Advanced Topics in Machine Learning
Assignment # 3
Universität Bern

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Due date: 11/04/2017

In this assignment you need to upload a .lua script to ILIAS which includes your implementation for both questions. The .lua script name must be First-Name_LastName.lua. If your implementation requires auxiliary functions, you must implement that function inside the corresponding .lua file.

Maximum grade: 4 Points

The goal is to use the 'nn' package to implement logistic regression and a linear Soft-Max classifier. **You need to use only torch functions to calculate the gradient and to update your weights**. The features are the same as in Assignment1. We want to classify images into two possible classes: person and non-person. The features are again available in train.h5, test.h5. The script assignment3.lua reads features from train.h5 and test.h5 (you do not need to extract features).
First, run the script. If all packages are installed, you should get the following message: `data is loaded successfully!`

Questions:

- **[2 points]** Implement logistic regression using the 'nn' package. Use a threshold of 0.5 to classify images in the test set as person or non-person. Print the classification accuracy.

  Hint. To classify your test data, you need to execute a forward propagation of your module on the test set and then to threshold the output.

- **[2 points]** Change your loss function to implement a linear classifier by using a SoftMax loss. Print the classification accuracy.

  Hints. Note the following suggestions

  - Use ClassNLLCriterion as criterion.
  - Change labels to 1,2 (instead of 0,1).
  - Your linear layer should produce a 2-dimensional output.
  - To classify your test data, you need to execute a forward propagation of your module on the test set and then to find the maximum value of each row of the output.