CSCE 496/896: Machine Learning	**Fall Semester, 1999**

List of Topics

August 23, 1999 — *Handout 2*

— SUBJECT TO CHANGE —

1. Overview of machine learning
   [**Chapter 1**]

2. Concept learning, version spaces, inductive bias
   [**Chapter 2**]

3. Sample complexity, PAC learning, introduction to VC dimension, mistake bounds
   [**Sections 7.1–7.4.3, 7.5–7.5.3, 7.6**]

4. Decision trees, overfitting, Occam's razor
   [**Chapter 3**]

5. Artificial neural networks, perceptrons, Winnow, gradient descent, exponentiated gradient, backpropagation, VC dimension of neural networks
   [**Chapter 4, Section 7.4.4, selected papers**]

6. Estimation, confidence intervals, comparing classifiers, holdout, leave-one-out cross-validation
   [**Chapter 5**]

7. Bagging, boosting, combining learned classifiers
   [**Section 7.5.4 and selected papers**]

8. Bayesian learning, MAP, ML, MDL, Bayes optimal classifier, Gibbs algorithm, naive Bayes algorithm, Bayes networks, EM algorithm, using labeled and unlabeled data
   [**Chapter 6, selected papers**]

9. Instance-based learning, k-nearest neighbor, locally weighted regression, radial basis functions
   [**Sections 8.1–8.4, 8.7**]

10. Support vector machines **(time permitting)**
    [**selected papers**]

11. Genetic algorithms and genetic programming **(time permitting)**
    [**Chapter 9**]

12. Learning sets of rules, inductive logic programming **(time permitting)**
    [**Chapter 10**]

13. Reinforcement learning
    [**Chapter 13**]

Important dates: Monday, September 6 (Labor Day Holiday, no class)
Monday, October 18 (fall break, no class)
Wednesday, November 24–Friday, November 26 (Thanksgiving break, no class)
Monday, December 6–Friday, December 10 (dead week, project presentations)
Monday, December 13 (project reports due)