Machine Learning Projects - Fall 2023

How should a project look like

The main purpose of the project is to apply machine learning techniques that we covered in class to a problem of your choice. In the end, your project **should include something interesting** that has ideally not been done before in that particular context. Good ideas for the project may include:

- something that you need to get done for your master thesis
- applying machine learning techniques to a very atypical data set
- testing effects of parameter changes, preprocessing techniques, or different algorithms
- developing methods for using unlabeled data in the context of supervised learning
- using unsupervised learning techniques to nicely visualize a complex data set
- explaining or finding atypical model behavior (look for model explainability or for adversarial samples)

The project does not need to lead to a successful application, but in case it is unsuccessful, you need to include a detailed analysis of why that happened and suggestions for future work. A typical machine learning project is a series of several trial-error-analysis development cycles, you need to perform at least one such cycle.
Also the most boring project is just stuff, where you try 47 combinations of models and hyperparameters and report some metric in a table. You dig deeper and devise some experiments to show why some model is better than other or why some feature is very relevant.

There are three possible forms of the output:

- summary in the form of a conference paper (5 - 15 pages, containing introduction, methods, results and discussion of results) + a pointer to a GitHub/GitLab/whatever repository with all code and data sets
- interactive web application (there should be short summary of your methods and results on the webpage) + 1 page summary of methods
- get at least 20th place in a serious Kaggle competition (by serious we mean there is money involved and the competitions is not about Santa) + 1 page summary of methods

The projects are due 2 days before your final exam or **January 30**, whichever comes first. Your project report should be sent via classroom.

Project proposals

Project proposals are not required, but well prepared project proposal may earn you up to 5 bonus points and constructive feedback. It is highly recommended to submit a project proposal. Proposals are due **January 8.**

Good project proposals will include at least the following:

- what problem are you trying to solve / formulation as a machine learning problem
- which data sets you are planning to use; are these data sets large enough to accomplish your goals?
- you may include proposed methods that you plan to use, but this is not required.