How to Read and Present a Scientific Paper

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Part I:

Reading a Scientific Paper

Motivations

Why to Read Scientific Papers?

[Academic World]

I read papers because of:

- The Content:

  Looking for new ideas or new proof techniques to write a new paper

- The Topic:

  What are the new directions in my field or learning a new topic

- The Authors:

  Looking for valuable colleagues to work with or new comers

Motivations

Why to Read Scientific Papers?

[Company World]

I read papers because of:

- The Content:

  I need the most efficient algorithm or new techniques for my product

- The Topic:

  Can I get a new product out of these crazy scientists work?

- The Authors:

  Who are the valuable persons to hire or collaborate with?

Motivations

What should I learn?
I already know how to read English!

It is cryptic

(notations, math formulas, references to other papers, . . .)

It is hidden

(where to find good papers?)

It is complex

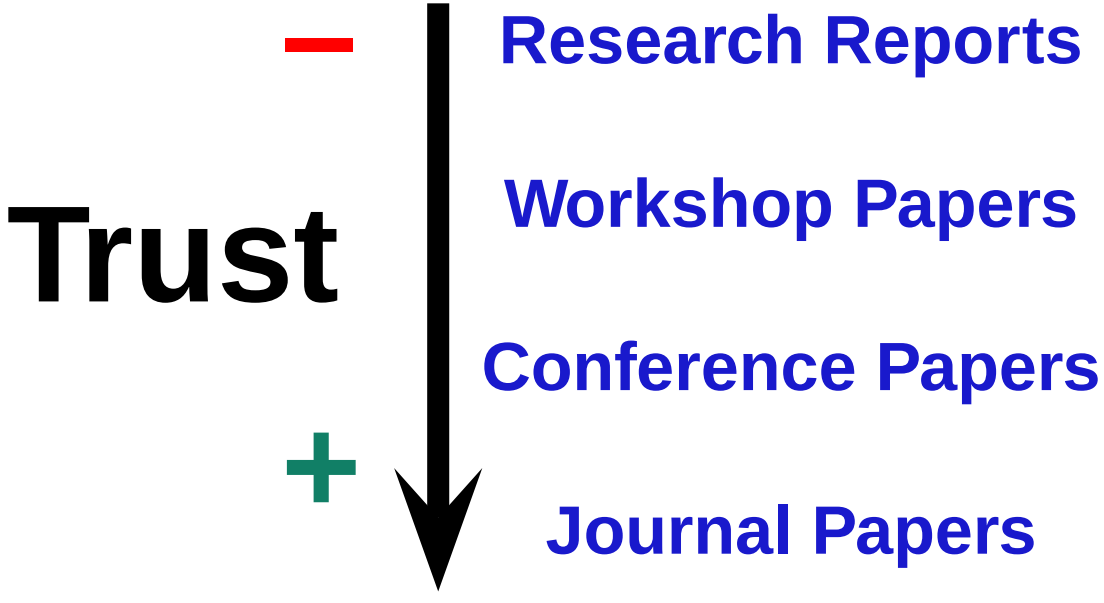
(theorems, lemmas, proofs, experiments, . . .)

Plan

1. Taxonomy of Scientific Papers
2. Structure of Scientific Papers
3. First Read Through
4. In Depth Reading
5. Looking at References
6. Evaluating Scientific Papers

7. Appendix
   - How to Read a Proof
   - How to Read an Experimental Result

Taxonomy of Scientific Papers



Taxonomy of Scientific Papers

Research Reports

Review: None

Goal: Stamp an idea before publishing

Size: Depends

Freshness: Instantaneous

Workshop Papers

Review: Yes, but low threshold

Goal: Either submit "*in progress*" work and hoping for feedback, or the paper has been rejected to a conference

Size: Few pages (from 5 to 15)

