## Linear & Non-Linear Separation

Linear separation is where objects from different classes can be separated by “drawing” a line (hyperplane in general) that separates the classes without errors.

Non-linear separation is very similar to linear separation - separate objects so that each object belongs to the right class. However, non-linear separation not bound be being linear. This means that it is possible to separate data using multiple lines, circles or any other shape to separate objects.

## Decision Trees

A decision tree is a classifier that looks at the various independent variables of a dataset and creates a tree-like structure (full of if statements) to define a class for each object of the dataset.

Decision trees provides explicit knowledge on the data.

The classification model is interpretable (a hierarchy of rules)

## Neural Networks

Neural networks have been developed to mimic and simulate principles of the biological brain. They generally consists of a set of neurons connected by edges.

A simple explanation is where neural networks behave as a boolean function. Take a neuron that sums up all inputs. It has a threshold of 0.4. Let’s assume that each edge has a value of 0.3. Each input therefore has to be multiplied by the weight (0.3) and then summed up in the neuron. If the sum is above 0.4, the neuron outputs 1. If the sum is less than 0.4, the neuron outputs 0.

## Support Vector Machines

Support Vector Machines (SVM) is a way to find the separator that has the maximum margin to the two objects, thus minimizing error rate when new objects are added.