CSCI/ARTI 8950
Machine Learning
Spring 2020

Instructor
Dr. Sheng Li
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University of Georgia
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Course website: http://cobweb.cs.uga.edu/~shengli/CSCI8950S20.html

Time and Location of the Lectures:
M: 2:30 pm - 3:20 pm
TR: 2:00 pm - 3:15 pm
Boyd GSRC 208

Office Hours and Location
Thursdays: 1 pm - 2 pm or by an email appointment.
Location: Boyd GSRC 804

Course Description
This course provides students with an in-depth introduction to machine learning theory, models and applications. The course covers classical machine learning algorithms for clustering and classification, and also discusses some emerging issues in machine learning such as fairness.

This course will be research oriented, encouraging students to explore the recent advances in machine learning field. The instructor will review the basic concepts of machine learning and briefly introduce some advanced topics. After that, students will present research papers from the reading materials. In addition, students will need to work on a research project on machine learning theory, methodology, or applications.
Course Objectives
Students will learn how to use and design machine learning algorithms for real-world problems.

Recommended Prerequisites
CSCI 6380 or CSCI 6550 or CSCI 6560

Credit Hours
4

Reading Materials

Course Topics
1. Overview of machine learning
2. Decision Trees
3. Geometry and Nearest Neighbors
4. Perceptron
5. Multiclass Classification
6. Bias and Fairness
7. Linear Models
8. Probabilistic Models
9. Neural Networks
10. Deep Learning

Grade Distributions
Class Participation  5%
Homework          10%
Midterm           30%
Paper Review      10%
Paper Presentations 10%
Final Project     35%

Grade Conversion
- A:    [93,100]
- A-:   [90,92]
- B+:   [87,89]
- B:    [83,86]
- B-:   [80,82]
Grading Policy

- **Late Submission Policy:** Late submissions will be penalized by deducting 10% of the score for each day beyond due time.
- **Regrade Request:** The regrade request must be submitted by email (to TA and Instructor) within one week of distribution of your grade. Any regrade request after one week will NOT be considered.

Reading Assignments and Paper Reviews

Students will be required to review 5 papers over the semester and submit the review to eLC by **11:59PM of the due date** shown in class schedule on course website. The reviewed paper should be chosen from the papers that will be presented in the following classes (Refer to classes schedule for more details). The reviewed papers should **not** contain the papers you’re going to present in the class. The review should summarize the main idea and contributions of the paper, describe the major experimental results, and discuss the strengths and weaknesses of the paper. The students are also encouraged to check the follow-up works on the topic of the assigned paper (e.g., search the latest papers that cite the assigned paper), summarize the state-of-the-art methods and results, and discuss possible future research directions.

Class Participation and Paper Presentations

Each student will be required to present one research paper over the semester. Each presenter should prepare slides for a **25 minutes talk** on the paper. **Slides for the talk must be emailed to the instructor by midnight (12:00am) before the class.** The talk should clearly address the following points: (1) motivation and problem statement; (2) related work; (3) methodology; (4) experiments; (5) conclusions; and (6) at least 3 questions for discussions. The presenter will need to lead another **10 minutes discussion** during or after the talk. The presenter should prepare discussion questions that lead to a deeper analysis of the paper’s content, strengths, weaknesses, and future works.

Research Project

Students are required to work on an individual or group (no more than three students) research project on machine learning over the semester. Research project will be evaluated based on the novelty, efforts, technical soundness, presentations, and the quality of final report.
Academic Integrity and Ethics
We will strictly follow UGA’s Academic Honesty Policy. Dishonest behavior will not be tolerated and may result into failing the course. Please contact the instructor if you have any concerns regarding this issue.