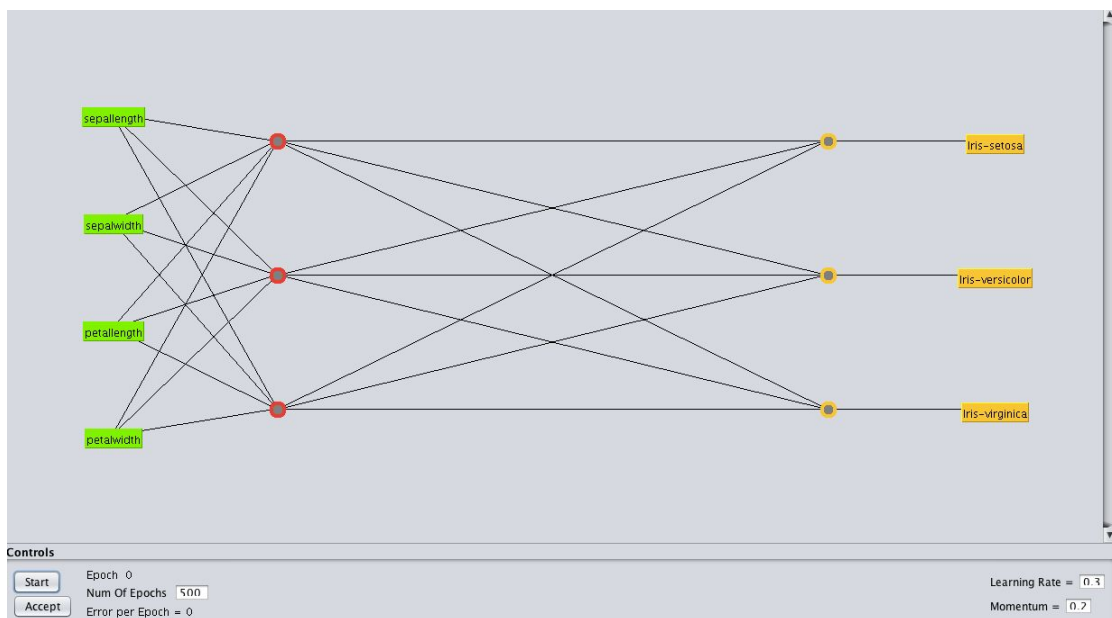


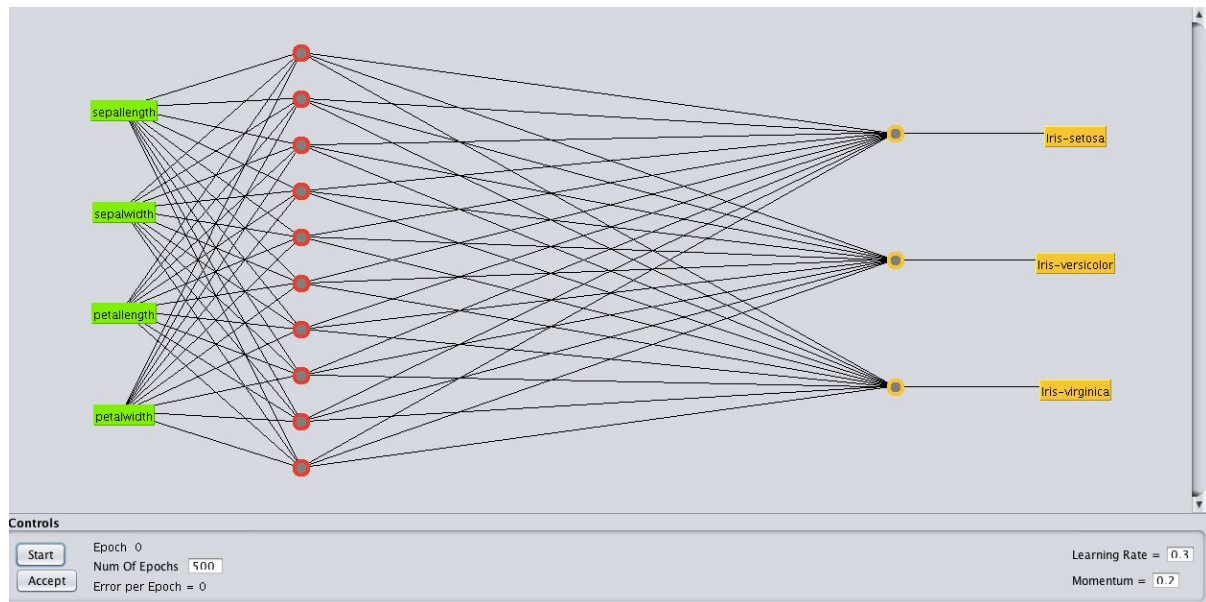
Perceptron and Neural Network

A neural network (ANN) is a computational model that has nodes that are connected with links, each link has a weight that is set up random t. The basic part of an ANN is called a perceptron, so an ANN is based on different layers of nodes, the input layer, the hidden layers (can be more than one) and the output one. The way it learns is by a cycle of feed-forward and back-propagation , it calculates the output with the input and the weight and calculates the errors to back propagate it to the layers and update the weights.

