How to Read and Present a Scientific Paper

Jiri Srba

Thanks to Emmanuel Fleury for providing his slides.

BRICS & Aalborg University
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?

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

- Research Reports
- Workshop Papers
- Conference Papers
- Journal Papers

Trust

How to Read and Present a Scientific Paper – p.7/33
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
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
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)  
(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)  
(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
David Harel
Science of Computer Programming

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...

Context of citations to this paper: More


...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] in Specware. Since colimits do not exist in the category of specifications and interpretations, we are interested whether colimits exist in...

Cited by: More
A Framework for the Static and Interactive Visualization .. - Castelló, Milí, G.Tollis (2002) (Correct)
Statecharts For Requirements Specification - As Simple As.. - Glinz (2002) (Correct)
Dynamic Hierarchical Machines - Ruggiero Lanotte Andrea (Correct)
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

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

16: ObjectOriented Modeling and Design (context) - Rumbaugh, Blaha et al. - 1991 Book Details from Amazon or Barnes & Noble

BibTeX entry: (Update)


```latex
@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 = "http://citeseer.nj.nec.com/harel87statecharts.html" }
```
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)
- Emphasize 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 Mistake... The Show Must Go On
Last Tips

Practice!

Practice!

Practice!

Practice!