

Homework 3 (10 pts)

Topics: Optimization + Neural Networks + SOM

Problem 1 (3 pts):

Perform SOM for clustering of 17 European languages using the following word set: 'skin', 'head', 'ear', 'eye', 'nose', 'mouth', 'tooth', 'tongue', 'neck', and 'heart'. **Show and discuss your SOM result.**

Note:

- This problem follows presentation in Section 6.7 (in 'Predictive Learning' by V. Cherkassky, 2013) – so you should use the same procedure and use 4x4 SOM for modeling.
- The encoded features of the word set corresponding to each country is available on Moodle – see 'euro_lang.csv')

Problem 2 (3 pts):

Derive the weight updating rules for backpropagation algorithm in MLP networks for classification using the log-likelihood loss function.

Problem 3 (4 pts)

(a) **Repeat Example 6.3** (in 'Predictive Learning' by V. Cherkassky, 2013) - use RBF network with 2, 5, 10, 15, 20, and 25 hidden units.

(b) **Repeat Example 6.3** (in 'Predictive Learning' by V. Cherkassky, 2013) - use MLP network with 2, 5, 10, 15, 20, and 25 hidden units.

Note:

The information about Example 6.3 is available on Moodle – see 'Example_6_3.pdf'