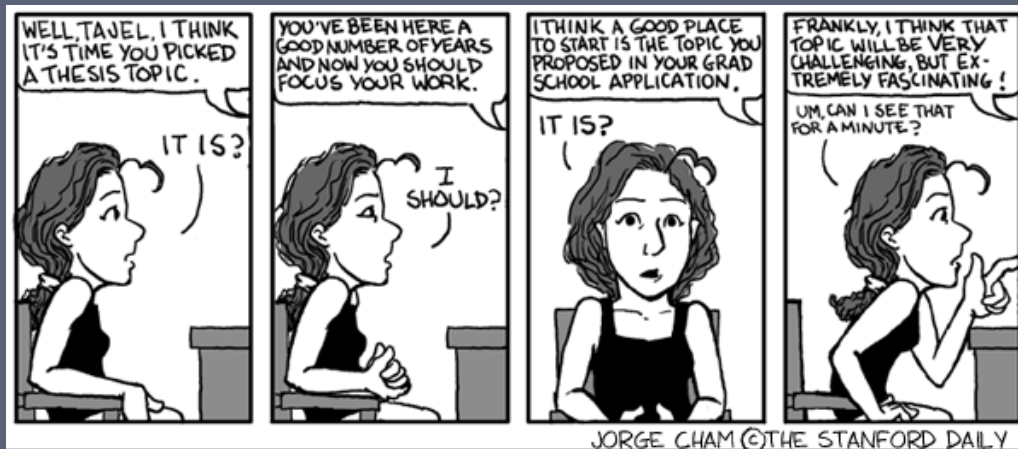


CMPT 880/890

Choosing a research topic



Outline

- What is a research topic
- Coming up with ideas
- How to evaluate ideas for topics

What is a research topic?

- The specific question / problem that you are going to answer / solve in your project
 - “It is unknown which type of link preview most accurately represents the linked page”
- More specific than the general problem
 - “It is difficult to determine the destination page of a vague web link”
- Much more specific than the overall area
 - “Improving navigation on the web”

Problem statements

- You must be able to state your problem as a problem!
 - “People currently have difficulty doing X”
 - “It is unknown whether X is true”
 - “Web servers currently cannot determine X”
- Compare with:
 - “To improve the throughput of a notification server”
 - “My interests are in robot motion algorithms”
 - “Context sensitivity can help systems make decisions”

Problem-based research

- What's the problem?
- Who cares about the problem and why?
- What's the solution?
- How do you show that the solution is a good one?

Ideas for research problems

- Keep a research notebook
- Read previous work
- Explain prior work to others
- Build things
- Do small research projects
- Use your own experience
- Look (carefully) at 'hot areas'

Habits and best practices

- Reserve uninterrupted time to think
- Write ideas down
- Don't thrash
- Think in terms of problems / solutions / evaluations

Evaluating research ideas

- Once you have a research idea, how do you know whether it's any good?
- Is it in fact a research problem?
 - Do we already know the solution?
 - What is the science underlying the problem?
- Does anyone care about the problem?
 - (Money, Happiness, Safety, etc.)

Evaluating research ideas

- Do you have any idea how to solve it?
 - Do you understand the mechanism underlying the problem?
- Will you know when you *have* solved it?
 - When will you stop?
 - How many cases; how much better?
- Can the solution be evaluated?
 - *Testable hypotheses*
 - “My system develops creative expression in children”
 - What measures would you use?

Evaluating research ideas

- The importance of the problem
 - “The more important the problem, the more important your results will be”
 - What does ‘important’ mean?
- “More important” usually also means “harder”

Evaluating research ideas

- Risky versus safe research
 - Incremental contribution or revolutionary idea?
 - Which should you do?

Scoping and scaling

- Your first formulation of a research problem will probably be too broad
- How to narrow it?
 - List the things that would have to be done in order to solve the problem
 - When you don't know how you would do one of the steps, you may have a new research problem

Playing it safe

- “We don’t know which of these three is best” vs.
“I bet that new technique X is best”

Tell me your problems