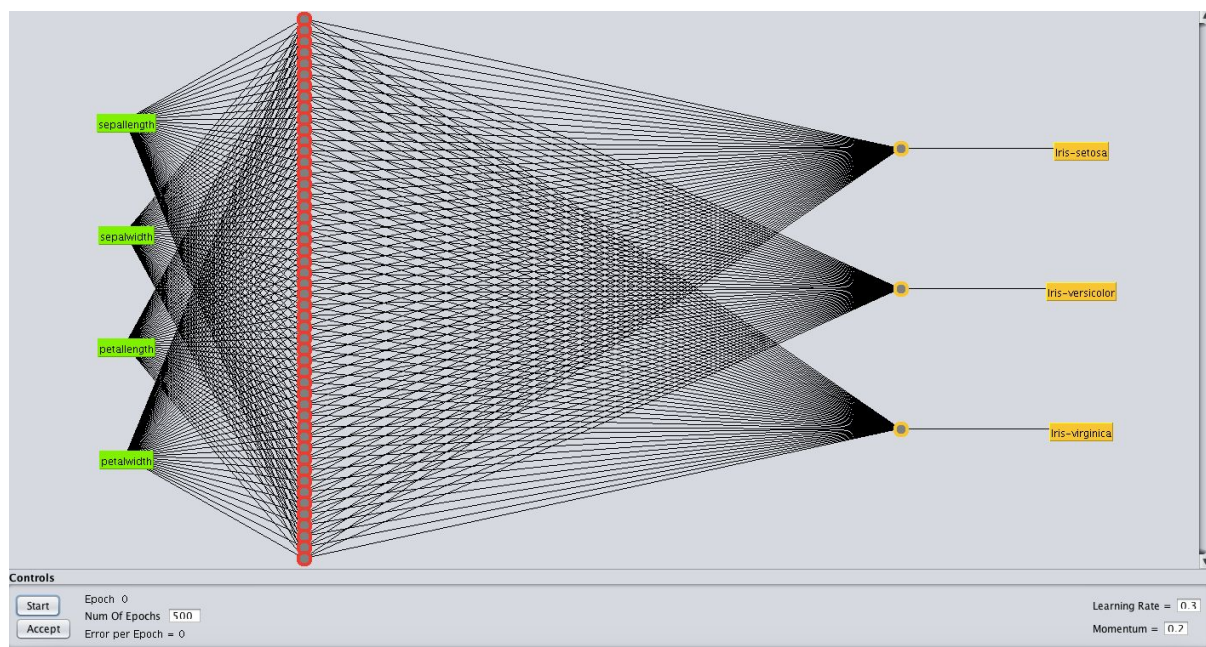
For the task with WEKA we used the iris dataset



Time: 68.18 sec Correctly Classified Instances: 98.66%



Time: 22.58 sec Correctly Classified Instances: 33.33%



Time: 16.18 sec Correctly Classified Instances: 33.33%

For working the neural networks in WEKA we needed to use the MultilayerPerceptron, it gives the nodes, time, accuracy, etc as text but it can also show it a graphic way
We were increasing the number of hidden layers in the neural network to see how many time it needed to build it and the accuracy of it.

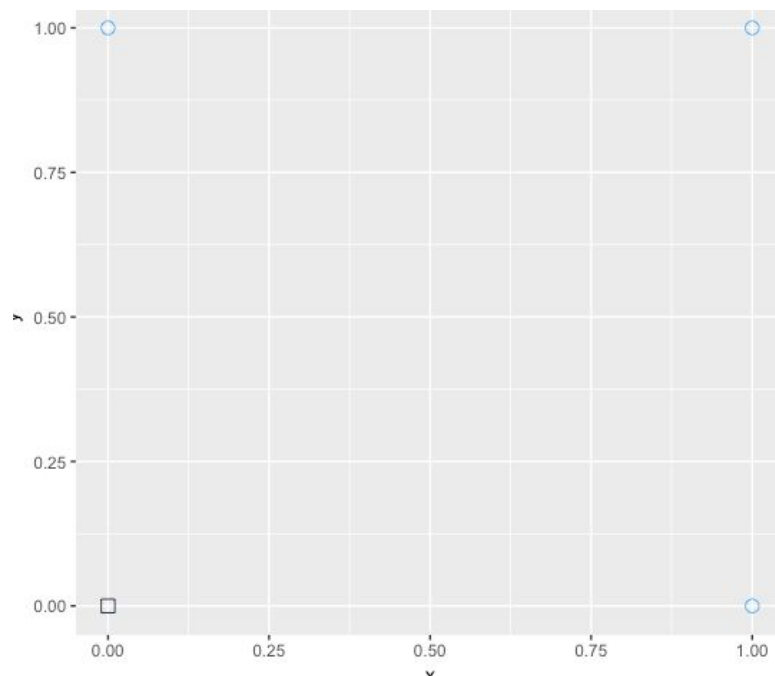
Neural networks are getting more important and used these days, they are used for illness prediction such as Brittany Wenger that has been working on a neural network for detecting cancer. Google just release their newest neural network autodraw that turns your doodle into art.