Freshness: From few weeks to few months

Taxonomy of Scientific Papers

Conference Papers

Review: Yes, the threshold depends on the conference

Goal: Publish a finished work with possible forthcoming research

Size: More than 8 pages and less than 20

Freshness: Few months

Journal Papers

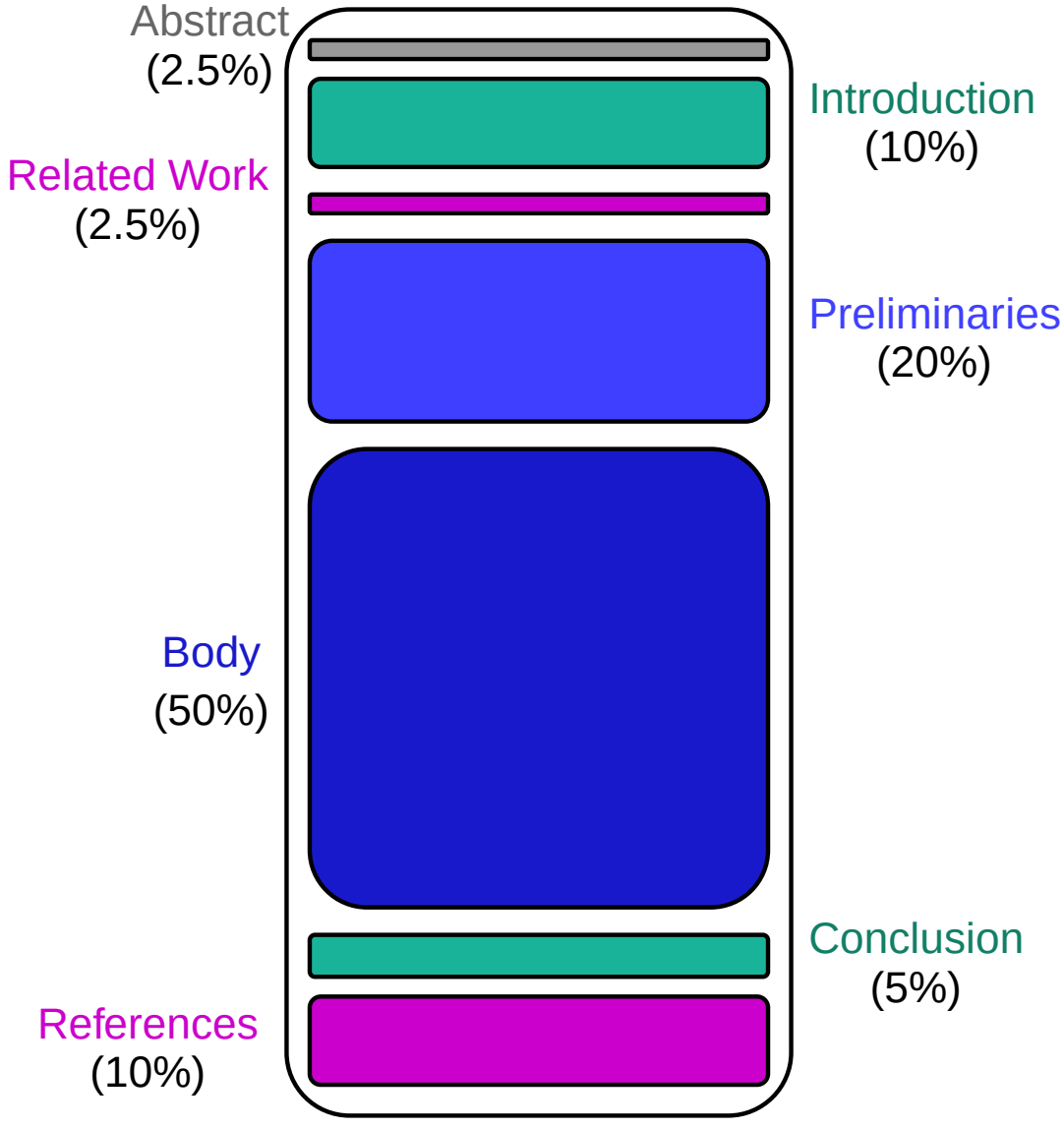
Review: Yes, the threshold depends on the journal (international experts are reviewing)

