SYLLABUS: EE 459/559 Big Data Analytics, Spring 2019

Course Information: Times: TuTh 3:30PM - 4:50PM; Location: Park 440; 3 credits

Instructor: Prof. Shaofeng Zou, 228 Davis Hall, szou3@buffalo.edu
Office Hour: Friday 1:00PM-2:00PM, 228 Davis Hall (other times by appointment)

Text book: There is no required textbook. Lecture notes will be provided. Some general references are given at the end.

Course Prerequisites: Calculus, Linear Algebra, Probability, Programming

Course Description: Data is everywhere, and petabytes of data is being collected everyday. The critical question is to analyze the collected data, and to extract knowledge and insights from data in various forms. This course will introduce students to the rapidly growing field of data analytics and equip them with the basic principles and tools. The course will be divided into two parts. The first part will focus on the foundations of machine learning, which include detection theory, learning theory, classification, regression, clustering, kernel methods, deep neural networks and reinforcement learning. The second part will focus on some practical applications, which include anomaly detection, community detection, average consensus, generative adversarial networks and quickest change detection.

Student Learning Outcomes:
1) Understand basic machine learning concepts and methods;
2) Understand theory behind the machine learning methods;
3) Be capable of designing and applying machine learning algorithms in practice and implementing on their own;
4) Be capable of analyzing machine learning problems and algorithms both practically and theoretically;
5) Be able to identify practical problems, and select machine learning methods to solve them.

Homework, Exams, Project and Grading Policy *(No late submissions will be accepted)***:**
1) Homework will be assigned every three weeks (approx.) with three in total. *Score: 30%*
2) One mid-term exam at the end of March. *Score: 30%*
3) One final project. The presentation will be on May 7th and 9th 2019. The report is due by May 17th 2019. *Score: 30%*
4) 5 random quizzes during class. *Score:10%*
5) There will be no final exam.

Academic Integrity
Academic integrity is a fundamental university value. The students shall follow the university guidelines.
https://catalog.buffalo.edu/policies/integrity.html
https://grad.buffalo.edu/succeed/current-students/policy-library.html

Accessibility Resources
If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources, 25 Capen Hall, 645-2608, and also the instructor of this course. The office will provide you with information and review appropriate arrangements for reasonable accommodations.
https://www.buffalo.edu/studentlife/who-we-are/departments/accessibility.html

General references
1. Trevor Hastie, Robert Tibshirani, and Jerome Friedman. The Elements of Statistical Learning (2nd Edition). Springer Series in Statistics. Springer New York Inc., New York, NY, USA, 2008.
2. Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani. An Introduction to Statistical Learning with Applications in R. Springer Series in Statistics. Springer New York Inc., New York, NY, USA, 2013.
3. Ian Goodfellow and Yoshua Bengio and Aaron Courville. Deep Learning. MIT Press, 2016.
4. Andrew Ng's notes. http://cs229.stanford.edu/materials.html

Final Grades:

A	A-	B+	B	B-	C+	C	C-	D+	D	F
93-100	90-92.9	87-89.9	83-86.9	80-82.9	77-79.9	73-76.9	70-72.9	67-69.9	60-66.9	0-59.9