EE527: Machine Learning Laboratory

Assignment 9

Due Date: 03 April 2023

**Classification of Normal and Shouted Speech using MFCC features. These features are extracted from speech samples of a number of speakers uttering a few sentences normally or by shouting. The features are divided into train-test splits and are made available in two csv files. You are tasked to learn a discriminative model to classify normal and shouted speech. This example uses discriminative functions. The whole process is described as follows.**

Consider the .csv file *“Train\_file.csv”* containing *86060* instances of 61-dimensional arrays. The first 60 dimensions of the array contain the feature values for a particular instance and the last dimension contains its label. The label can be either ’0’ or ‘1’.

**[Q1]** Evaluate **µ0**, **µ1**, **C0**, **C1** from instances in “*Train\_file.csv”.*

**µ0** : Mean of all instances having label `0’

**µ1** : Mean of all instances having label `1’

**C0** : Covariance matrix of all instances having label `0’

**C1** : Covariance matrix of all instances having label `1’.

Construct parameters of the discriminant function with Gaussian assumption on instance distribution in classes.

The decision rule for classification of an unseen instance is given by its label defined as

**[Q2]** Perform Logistic Regression on the training dataset to predict the logit value for input data as follows.

Read “*Test\_file.csv”* consisting of *21516* instances of 61 dimensional arrays. For each array, the first 60 dimensions contain the feature values for the test data and the last dimension contains its **actual label**. Predict the label of each data instance from the testing set using the decision rule mentioned above and compare the predicted and actual labels. Report the class-wise ( and ) and overall () accuracy measures.

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