Course Flyer  Spring 2014  ECEN689.611

Machine Learning with Networks

When (tentative): MW 10:30AM – 12:00PM

Where (tentative): THOM 122

Instructor: Xiaoning Qian (xqian@ece.tamu.edu)

Course webpage: http://www.ece.tamu.edu/~xqian/courses/ECEN689_mln/

Credit: 3

Course Description:

The major focus of this course is to introduce the basic machine learning techniques together with advanced methods and their applications to analyze structured data represented as networks in many fields, including social networks, computer networks, especially biological networks in computational biology.

Audience: Machine learning to analyze structured data represented as graphs or networks provides useful tools to analyze the outbursting amount of data from different disciplines, such as biology, engineering, social science, etc. Students working in various fields will benefit from the course.

Topics: Bayesian learning with linear models (supervised and unsupervised), Markov models (finite Markov chains, hidden Markov models, Markov random fields), Network-based algorithms (network clustering, network diffusion, etc.), Learning with network prior (structured sparsity)

Prerequisites:

1. Undergraduate-level linear algebra, multivariate calculus, and probability theory
2. Basic programming skills in any programming language (C, C++, Java, Matlab, etc.)

Recommended books:

1. David Barber, Bayesian Reasoning and Machine Learning (ISBN 9780521518147)

Grading (tentative):

Homework (written + programming) 50% + Midterm (30%)+ Course Project (20%)