Goal: Survey or complete work on a topic (in depth paper)

Size : From 15 pages up to 70 (or more)

Freshness: Few months to few years

Structure of Scientific Papers



First Read Through (Step 1)

1. Read:
   - Abstract
   - Introduction
   - Related Work
   - Conclusion
   - References (Only the one pointed in one of the previous sections)

2. Reply to the following questions:
   - **For which community is the paper written?** [Introduction, Related Work]
   - **What contributions are in this paper (according to the authors)?** [Abstract, Introduction, Conclusion]
   - **What possible consequences can the contributions have?** (direct applications, new techniques, new fields,. . .) [Introduction]

First Read Through (Step 2)

1. Read:
   - Preliminaries (Identify the notations or analysis methods)
   - Body (Warning ! Do **NOT** read the proofs or experiment settings)

2. Reply to the following questions:
   - **If I assume the proofs correct or the experimental setting and the analysis method relevant, does the authors meet the list of contribution?**
     [Preliminaries, Body]
     - **Yes**: Go to "In Depth Reading"
     - **No**: Try again or ask for advice by your supervisor

In Depth Reading

1. Read:
   - Body (Everything)
   - References (Quick glance to external theorems/experiments)
2. Last Tips:
   - **A proof/experiment is too technical, I do not understand it!**
     - Is it relevant to understand it?
       Yes: Try harder or contact your advisor
       No: Skip it
   - **I found an error !**
     - Are you sure?
       – Double check
       – Triple check
       – Ask your advisor
     - Are the contributions of the paper still valid?
       Yes: Then, it is not so important
       No: Write a paper!

Looking at References

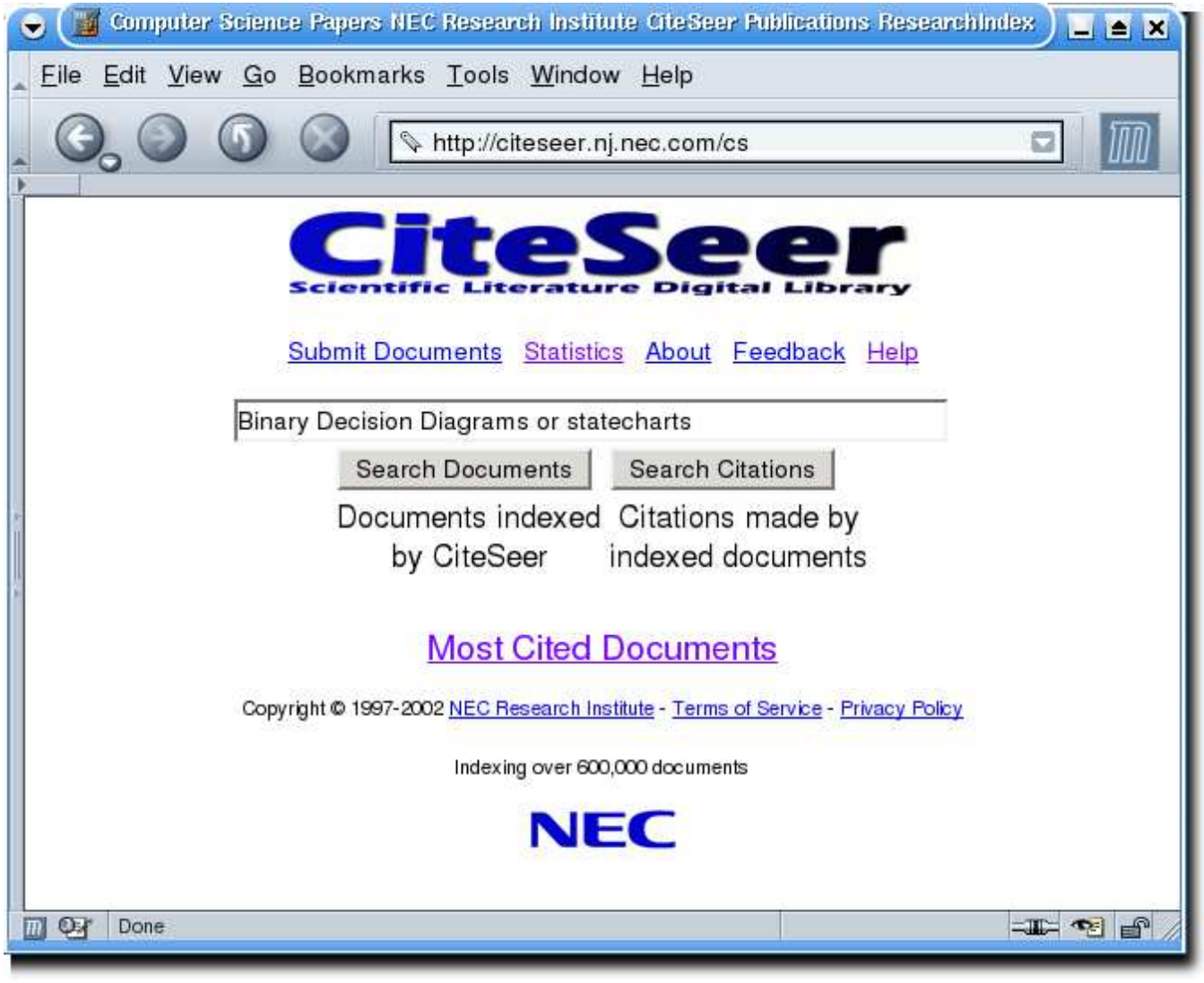
A paper is just one link in a chain !

