INT301 Bio-Computation Lab of Week 13

Self-Organizing Map

Example:
Clustering Problem using a Self-Organizing Map (demo.m)

```
close all, clear all, clc, format compact
load simplecluster_dataset;
% a 2x1000 matrix of 1000 two-element vectors.
x = simpleclusterInputs;
% plot clusters
figure, plot(x(1,:),x(2,:),'g.');
hold on
grid on

% Create a Self-Organizing Map
dim1 = 10;
dim2 = 10;
net = selforgmap([dim1 dim2]);
% Train the Network
[net,tr] = train(net,x);

% View the Network
view(net)
% Plots
figure, plotsomtop(net)
figure, plotsomnc(net)
figure, plotsomnd(net)
figure, plotsomplanes(net)
figure, plotsomhits(net,x)
figure, plotsompos(net,x)
```

Exercise:

1. Define 4 clusters of input data with the following piece of code, and plot input data using your own codes;

```
% number of samples of each cluster
K = 200;
% offset of classes
q = 1.1;
% define 4 clusters of input data
P = [rand(1,K)-q rand(1,K)+q rand(1,K)+q rand(1,K)-q; rand(1,K)+q rand(1,K)+q
rand(1,K)-q rand(1,K)-q];

%% Your own codes
```

2. Create and train 2D-SOM with the following parameters using your own codes, and plot the 2D-SOM results with the following functions (you can also change the parameters accordingly).

```
% SOM parameters
dimensions = [10 10];

%% Your own codes


% plot input data and SOM weight positions
figure, plotsompos(net, P); grid on
% plot SOM neighbor distances
figure, plotsomnd(net)
% plot for each SOM neuron the number of input vectors that it classifies
figure, plotsomhits(net,P)
```