Machine Learning

Course Information:

Course number: CSE 446

Instructor: Ali Farhadi (ali[at]cs, CSE 652)

Class time: Tuesday, Thursday 9:00am-10:20am

Class location: EEB 125

TAs:

- Dae Hyun Lee (dhlee4@uw)
  Office Hours: Tuesdays 13:30-15:00 in CSE 007, 15:00-15:30 at 3rd floor breakout
- Jianyang Zhang (jianyz@uw)
  Office Hours: Mondays 9:00-11:00 in CSE 007
- Yue Zhang (yjzhang@uw)
  Office Hours: Thursdays 13:30-14:30 in CSE 007
- Deric Pang (dericp[at]cs)
  Office Hours: Fridays 15:30-16:30 (or by request) CSE 4th Floor Breakout
- Qiang (Andrew) Yu (shift90@uw)
  Office Hours: Wednesdays 13:30-15:30 in CSE 007

Contact: cse446-staff[at]cs[dot]washington

There will be no quiz sections.

Discussion board: CSE 446 Spring 2017

Exam:

The final exam is on Wednesday, June 7 2017, 10:30am - 12:20pm. The exam is open, you are welcome to bring the book, the lecture slides, and any handwritten notes you have. Laptops/tablets are allowed, but internet access is NOT allowed.

Syllabus Overview:

- 3/28
  - Introduction
  - Readings (Murphy): 1.1-1.4
- 3/30

- Introduction (continued)
- Readings (Murphy): Same as 3/28

- 4/4
  - Decision Trees
  - Readings (Murphy): 16.2, 16.4

- 4/6
  - Point Estimation
  - Homework 1: [pdf][tex]
  - Readings (Murphy): 2.4.1

- 4/11
  - Linear Regression
  - Linear Regression (marked)
  - Readings (Murphy):
    - Linear Regression Model: 7.1-7.3
    - Error metrics, overfitting, bias-var tradeoff: 6.4
    - Regularization, ridge regression: 7.5.1
    - LASSO: 13.1, 13.3-13.4.1

- 4/13
  - Linear Regression (continued)
  - Linear Regression (marked) (continued)
  - Readings (Murphy): Same as 4/11

- 4/18
  - Naive Bayes
  - Readings (Murphy): 3.5

- 4/20
  - Logistic Regression
  - Readings (Murphy): 8.1 - 8.3, 8.5.2
  - Homework 1 is due before the class.
  - Homework 2: [pdf] [tex]

- 4/25
  - Logistic Regression
  - Readings (Murphy): Same as 4/20

- 4/27
  - Perceptron
  - Readings (Murphy): 8.5.0, 8.5.4

- 5/2
  - Support Vector Machines
  - Support Vector Machines (marked)
  - Readings (Murphy): 14.5

- 5/4
  - Kernels (annotated)
  - Readings (Murphy): 14.4
  - Homework 2 is due before the class.
  - Homework 3: [pdf] [tex]

- 5/9
  - Boosting
  - Readings (Murphy): 16.4
- 5/11
  - Boosting (continued)
  - Readings (Murphy): Same as 5/9
- 5/16
  - Clustering
  - Readings (Murphy):
    - Clustering & K-means: 11.4.2.5
    - Mixtures of Gaussians: 11.2
    - EM: 11.4 - 11.4.2.3
- 5/18
  - Clustering (annotated)
  - Readings (Murphy): Same as 5/16
  - Homework 3 is due before the class.
  - Homework 4: [.pdf][.tex][country data]
- 5/23
  - PCA
  - Readings (Murphy): 12.1.0, 12.2
- 5/25
  - PCA
  - Readings (Murphy): 12.1.0, 12.2
- 5/30
  - Non-parametric methods
- 6/1
  - Neural Networks
  - Homework 4 is due 11:59PM.

Text Books:

- Machine Learning: a Probabilistic Perspective, Kevin Murphy, MIT Press, 2013.
- Optional: Pattern Recognition and Machine Learning, Christopher Bishop, Springer, 2007.
- Optional: Machine Learning, Tom Mitchell, McGraw-Hill, 1997.
- Optional: The Elements of Statistical Learning, Friedman, Tibshirani, Hastie, Springer, 2001.

Homeworks:

We will have 4 homework assignments, which will be listed below as they are assigned. The assignments will be given out roughly in weeks 2, 4, 6, and 8, and you will have two weeks to complete each one.

- Assignment 1: Decision Trees
- Assignment 2: Classifiers: Naive Bayes, Perceptron, Logistic Regression
- Assignment 3: SVMs and Ensembles
- Assignment 4: k-Means and EM.

Note that there is a deadline for each assignment. Anything uploaded after the deadline will be marked late. Please be careful to not overwrite an in time assignment with a late assignment when uploading near the deadline.

Each student has three penalty-free late day for the whole quarter, other than that any late submission will be penalized for each day it is late.

Please let the TA know if you cannot access any of the pages.

Grading:

The final grade will consist of homeworks (70%), a final exam (25%), and course participation (5%).

Course Administration and Policies

- Assignments will be done individually unless otherwise specified. You may discuss the subject matter with other students in the class, but all final answers must be your own work. You are expected to maintain the utmost level of academic integrity in the course.
- As we sometimes reuse problem set questions from previous years, please do not to copy, refer to, or look at any solution keys while preparing your answers. Doing so will be regarded as cheating. We expect you to want to learn and not google for answers.
- Each student has three penalty-free late day for the whole quarter. Beyond that, late submissions are penalized (10% of the maximum grade per day)
- Comments can be sent to the instructor or TA using this anonymous feedback form (coming soon). We take all feedback very seriously and will do whatever we can to address any concerns.

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