Don’t stop once you have read it, it’s only the beginning !

Looking at references allows you to:

- Discover the community around it
- Understand the context
- Put the paper in perspective
- Link it with other fields/topics

Citeseer – Tools for You



Citeseer – Result of our Query

CiteSeer Find: Binary Decision Diagrams or statecha Documents Citations

Searching for **binary decision diagrams or statecharts**.

Restrict to: Header Title Order by: Citations Hubs Usage Date Try: Amazon B&N Google (RI) Google (Web) CSB DBLP

2611 documents found. **Only retrieving 250 documents (System busy - maximum reduced).**

Retrieving documents... **Order: citations weighted by year.**

Statecharts: A Visual Formalism for Complex Systems - Harel (1987) (Correct) (926 citations)

Programming 8 (1987) 231-274 231 North-Holland **Statecharts**: A Visual Formalism For Complex Systems*

control units. Our diagrams, which we call **statecharts**, extend conventional state-transition diagrams structured and economical description language. **Statecharts** are thus compact and expressivesmall diagrams

www.wisdom.weizmann.ac.il/~dharel/SCANNED.PAPERS/Statecharts.pdf

Symbolic Boolean Manipulation with Ordered Binary Decision Diagrams - Bryant (1992) (Correct) (417 citations)

Symbolic Boolean Manipulation with Ordered **Binary Decision Diagrams** Randal E. Bryant #Fujitsu

akebono.stanford.edu/users/nanni/courses/EE318/bryant92.pdf

LSCs: Breathing Life into Message Sequence Charts - Damm, Harel (2001) (Correct) (21 citations)

agree that a state-machine language (such as **statecharts** [18, 20]is most useful. The reason we want we synthesize a good first approximation of the **statecharts** from the MSCs? Finding good ways to do this from the UML standard [36]which recommends **statecharts** as well as sequence-charts for modeling

www.wisdom.weizmann.ac.il/~dharel/SCANNED.PAPERS/LSCs.pdf

Citeseer – Paper Details (Top)

Statecharts: A Visual Formalism for Complex Systems (1987) (Make Corrections) (984 citations)
David Harel
Science of Computer Programming

CiteSeer Home/Search Context Related

View or download:
wisdom.weizmann.ac.il...Statecharts.pdf
Cached: PS.gz PS PDF DjVu Image Update Help

