

Course Project

The goal of the course project is to expose the students to advanced topics that were published in the professional literature but we didn't cover in class, as well as to research in the area of Recommender Systems.

List of papers:

1. Matrix Factorization techniques for context aware recommendation (2011) [link](#)
2. AutoRec: Autoencoders meet collaborative filtering (2015) [link](#)
3. Session-based recommendations with recurrent neural networks (2015) [link](#)
4. XDeepFM: Combining explicit and implicit feature interactions for recommender systems (2018) [link](#)

Paper selection

Each group of students will select a paper for their research.

Paper presentation (optional)

One group for each paper will briefly present the paper in class. The presentation format is described below. The students from volunteering group will get 10 bonus points to the project grade (!).

Presentation format:

- What is the main objective of the paper, what are they trying to solve? (10 minutes)
- Short description of the proposed approach (15 minutes)
- Evaluation (5 minutes)
- Conclusion, limitation and future work (5 minutes)

Project submission

The report for the project submission should be up to 5 pages in the format described below.

1. Anchor paper
 - a. State the anchor paper
 - b. What is the main objective of the paper, what are they trying to solve?
 - c. Provide a short summary of the approach presented in the paper
2. Suggesting an improvement
 - a. Suggest an improvement to the paper you chose. Give a detailed explanation of your proposed improvement and why you think it might improve the algorithm's performance.
3. Select a well-known algorithm for comparison
 - a. Select a well-known baseline algorithm to compare with the algorithms you are evaluating.
4. Evaluating the algorithms you choose in steps 1,2,3
 - a. Datasets
 1. Select two datasets from [papers with code](#) for the evaluation

2. If you selected the 'session based recommendation' paper you can select the datasets from [here](#)
- b. Hyper parameter optimization
 1. Do hyper parameter optimization for the algorithms that you selected for stages 1,2 and 3.
- c. Performance metrics for evaluation
 1. Compare the three algorithms on the same train and test set
 2. Use the same metrics used by the anchor paper for comparison. If the original paper didn't use ranking metrics add such metric to your evaluation.
 3. You can add additional metrics to demonstrate the superiority of your algorithm.
5. Reporting your conclusions
 - a. Present the three algorithms you are evaluating. Include the pseudo code, results and conclusions.
 - b. What affects the grade
 - Completeness – all of stages were executed
 - Correctness
 - Clarity – Clear writing of the report
 - Originality
 - Efficiency of the implementation
 - Content – the complexity of the project
 - Detailed evaluation of the algorithm (selecting appropriate metrics, optimizing algorithm parameters based on multiple parameters, selecting appropriate baselines, varied datasets)
 - Coming to interesting conclusions that are supported by the experimental results
 - Code documentation
 - c. Plagiarism
 - All the work you submit (Report, Figure, Table, Equation, Slide, Software code etc.) must be your personal work unless otherwise explicitly indicated by a reference to the source.
 - You are allowed to copy excerpts for the article, but you must note this explicitly. An attempt to submit other work as your own (plagiarism) will result in a grade of 0 in the course.
 - If this project is also being used for any other purpose (like for another course) you must explicitly state this and emphasize what additions were specific to this course.
 - d. Project submission
 1. Source code, detailed instructions on how to run the code, and detailed algorithm hyper parameters should be uploaded to a GitHub repository for this project. Submit the link to your project on GitHub
 2. A zip file that includes
 - A link to the GitHub repository
 - Detailed results of your experiment
 - A report according to the instructions above

Good luck