CIS 635 Data Mining

Homework 6

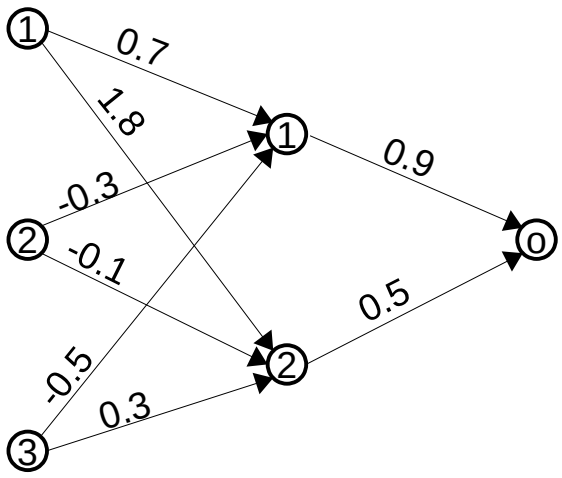
Description

Homework 7 reinforces the concepts in ANN.

Instructions

Part 1 – classifying instances using ANN

The ANN to the write has 3 input nodes (1, 2 and 3), 2 nodes in the hidden layer (1 and 2) and the output node. Assume that the threshold function in the hidden layer is a step function that output 1 if the sum of its inputs is >= 0 and -1 if the sum is less than zero. There is no threshold function for the output layer – it simply outputs the sum of its inputs. Calculate the output for the following inputs



1. {1, 1, 1}

2. {1, 5, -3}

Part 2 – calculating weights in a perceptron in R

For this part, you are to do one iteration of calculating the weights for a single perceptron. Use the data to the right. For the initial weights use w={0.1, 0.1, 0.1} and use a learning rate of 0.1. Use the update formula from the book or from the lecture video/slides.

x0	x1	x2	cls
1	0	1	-1
1	1	0	-1
1	1	1	1
1	0	0	-1

Part 3 – building models in R

You have been provided a data set with many instances with 5 variables – 4 numeric and 1 class. The data set is separated into a training set, hw06dataTrain.txt and a test set hw06dataTest.txt.

Follow these directions to process the data, create models and examine the results:

1. Use neuralnet to build a model with the training set. Use 3 hidden nodes and be sure to set.seed(1) before each time you create the model.
2. Plot the neural network
3. Predict the results using the test set. Create a confusion matrix using the table command.