Machine Learning Methods for Biomedical Informatics

Instructor: Prof. Jianlin Cheng

Department: Computer Science, University of Missouri, Columbia

Location: Strickland Hall 209; **Time**: MoWe 11:00 am - 12:15 pm; **Office Hours**: MoWe 1:30 - 2:00;

Semester: Fall 2016

Prerequisite: some background in bioinformatics, machine learning or data mining

Course web site: http://calla.rnet.missouri.edu/cheng_courses/mlbioinfo/mlbioinfo.htm

Objectives:

This course teaches several most advanced machine learning methods (e.g. hidden Markov models, neural networks, deep learning, support vector machines, and Bayesian networks) and their applications in Bioinformatics. The course intends to achieve two major goals. The first goal is to help students understand the theories of advanced machine learning methods. The second goal is to teach students how to develop Bioinformatics tools using the methods.

Topics:

1. Hidden Markov models and their applications in bioinformatics

2. Neural networks, deep learning and their applications in bioinformatics

3. Support vector machines and their applications in bioinformatics

4. Bayesian networks and their applications in bioinformatics

Homework:

Reading of classic papers (self paced, not graded)
A comprehensive group project of applying machine learning methods to a bioinformatics problem. Each group has up to 4 students.

Grading:

Class participation (30%), project presentation (40%) and report (30%).

References:

1. Baldi and Brunak. Bioinformatics: the Machine Learning Approach (Second edition). MIT press, 2001.
2. Durbin, Eddy, and Krogh. Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids. Cambridge University Press, 1999.

Disability Accommodations:

If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need to make arrangements in case the building must be evacuated, please let me know as soon as possible.

If disability related accommodations are necessary (for example, a note taker, extended time on exams, captioning), please establish an accommodation plan with the Disability Center (http://disabilitycenter.missouri.edu), S5 Memorial Union, 573- 882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for persons with disabilities, click on "Disability Resources" on the MU homepage.

Academic Integrity

Academic integrity is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards breaches of the academic integrity rules as extremely serious matters. Sanctions for such a breach may include academic sanctions from the instructor, including failing the course for any violation, to disciplinary sanctions ranging from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, collaboration, or any other form of cheating, consult the course instructor.