

How To Read a Research Article Efficiently

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Why do you need to read a scientific article?

Always ask yourself this question
before reading and/or searching

Different objectives lead to different
reading strategy

What articles?

How?

Why do you need to read a scientific article?

- To know most recent research progress
- To develop a research direction
 - When you have a “new” research idea
 - 90% It has been performed
 - 9% Fundamental flaw
 - 1% NEW idea
- To learn how to perform an experiment
 - Learn from existing results and methods
- To learn basic knowledge or concepts in one field
 - Textbooks
 - Tutorial/review paper
- To improve your writing

To know most recent research progress

- Daily/weekly track
 - Let reading new articles becomes your routine
- No one can read all publications
- What journal should I follow?
 - Top journals
 - One or two top subfield field journals
 - Group members, friends, news

To develop a research direction

- Targeted search
 - Understand a specific research direction
 - Check if your idea is “new”
- Perform a targeted search
 - Find key papers
 - Review paper
 - Foundation paper
 - One or two most recent paper
 - Expand your search
 - **Google Scholar** (Web of Science)
 - References and “Cited by”

Structure of a Research Article

- Title: The main idea about this article
 - Authors: Any familiar names?
- Abstract: Short summary of the article
- Introduction: Background and motivation
- Results: Evidence supporting the motivation
- Discussion: Interpretation or explanation of results
- Conclusion: Summarize important findings and significance
- Methods: Technique details
- References

Typical Reading Sequence

Abstract



Introduction



Conclusion



Figures



Details

Questions during reading

1. What's the major work of this paper? Title, Abstract
Browse
-

2. What's the motivation in this direction (not only this paper)? Introduction
3. Comparing to previous work, what's the significance? Introduction
Conclusion
- a. Novelty?
 - b. Technique improvement?
 - c. Performance?
4. How is the work realized (technique used)? Key figures
Brief Reading
-

5. What's the logic flow of this paper? Figures
First and last sentences
of each paragraph
- a. What's the relation between sections?
 - b. What's the relation between figures?
 - c. What's the purpose of each figure?
- Detailed Reading**
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6. What's the technique details? (Only if you are interested in)
- a. How do they get each figure? What techniques do they use to draw each figure?
 - b. Are there any technique details not covered in previous questions?
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Strategy

- Daily track
 - Skip unrelated by title
 - Browse **all** related articles in your selected journal
 - Select a small portion for **brief reading** and **detailed reading**
 - One **in-depth reading** per week (requirement for my students)
- Targeted search
 - Foundation paper: **in-depth reading**
 - Most recent paper: **detailed reading**
 - During expanded search
 - Browse or **briefly read** related articles
 - Perform **detailed reading** only if an article is very important

Comments

- Everyone is different. Try to find your own way.
- Jargon
 - **Do NOT skip a jargon if it appears more than once**
 - Defined in the article
 - Textbook
 - Wikipedia for quick understanding (may not be reliable)
- The more you read, the faster you read
- Trust an article unless you perform in-depth reading

Thank you!

Questions?