CS594: Artificial Intelligence, Fall 2004
Due: Monday, November 29, 2:10 PM (either bring to class or email to parker@cs.utk.edu before class)

Homework 7

1. (Bayesian vs. ML): Work problem 20.4 on page 760 in the text ("Two statisticians…").

2. (Naïve Bayes classifiers): Consider a naïve Bayes classifier with three Boolean input variables, W, X, and Y, and one Boolean output, Z:

   $$P(W, X, Y \mid Z) = P(W \mid Z)P(X \mid Z)P(Y \mid Z)$$

   a. Draw the equivalent Bayesian network.

   b. How many parameters are to be estimated and how many would have been needed if the Naïve Bayes assumption were not made?

3. (EM for Bayesian Learning): Work problem 20.10 on pages 760-761 in the text ("Consider the application of EM…"). In part b, note that some of the calculations have been done for you on pages 729 and 730. In part c, assume $\theta = 0.5$.

4. (Neural nets): Work problem 20.11 on page 761 in the text ("Construct by hand…").

5. (Back propagation): Work problem 20.19 on page 762 in the text ("Suppose that a training set…").