UNIVERSITY OF NEBRASKA AT OMAHA

STAT 8730: Advanced Statistical Machine Learning

TR 4:00 PM – 5:15 PM | On-Campus | Dr. Xiaoyue Cheng

Description:
Advanced Statistical Machine Learning is the second course in machine learning course sequence, following MATH/STAT 4450/8456 (Introduction to Machine Learning). This course will focus on machine learning techniques that investigate variable association, like unsupervised learning and graphical models.

Tentative topics:
1. Clustering: k-means, hierarchical clustering, model-based clustering
2. Dimension reduction: principle component analysis, self-organizing maps, multidimensional scaling
3. Other unsupervised learning methods: association rules, page rank
4. Mixture models and EM algorithm
5. Graphical models: Bayesian networks
6. Sequential data analysis: Markov models, hidden Markov models
7. Sampling methods: rejection sampling, importance sampling

Software: R or Python.

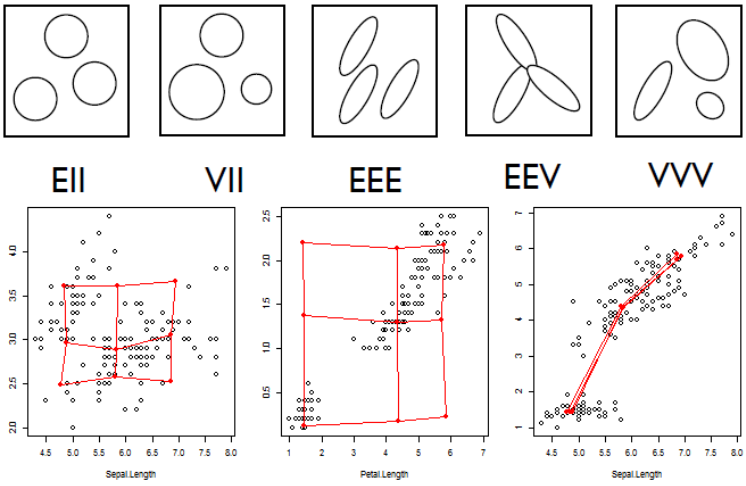
Pre-requisites:
MATH 4750 or permission of instructor.

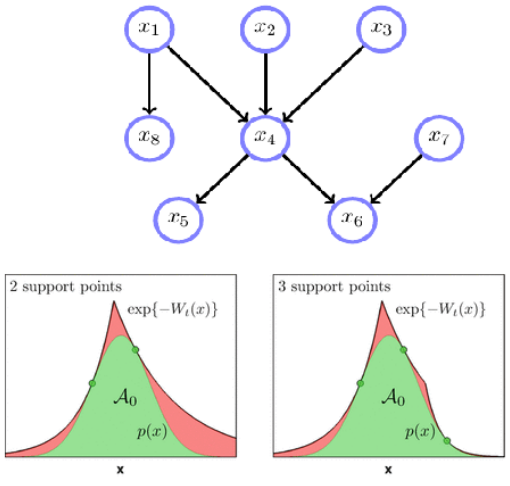
Textbooks:
- The Elements of Statistical Learning: Data Mining, Inference, and Prediction
- Pattern Recognition and Machine Learning
- Bayesian Reasoning and Machine Learning
- Machine Learning: A Probabilistic Perspective

Teaching presentation:
Students will be assigned academic papers on machine learning topics to read, learn, reproduce the results, and lead a discussion in class.

Machine learning contest:
A regression-based prediction competition will be held. Students will search for the best predictive model and give a presentation.

Research project:
Each student will complete a project using machine learning methods on some research topic.





For More Information:

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University of Nebraska Omaha