

CS478 Machine Learning
Spring 2000
Assignment 3

Due electronically by Thursday, March 30, 11 a.m.

1. Exercise 10.1 in *Mitchell*.
2. Exercise 10.2 in *Mitchell*.
3. Exercise 10.3 in *Mitchell*.
4. Exercise 10.4 in *Mitchell*.
5. Exercise 8.3 in *Mitchell*.

6. Comparison of Learning Algorithms

You've just designed three machine learning systems that can predict whether the stock market will go up or down tomorrow given as input a set of attribute-value pairs that describe the movement of today's market. The first system is propositional rule-learning system like CN2. The second system is an instance-based (i.e, case-based) algorithm that uses a nearest-neighbor similarity/distance metric for case retrieval. The third is a decision tree trained using the ID3 algorithm for top-down induction of decision trees. Assume that all systems achieve equal accuracy on all of your test data. In the end, you manage to convince skeptical traders from a prominent Wall Street trading firm agree to use your systems for stock market prediction.

- (a) Which system will the traders prefer when they want to be able to make predictions about tomorrow's market as quickly as possible? Why?
- (b) Which system will they prefer when they want a justification of the system's reasoning? Why?
- (c) The traders have gathered new training data and want you to update the concept description derived by each system to include the new training data. Compare how each of the three systems could handle this task.