How to read a Research Paper

Advices & Good Practice

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Why do you need to learn to read?

- Your teacher tells you to read a whole lot of research papers during this course.
- Reading research papers is different from reading Harry Potter or a Textbook about programming. It is a skill that needs to be taught.

Hence this short tutorial/overview.

First get this Paper

"How to read a paper" by S. Keshav in SIGCOMM Comput. Commun. Rev. vol 37, no. 3. 2007.

It's 2 pages only – read it and think about it.

The Computer Science Approach

We will now talk about research papers in two ways

- The paper structure (static description) – We will divide a paper into independent chunks and define the purpose of each chunk
- How a paper works (dynamic description) – We will look at the "data (information) flow" in a paper when reading it.

The Structure of a Research Paper

Most research papers are organized into the same structure

- Title
- Author list
- Abstract
- Introduction
- Previous Work/Litterature Study
- Method
- Experiments and Results
- Discussion and/or Conclusion
- Reference List

Each chunk is there for a specific purpose.

Think about this?

- What is the purpose of each section of the paper?
- Who is the intended reader of each section?

How I Read a Paper – Step 1

- Does the title interest me? (It is important that the title is descriptive).
- Sometimes keywords/topic classifiers might be helpful too.

(Is this paper relevant to me? Or should I stop reading it?)

How I Read a Paper – Step 2

- Do I get an idea of the paper by just looking through headings, pictures and plots?

(This is about getting an overview and feel of the paper)

How I Read a Paper – Step 3

- Does the abstract sell the idea to me? Or promise me nice results?
- Do I get a rough idea of what it is the authors want to do?

(Rough motivation and perspective on work – Clear novelty and contributions?)

How I Read a Paper – Step 4

- Does the results (at a coarse level) look impressive/interesting enough?
- I would also have a first look at any supplementary material (like videos). Do I get the ideas of what goes on and how things work? Does it interest me?

(Does it work or will I waste my time reading more?)

How I Read a Paper – Step 5

- From discussion/conclusion does this actually work?
- Are the authors honest about their work? Have they pointed out weaknesses and future improvements?

(Reflection and evaluation of the work)

How I Read a Paper – Step 6

- Skimming through the introduction and method sections do I actually get an idea of the central contribution and how the method work?
- Do the authors set the scene properly? That is do they explain what they want to do and why it is important or relevant to do it

(Motivation and perspective on the work! Clear intuition of how the method work?)

How I Read a Paper – Step 7

- A closer look at the results – are there any artifacts/problems or missing (obvious) experiments or comparisons?
- Basically verifying if there is alignment with what was promised in the abstract and introduction

(Are verification and validation in order?)

How I Read a Paper – Step 8

- Looking previous work through – do the Authors know their shit? Do they compare their own work with existing work?

(Do the authors know the value of their own work?)

How I Read a Paper – Step 9

- Looking through reference list – is there anything interesting? or obviously, missing here?

(Have the authors done their pre-study properly?)

How I Read a Paper – Step 10

- I go into all the small technical details – reading methods section (verifying derivations, checking all choices are motivated or properly argued for) and go over the results in a very detailed way.

(Are there any technical errors?)

- Now I am happy... sometimes I spend some time just giving the paper a final read from A to Z.

Last Piece of Advices

- There is no single right or wrong way to read a research paper!
- Learn what reading techniques work for you!
- Try to attack this in a structured way – make it an efficient process!
- There are always exceptions to the rules!