UCLA MSOL
CS260 Machine Learning Algorithms
Winter 2018

Week 5 - Midterm Review

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Outline

• Midterm logistics
• Topics to be covered
• Review of the topics
• Some Rehearsal Problems will be posted
Midterm Logistics

• Date and Time:
  – 1-3pm
  – Saturday February 10, 2018

• Location
  – 325 Botany

• Office Hour:
  – Thursday 8-10pm Thursday, February 8

• Policy:
  – Close-book and closed note
  – May bring two-page single-sided 8.5’x11’ cheat sheet
  – A Calculator IS allowed

• Coverage:
  – All contents covered in Lecture Notes (CS260-Lec1 to CS260-Lec5)
Topics Won’t Be Covered

- Chapter 1.3, 1.4
- Chapter 2
- Chapter 3.4
Topics Won’t Be Covered

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• Coverage:
  – Chapters 1 - 6, 10.3
What We Have Learned

- Basic concepts of machine learning
  - Learning Model
  - Learning Components
  - Learning Style
- The linear model algorithms
  - PLA/Pocket
  - Linear Regression
  - Logistic Regression
- The application of ML algorithms into solving the real-world problem
Framework of Machine Learning

unknown target function $f: \mathcal{X} \rightarrow \mathcal{Y}$

(ideal credit approval formula)

training examples $\mathcal{D}: (x_1, y_1), \ldots, (x_N, y_N)$

(historical records in bank)

learning algorithm $\mathcal{A}$

final hypothesis $g \approx f$

('learned' formula to be used)

hypothesis set $\mathcal{H}$

(set of candidate formula)
Things You Should Know Well

• Basic Concepts
  • target function
  • hypothesis set
  • training/test datasets
  • perceptron and PLA and Pocket algorithm
  • linear separate
  • linear regression, pseudo-inverse, squared errors
  • logistic regression, logistic function, gradient descent, cross-entropy errors
Linear Model Algorithm Comparison

Credit Analysis
- Approve or Deny
- Amount of Credit
- Probability of Default

Perceptron
- Classification Error
  PLA, Pocket, ...

Linear Regression
- Squared Error
  Pseudo-inverse

Logistic Regression
- Cross-entropy Error
  Gradient descent
Midterm Sneak Preview

• Philosophy
  – Test your digital fluency in two aspects:
    * Firm grasp of basic theories and techniques
    * Hands-on skills of designing and analyze a machine learning problem using the linear models

• Format:
  – Q & A
    ★ Conceptual problems
    ★ Design: solve a problem using one of algorithms
    ★ Analysis: pros and cons.

• Length:
  – Will have 4 to 6 problems
  – Points are assigned according to the estimated difficulty of the problems