

To prepare for the next session of the course, students are expected to complete the following exercises. At the beginning of the session, a handout will be distributed containing a list of exercises. Students will be required to tick off their individual achievements as evidence of their work. During the session, students will be randomly selected from those present and will be asked to present (defend) their solutions. A brief interview will follow, during which the student's solution will be discussed. If any doubts arise regarding a student's presentation that they are unable to explain, no credit will be awarded for that exercise in the final grading. To ensure a collective learning experience, the instructor will also review and discuss the presented work with the plenum.

1 Hands-On Deep Learning

In this part, we are going to have a hands-on view on Deep Learning.

Ex. 29 Do what every you like! In this task I don't want to instruct you to work on a specific topic with Deep Learning. Rather I want to give you a chance to explore one or two things of your particular interest.

Use PyTorch to create something that you are particularly interested in: may it be a image classification task, topic modeling (NLP), or a Recommender System using techniques like CNNs, Attention, or LSTMs. Everything is up to you.

As an inspiration, you can go to the PyTorch Tutorials or the PyTorch Examples.

Attention: certainly you can also use the examples from them, but be aware to correctly state the sources and you **must** be able to explain all aspects.

This exercise can have several levels of depth, e.g.

- (a) take the example of PyTorch,
- (b) take inspiration from the tutorials and reimplement something yourself from scratch (data taken from the tutorial), or
- (c) do something on your very own (identify data, do data pre-processing, build up the model, do evaluation, etc.) (here, please take care to do the full lifecycle, see the tutorial examples on what needs to be in there).

The different levels will be judged differently and checked very carefully!

Ex. 30 Track the progress of the training: To track the progress of the training, several tools are available. For this task, extend your example from before and track the training progress using TensorBoard.

Ex. 31 Manage all your training runs! It is very hard to keep about all the experiments, when you do a lot of them. One tool to do so is mlflow. Integrate mlflow into the example from the first task of this sheet and show how to track

- all parameters passed to the training,
- all evaluation metrics, and
- the stored model.