FIT5186 Intelligent Systems

Week 7 Tutorial

Consider the problem of determining clusters from the following data points:

(0, 0.2), (0.1, 0), (0.1, 0.1), (0.5, 1), (0.6, 0.9), (0.65, 0.9), (0.6, 1), (1, 0.3), (0.9, 0.3), (0.9, 0.35), (1, 0.35)

Use a self-organising feature map (SOFM) with a linear array of 4 neurons to determine the clusters within the data:

(i) Perform one epoch by hand calculations (or at least present the first few inputs to make sure you understand how the algorithm works)

(ii) Use NeuroShell 2 (advanced system) with the following parameter values:

learning rate = 0.95	initial weights = 0.5
initial neighbourhood size = 3	number of epochs = 500

Choose random presentation of patterns, and the Euclidean metric for distance.

Apply the trained network to the input pattern file, to determine the classification of each input pattern to a cluster. How many clusters does the SOFM detect?

Plot the final weights on the same graph as the data points (either by hand, or by copying the data into an Excel graph). The final weights should be:

(0.07, 0.1), (0.49, 0.22), (0.86, 0.48), (0.68, 0.79)

Try varying the values for the neighbourhood size, and the learning rate to see the effect they have on the clusters

Try	learning rate = 0.95	initial weights = 0.5
	initial neighbourhood size = 0	number of epochs = 500
and	learning rate = 0.5	initial weights = 0.5
	initial neighbourhood size = 3	number of epochs = 50
and	learning rate = 0.5	initial weights = 0.5
	initial neighbourhood size = 0	number of epochs = 50

Try adding data points to see the effect these new points have on the clusters(both the position of the weights, and the number of clusters detected).