SMAI ASSIGNMENT-1

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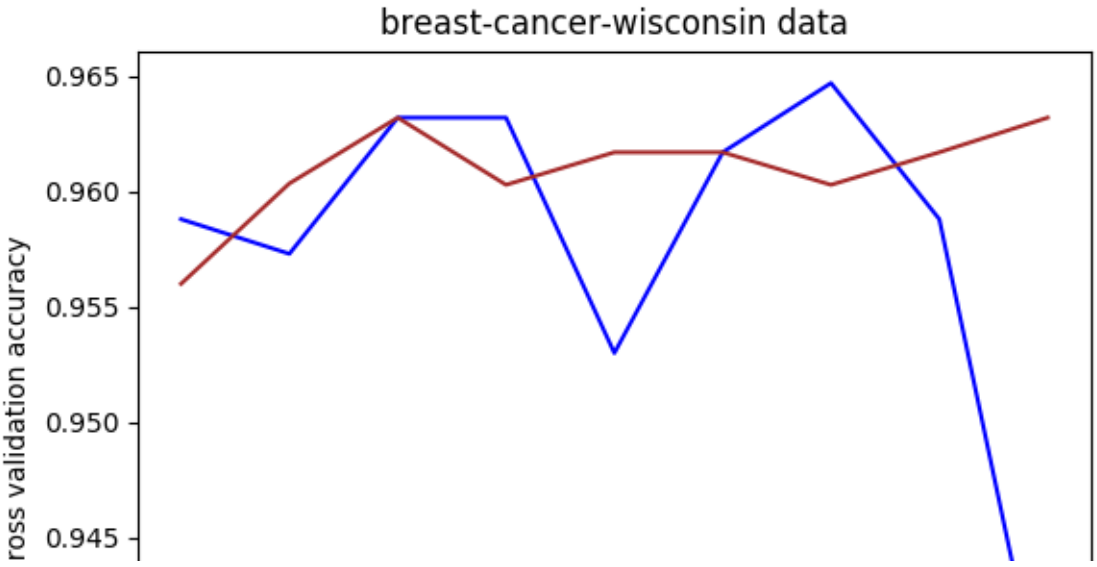
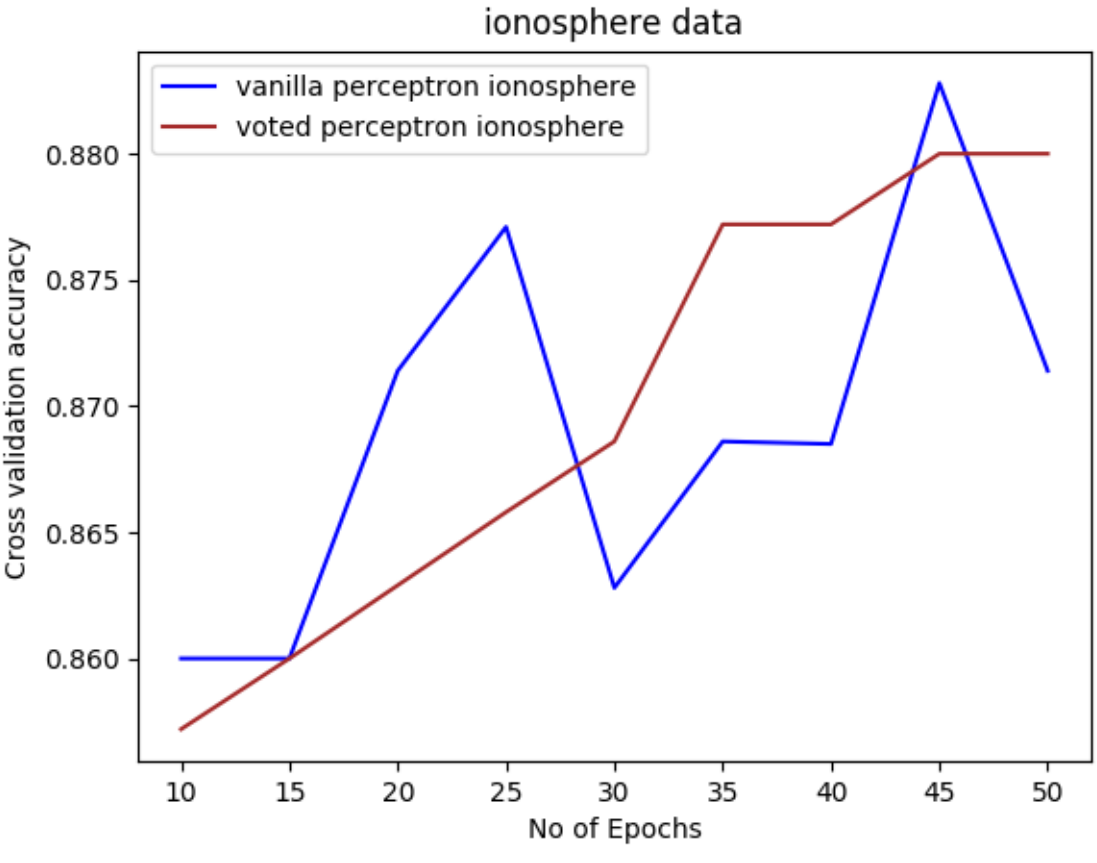
Question-1:

