

# DD2434 Projects

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## Abstract

The task of the project is to reproduce the results presented in a published scientific article, describe the article orally and in written form to your peer students, and argue for and against the method presented in the article. From this you will learn how to read scientific articles, how to implement and use a particular method, how to argue for and against a method, and how to adapt the presentation of a method to different target groups (i.e., adapt the presentation of the method in the article - targeted to active researchers in Machine Learning - so that it is understandable to first year Master students in Machine Learning).

The below 2 papers represent a range of different topics in Machine Learning, and have been selected by Jens, who will be the supervisor of these projects.

Some of the papers are more theoretical and while others are of a more practical nature. The requirements will change accordingly, so if you pick a more practical paper you will need to perform more experiments while a more theoretical paper requires you to show a more thorough analysis of the paper.

Detailed instructions about the project can be found on the course home page, Project in the menu to the left.

## 1 EM and Graphical Models

N Friedman. “The Bayesian structural EM algorithm”. In: *Proc. UAI 98* ()

This is a classical machine learning paper where Nir Friedman shows that the EM algorithm can also be applied in order to maximize with respect to discrete parameters. The focus here is on finding a DGM with observable variables given data (for all those variables).

M Meila and M Jordan. “Learning with mixtures of trees”. In: *The Journal of Machine Learning Research* (2001)

In this paper Meila and Jordan extend a classical result by Chow and Liu. Chow and Liu showed in 1968 that a tree DGM can be learned, or rather that an ML estimate of the tree can be obtained. In this paper, Meila and Jordan introduce mixtures of trees (i.e., tree DGMs) and provide an EM algorithm for the ML estimation problem.

## References

- N Friedman. “The Bayesian structural EM algorithm”. In: *Proc. UAI 98* ().
- M Meila and M Jordan. “Learning with mixtures of trees”. In: *The Journal of Machine Learning Research* (2001).