

Stanford  
ONLINE

DeepLearning.AI

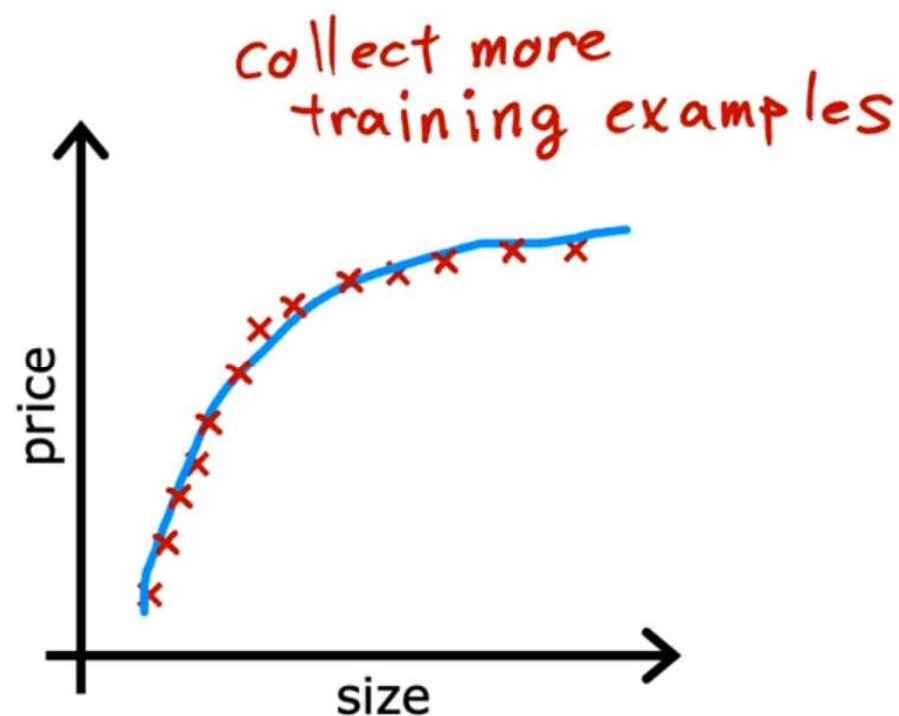
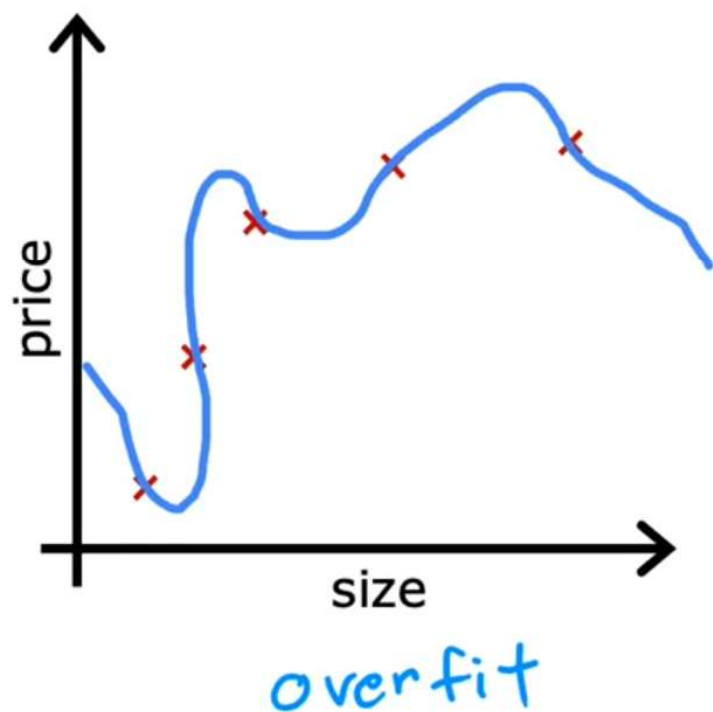


# Regularization to Reduce Overfitting

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## Addressing Overfitting

# Collect more training examples



# Select features to include/exclude

size $x_1$	bedrooms $x_2$	floors $x_3$	age $x_4$	avg income $x_5$	...	distance to coffee shop $x_{100}$	price $y$
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all features

+

insufficient data



overfit

selected features

size

bedrooms

age

just right

feature selection

course 2

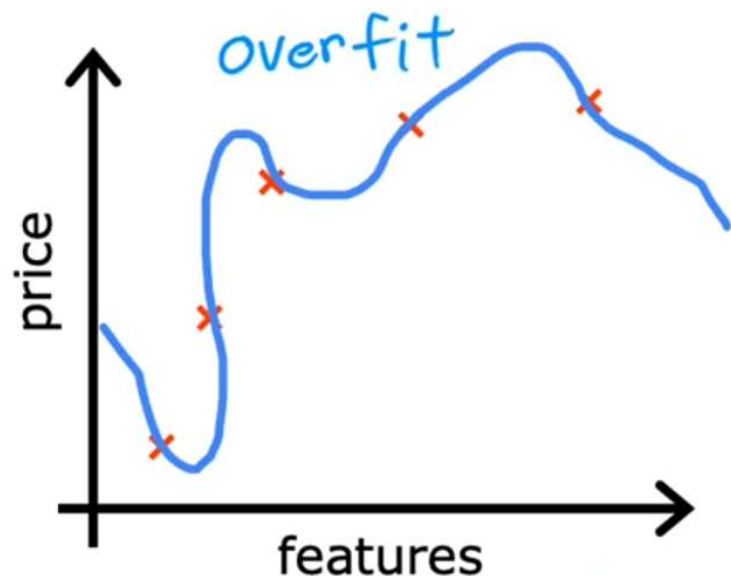
disadvantage



useful features  
could be lost

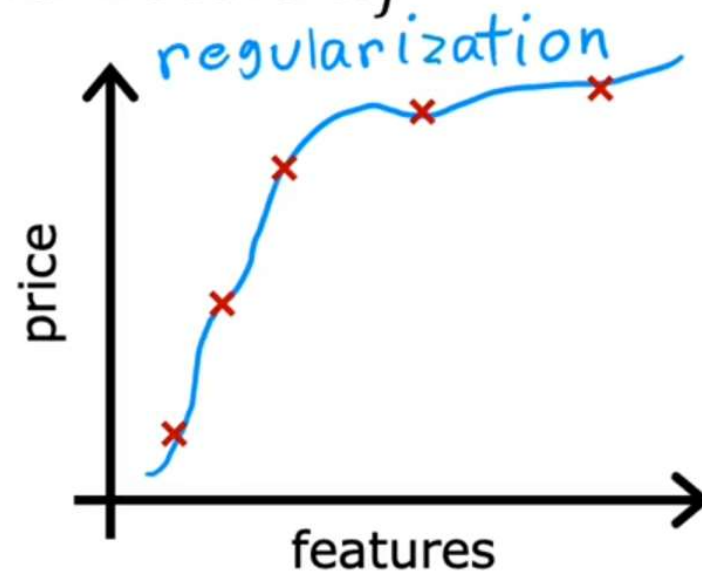
# Regularization

Reduce the size of parameters  $w_j$



$$f(x) = 28x - 385x^2 + 39x^3 - 174x^4 + 100$$

large values for  $w_j$  ← eliminate feature



$$f(x) = 13x - 0.23x^2 + 0.000014x^3 - 0.0001x^4 + 10$$

small values for  $w_j$

# Addressing overfitting

## Options

1. Collect more data
2. Select features
  - Feature selection *in course 2*
3. Reduce size of parameters
  - “Regularization” *next videos!*