Computer Exercise 2

Sept. 19, 2019

Goal:

Write a computer program of the MLP with BP learning in Matlab, Octave or Python, and conduct experiments on the given data to explore the behavior of the algorithm in different situations. The program should be able to **show the learning curve** during the training procedure.

Learning task:

Using 10 gene expression features to classify two cell types (fibroblast vs. endothelial cell)

Datasets	Sample size	Feature data file	Class label file
TrainingSet-1	40	train_10gene_sub.csv	train_10gene_label_sub.csv
TrainingSet-2	303	train_10gene.csv	train_label.csv
TestSet	100	test_10gene.csv	test_label.csv
TestSet-2	263	test2_10gene.csv	test2_label.csv

Note: TrainingSet-2 is the combination of samples in TrainingSet-1 and TestSet-2.

- **Experiment:**

Design an MLP classifier. Use TrainingSet-1 to train the MLP. Show the learning curve. Apply the trained MLP on TestSet and on TestSet-2 separately. Calculate the training error, the cross-validation error on the training set, the test errors on the two test sets.

Use TrainingSet-2 to train the MLP. Show the learning curve. Apply the trained MLP on TestSet. Calculate the training error, the cross-validation error on the training set, the test error.

Analyze and discuss observations in the experiments. If the performance or the learning curves are not satisfactory, try some strategy suggested in the lecture slides or in reference books to study their effect on the experiments.

- **Experiment Report**

Write an experiment report to describe and analyze the experiment observations.

Provide detailed supplementary materials that should include at least the following materials:

- A readme file that contain information on all the supplementary files, programming environment and parameters used in the experiments (if any)
- Source code (should let TAs to be able to run the code and reproduce your experiments)
- Experiment result files

All files should be packed in one file for submission. Acceptable formats are .zip, .rar, and .7z.

Report due date: Oct. 9 (Wednesday) 23:59 (same for Ex3)