314 ASSIGNMENT 3

Artificial Neural Network

Output activation function

I chose the sigmoid activation function. This is because the output is either 0 or 1 (malignant vs non-malignant). The sigmoid function limits the output to this range.

Learning rate

A slower learning rate was usually beneficial, because if it was too high, the weight updates jumped around, and the network would never converge. I experimented with a couple of different values, and decided to use 0.1 as the learning rate. This means that the weights do not change too drastically per training instance.

Stopping condition

To test whether the network should stop training, I determined if the weight adjustment had significantly diminished over a number of iterations.

This means that the training data is no longer making changes to the weights, and there is no point in training further.

Accuracy and F-measure

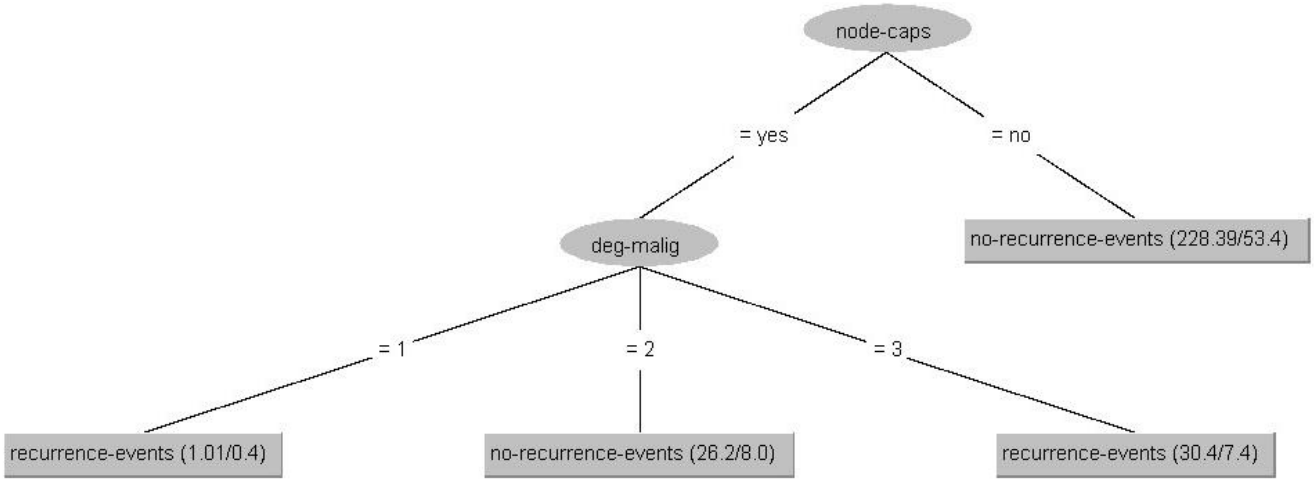
The network scored an accuracy of 80% and an F-measure of 0.55.

Data pre-processing

Data with missing values were removed from the set, as there were plenty more data points to use.

C4.5 Weka Decision tree

The following is the tree produced by the Weka software, which correctly classifies the data 75% of the time.



Performance

Model	Accuracy	Runtime
Neural network	80%	High
Decision tree	75%	Low

How to replicate results

Open the program with CLion on windows and click run,