

CSCI 7000: Applied Deep Learning

Homework 1

Goals: First steps in Keras, brush up knowledge on course tools (Python, numpy, matplotlib)

Deliverable: Jupyter Notebook performing and explaining a deep neural network for a simple classification task.

Due date: Sunday, February 9, 6pm.

Description

So far, you have learned about basic fully connected artificial neural networks, and how to model and train them in Python. You have also learned about different architecture choices, in particular different numbers of hidden layers and different activations, most notably ReLU and Softmax. Finally, you saw how to systematically explore and optimize hyperparameters of the network.

The goal of this homework is to apply these tools to a standard online dataset. (The dataset has to be available online.) Develop an iPython/Jupyter notebook that walks the user to the entire process from loading the data, visualizing it, defining a suitable neural network, optimize hyperparameters, and showing the results.

One possible source of data is the UCI Machine Learning repository

<https://archive.ics.uci.edu/ml/index.php>

You are welcome to use data that has a time component, but it is not recommended. (Homework 2 will focus on time-series data).

Please make sure that you not only present one possible network architecture, but that you illustrate how you have found the optimal hyper parameters, for example by comparing different architectures / parameters and/or systematic search.

Submission

In order to submit the homework, pull the deep learning repository on github (<https://github.com/correll/deep-learning.git>), place your file with a meaningful name, such as the name of the dataset you chose into the directory “examples/static_problems” and create a pull request. The date of your pull request will be counting as submission.