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- If it’s not peer-reviewed yet, proceed with caution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
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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/intuitions/techniques you learnt from the paper?

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