Deep Learning with Python
Summer Semester 2020
University of Konstanz
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Assignment 2

This homework is due on Friday the **7th of August** (but feel free to haand it in earlier).

1 Text Generation

We have now learned about RNNs, LSTMs and convnets. RNNs and LSTMs are particularly good at doing sequence processing because they can remember information about previous states in the input. Convnets are supposed to be good at detecting local patterns and hierarchical relationships. This is good for language data because we have smaller units that get put together to form bigger units (characters to words, words to constituents). So these are the algorithms that are particularly interesting for NLP and linguistics.

We have looked at models that can have a predictive function, namely being able to predict the next item in a sequence given the preferences and patterns that have been extracted from the training data.

So, once you've trained a language model on a given set of data, you can use it to predict the next item in a sequence and thus use the model to generate text dynamically. Your task is to do that using the example in Chollet's Chapter 8.1.

1.1 Data Set

I have uploaded several texts onto ILIAS. You can, however, also use your own data set. Just make sure it is big enough (so no snippets of poetry or a short novella by one author).

1.2 Language Model

Configure a deep learning network so that it can perform text generation, as shown in Chapter 8.1. of Chollet. For this, you might actually want to use GPUs because the computing power needed is quite significant.

We do have a GPU server at the University that you can log in to and use. Information on how to do this is provided separately.

But you can do the initial data processing and initial experimentation to get everything running on your own computer.

Be sure to experiment with different setups and different "temperatures" and include a discussion of which combination of features/settings seem to work the best.

Hand in the code per email to myself and Wassiliki Siskou (miriam.butt|wassiliki.siskou@uni-konstanz.de) for your optimal model along with a documentation of the code. You will be graded on the clarity of your documentation and the code and the justification of your design choices for the network. Handing in your assignment via a Jupyter Notebook is much appreciated. People didn't seem so interested in this...

2   Extra Credit: Literature and Computation

In *Murder at the Vicarage* Agatha Christie first introduced the character of Miss Marple. It was published in 1930. Read through the following passage, explain how it relates to what we have been learning in the course and comment on whatever else you might find interesting.

> I found my wife and Miss Marple with their heads together. "We've been discussing all sorts of possibilities," said Griselda. "I wish you'd solve the case, Miss Marple, like you did the way Miss Wetherby's gill of pickled shrimps disappeared. And all because it reminded you of something quite different about a sack of coals. "You're laughing, my dear," said Miss Marple. "But after all, that is a very sound way of arriving at the truth. It's really what people call intuition and make such a fuss about. Intuition is like reading a word without having to spell it out. A child can't do that, because it has had so little experience. But a grown-up person knows the word because he's seen it often before. You catch my meaning, Vicar?"
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> "Yes," I said slowly, "I think I do. You mean that if a thing reminds you something else—well, it's probably the same kind of thing."
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> [Murder at the Vicarage, Ch. 11, p. 77]