WiSe 2024/25
Machine Learning for Data Science
Lecture by G. Montavon

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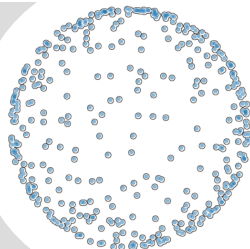
Lecture 0 | **Course Organization**

Weekly Schedule

Lectures (4 SWS):

▶ Tuesdays from 16:15 to 18:00, T9/Gr. Hörsaal (Takustr. 9)

▶ Thursdays from 16:15 to 18:00, T9/Gr. Hörsaal (Takustr. 9)

Exercises (2 SWS):

▶ Wednesdays from 16:15 to 18:00, T9/SR 006 Übungsraum (Takustr. 9)

Weekly Homeworks

Homework groups:

- ▶ Homeworks are done in groups of 3–5 students (use the forum to form a group).
- ▶ Once you have formed a group of appropriate size, write an email to `gregoire.montavon@fu-berlin.de` until **October 31** latest with the name of the group members (with all group members cc'ed).
- ▶ Groups will be created on November 1.

Theory part of the homweorks:

- ▶ Distributed as pdf file.
- ▶ You need to produce your solution on a separate document.

Programming part of the homeworks:

- ▶ Distributed as a zip file (containing an ipython notebook and several additional files). The zip file is gpg-signed.
    - ▶ GPG fingerprint: `8B4A 29AE B48E 9FCA 48F0 883E 6618 680B 4B60 996A`
- ▶ Please produce your solution directly in the provided Jupyter notebook. Run the notebook and then export the notebook to pdf.

Weekly Homeworks

Submission format:

- Homeworks should be submitted as a *single PDF file*, which concatenates two pdf documents:
    1. PDF scan of your handwritten solution for the theory part (or alternatively a latex file of your solution compiled to PDF),
    2. Jupyter notebook exported to PDF for the programming part.
- In some homeworks there is only a theory part or only a programming part.

Homework deadline:

- Each week on Wednesday at 16:00 (the week after the lecture).

Credits / Exam

Credits for the course:

▶ 10 ECTS

Prerequisite for taking the exam:

▶ Having passed 2 of the 3 evaluated homeworks.
  ▶ Evaluated homeworks = homeworks $\{3, 6, 9\}$.
  ▶ Passed = 50% points or more.

Exam:

▶ First Exam: Thursday 13 February 2025 from 16:15 to 17:45, T9/Gr. Hörsaal (Takustr. 9).
▶ Repeat Exam: Thursday 11 March 2025 from 16:15 to 17:45, T9/Gr. Hörsaal (Takustr. 9).
▶ Exam covers all lectures and all homeworks.
▶ Exam is 'paper & pen' (i.e. course material, personal notes, computers are not allowed).
▶ Final grade for the course is *only* determined by the exam result.

Syllabus

lectures	topics
1	Data science & big data
2	Visualization techniques
3–5	ML models of dispersion (PCA, clustering, anomalies)
6–7	ML models of correlations (CCA, regression, Fisher)
8	Reproducibility
9–11	Advanced ML models (probabilistic / kernelized / deep)
12	Explainable AI

Further Courses Offered

WiSe 2024/25

- ▶ Lecture: Machine Learning for Data Science (6 SWS / 10 ECTS)
- ▶ Seminar: Explainable AI for Data Science (2 SWS / 5 ECTS)
- ▶ Seminar: Machine Learning for Process Control (2 SWS / 5 ECTS)