Exercise 4

Deadline: 18.06.2019

Regulations

Create a PDF `project-ideas.pdf` with the description of your project topics. Zip this file along with your comments to exercise 3 (cf. task 1) into a single archive with naming convention (sorted alphabetically by last names)

`lastname1-firstname1_lastname2-firstname2_exercise04.zip`

or (if you work in a team of three)

`lastname1-firstname1_lastname2-firstname2_lastname3-firstname3_exercise04.zip`

and upload it to Moodle before the given deadline. We will give zero points if your zip-file does not conform to the naming convention.

1 Comment on your solution to exercise 3

Study the sample solution `ex03_sample_solution.html` on Moodle and use it to comment on your own solution to this exercise. Specifically, copy your notebook `cnn.ipynb` to `cnn-commented.ipynb` and export it to `cnn-commented.html` in the end. Insert comments as markdown cells starting with

```
<span style="color:green;font-weight:bold">Comment</span>
```

in order to clearly distinguish your comments from other cell types. The point of these comments is that you identify your errors and bugs yourselves, so that you learn from your mistakes. In addition, the tutor will have an easier time distinguishing between the initial mistake and consequential errors caused by the first one and will only deduct points for the former. If you fail to hand in comments, the tutor is not required to make this distinction and will deduct points for all errors alike.

2 Final Project Topics (20 points)

Brainstorm for topics you would like to work on during your final mini-research project. Write up a short description (two paragraphs) of two or three project ideas, using advanced concepts from this semester's lecture (e.g. neural networks, Gaussian processes, graphical models, causality, even if much of it is still to come in the lecture).

- You should have fun working on them – choose an interesting problem. For example:
  - Look at one of the major machine learning conferences and pick a paper you would like to replicate. These papers are freely accessible on the internet: NIPS/NeurIPS (`https://papers.nips.cc/`), ICLR (`https://openreview.net/group?id=ICLR.cc`), ICML (`https://openreview.net/group?id=ICML.cc`), ICCV/CVPR (for image analysis applications, `https://www.thecvf.com/?page_id=100`). To identify good papers, watch for interesting titles, best paper awards, positive coverage on twitter or in blogs, highly cited work etc.
  - Consult Kaggle (`https://www.kaggle.com/`) for interesting challenges.
  - Ask people in our lab or in a research group/company you are in contact with.
- Don't choose projects whose solution can be downloaded from the internet. This is cheating!
- Your projects should neither be too easy nor too hard. Your team should be able to produce a reasonable solution within ≈ 90 hours per team member (equivalent to 3 ECTS).

- The same applies to hardware requirements: Don't choose a project that needs hardware you don't have access to (e.g. lots of GPUs). On the other hand, free offerings from the big cloud providers, e.g. Amazon Web Services (`https://aws.amazon.com/de/free/`) and Google Colab (`https://colab.research.google.com/`), may give you more power than you are aware of.

The project descriptions will be judged (and graded) by how carefully you search for and reason about what is interesting and doable. Thus, picking the first things that comes along will probably not be the most clever strategy. Moreover, your descriptions should include a sentence about the required ressources (make a plausible guess at the hardware size and time) to ensure that your proposal is realistic.