Chapter01 Introduction

1. A set of function --- Goodness of function --- Pick the 'best' function
2. Learning Map

   Supervised Learning: a. Regression b. Classification c. Structured Learning

   Semi-Supervised Unsupervised Transfer Reinforcement

Chapter02 Regression

1. Regularization

$$\mathrm{L} = \sum_{n} \left(\hat{y}^n - (b + w_i x_i)\right)^2 + \lambda \sum (w_i)^2$$

   Smaller w means smoother

   Training loss in direct proportion to λ

   Testing loss first in inverse proportion to λ, then in direct proportion to λ

Chapter03 Bias and variance

1. Error due to bias and variance
2. More complicated model → Smaller bias and Larger variance
3. Bias too large → Underfitting Variance too large → Overfitting
4. What to do with larger bias?
   a) Add more features as input
   b) A more complex model
5. What to do with larger variance?
   a) More data
   b) Regularization
6. Cross Validation

   Cutting training set into training set and validation set

   Using the results of public testing data to tune the model