Paper Reviewing
CS 2001: Research Topics in Computer Science
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School of Arts of and Sciences
Department of Computer Science
Topics for Today

Why review papers?

Structuring a good technical paper review

Common pitfalls and how to avoid them

Examples & Exercises
There are many reasons to write paper reviews!

**Reason 1:** Testing your own comprehension
- Noting contributions, significance, strengths, and weaknesses
- Identifying promising areas for future work

**Reason 2:** Group meetings / reading groups
- Similar to above, but to promote discussion within group

**Reason 3:** Related work in your papers
- Can be thought of as very concise paper reviews
- Summarize main technical points, compare/contrast with your work

**Reason 4:** Conference and journal reviews
- Peer review is used to judge the merit of scientific papers
- Reviews influence accept/reject decision and author revisions
How are conference programs decided?

The program committee chair appoints a program committee
- A collection of experts in the field
- Typically consists of 15-50 people, depending on conference size

Once papers are submitted, the PC members bid on papers within their specific areas of interest and expertise

Each paper is typically assigned to at least 3 reviewers who
- Read the paper carefully
- Draft a review of the paper
- Discuss the paper with other PC members

The final program is decided upon after discussion at the PC meeting
What is the purpose of a conference review?

A conference paper review serves many purposes:

- **Synthesizes** the reviewer’s understanding of the paper
- **Communicates** the reviewer’s thoughts about the paper to other PC members and the PC chair
- Partially **documents** the PC’s decision to accept/reject the paper
- **Provides guidance** to the authors regarding possible (or mandatory!) improvements to their work

As a result, the review is important at all stages of the process

**Bottom line:** A paper review should *not* be a book report!
What is the structure of a good paper review?

**Content:**
- Very short (1-2 paragraphs)
- Overview of the paper

**Purpose:**
- As the reviewer, this provides you with context for the review
- Allows the PC chair to get a quick synopsis of the paper
- Convinces the author that you, as the reviewer, actually read and understand the paper

Technical summary
Description of contributions
Major critiques
  - Strengths
  - Weaknesses
  - Questions
Minor points
Concluding remarks
What is the structure of a good paper review?

**Content:**
- Very short (1-2 paragraphs)
- Quick summary of the novel aspects of the paper

**Purpose:**
- Novelty is paramount! This provides evidence for the final accept/reject decision
- Again, convinces the author that you understand the novelty of their contribution
- Sets the stage for detailed critiques

Technical summary
Description of contributions
Major critiques
  - Strengths
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Minor points
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What is the structure of a good paper review?

Content:
- Technical and/or methodological strengths and weaknesses
- Examples:
  - How interesting is the problem?
  - Novel proof techniques or solutions
  - Missing related work
  - Assessment of the (in)completeness of the evaluation
  - ...

Purpose:
- Primary assessment of the paper
  - Do the authors bring something really cool to the table?
  - Is the paper somewhat incremental, but well executed?
  - Does the paper have fatal flaws?
- Typically, this provides fodder for discussion at the PC meeting
What is the structure of a good paper review?

Technical summary
Description of contributions
Major critiques
  - Strengths
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Concluding remarks

**Content:**
- Remarks on any thing that was unclear in the paper

**Purpose:**
- Stimulate discussion with other reviewers
- Inform the author of questions still remaining after reading
What is the structure of a good paper review?

**Content:**
- Aspects of the paper that don’t influence the novelty of the contribution, but do impact the quality of the paper overall
- **Examples:**
  - Typos and grammar errors
  - Suggestions for better examples
  - Corrections to minor logical flaws
  - ... 

**Purpose:**
- Helpful for planning revisions
What is the structure of a good paper review?

Content:
- Very short (1-2 paragraphs)
- Final assessment of paper, with justification

Purpose:
- Communicate your views on the paper to others
  - You might love the paper, yet make many negative critiques
  - You might hate the paper, yet say some positive things about it
  - This is where you clarify
- Provide final suggestions

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Tips on being a good reviewer

Acceptance rates at good conferences are very low
- < 15% is not unusual at competitive venues
- < 10% not unheard of!

This leads to the following situation
- **Problem:** Writing a good review takes time
- **Problem:** PC members often must review many papers
- **Problem:** Very few papers can be taken anyway
- **“Solution”:** Look for reasons to reject a paper and be done with it

This is extremely counterproductive, and not good for science (Why?)

Hill and McKinley* offer suggestions on avoiding this type of pitfalls

* http://www.cs.utexas.edu/users/mckinley/notes/reviewing.html
## Avoiding Pitfalls

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<tr>
<th>Pitfalls</th>
<th>Recommendation</th>
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<tr>
<td>1  Seek to find all flaws in the paper, in part to show your expertise as a reviewer</td>
<td>Look for reasons to accept a paper. Despite its flaws, does it point in new directions or expose promising insights? The community can benefit from imperfect, insightful papers.</td>
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<td>2  Since the review process is anonymous, it is appropriate to criticize the paper as if the authors did not have feelings.</td>
<td>Your tone should be the same as if you are giving comments to a colleague face-to-face. It is always possible to be constructive, focus on the work, and do not attack the researchers behind it. The purpose of a review is not only for selecting papers, but to improve the quality of all the work in our area.</td>
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<td>3  Reject papers that build on recently-published new directions, but accept those that build on the established norm.</td>
<td>While truly new papers are best (and rare), consider accepting papers that follow-up on recently-published promising directions. These papers allow the community to explore ideas that can not be fully-developed in one paper.</td>
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<td>4  Advocate rejecting a paper with little comment, because it is obvious that all with agree with you. Ditto for accept.</td>
<td>Explain why you advocate a rejection or acceptance, because people will often disagree with you. Your explanations will make you a more effective advocate or detractor for the paper.</td>
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<td>5  Advocate rejecting (almost) all papers to show about tough you are.</td>
<td>Your job is decide what is best which is not usually accomplished by rejecting every submission.</td>
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<td>6  Advocate rejecting a paper because you seem to remember it being the same as (or similar to) unidentified prior work.</td>
<td>In this situation, the professional should reference important prior work after refreshing one’s memory regarding what it contains. One missing reference is usually not a reason to reject a paper.</td>
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Concluding Thoughts

Paper reviews serve many purposes
- Developing your own comprehension
- Preparing for group meetings
- Critiquing the work of students in your lab
- Evaluating conference or journal submissions

Writing a good review is not hard, it just takes time and practice
- Right now, time is a resource that you do have
- You will get practice in this class, and as you advance

Try to avoid common pitfalls and focus on
- Recognizing the strengths of a paper
- Preparing useful feedback for the authors

In short: Write the paper review that you want to receive!