ECE M146 Introduction to Machine Learning

Spring 2020
Instructor: Prof. Lara Dolecek

Syllabus Date: March 30, 2020

Logistics Overview:

All the course materials will be posted on CCLE.

How to reach teaching staff:

Instructor and TAs will be available on Zoom through CCLE as follows:

Prof. Lara Dolecek OHs:
- Tuesday 1.30 - 2.30 pm
- Thursday 1.30 - 2.30 pm

Zehui (Alex) Chen OHs:
- Wednesday 1:30 - 3:30

Zehui (Alex) Chen Discussion:
- Discussion 1C Friday 12 - 12:50 pm
- Discussion 1D Friday 1 - 1:50 pm

Ruiyi (John) Wu OHs:
- Monday 12:30 - 2:30 pm

Ruiyi (John) Wu Discussion:
- Discussion 1A Friday 10 – 10:50 am
- Discussion 1B Friday 11 - 11:50 am

How to submit the homework and by when:

Homeworks are due on Thursday 11:59 pm every week. Please upload on CCLE.

Grade break down:

Weekly homeworks – 70 %
Assessment 1 in week 6 – 15 %
Assessment 2 in week 11 – 15 %

For Spring 2020: Note that you can take the class Pass/Not Pass. Pass Grade is C or better.

Reading Material:

Recommended reading is Hal Daume's book:

http://ciml.info/

Additional reading pointers will be provided as needed.

Detailed Weekly Schedule:

Week 1
- Lecture 1: Overview and math review. Reading: Daume Ch.1.1 -- 1.2
- Lecture 2: Perceptron. Reading: Daume Ch. 4

Week 2
- Lecture 3: Linear regression. Reading: Daume Ch. 7
- Lecture 4: More on regression, (stochastic) gradient descent. Reading: Daume Ch. 7

Week 3
- Lecture 5: Logistic Regression, Maximum Likelihood, Loss Functions. Reading: Daume Ch. 7
- Lecture 6: Decision Trees. Reading: Daume: Ch. 1

Week 4
- Lecture 7: kNN; cross validation; multi class classification. Daume Ch. 3.1 - 3.2, 5.6, 6.2
- Lecture 8: SVM. Reading: Daume Ch. 7.7, 11.5 and 11.6
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Week 5
- Lecture 9: Kernels Soft SVM and regularization. Reading : Daume Ch. 7 and 11
- Lecture 10: Review

Week 6
- Lecture 11: Assessment 1
- Lecture 12: Naive Bayes: Reading: Daume Ch. 9.1 - 9.3

Week 7
- Lecture 13: Gaussian discriminative analysis. Reading: Daume Ch. 9.5 -- 9.7
- Lecture 14: Gaussian discriminative analysis. Reading: Daume Ch. 9.5 -- 9.7

Week 8

- Lecture 15: Unsupervised learning. K-means clustering. Reading: Daume Ch. 15.1
- Lecture 16: PCA, eigen value decomposition. Reading: Daume Ch. 15.2

Week 9

- Lecture 17 [Monday is university holiday]
- Lecture 18: EM and soft kmeans

Week 10

- Lecture 19: Ensemble methods. Reading: Daume Ch. 13
- Lecture 20: Advanced topics and Review

Week of finals

- Assessment #2.