INT301 Bio-computation Week 4 Lab 2021

Further Practice with Perceptrons

Demo:

Analyze the given program *PerceptronExample*, which consists of following parts:

(1) Prepare *mydata* by generating 2 dimensional linearly separable data.

```
mydata = rand(500,2);
% Separate the data into two classes
acceptindex = abs(mydata(:,1)-mydata(:,2))>0.012;
mydata = mydata(acceptindex,:); % data
myclasses = mydata(:,1)>mydata(:,2); % labels
[m n]=size(mydata);
```

You may check the data distribution using:

```
scatter(mydata(:,1),mydata(:,2))
```

(2) Train the perceptron by calling the function *PerceptronTrn* with the prepared training data *(x, y)*, which will return the connection weights, the bias, and the number of iteration;

(3) Test the trained Perceptron model with the testing data *(xt, yt)*, by calling another function *PerceptronTst*, which will return the testing error;

(4) Display the two classes of data points with a separating line.

Exercise:

(1) The Perceptron training function uses a learning rate 0.5 and a threshold 0.5. Change these two parameters, e.g. learning rate 0.1 and threshold 0, and observe the differences;

(2) Revise the program to calculate the Root-Mean-Square (RMS) error for every input data points and display the error curve, i.e. RMS vs. iteration.