Research Seminar Data Science

Kick off meeting

Ratzenböck — WS 2024/25

Agenda

- Seminar structure
  - Paper presentation/discussion
  - Programming exercises

- Schedule

Motivation

Motivation: preparation for Master's thesis

- Master's thesis: first peek into scientific research
- Often presented with a paper or prior research that you need to (1) ***understand*** and (2) ***implement***

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- ***Connect with professors***
  - Contributed papers and join presentation & discussion
  - Can lead to a Master's thesis

Schedule

Date	Minutes / week	Time (final pres)	Content	Comments
03/10/2024	90		Introduction	
10/10/2024	0			No lecture
17/10/2024	0			
24/10/2024	90		A1 Übung	Assignment 1 (A1) check ("Kreuzerlübung" style)
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30/01/2025	180		A4	A4 check + final assignment presentations

Talk pitches

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Coding assignments (90 min)

Paper presentations

Papers

- Everyone selects 1 paper to present
- Before choosing: read abstract carefully and go over methodology to check if paper is for you
- Select your favourite paper on Moodle
  - First come first serve basis
  - ***Window opens on Thursday. Oct. 10th 2024, 10:00***

Paper presentation

	Time (min)
Paper presentation	15
Literature review	3
Summarisation to a layperson	2
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Start your presentation with this part!

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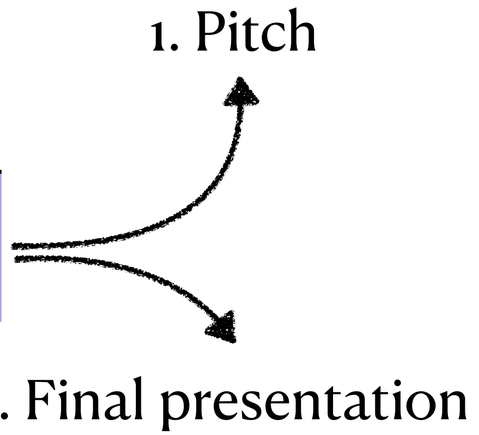

Pitch your presentation

Must include:

- Overall structure
- Motivation
- Method summary

You'll get:

- Early feedback
- Makes up 15% of grade

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Your presentation will be judged on:

- **Contents (70%)**
  - Do you understand the concept?
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- **Contents (70%)**
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- **Style (30%)**
  - Does your audience understand the concept?
  - Articulate the concept clearly and easy to follow.

Guidelines I — Contents

- Understand a ***contribution*** of a paper?
  - What's new?
  - What's the research question?
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- Who is your ***audience***?
  - Adopt to knowledge level of your audience
  - When necessary, introduce key concepts

Guidelines II — Style

- Don’t overload slide with text
- Don’t overuse ChatGPT, use your own words!
- Explain methodology with ***visuals*** as often as possible!
- Make a logical progression of slides (=ideas):
  - Express **motivation**
  - Focus on the **workings of the method** & why it works
  - Briefly summarise results
  - Don’t get lost in the details

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Literature review

Conduct a literature review of related works:

- What literature is this work based on?
- How is methodology different from previous works?
- Familiarise yourself with ***good and bad journals/conferences***

Literature review: Dos & Don’ts

Dos:

- Construct a timeline of major contributions: Milestone papers — check citation count & journal/conference.
- Start at fundamental paper (still relevant to the topic).
- For each element summarise contribution in max 1 sentence.

Don’ts:

- Don’t list few papers from related works section, dig deeper!
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Summary for layperson

Summarise paper to non-specialist audience (layperson)

- Simplify key concepts — don’t go deep into method
- Use a simple guiding example from everyday life
- Use **visuals** and restrict text:
  - Max 2 slides, max 5 words in total on slides

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Feedback

Need to play an active part in the course and discussion!

- At least **3 times** in the semester (for full points)
  - provide feedback about the talk (content or style related)
  - ask question(s)

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  - provide feedback about the talk (content or style related)
  - ask question(s)
- I'm keeping a list of students who actively participated
  - ***Come to me after the seminar and I'll add you***

Presentation guidelines

- Presentations in **.pdf and sent 1h** before seminar stars
- Presentations will have sharp time cut
  - After time is over, you are interrupted and have to stop
- Be punctual when presenting!

Coding assignments

Coding assignment

	Time (weeks)
Probability calculus fundamentals (recap)	3
Likelihood free inference (using existing python package: SBI)	4
Familiarising with recent research (understand paper & its github code)	3
Apply code to new data	4

Coding assignment: specifics

- Made available on Moodle (Jupyter notebook)
- Coding/exercise assignments in ***groups of max 3***
  - Choose a group in Moodle

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- Coding/exercise assignments in ***groups of max 3***
  - Choose a group in Moodle
- Submissions: ***the day before*** on Moodle
  - Must be in a Jupyter notebook or .pdf of it

Coding assignment

- Exercises will be graded in class

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Coding assignment

- Exercises will be graded in class
- Beginning of class:
  - Fill out the list of exercises you successfully solved
  - You get points for each solved problem
- Randomised selection: pick someone to present a given problem

Name	Problem 1 (2 pts)	Problem 2 (4 pts)	Problem 3 (3 pts)	Problem 4 (4 pts)	Problem 5 (6 pts)	Problem 6 (1 pt)
Student 1	☐	☑	☑	☑	☑	☑
Student 2	☑	☑	☐	☐	☑	☑
Student 3	☑	☑	☐	☑	☐	☐
Student 4	☐	☑	☑	☑	☑	☑
Student 5	☑	☐	☑	☐	☐	☐
Student 6	☑	☑	☑	☑	☑	☑
Student 7	☑	☑	☐	☑	☐	☑
Student 8	☐	☐	☐	☑	☑	☑
Student 9	☑	☑	☑	☑	☑	☑
Student 10	☑	☐	☑	☐	☐	☑
Student 11	☐	☑	☑	☐	☑	☑
Student 12	☑	☑	☑	☐	☑	☐
Student 13	☑	☐	☐	☐	☐	☐

Grade: Sum of points / total points

Misc.

Parameters & requirements

- 3 SWS, 4 ECTS
- Participation, including Moodle course, is mandatory
- Allowed to have ***up to two unexcused absences***
- Please notify in advance if sick/absent for your presentations!
- De-registration possible until ***Mo 14.10.2024 23:59***

Grading & grade composition

1. at least 87.5%
2. at least 75.0%
3. at least 62.5%
4. at least 50.0%

Composition	**Weight (%)**
Paper pitch	15
Final paper presentation	35
Feedback	10
Coding exercises	40

Questions?