

How to Read a Paper: a three-pass method

Based on
"How to Read a Paper," by S. Keshav

Why reading papers?

- ❑ review them for a conference or a class
- ❑ keep current in the field
- ❑ for a literature survey of a new field

The three-pass approach

1. Get a general idea of the paper
2. Grasp the paper's content, not details
3. Understand the paper in depth

The 1st pass - a quick scan to get a bird's-eye view (5-10 mins)

1. Carefully read the title, abstract, and introduction
2. Read the section and sub-section headings, but ignore everything else
3. Read the conclusions
4. Glance over the references, mentally ticking off the ones you've already read

✓ "readers of your papers do this"

Result of the 1st pass

1. Category: What type of paper is this?
 - A measurement paper?
 - An analysis of an existing system?
 - A description of a research prototype?
2. Context: Which other papers is it related to? Which theoretical bases were used to analyze the problem?
3. Correctness: Do the assumptions appear to be valid?
4. Contributions: What are the paper's main contributions?
5. Clarity: Is the paper well written?

The 2nd pass - read the paper with greater care (up to an hour)

1. Look carefully at the figures, diagrams and other illustrations in the paper
 2. Mark relevant unread references for further reading
- ✓ appropriate for a paper in which you are interested, but does not lie in your research specialty.

The 3rd pass - attempt to virtually re-implement the paper (4-5 hours)

- ❑ identify and challenge every assumption in every statement
- ❑ think about how you yourself would present a particular idea
- ✓ identify not only a paper's innovations, but also its hidden failings and assumptions.

Guidelines

- ❑ Read *critically*.
 - Should not assume that the authors are always correct. Asking appropriate questions.
- ❑ Read *creatively*
 - What are the good ideas in this paper?
 - Do these ideas have other applications or extensions?
 - Are there possible improvements?
 - What would be the next thing you would do?
 - Do one pass on each paper
- ❑ Make notes as you read the paper

Literature survey

Read tens of papers, perhaps in an unfamiliar field

1. Use a search engine, e.g. *Google Scholar*, and some well-chosen keywords to find 3-5 recent papers in the area
2. Do one pass on each paper
3. Read related work sections to find a summary of the recent work
4. Find shared citations and repeated authors - key papers and researchers in the area.
5. Read their papers and scan related conferences.

Summarizing a paper

- ❑ 1-2 sentences
 - Almost all good research papers try to provide an answer a specific question
- ❑ 3-4 most important subpoints of the main idea
- ❑ compare the paper to other works

One page review

- ❑ a one or two sentence summary of the paper
- ❑ a deeper, more extensive outline of the main points of the paper, including for example assumptions made, arguments presented, data analyzed, and conclusions drawn
- ❑ any limitations or extensions you see for the ideas in the paper
- ❑ your opinion of the paper; primarily, the quality of the ideas and its potential impact.