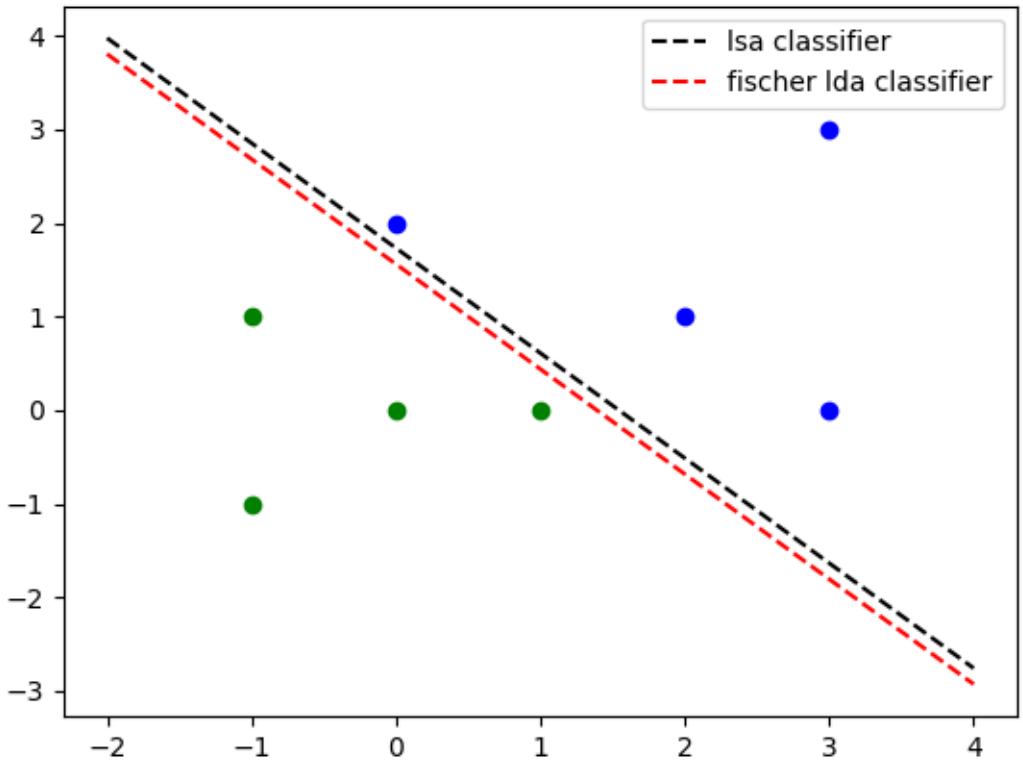
Voted perceptron gradually increases generally upon increasing the number of epochs but vanilla perceptron takes w and b as random ,so it might increase or decrease upon increasing the number of epochs(generally increases).For very large number of epochs,voted perceptron must give more accuracy compared to vanilla perceptron because it considers weights for each w and b and based on it estimates the label.



