COMPSCI 271 - Machine Learning
Homework Due 11/1/07

1 SVMs I

Do problem 7.2.

2 SVMs II

Pick one of the many publicly available SVM implementations and familiarize yourself with it by trying some sample data sets. Produce a graph of the resulting decision boundary and turn it in. Tell us which implementation you chose and why. (Wasn't that easy?)

3 SVMs III

Prove or disprove the following claim: If a dataset is linearly separable with a linear kernel, then a support vector machine will return the same, linear decision boundary for any polynomial kernel applied to the same dataset.

4 SVMs IV

Describe a kernel that forces every data point to be a support vector and justify your answer. (Hint: Look carefully at the objective function in the dual formulation of the SVM.)

5 Bayes Nets I

Do problem 8.3

6 Bayes Nets II

Do problem 8.4.

7 Bayes Nets III

Do problem 8.10.

8   Bayes nets IV

Consider a Bayesian network where the undirected structure (structure that results if you remove the arrow ends from the arcs) forms a singly connected loop of n nodes. What is the computational complexity of computing the marginal distribution of any single variable in this Bayes net in terms of n.

9   Bayes V

Consider a distribution over 4 random variables in which there is no exploitable conditional independence. How many Bayes nets are compatible with this distribution?