Reading and presenting papers

COS 518 *Advanced Computer Systems*

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!

3

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

5

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