Deep Learning Practical 3

Training a neural network and solving a few of its issues

Practical overview

Welcome to the third deep learning practical. This practical has the following purpose:

- Ensure you have understood how to work within your deep learning training environment.
- Go through the steps involved in the training of a simple neural network.
- Explore the methods you might want to use to identify issues in the implementation of neural networks.
- Chat with the staff about any questions about the module.

Working Environment

You will need a GPU to run the exercises in this practical. You might use NCC, following the steps in the previous practical. Hopefully, more GPUs are now available and things are working a lot better. If you do face any issues, you can possibly use Google Colab for this practical.

Building a Multi-Layer Perceptron

In our first exercise, we are going to build a simple neural network. You will have already seen this happen in the second lecture. You can access all the source code material we went through in the lecture here:

- Tensors
- Datasets
- Backpropagation
- Classifier

You can view the lecture videos or a playlist independently available on YouTube:

- YouTube Playlist

Now that you are hopefully a bit more comfortable with PyTorch programming, let's go through a Notebook and build a simple MLP.

You can get the Notebook here: Part 1 - Classifier
The notebook itself should contain all instructions you will need for the exercise.

When things go wrong!

In our second exercise, we are going to spend a little time exploring how things can go wrong and what we can do to resolve bugs that might happen in a deep learning setup.

You can get the Notebook here: Part 2 - when things go wrong!

Things will go wrong again!

The third exercise is somewhat similar to the previous one, in that the source code suffers from a few issues that you will need to resolve. You can get the notebook here:

Part 3 - things will go wrong again!

The notebook itself should contain all instructions you will need for the exercise.

All you need should be there in these Notebooks. Please ask if anything is not clear or you might need help understanding anything.

Dive into deep learning, chapters 4-5

If you have finished this set material early, you may wish to follow through chapters 4-5 from the dive into deep learning book, for example practicing in both JAX and PyTorch:

`https://d2l.ai/chapter_linear-classification/index.html`
