Deep Learning Lab 2018

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Exercise 1: Feed-foward Neural Network

machine learning lab

- ▶ Submit this exercise done individually until the 30.10.2018 via mail to kleinaa@cs.uni-freiburg.de and eitel@cs.uni-freiburg.de.
- ▶ Your submission should include your code (github/bitbucket link) and a 1-2 page report as pdf.
- ▶ **Implementation:** Implement a feed-forward neural network by completing the provided *stub* this includes:
  - ▶ possibility to use 2-4 layers
  - ▶ sigmoid/tanh and ReLU for the hidden layer
  - ▶ softmax output layer
  - ▶ optimization via gradient descent (gd)
  - ▶ optimization via stochastic gradient descent (sgd)
  - ▶ weight initialization with random noise **(!!!)** (use normal distribution with changing std. deviation for now)
- ▶ Bonus points for testing some advanced ideas:
  - ▶ implement dropout, l2 regularization
  - ▶ implement a different optimization scheme (rprop, rmsprop, adagrad, adam)
- ▶ **Code stub:** `https://github.com/aisrobots/dl-lab-2018`
- ▶ **Evaluation:**
  - ▶ Find good parameters (learning rate, number of iterations etc.) using a validation set (usually take the last 10k examples from the training set)
  - ▶ After optimizing parameters run on the full dataset and test once on the test-set (you should be able to reach $\approx 1.6 - 1.8\%$ error if you invest some time ;)). Plot the training and validation loss.