From: wisdom.weizmann.ac.il/~dharel/... (more)
Homepages: D.Harel HPSearch (Update Links)

Statecharts constitute a broad and popular extension of finite state diagrams

Rate this article: 1 2 3 4 5 (best)
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Abstract: We present a broad extension of the conventional formalism of state machines and state diagrams, that is relevant to the specification and design of complex discrete-event systems, such as multi-computer real-time systems, communication protocols and digital control units. Our diagrams, which we call statecharts, extend conventional state-transition diagrams with essentially three elements, dealing, respectively, with the notions of hierarchy, concurrency and communication. These transform the... (Update)

Context of citations to this paper: More

...collection of formalisms, languages, approaches, architectural constructs. **Examples thereof are team automata [2] Manifold [1] Statecharts [11], CORBA [3] blackboard architectures [14] Thus, coordination in highly complex communicative systems is indeed speci ed, designed**...

...parsed the Evolving Algebra for ANSI C [11] in the Specware tool. **In [26] we concentrate on using this idea to integrate state charts [18]inSpecware.** Since colimits do not exist in the category of specifications and interpretations, weareinterested whether colimits exist in...

Cited by: More

A Framework for the Static and Interactive Visualization .. - Castelló, Mili, G.Tollis (2002) (Correct)
Statecharts For Requirements Specification - As Simple As.. - Glinz (2002) (Correct)
Dynamic Hierarchical Machines - Ruggero Lanotte Andrea (Correct)

Citeseer – Paper Details (Middle)

Active bibliography (related documents): More All

1.0: Extending Statecharts with Temporal Logic - Sowmya, Ramesh (1994) (Correct)
0.5: On Visual Formalisms - Harel (1988) (Correct)
0.2: Temporal Logic and Z Specifications - Roger Duke (1989) (Correct)

Similar documents based on text: More All

2.2: Science of Computer Programming 8 (1987) .231-274.. - Statecharts Visual.. (Correct)
0.3: A Process Algebraic Semantics for Statecharts via State.. - Uselton, Smolka (1994) (Correct)
0.3: A Compositional Semantics for Statecharts using Labeled.. - Uselton, Smolka (1994) (Correct)

Related documents from co-citation: More All

19: STATEMATE: A working environment for the development of complex reactive systems - Harel, Lachover et al. - 1990
16: ObjectOriented Modeling and Design (context) - Rumbaugh, Blaha et al. - 1991 **Book Details from Amazon or Barnes & Noble**
12: The Temporal Logic of Reactive and Concurrent Systems (context) - Manna, Pnueli - 1992 **Book Details from Barnes & Noble**

BibTeX entry: (Update)

D. Harel. Statecharts: A visual formalism for complex systems. Science of Computer Programming, 8:231--274, 1987. http://citeseer.nj.nec.com/harel87statecharts.html More

```
@article{ harel87statecharts,
    author = "David Harel",
    title = "Statecharts: {A} Visual Formalism for Complex Systems",
    journal = "Science of Computer Programming",
    volume = "8",
    number = "3",
    month = "June",
    pages = "231--274",
    year = "1987",
    url = "citeseer.nj.nec.com/harel87statecharts.html" }
```

Evaluating Scientific Papers

Ok, I have:

- Read the paper,
- Understood it,
- Browsed the references.

What's next?

- List the strength/weakness of the paper (be critical!)
- Define the contributions of the paper (look at the papers quoting it)
- Put the paper in perspective (impact on the community)
- Make your own opinion! (very important)

Summary: How to Read a Paper?