ANN has increased their power over the past years because of the amount of data that we have, neural networks learn to predict in a more accurate way, and they learn by examples, the data that is around us help this AI to gain more power and accuracy over the years.

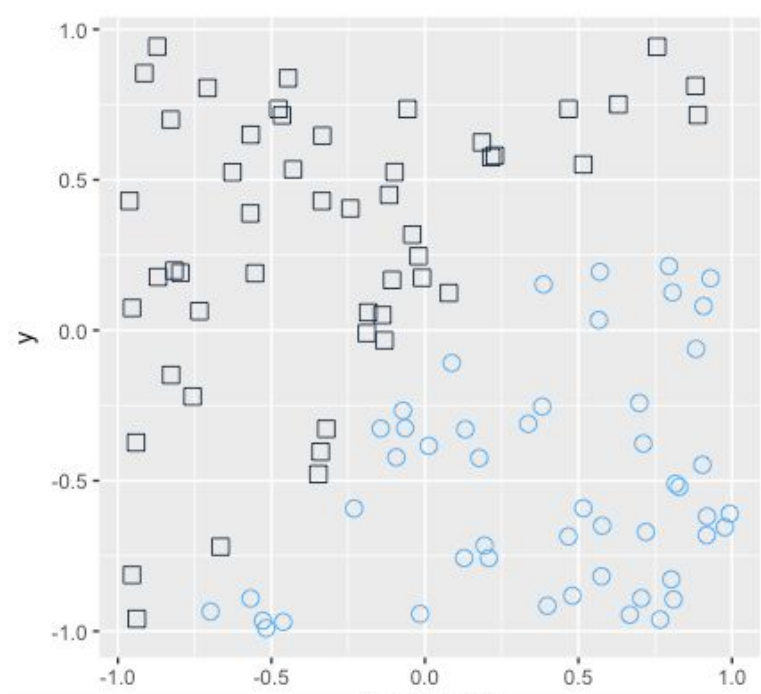
Based on a paper by Laura Diane Hamilton in which she defines which algorithms perform better in certain tasks. It is used mainly for image or video recognition, human tasks such as car self driving and a lot for robotics.

She mentioned that neural networks as any other algorithm has its pros and cons. An ANN is extremely powerful, can model very complex relationships, doesn't need to understand the underlying data but it can achieve overfitting, it may take a long time for training, requires computing power for big datasets.

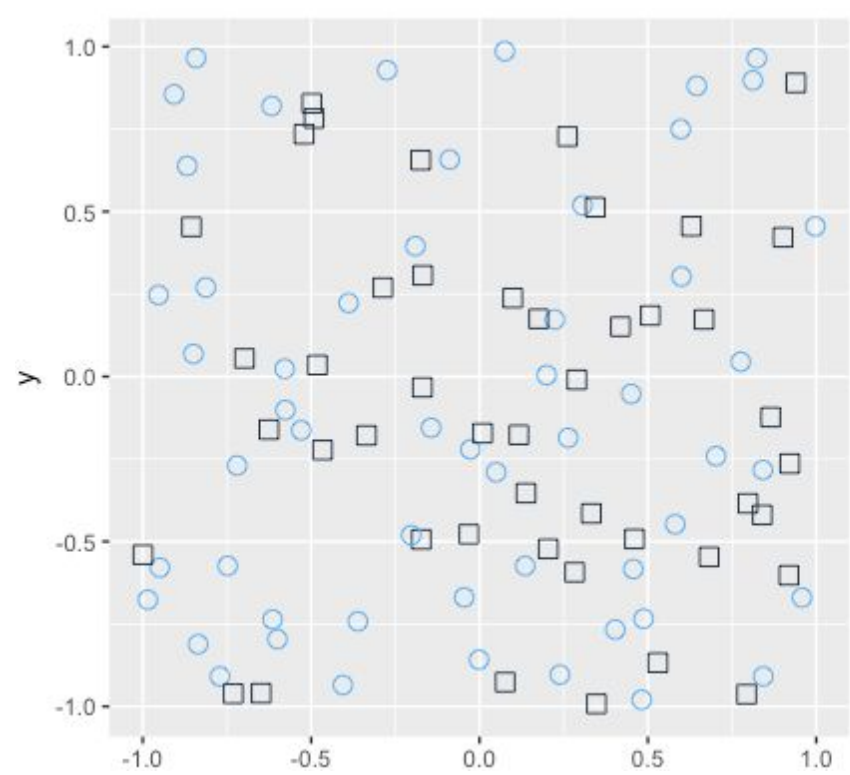
Test 1



Test 2



Test 3



As we can observe in the test images , only test 2 is linearly separable, this means that it can be really separated in two possible outputs by a straight line, so each point of the first class are in one half-space and those of the second class are in the other half. Linearly separable data sets are much easier to predict.

References:

<http://www.lauradhamilton.com/machine-learning-algorithm-cheat-sheet>