How to critically read a paper (1/2)

- Read once for perspective, twice for details
  - Large systems have many "moving parts" (Lect. 1)
  - Analogous to "build one to throw one away", you may need to revisit the paper in order to know which design details to focus on

- Take notes as you read
  - Question assumptions, importance of problem, important effects not mentioned by authors
  - Write questions to track what you don’t understand

How to critically read a paper (2/2)

- Don’t pass by ideas/design details until you understand
  - May need to re-read a paragraph, many times, or even discuss with peers
  - You can’t fully understand if the design is good unless you understand all the details: be vigilant!

- Don’t presume authors’ assumptions or design choices correct simply because paper was published!

How to evaluate a research paper?

- Important, relevant problem? Clever idea?
  These are orthogonal!

- Reasonable assumptions and models?

- Longer ago published, more you can judge impact:
  - Does everyone now use systems derived from it?
  - Has the idea shown up in many different contexts?

- Recent papers: more on cleverness, promise

- Other contributions possible
  - Thorough investigation of complex phenomenon
  - Comparison that brings sense to an area
## Presentation guidelines

- Slides for a talk 10 - 12 minutes in length
- Come prepared to lead class discussion after talk

## Content of a presentation

- Motivation and problem statement
- State main contributions of work (core ideas)
- Description of central design
- Experimental evaluation
- Related work
- Future work
- “Opinion part”

## Description of central design

- You won’t have time/space to discuss every detail, so present those that are most important…
  - To understanding how and why system, design, or algorithm works
  - To understanding results in experimental evaluation

- Clarity is very important here
  - Usually describe in a “top-down” fashion
  - Start with the overall problem
  - Identify parts of the solution, then identifying the sub-parts of those parts, etc.

## Experimental evaluation

- What questions do the authors ask in their evaluation?
- What is authors' hypothesis for each question and why?
- Won’t have time to present all results, so present most important results

- For any graph you show or refer to:
  - First, explain the axes
  - Explain overall trend: why system behaves as it does
  - Justify explanation by referring to relevant details of the system's design and experiment's design
  - Does anything in graph seem anomalous? Try to explain
Related and future work

• What are the most closely related other systems/results?
  – How are they similar? How are they different?
  – Is the difference between the work you are presenting and the related work significant?
• Should read citations enough to understand differences
• Should search for related work published after/with the paper
• No need to claim the work you are presenting is “better” or “worse” than a particular piece of related work
  – Often it is simply that the two pieces of work are different
• But, should articulate the precise difference (e.g., “this work solves a slightly different problem…”)

“Opinion part”

• Offer your final critical assessment:
  – What are the strengths of the work?
  – What are the weaknesses/limitations?
  – What important questions are left unanswered?

Advice on giving a good talk

• Rehearse your talk several times
  – Pay attention to length
• Help one another present clearly
• Use examples to explain difficult ideas
  – Animations and pictures help tremendously
  – There is utility in creating your own
• Be constructively critical throughout