Biological Neural Computation

Homework problem set 3

Spring 2019

Data Assigned: **2/28/2019**
Data Due: **4/8/2019**

General Guidelines: The homework solutions should include figures that clearly capture the result. The figures have to be labeled, well explained and the results must be clearly discussed. When appropriate, it is recommended that you use the ***Hypothesis – Rationale – Experiments/data – Analysis – Results – Discussion/Conclusions – Limitation(s)*** framework to discuss your work.

The first sheet of the homework must certify that this is completely your work and list the students/people you have consulted or received help from (with your signature and date of submission). All online references used must be listed in the reference section at the end of the homework. It is sufficient to include Matlab code only in the online submission.

All identification information should be self-contained in the second page of the homework. No other place should this information be available to facilitate blind peer-review.

Good luck,
Barani Raman

Points for BME 572 students
Points for L41 5657 students

Problem 1. Implement the Linear Discriminant Analysis for a two-class classification problem. Generate different toy datasets and compare the performance of PCA and LDA on those datasets? The goal of generating those datasets should be to study when each algorithm would succeed or fail. Discuss your results?

[50 pts]
[100 pts]

Problem 2. Implement the Independent Component Analysis (Kurtosis Maximization with Fixed Point Algorithm version). Generate toy datasets (e.g. mixture of digits (e.g. sum digit1 with digit5) from MNIST dataset) and illustrate when the ICA algorithm can identify the components of mixed signals and when does it fail.

[50 pts]
[0 pts]