Identifying and Reading Papers

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Goals

- Learn about a new subfield
- Stay up to date
- Literature review before embarking on a project
- Making sure you cite relevant work in your submissions
- Sounding smart in front of friends and relatives

Challenges

- Way too many papers! In ML, publication volumes are growing exponentially. Not sure about other fields...how is it in yours?
- Search is hard...need to know right keywords.
- Computationally expensive. Browser can’t handle all the needed tabs.

Class question #1

- How do you find papers now? How do you manage the search/volume problem?

Tips!

- For ML, use arxiv sanity!!
- Twitter! Seriously, academic twitter is a great source for papers which are currently trending, and also provides some humor.
- If it’s not peer-reviewed yet, proceed with caution
- Find a related paper, then walk the citation graph
- Follow well-known authors in the subfield
- Use Mendeley instead of browser tabs
- Plug into the community. Interesting papers make the rounds.

Tips #2!

- Find a related paper, then walk the citation graph
- Follow well-known authors in the subfield
- Use Mendeley instead of browser tabs
- Plug into the community. Interesting papers make the rounds.

Class Question #2

- Do you all have any other tips?

Reading Research papers

General content and the order of reading papers

- Abstract
- Introduction
- Background
- Related Work
- Main Techniques
- Experiments
- Future Work
- Conclusion
- References

Q: What ordering do you follow while reading a paper and why ?

Intention of reading a paper

- Trying to identify a new research problem
- Checking if the paper solves the research problem you are trying to solve
- Keeping up with state of the art results
- Problem sounds cool / Techniques used are cool

Q: Are there any other intentions ? Depending on the intention, how do you prioritise different sections of the paper? Do you always read everything or do you ignore certain parts?

Comprehending and understanding a paper

- Spending non-trivial amount of time trying to understand what the paper is trying to do and why.

- Try to pinpoint the contributions of the paper - What is new in the paper? Is it a new problem? A new way of solving an old problem? A new perspective on a problem and its analysis? A new evidence that proves/disproves previous claims? What is original about the paper?

- How do authors substantiate their claims ?

  Understanding the settings in which the experiments were conducted. What are the major theorems that contribute to the claims?

  Q: Technicalities vs Intuition (What do you do to gain technical/intuitive insights? Do you prove all the important theorems/lemmas by yourself or run the experiments ? Do you solve smaller and simpler instances of the problem considered to gain intuition ?)

Hiccups while reading a paper

Many papers have typos and sometimes wrong proofs that make you question everything about what you know. What should one do in such situations?

- Confirm if it is an obvious mistake.
- If not, discuss with fellow students or your advisor.
- If it’s a major mistake that completely refutes the claims of the paper, definitely talk to your advisor - chances are you are doing something wrong.

- Proof is trivial, so it is left as an exercise for the reader !! Many times, they are not ! It is okay to seek help to solve ‘trivial’ problems.

- If it is something you and your colleagues are having difficulties understanding something, contact the authors, most people in academia are pretty chilled (I think)

Q: Any other tips that you follow ?

Do you really understand? (Credit Prof. Adam Smith)

- Make multiple passes.
- Separate the various parts of the paper into
  - Parts you *completely* understand
  - Parts you think you mostly understand
  - Parts you are totally confused by

Post-reading stage

- How important was the problem ? Did the paper sweep some unreasonable assumptions under the rug?
- Are the techniques applicable to other problems?
- Understand what the paper lacks. Improve the research done in the paper.

Q: Do you write down any profound results/intuitons/techniques you learnt from the paper?

Q: How do you verify the correctness of your understanding of the paper?