Deep Learning Project (version 1)

What?	When?
Project Proposal Brainstorm	Lab session april 6
Project Proposal Deadline	Before first lab session in Q4 **Note:** only during lab on april 6 you can ask TAs for advice!
Milestone Report Deadline	Halfway Q4
Project Deadline	End of Q4
Poster Session	End of Q4

Project Proposal

You will write a 1 page project proposal. On the project proposal you will indicate the your partners (team size of 4-5 students). The project proposal should answer:

- What is the problem that you will be investigating? Why is it interesting?
- What data will you use? If you are collecting a new dataset, how will you collect it?
- What method or algorithm are you proposing? If there are existing implementations, will you use them and how? How do you plan to improve or modify such implementations?
- What reading will you examine to provide context and background? Provide at least 3 references that are relevant, for example, papers that consider a similar problem or previous works / methods that could also work for your considered problem.
- Formulate a hypothesis / research question. The question should be precise enough so that it is answerable through experiments. What kind of experiments will you use to answer the question?
- How will you evaluate your results? Qualitatively, what kind of results do you expect (e.g. plots or figures)? Quantitatively, what kind of analysis will you use to evaluate and/or compare your results (e.g. what performance metrics or statistical tests)? How will the question you posed be answered by the results?
- Make a list of the tasks and create a timeline: who will finish what task when? For each week try to formulate at least one thing that you want to finish. Put relevant distractions of team members in the timeline (such as exams of other courses, etc.) to make a good overview and to estimate feasibility of your plan. What will you deliver as a Milestone?
- Estimate the feasibility of the project. Take into account the experience of your team and take into account how long it took you to finish the deep learning lab exercises.

You may use other people their codes / datasets / models, but you have to clearly state that you do! The point of this project is not to show off your ‘tensorflow’ skills or do a lot of coding (you may do that if you *want* but it will not lead necessarily to a higher grade(!)), instead, we would like for you to try and get new insights into deep learning by using the scientific method (proposing questions / hypotheses and experiments to answer these questions / validate or falsify the hypothesis).

Suggestions and or example projects:

- Take a common used architecture or pre-trained model. Formulate a new design or alteration to the design and formulate a question regarding this. When would you expect your design change to influence or improve performance? Why? As a side note: we are generally not interested in obtaining 'good performance' but rather to find some **new insights**, so try to focus on that.
- Take a new dataset / setting that interests you and try to solve the task. Explain why you think your approach will work for this task, or whether it can improve (or not) upon a naive baseline or previous work.
- Gather a new dataset and run a novel experiment.
- If you are out of ideas, consider:
    - A Kaggle Competition (current or past) to get some data / new setting / inspiration
    - View project proposals and finished projects of the stanford course: http://cs231n.stanford.edu/project.html

Project

We will accept or reject your project proposal based on feasibility. If we reject the proposal we will come up with a replacement project (which may not be as interesting). So please think carefully about your project proposal (in particular, make sure it is feasible)!

During most labs of Q4 you will work full time on the project, in addition to 2.5 hours extra per week in your own time. This should provide you with enough time to produce a satisfactory project. During the lab sessions in Q4 you can discuss your project and progress with the TAs.

Milestone report

The milestone will be a report of 3 pages detailing the progress of the project. It should contain three main parts:

- Progress so far
- Preliminary results and figures
- Reflection

In the milestone report we at least expect you to have run an experiment and to have some results --- with other words, the setup should be done and you should be able to really start experimenting from that point.

Reflection: Identify problems with your current approach and identify bottlenecks: what can potentially endanger the success of your project? How can you change the project in order to be sure to finish it on time? Estimate how much time was spent on the projects and the results you got with that, and extrapolate to the rest of Q4, do you need to spend more time on the project?

Project Deliverables

Finally, we expect you to hand in a report of max 6 pages, which should be structured like a scientific work (abstract, introduction, related work, method, experimental setup, experiments, discussion, conclusion). Additionally, in a zip file you will hand in your code and other relevant results (such as model checkpoint or other intermediate results).

Poster Presentation

At the end of Q4 there will be a poster session where all students show their work.

Grading of the project

- Project proposal 15%
- Milestone 25 %
- Poster 30 %
- Deliverables (report + code) 20 %

The weighted average will determine your final grade.