
Probabilistic Graphical Models

Winter Semester 2015/2016

— Syllabus —



TECHNISCHE
UNIVERSITÄT
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Course website: <http://www.ausy.tu-darmstadt.de/Teaching/ProbabilisticGraphicalModels>

Time and place: Wednesdays 11:40 – 13:20 at room S2|04 213
Fridays 11:40 – 12:30 at room S2|04 213

TU-CAN: 20-00-0449-iv Probabilistische Graphische Modelle

Credits: 6.0

Mailing List: via Moodle (see course website)

Course description: The course covers advanced topics in machine learning, for example: Graphical models in machine learning, inference mechanisms and sampling strategies in graphical models, Gaussian processes, probabilistic topic models, unsupervised and semi-supervised learning and deep learning. Graphical Models provide a high-level description of many machine learning algorithms and are highly used for inference and learning.

After successfully attending the course, students have developed an in-depth understanding of probabilistic graphical models. They describe and analyze properties of graphical models, and formulate suitable models for concrete estimation and learning tasks. They understand inference algorithms, judge their suitability and apply them to graphical models in relevant applications. Moreover, they determine which learning algorithms are suitable to estimate the model parameters from example data, and apply these.

Exam

Date: TBA

- The exam may cover all content of the lectures and the exercises, unless specified otherwise.
- Students are allowed to bring a single A4 sheet with handwritten notes to the exam. This sheet has to be handed in with the exam papers.

Final Grade: The final grade will depend on your performance in the exam. By handing in your homework solutions and participating actively in the homework discussions, you can improve your grade by up to 1.0 grade. However, you have to pass the exam without the bonus, i.e., the bonus is only applied on exam results of 4.0 and better. Receiving the final grade 1.0 is possible without the bonus points.

Homeworks:

General Remarks: Your homework grade will of course depend on the correctness of your answer, but also on a clear presentation of your results and good writing style. It is your responsibility to find a way to *explain clearly how* you solved the problems. Note that you will get grades for the solution, not for the result. If you get stuck, try to explain why and describe the problems you encountered – you can get partial credit even if you did not complete the task. So please hand in enough information for us to understand what you did, what you tried, and how it worked!

We encourage interaction about class-related topics both within and outside of class. However, you should not share solutions with your classmates, and *everything you hand in must be your own work*. You are also not allowed to use material from the web. You are required to **acknowledge any source of information that you used to solve the homework** (i.e. books, papers, web sites, etc.). Acknowledgements will *not* affect your grade. Thus, there is no reason why you would not acknowledge sources properly. Not acknowledging a source that you have used, on the other hand, is a clear violation of academic ethics. Note that the university as well as the department is very serious about plagiarism. For more details please see <http://www.informatik.tu-darmstadt.de/index.php?id=202> and <http://plagiarism.org>.

Q&A Session: There will be a Q&A session shortly after the homework is released to sort out any problems of understanding the homework assignment. The homeworks will be updated afterwards to include your comments and improve the understanding of the exercise.

Homework Discussions: After the homeworks are handed in, there will be a homework discussion which is **obligatory** to attend if you want to receive the bonus points. If you handed in your solutions to the homework, you must also be able to present them during the homework discussions.

Programming Exercises: For the programming exercises you will be asked to hand in Matlab code. If you used any other tool to write your code, say Octave, it is *your responsibility* to make sure that the code also works in Matlab, which is what we will use for grading. In order for us to be able to grade the programming assignments properly, you need to comment your code in sufficient detail so that it will be easily clear to us what each part of your code does. Sufficient detail does not mean that you should comment every line of code (that defeats the purpose), nor does it mean that you should comment 20 lines of code using only a single sentence. Of course, all this is good coding practice anyway, so you would want to do this no matter what we expect from you.

Your Matlab code should display your results so that we can judge if your code works from the results alone. Of course, we will still look at the code. If your code displays results in multiple stages, please insert appropriate pause commands between the stages so that we can step through the code. Please be sure to name each file according to the naming scheme included with each problem. This also makes it easier for us to grade your submission. And finally, please be sure to include your name(s) and email address(es) in the code.

Collaboration Policy: You may work in groups of up to three people. Groups have to hand in a single submission with the names of all collaborators on it. All collaborators have to be able to present any part of their solutions independently during the homework discussions.

Files you need: All the data you will need for the problems will be made available on Moodle.

What to hand in: As mentioned, you need to show your solution and how you got there. Your submission should contain any textual answers that may be required; also put your **name(s) on the first page**. You do not have to include images of your results. Your code should show these instead.

For the programming parts, please hand in all documented `.m` scripts and functions that your solution requires as a single `.zip` or `.tar.gz` file to Moodle. Make sure your code actually works (also in an empty workspace) and that all your results are displayed properly.

Handing in: Please put your writeup in the mailbox in front of E315 or bring it to the lecture/practical and upload your code to Moodle. Only one group member has to hand in your work. If *and only if* you experience problems with uploading your solution, you may also email it to the TA.

You are supposed to send all your solution files as a single `.zip` or `.tar.gz` file. **Please note that we cannot accept file formats other than the ones specified!** These are widespread standards that are available on any platform.

Late Hand-ins: We will not accept late hand-ins, as we want to discuss the solutions in class right after the deadline.