

Lab - 9

CSL2010: Introduction To Machine Learning AY 2021-22

General Instructions

1. You need to upload a zip **<Your_Roll_No>.zip**, which contains two files for the task in **<Your_Roll_No>.py** format and the report for the entire assignment in **<Your_Roll_No>.pdf** format.
2. Provide your colab file link in the report. **Make sure that your file is accessible.**
3. Submit a single report, mention your observations for all the tasks.[Include plots]
4. Report any resources you have used while attempting the assignment.

Any submission received in another format or after the deadline will not be evaluated.

(Due: 5:30 PM, 20 Oct 2021)

i. Download the dataset from the given link:

https://drive.google.com/file/d/1s2IhEwbbSAGetVuPpLwLq_wQ8P3Svf0l/view

ii. Perform LDA using the scikit learn library with two different numbers of linear discriminant components **n_components** using any solver (svd or eigen) of your choice. Perform PCA on the same dataset with the same number of components and compare the result with LDA, by evaluating the kNN classifier (k=5) separately using the projected PCA and LDA features on a random 70:30 train-test split. (4 marks)

iii. Compare the scatter matrices for both classes obtained after applying PCA and LDA for the two different discriminant components used in part (ii) above. Visualize the final results with the help of a scatter plot and compare results with PCA. (3 marks)

iv. Learn another binary classifier (LogisticRegression, Decision Tree, etc.) of your choice on the original features and compare the performances with the features obtained using LDA in part (ii) above. (3 marks)

v. Implement the Multi-Layer Perceptron (MLP) classifier using the MLPClassifier from scikit learn library using one hidden layer. Experiment and analyze using different values of other hyperparameters (such as the number of nodes in the hidden layer, choice of activation function, etc.), and compare with the results obtained in the previous question. (10 marks)

Resources:

1. [Link](#)

2. https://scikit-learn.org/stable/modules/generated/sklearn.neural_network.MLPClassifier.html