1. **First Read Through**

   (Abstract, Introduction, Related Work, Conclusion, References)

   Extract the context and the intended contributions

2. **In Depth Reading**

   (Preliminaries, Body, References)

   Grab the details

3. **Looking at References**

   (References, Citeseer)

   Make the link with other papers, look at the real impact

4. **Evaluate the Paper**

   (Everything)

   Make your own opinion

5. **Start to Prepare your Presentation**

Appendix:

How to Read Technical Parts

How to Read a Proof

1. **Analyze the Theorem**
   - What are the hypothesis?
   - What is the result?
2. **Understand the Structure of the Proof**
   - What type of Proof is it?
     - Direct Proof
     - Proof by Contradiction
     - Proof by Induction
     - Case by case Enumeration
     - Others. . .
   - Decompose the Proof (divide and conquer)
     - Look for Independant Parts (lemmas, propositions, . . .)
     - Look for External Theorems (look at References)
3. **Assume intermediate steps to be true and understand the skeleton of the proof**
4. **If necessary, look at the small annoying steps**

How to Read an Experimental Result

- **Identify**:
  1. The setting of the experiment
     (processor, RAM, layout of the network, . . .)
  2. What concrete parameters are measured
     (computational time, memory used, bandwidth, . . .)
  3. The method used to analyse the results
     (bare results, average, other statistical methods, . . .)
  4. The interpretation of the results done by the authors
     (making of a theory which should match with the facts)
  5. The conclusion of the authors
     (According to the theory made previously, what to do?)
- **Look for**:
  1. A bias in the setting
  2. A bias in the method used to analyze results
  3. A bias in the interpretation of the results
  4. A bias in the reasonning from the interpretation to the conclusions

Part II:

Presenting a Scientific Paper

Plan

1. Before You Start
2. Organize your Ideas
   - Introduction
   - Preliminaries
   - Body
   - Technicalities
   - Conclusion
3. Slides
4. Speaking
5. The Show
6. Last Tips

Before You Start

- **Know your Topic**

  (Be sure you have understood the paper)

- **Know Your Audience**

  (Your talk must take the audience into account)

- **Know Your Goals**

  (What are the expectations of the audience?)

- **Know Your Limits**

  (how much time will be needed?)

Organize Your Ideas (1/3)

- **Identify the Key Ideas**

  (Make sure that all the key ideas of the paper are in your talk)

- **Do not Go into too Many Details**

  (Ignore the superfluous and focus on the essentials, use examples!)

- **Use A Top-Down Approach**

  (starting wide, finishing narrow)

- **Structure Your Talk**

  Introduction, Preliminaries, Body, Technicalities, Conclusion)

Organize Your Ideas (2/3)

Introduction

- Define the Problem
- Motivate the Audience
- Discuss Earlier/Posterior Work (briefly)
- Emphase the Contribution of the Paper
- Provide a Road-map

Preliminaries

- Introduce Terminology and Notations or the Setting of the Experiment (but only the absolutely necessary ones)
- If Needed, Redefine the Problem more Technically

Organize Your Ideas (3/3)

Body

- List Major Results
- Explain the Meaning of the Results
- Give some Examples

Technicalities

- Either Sketch the proof of an important result or Present some experimental results

Conclusion

- Remind the Main Results
- Explain Your Opinions on the Paper
- Indicate that Your Talk is Over

Slides

- **Use them: computerized, printed or handwritten slides**
- **The Simpler, the Better!**

  (do not put the whole sentences you want to say on slides)

- **Use Colors!**

  (but don't exaggerate !)

- **Use Pictures**

  (one picture is worth thousands of words)

- **One Slide = 1–3 minutes (average)**

  (think about timing)

Speaking

- **Speak Slowly, Steadily and Loud**

  (do not speak mentally, something to drink, avoid bubbles)

- **Find the Right Words**

  (prepare some full sentences to say during the talk)

- **Transitions are the Keys**

  (prepare transition between slides)

- **Improvisation is Needed**

  (whatever you do, you will have to improvise)

- **Humour is OK but not Recommended**

  (do not try to be funny!)

The Show

- **Do not be monotonous**

  (try to make your voice vary slightly)

- **Make the Audience Participate**

  (depends on the type of talk)

- **Maintain Eye Contact**

  (don’t show them your back)

- **Control Your Position**

  (don’t hide the slides)

- **Control Your Timing**

  (do not forget the time)

- **I made a Mitsake... The Show Must Go On**

Last Tips

Practice!

Practice !

Practice !

Practice !

Practice !