EEE 598: STATISTICAL MACHINE LEARNING: FROM THEORY TO ALGORITHMS
SPRING 2019 Course Information

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Class Meetings: MW 3:05pm - 4:20pm @ ECG 152
Office Hours: TBD

Course Description: This course will serve as a primer in statistical learning theory and as a platform for exploring emerging algorithms and theory in large scale data analytics. This study is at the intersection of information processing, statistical theory, and computational sciences. The class will contain a healthy mix of topics from all of these disciplines.

Prerequisites: Background in probability, statistics, linear algebra, and applied mathematics. Some facility in a programming language like Python, R, or Matlab will be assumed.

Instructor Consent: Future enrollment in the course would require instructor consent. Please fill out this form in its entirety: https://goo.gl/forms/Z6AhczqiIBdT2EEt1

Topics: A tentative list of topics that we will cover:
1. Introduction [motivation, definitions, terminology, probability, statistics, and linear algebra tools]
2. Concentration of measure and Empirical Risk Minimization
3. Vapnik-Chervonenkis Theory and binary classification
4. Structural risk minimization
5. Support Vector Machines
6. Ensemble methods [weak and strong learning, boosting, Adaboost]
7. Convex Losses and Radamacher Complexity
8. Logistic regression and LASSO
9. Johnson-Lindenstrauss Lemma, Sparsity, and Compressed Sensing
10. Graphical Models: Inference, Structure Learning, and applications
11. Clustering [k-means, k-means++, hierarchical, spectral]
12. Stochastic Gradient Descent (SGD) and Large Scale Optimization
13. Multi-armed Bandits, Active Learning
14. Online Learning
15. Ranking
16. Minimax lower bounds

Grading: Grades will be based on class participation, quizzes, homework assignments, presentations and/or project reports.

Textbooks: A textbook will not be followed in this course. A collection of notes, relevant papers and materials will be prepared and distributed.

Academic Integrity: Absolute professionalism in matters of academic integrity is expected. The minimum penalty for collaboration on an examination in this class will be a grade of E for the class. Other forms of academic misconduct will also incur harsh penalties. You are urged to review the ABOR Student Code of Conduct and disciplinary procedures.
http://students.asu.edu/files/StudentCodeofConduct.pdf
http://students.asu.edu/files/StudentDisciplinaryProceduresChapter5.pdf