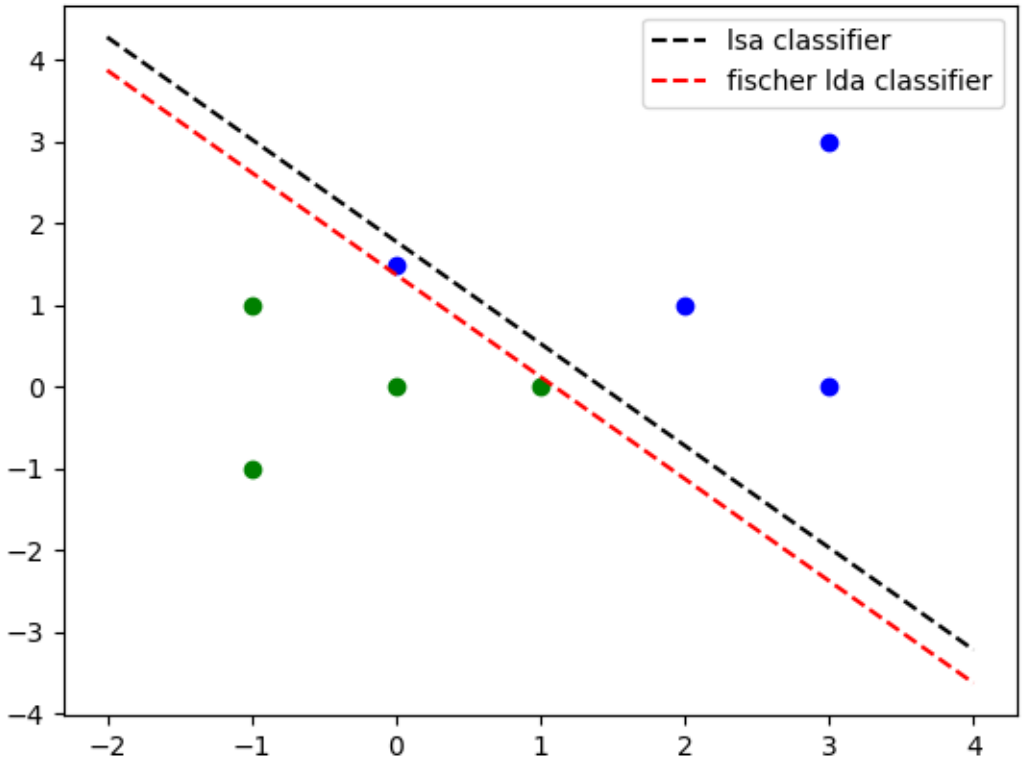


Question-2:
In second dataset,Least square approach classifies one point wrongly but fischer's lda classifies it correctly.
Reason:
The Least square approach aims to minimize the sum of squares: the squared distances from the regression line to the data-points. The regression line obtained via Least square approach will therefore be attracted to these outliers because it aims to make the distance to this point small and makes the line closer to this outlier.

Data-1:

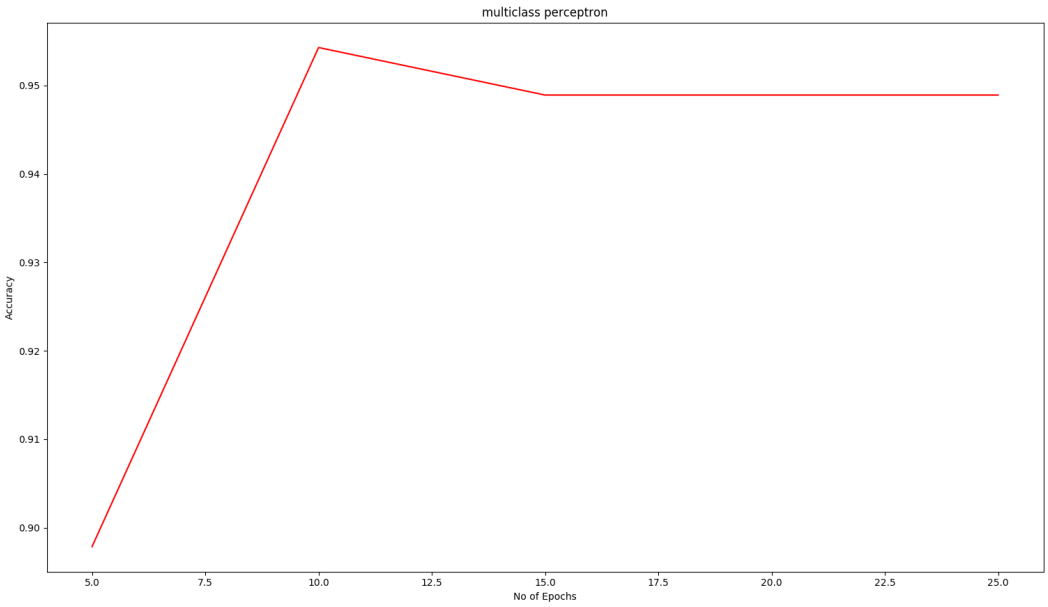


Data-2:



