CS2309 CS Research Methodology

Paper Reading

Lee Wee Sun
School of Computing
National University of Singapore
leews@comp.nus.edu.sg

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Paper Reading Guidelines

1. Read through the reading guide on the papers to be read for that week.
2. You will probably need to do the background reading suggested in the guide to obtain the knowledge necessary to appreciate the papers.
3. Read the papers before class.
4. Observe the type of research that they are doing, the results that they obtained and how they validated the results.
5. Think about why the paper had impact.

How to Read a Paper

Keshav's three pass approach [1]

First pass to get a bird's eye view. Should take 5 to 10 minutes

1. Read the title, abstract and introduction.
2. Read the section and subsection heading but ignore the content.
3. Read the conclusions.
4. Glance over the references, mentally ticking off the ones you have read.

After the first pass, you should be able to answer:

1. Category: What type of paper is this? (type of problem, results, validation)
2. Context: What other papers is it related to?
3. Correctness: Do the assumptions appear to be valid?
4. Contributions: What are the main contributions?
5. Clarity: Is the paper well written

You can decide whether to read further based on this.

The first pass should be enough for papers that are not in your research area.
When writing, keep in mind that most readers will only make one pass over your papers.

- Abstract and introduction must be well written.
- Section and subsection titles must be coherent.
- If the reader cannot understand the main message after the first pass, the paper will likely never be read.

Second Pass

Read with greater care, but ignore details like proofs. It helps to jot down key points.

1. Look carefully at the figures diagrams and other illustrations. Are axes properly labeled? Are results shown with error bars, so conclusions are statistically significant. These common mistakes will separate rushed, shoddy work from excellent ones.
2. Mark relevant references for further reading.

Second pass should take up to an hour.
You should be able to grasp the content and summarize the main thrust with supporting evidence after this.
Appropriate for paper in which you are interested but not in your speciality.

Third Pass

Required to fully understand a paper.
Key is to *virtually re-implement* the paper.
Allows identification of innovation, hidden failings and assumptions.

- Identify and challenge every assumption in every statement.
- Think about how you yourself would present an idea.
- Comparison with your virtual recreation will provide sharp insight into proof and presentation. Allows you to add to your tools.
- Jot down ideas for future work.

At the end you should be able to reconstruct the entire structure of the paper from memory as well as identify its strong and weak point.
In particular, you should be able to pinpoint implicit assumptions, missing citations, potential issues with experimental or analytical techniques.

Comments Guidelines

- Those who are not presenting are required to hand in comments about the paper.
- You should read the paper at least up to the second pass in Keshav's method.
- Start with a one paragraph summary demonstrating that you understand what the paper is about (about 200 words). Then follow up with a paragraph consisting of what you think of the paper (roughly another 200 words).

- Include why you think the paper had impact.
- If possible, relate the paper to the principles studied in the course.
- Comment on things that are particularly important, elegant, clever, or surprising.
- The comment is due midnight the day before the paper is to be presented in class.
- Bring up your interesting comments during class discussion on the paper.

Comment Grading

The comments will be graded according to:

- Content: Does your comment show understanding of the paper? Does your comments show insights on the paper, including why the paper had impact, what is clever about the formulation or solution, or what is surprising?
- Writing: Did you use words and grammar correctly. Does the writing have a clear and easy to understand style?

More information on good writing style will be presented separately.

Plagiarism

Plagiarism (New Oxford Dictionary of English)

The practice of taking someone elses work or ideas and passing them off as ones own.

Taken very seriously in NUS and in this course.
Consider the use of the following material from *Introduction to Algorithms*, by Cormen, Leiserson, Rivest and Stein. To avoid plagiarism, do the following:

- A word for word reproduction needs to be placed within quotations: *Quicksort is "often the best practical choice for sorting because it is remarkably efficient on average" (Cormen et al. 2001).*
- A paraphrase, appropriately documented, is more common: *Quicksort is often the algorithm of choice in practice because of its good average-case performance (Cormen et al. 2001).*

The following are considered as plagiarism:

- Failure to put verbatim reproduction in quotations and failure to acknowledge source: *Quicksort is often the best practical choice for sorting because it is remarkably efficient on average.*
- Removal, modification or rearrangement of just a few words: *Quicksort is usually the best practical choice for sorting as it is remarkably efficient on average (Cormen et al. 2001).*

Different sub-areas have different preferred styles of citation. For this course, any of them are fine, e.g. the IEEE style `http://www.ecf.utoronto.ca/~writing/handbook-docum1b.html`.

Reviews on the Web

- Question: The papers that we are asked to read are classics and often have reviews on them on the Web. Should we search for and read the reviews?
- Answer: It's fine to do that as long as you cite the material.
  - Preferably, you should do your thinking before you read up on other people's thoughts.
  - And think about what they say, whether you agree, after you read.
  - You can talk about whether you agree in your comments and presentations.

References

1. How to Read a Paper, *S. Keshav*, ACM SIGCOMM Computer Communication Review, Volume 37, Number 3, July 2007.
2. Plagiarism and How You Can Avoid It, *Christina Low*. http://www.cdtl.nus.edu.sg/success/sl7.htm