CS 438/697 Applied Machine Learning

Midterm Examination Review

Spring 2015

Wei Ding

Schedule

The examination is close-book and close-note. However, you can prepare a cheat sheet using ONE piece of paper (size 8.50" * 11.00", double side, no less than 11-font size and single line space).

There are **65 minutes** for the Examination.

Class Time	Exam Time
4:00 PM	4:05 PM – 5:10 PM Thursday March 12
Must be at class room at 4:00 PM sharp	Assume it takes 5 minutes to distribute the examination papers

Preparation Materials

Lecture notes, in-classes exercise, Textbook, homework assignments.

Topics

1. Everything you have practiced in homework
2. All the questions we have practiced in the class
3. Introduction to Applied Machine Learning:
    - what is machine learning
    - the idea behind machine learning
    - explain machine learning using a real-world example
    - what is supervised learning
    - what is unsupervised learning
    - how to use training data in supervised learning
    - difference between classification and regression
    - difference between machine learning and statistics
4. Introduction to Pattern Recognition Part I
    - What is pattern recognition
    - What is feature extraction
    - What is polynomial curve fitting
    - How to define an error function in polynomial curve fitting

- What is the gradient descent algorithm; must understand its formal definition.
- What is the learning rate
- Understand why we use partial derivative in the gradient descent algorithm
- Understand how to plot hypothesis h and cost function J
- Understand how to do linear algebra addition and multiplication

5. Introduction to Pattern Recognition Part II
   - Explain what is over-fitting
   - Understand the relationship between over-fitting and size of the data set
   - How regularization is used with the sum-of-squares error term
   - Must know how to calculate partial derivative for θ_0 and θ_1 when n=1 (only one feature).
6. Theano: GPU Computing and Automatic Differentation for Python:
   - What is Theano?
   - What is CUBLAS?
   - What is the Nearest Neighbor algorithm?
   - Understand how to write one matrix operation for distance calculation