Assignment 1

BITS F464 Machine Learning

Due on 11:59pm XXXXXXX

This assignment will focus on the implementation and visualization of Fisher Linear Discriminant Analysis and Perceptron algorithms learnt in class on dataset_1, dataset_2 and dataset_3. The data sets are uploaded in CMS.

1. Fisher Linear Discriminant Analysis (as described in Bishop ch 4)

- Once the points are transformed to one dimension, visualize them as points on a line.
- Colour the points belonging to different classes with different colours.
- Determine the classification threshold by plotting normal curves for each class and finding their point of intersection.
- Libraries may be used only for data handling and visualization. The algorithm must be coded from scratch.

2. Perceptron

- Visualize the dataset as a scatterplot.
- Implement the perceptron algorithm and show the change in the decision boundary on the scatterplot with each epoch.
- Combine the plots into a GIF (You could use the 'images to GIF' section of https://imgflip.com/gif-maker or giphy to convert plots into a GIF)
- Java, C++, C or Python may be used for this assignment. Submitted codes will be tested on standard plagiarism detection tools and those with plagiarism above a threshold will not be evaluated.

Report

- Prepare a formal report detailing your observations and results obtained.
- Discuss the difference between the datasets with respect to the perceptron convergence theorem and report the impact of parameter initialization and training data ordering on the models.
- Note that the code must be properly indented and commented.

For any queries reach out to Kshitij Grovor at f20150070@hyderabad.bits-pilani.ac.in