

How to read & research scientific papers

DAT550/DIT978 Advanced Software Engineering
for AI/ML-Enabled Systems

Eric Knauss eric.knauss@cse.gu.se

Chalmers | University of Gothenburg, Sweden

2023-03-24

Intro

Searching

Reading

Writing

Academic integrity

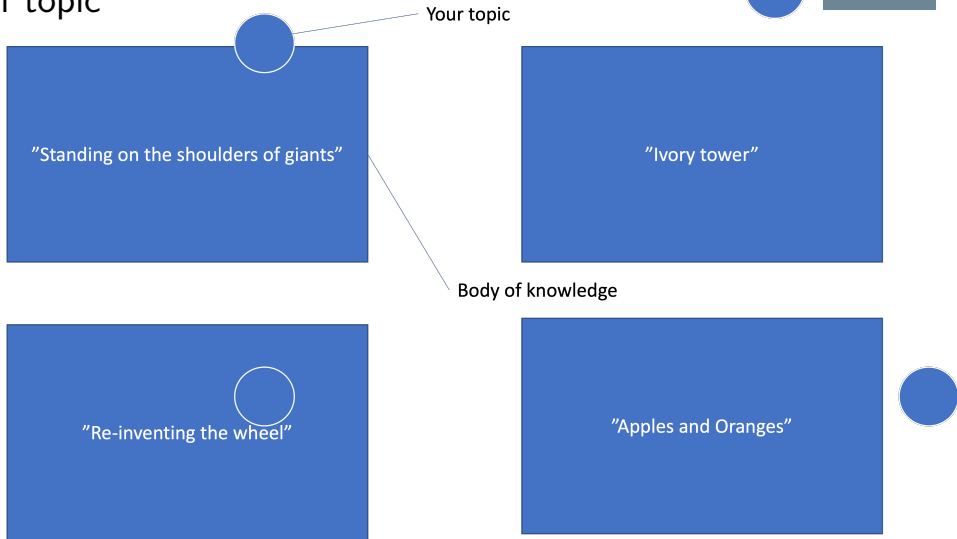
Presentation style

Intro

Goal for the day:

- ▶ Hands-on advice on how to work with literature
- ▶ Let's learn how to search, read, and write
 - ▶ We are all experts in that, are we not?
- ▶ Slides just to support our discussion
 - ▶ Expert discussions! :-)

Scope of topic



Search strategy

There is a spectrum from ad hoc to systematic literature reviews. Consider:

- ▶ What to search: Select search terms, use thesaurus (or ChatGPT) to find other related search terms
- ▶ Where to search:
 - ▶ Use literature databases to increase reproducibility
 - ▶ Use general purpose or specialized search engines (e.g. google scholar) to get more up to date information
- ▶ Use forward and backward snowballing (for a good paper: Which other papers does it cite, which papers are citing this paper)
- ▶ Use the library services

Organize your work

- ▶ Create an annotated literature list
- ▶ Search engines can usually export results to a spreadsheet. That can be very useful.

How to judge the quality of academic publications?

- ▶ Technical report vs. published paper
- ▶ Journals, Conferences, Workshops, and their metrics
- ▶ How to use non-academic publications?

Be careful about AI tools

- ▶ They tend to invent plausible references

References

Adapted from various internet readings:

- ▶ <http://whytoread.com/how-to-read-simple-reading-strategies-read-effectively/>
- ▶ https://www.unb.ca/fredericton/studentservices/_resources/pdfs/wss/reading.pdf
- ▶ <https://medicine.tamhsc.edu/academic-support/reading-effectively.html>

General Approach

1. Survey
2. Questions
3. Read
4. Recite
5. Review

Survey

- ▶ Read the title and abstract
- ▶ Read all headings
- ▶ Quick look at all figures / tables: No details, just rough idea on what they are about

Questions

► Here: Use data collection sheet

Read

- ▶ But only as much as you need to answer your questions!
- ▶ Annotate paper (highlight important concepts)

Recite

- ▶ Tell the answer to your question, content of paper based on annotations
- ▶ [Optional] Check correctness of answer
- ▶ [Optional] repeat until answer is perfect

[Optional] Review

- ▶ Revisit material regularly

How to write

Technical writing

One strategy: Think in brackets

‘(’ what you aim to show
— your content
‘)’ what you just showed

Examples:

- ▶ abstract/introduction, conclusion
- ▶ research method, discussion
- ▶ each paragraph

Writing takes time

Use 10 fingers.

It still takes time, though!

How to write strong related work

- ▶ Give an overview (show how a small number of research areas relate to your topic)
 - ▶ Example: Architecture for ML-based systems
 - ▶ what is architecture,
 - ▶ what is ml,
 - ▶ what are ml-based systems
- ▶ One subsection per area
 - ▶ One paragraph per paper
 - ▶ One sentence about the key findings
 - ▶ One sentence about the method and support for the findings
 - ▶ [Optional] One paragraph on what is missing for my study?
 - ▶ One paragraph
 - ▶ Key take aways / gap
- ▶ [Optional] figure or table to synthesize across all subsections

Academic integrity

- ▶ Plagiarism
- ▶ Use of AI tools

Academic integrity: plagiarism

- ▶ What is plagiarism?
- ▶ Why we should not plagiarise
- ▶ What to do instead?
 - ▶ Quotation
 - ▶ Paraphrasing
 - ▶ Quoting/paraphrasing figures
 - ▶ Referencing styles

How to present

- ▶ Keep your audience in mind
- ▶ Motivation is crucial
- ▶ A good example helps - use it early
- ▶ T shaped presentations
- ▶ Use references

Pedagogical example

- ▶ Trade-off: Easy to understand vs. realistic
- ▶ Key take-aways: Do not leave them to the audience