

# CS322 Fall 1999

## Module 12 (Neural Network Learning)

### Assignment 12

Due: 1:30pm, Friday 3 December 1999.

#### Question 1

The following is the same data from assignment 11:

| Example  | <i>bought</i> | <i>edu</i> | <i>first</i> | <i>visited</i> | <i>more_info</i> |
|----------|---------------|------------|--------------|----------------|------------------|
| $e_1$    | false         | true       | false        | false          | true             |
| $e_2$    | true          | false      | true         | false          | false            |
| $e_3$    | false         | false      | true         | true           | true             |
| $e_4$    | false         | false      | true         | false          | false            |
| $e_5$    | false         | false      | false        | true           | false            |
| $e_6$    | true          | false      | false        | true           | true             |
| $e_7$    | true          | false      | false        | false          | true             |
| $e_8$    | false         | true       | true         | true           | false            |
| $e_9$    | false         | true       | true         | false          | false            |
| $e_{10}$ | true          | true       | true         | false          | true             |
| $e_{11}$ | true          | true       | false        | true           | true             |
| $e_{12}$ | false         | false      | false        | false          | true             |

We want to use this data to learn the value of *more\_info* as a function of the values of the other variables.

In this assignment we will consider neural network learning for this data. We have a Java applet and a CILog program that can be used to answer this assignment.

- Consider neural network learning with no hidden layers. After the network has converged, what are the parameter values? What is the Boolean function that the network represents? Are all the training examples classified correctly (if not, which aren't)? Give two examples, not in the training set, and specify what the predicted values is.
- Consider neural network learning with one hidden layer containing two variables. After the network has converged, what are the parameter values? What is the Boolean function that the network represents? Are all the training examples classified correctly (if not, which aren't)? Give two examples, not in the training set, and specify what the predicted values is.
- For the network with a hidden layer what is a local minima of the learning rate (within one decimal point)? The value to minimize is the number of steps before the error gets below 1.0. Hint: there is a local minima in the range [0.3, 7.0].

#### Question 2

For each question in this assignment, say how long you spent on it. Was this reasonable? What did you learn?