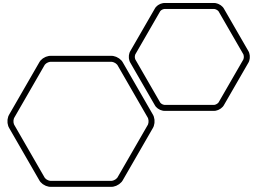


How to read, write and present a research paper



Outline



**HOW TO READ A
RESEARCH PAPER**



**HOW TO WRITE A
RESEARCH PAPER**



**HOW TO PRESENT A
RESEARCH PAPER**

Finding related work

- Search by keywords
 - Google scholar
- Find their related work
- Find “cited by”
- Find the authors’ other work
- Find proceedings of top conferences

How to read a research paper

- First pass
- What
 - What is the problem
 - What is the setting of the problem
 - What method is proposed
- Why
 - Why it was solved this way

How to read a research paper

- Second pass
- How
 - The detail of method
 - The detail of theoretical prove
- Third pass
 - implementation

Reading papers – common mistakes

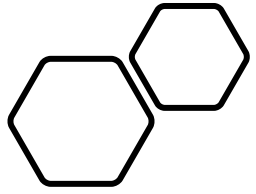
- Papers are not textbook
 - There is no correct/wrong answer
 - Papers are telling you what you CAN do, not what you SHOULD do
- Reading without a purpose
 - Too many papers. You need to read strategically
- Reading Obstacles
 - Don't feel bad. There is nothing wrong. Just keep reading
 - Read the cited work

Tips for reading a research paper

- TAKE NOTES
 - Notes highlights
 - Summarize the paper
 - Do comparisons
- Build your “knowledge graph”
 - Link topics, methods together
 - Think more abstract
- Learn how to write
- Discussion is important
- Reading is to inspire your research

Tips for reading a research paper

- Use software to organize
 - OneNote
 - Screen shot is easy
 - Hyperlink the pages
 - Mendeley
 - Easy to export as bib file
 - Github
- Research is a journey.
 - It takes time. Months to years
 - Keep things ORGANIZED



Outline



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**HOW TO WRITE A
RESEARCH PAPER**



**HOW TO PRESENT A
RESEARCH PAPER**

How to write a research paper

- What
 - What is the problem
- Why
 - Why it matters
 - Why it is not solved
 - Why you solve it this way
- How
 - How you solve the problem

Research paper outline

- Abstract*
 - Introduction*
 - Related work*
 - Preliminaries
 - Methodology*
 - Experiment^
 - Discussion
 - Conclusion*
- *: essential component
 - ^: optional for theoretical papers

Introduction

- Motivate your problem
- Motivate your solution
 - Overview of existing work and why they need improvement
- Describe your solution high-level
- Summarize your contribution
- Goal
 - Your readers understand what problem you are working on
 - Convince readers that existing work may not solve this problem

Introduction – common mistakes

- Use terms that are defined in the methodology
 - This is going to confuse the readers as they don't know what you are talking about
 - Even worse, they will get wrong impression of your task
- Too many notations
 - Again, readers can get confused
- Too much detail on related work
 - That's the task of the Related work section

Related work

- Usually after introduction or after experiments
- Discuss the existing work in a little more detail
- What counts as related work?
 - Papers that solve similar problems or similar settings
- Goal
 - Let your readers understand the current progress of this problem
 - Convince your readers that your method is better because
 - Settings of the existing methods are different, so they don't work well on the problem
 - Your technique is more advanced

Related work – common mistakes

- Not really related
- Too much detail
 - You want to highlight the key difference
- Missing important related work
 - The most common problem

Methodology

- Overview
- Technical component 1
- Technical component 2
- ...
- Goal
 - Let your readers understand why you solve this way
 - Let your readers understand how you solve the problem
 - Convince your readers that your method can work before showing them the experiments!

Methodology

- observations/motivations -> formulation -> solution
- xx should be considered in xx problem. We formulate the problem as xxx. We solve the problem with xxx
- Bad example: we use xxx to solve the problem. The benefit is that xxx

Tips for Methodology

- Adding a notation table
 - Especially helpful for math heavy papers

notation	meaning	example
W	Word	W="tips"

- Adding examples
- Adding flow chart or model overview
- Focus on the main solution. Specific issues can be added to discussion. Proofs can be added to Appendix

Methodology – common mistakes

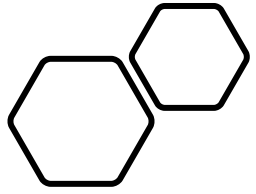
- This is not a "readme"
- Lack of explanations
 - Explain WHY!
 - Why this function/design/model?
 - What this function is trying to do?
- Explanation is not convincing
 - "because it performs well in our experiments" is not an explanation
 - You need to explain your model from a principle way

Experiments

- Setting
 - Dataset
 - Baseline methods
 - Performance metrics
- Performance
- Other analysis
 - Ablation study: describe a procedure where certain parts of the model are removed, in order to gain a better understanding of the model behavior.
 - Parameter study
 - Convergence study
 - Error analysis
- Goal
 - To convince your readers that your method work empirically.

Experiments – common mistakes

- Lack of explanations
 - Explain WHAT!
 - Explain WHY!
- Figure is too hard to read
 - Font is too small
 - Lines are too thin
- Experiments are not thorough
 - Too few baselines
 - Too few datasets



Outline



HOW TO READ A
RESEARCH PAPER



HOW TO WRITE A
RESEARCH PAPER



**HOW TO PRESENT A
RESEARCH PAPER**

How to present a paper

- Front page: Title, authors
- Outline
- Introduction and related work
- Outline
- Methodology
- Outline
- Experiments
- Outline
- summary

Tips

- Use figures
- Follow the structure of your paper
- Proper amount of content
- Take pauses, but naturally
 - Your audience needs to digest the information
- Don't need to present all details of the paper
- Cohesive: natural transit from page to page
- Know your audience
 - What they know
 - What they don't know

Common mistakes

- Too much content
 - NO COMPLETE SENTENCE
- Too little content
 - Your audience can get lost
- Font size is too small
 - No smaller than 24
- Lack of confidence
 - Eye contact
- Read slides
- Presenting to one person (namely, your advisor)
- Run overtime or undertime

Prepare for questions

- Prepare time for question and interruption
- Prepare a list of questions that your audience may ask
- prepare extra slides for questions
 - This is the appendix of your slides
- Listen to the questions
- Be honest

Practice

- Practice your presentation
- Try to find the matching audience
 - For class/research group presentations, practice to yourself.
 - For conference presentation, practice in the research group
 - For defense, practice to yourself and in research group
 - For job talk, practice in departmental seminars. You need audiences from faculty members to students, who are outside your domain