

## INT301 Bio-computation Week 12 Lab

### Competitive Learning

To demonstrate the competitive networks ability to cluster data, a 2-dimensional dataset consisting of 6 Gaussian distributions with small widths will be used. Use the function `loadclust1` to get the data and Matlab's plot function to visualize it, e.g.

```
>> [P,T] = loadclust1(200);  
>> plot(P(1,:),P(2,:), 'b*');
```

Use m-file `syn_comp.m` in the next 3 exercises.

**Exercise 1:** Use 100-200 data from the data set, with 6 output neurons and default values for the learning parameters. Does it work?

(Note: after setting the parameters, remember to 'Hit a key to continue' in the command window; it is also recommended to keep Figure 1 on top to observe the position changes of output neurons.)

**Exercise 2:** Use 100-200 data from the data set and 6 output neurons, but try different settings of the learning parameters and conscience learning parameter. Especially, turn off the conscience learning parameter (type 'n' for 'Use default learning parameters' and type 0 for 'Conscience learning rate') to see if 'dead neurons' appear. (Note: use "help learncon" in command window if you want to know more about conscience learning parameter.)

**Exercise 3:** Use 100-200 data from the data set. Use more than 6 output neurons (e.g. 12), and run the network for both with and without conscience learning parameter. What happens with the superfluous neurons?