C SC 74020: Machine Learning

Semester/Year: Fall/2020
Meeting Days & Times: Monday, 11:45~1:45
Location: Online (Blackboard)

Instructor's Name: Chia-Ling Tsai
Email: ctsai@gc.cuny.edu
Office Hours: By appointment

Prerequisites:

Data Structures (or sufficient programming courses), Linear Algebra

Course Materials:

Lecture slides, assignments and handouts are only available on the Blackboard site.

Textbook

- Learning from Data (AMLBook), by Yaser S. Abu-Mostafa, Malik Magdon-Ismail, Hsuan-Tien Lin

Other Recommended Text/Source Materials

- Pattern Recognition and Machine Learning (Springer), By Christopher M. Bishop
  ISBN-13: 978-0387310732
- The Elements of Statistical Learning (Springer), By Trevor Hastie, Robert Tibshirani, Jerome Friedman
- Interpretable Machine Learning, A Guide for Making Black Box Models Explainable, By Christoph Molnar, https://christophm.github.io/interpretable-ml-book/

Course Topics

The following is a tentative set of topics that will be discussed in class.
- Review on linear algebra and probability theory
- Types of learning and feasibility of learning
- Linear classification
- Linear regression
- Logistic regression
- Multiclass classification
- Nonlinear transformation
- Regularization
- Validation

- Aggregation model (decision tree and Adaboost)
- SVM
- Neural network
- Deep learning
- Unsupervised learning (K-Means)
- Dimensionality reduction (PCA)
- Machine learning pipeline

Grading Criteria & Assessment Information

Assessment Tool	Percentage of Grade
Homework assignments (3)	10% + 15% + 15%
1 midterm test	20%
Final project	40%

Test Policy:
The dates will be announced later. There is no scheduled make-up for a test; so, if for some reason you are unable to attend the exam, you should contact the instructor ahead of time to discuss the circumstances.

Class Participation Policy:
A good learning environment is one in which everyone feels welcome and comfortable; so, please be respectful of the diversity of backgrounds, beliefs, and lifestyles of the students in our class.

Laptops may be used in class only to take notes. ***The use of cell phones is strictly forbidden***. Violation of these policies will result in heavy penalty on the participation grade.

Project policy:
1. Assignments will be announced in class and posted on Blackboard (to save the trees).
2. All the homework assignments and final project can be done in pair.
3. Completed assignments are submitted on Blackboard.
4. Late submission penalty:
   One day late => 20% off the original grade
   One week late => 50% off the original grade
   More than one week late => 0%
5. At the bottom of each assignment, please include a section entitled: "Resources that Helped Me." If you had a good conversation with someone in the class, you had a good discussion with me during office hours, or you found a useful website that helped you understand a concept (without copying code from the website), you should list these resources at the end of your assignment. However, if you only used the textbook and the in-class lectures when you did your assignment, please specify "None" for "Resources that Helped Me" section.

Plagiarism:

Plagiarism is the unauthorized use or close imitation of the language and thoughts of another author/person and the representation of them as one's own original work. Plagiarism on a quiz, computer project, paper, or the final exam results in loss of credit for all involved. Plagiarism on the final exam may result in failure of the course.