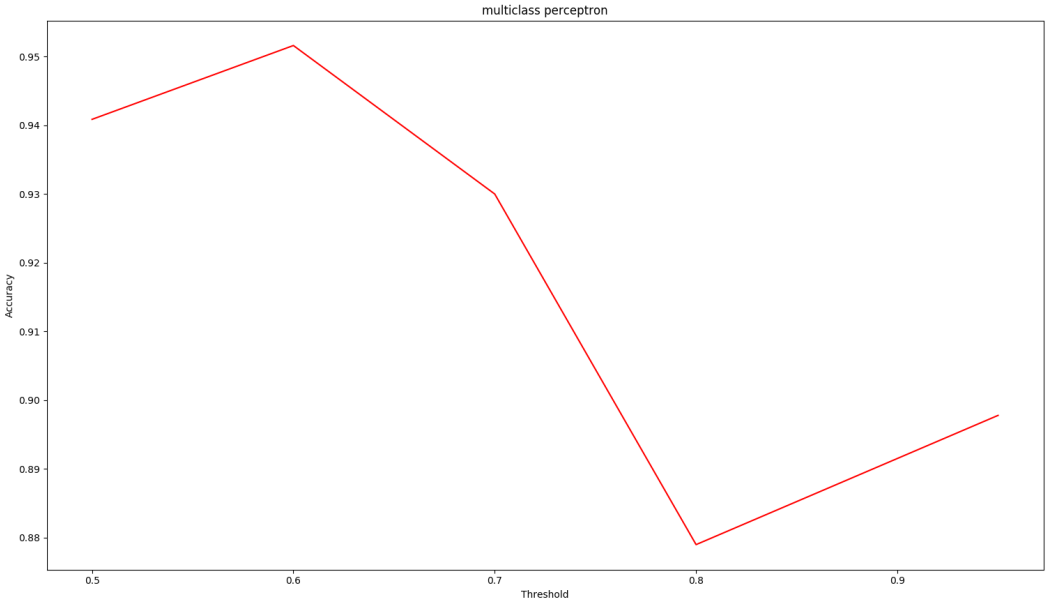
Question-3:

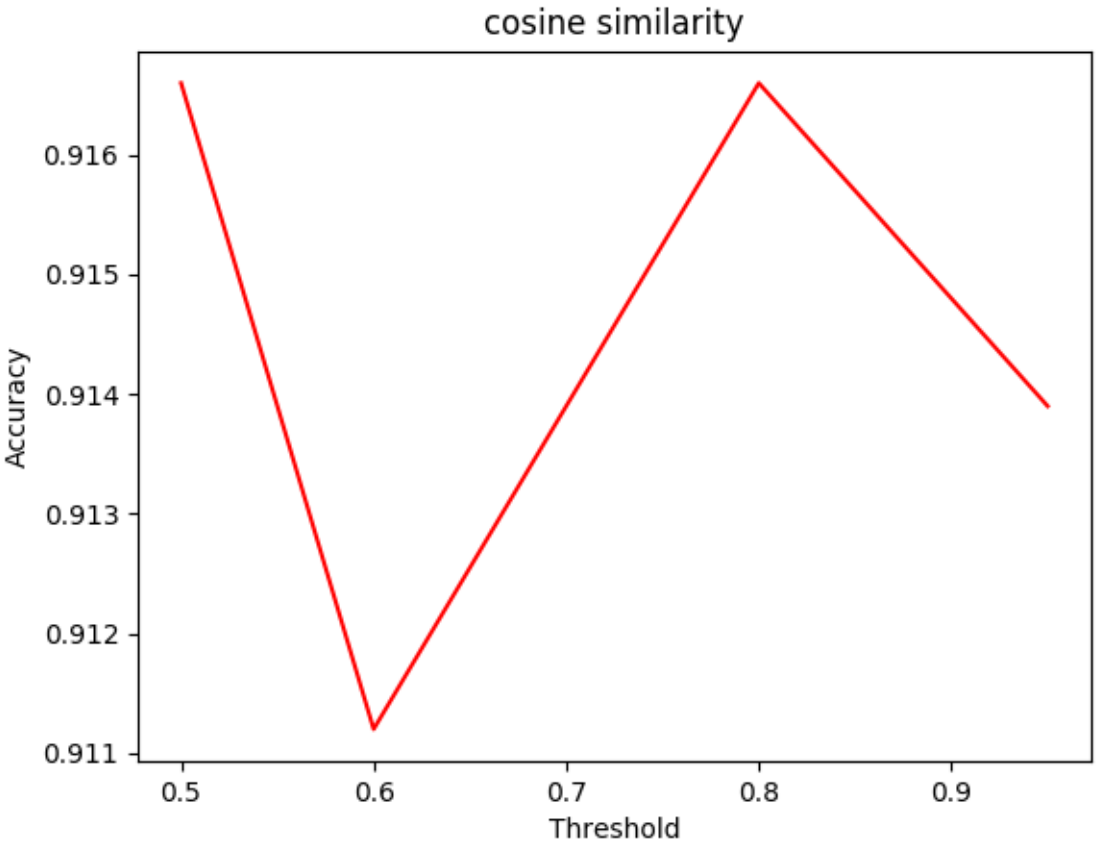
Accuracy for multiclass perceptron when number of epochs are 5,10,15,20,25



Here i am not shuffling the data,so the graphs might increase and decrease.Generally,upon decreasing the threshold the accuracy must decrease.

For 5 epochs


multiclass perceptron
Accuracy
0.95
0.94
0.93
0.92
0.91
0.90
0.89
0.88
0.5
0.6
0.7
0.8
0.9
Threshold


cosine similarity
Accuracy
0.916
0.915
0.914
0.913
0.912
0.911
0.5
0.6
0.7
0.8
0.9
Threshold