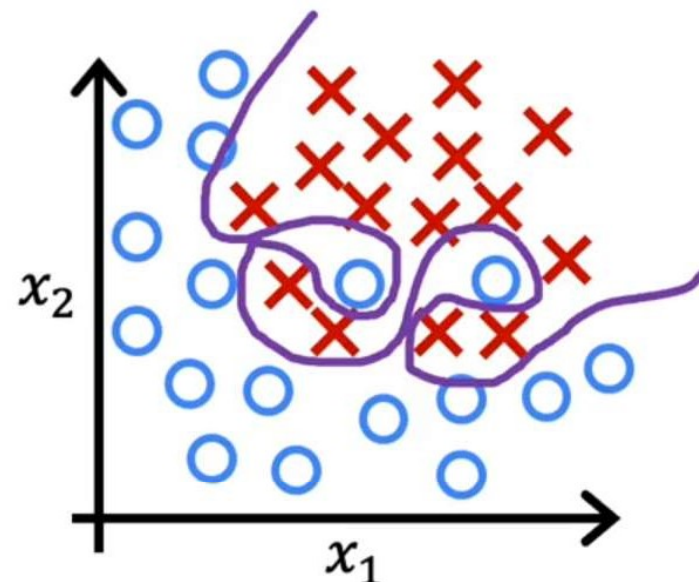
g is the sigmoid function

underfit high bias



$$z = w_1 x_1 + w_2 x_2 + w_3 x_1^2 + w_4 x_2^2 + w_5 x_1 x_2 + b$$

just right



$$z = w_1 x_1 + w_2 x_2 + w_3 x_1^2 x_2 + w_4 x_1^2 x_2^2 + w_5 x_1^2 x_2^3 + w_6 x_1^3 x_2 + \dots + b$$

overfit