Agenda

HW6 Live Grading
Conference Updates
How to read Papers
Expt in Uncontrolled Environments
HW7
Conference Updates
Group Activity

Experiment Design
Metric Selection
Experiments

What experiments are useful?
Critical for the main arguments of the paper

What experiments are not useful?
Pointless experiments that generate pointless numbers, graphs, and tables
Types of Experiments

From the “context” perspective

Controlled

Uncontrolled

There are other perspectives to be covered in future lectures
A new algorithm that can identify the person in an image.
How to Read a Scientific Paper

Begin with introduction, not abstract.
Identify the big question
Summarize the background in five sentences
Identify the specific questions
Identify the approach
Read the methods section
Read the results section
Determine if the results answer the questions
Read the conclusions/discussion/interpretation section
Read the abstract
Find out what others say about the paper

How to read a research paper

Goal is to understand the scientific contribution

Read critically
  Question the study, approach, ...
Read creatively
  Extrapolate, extend, generalize, ...
Make notes
Summarize
Compare

How to Read a Paper

First pass [5-10 mins]
High level idea, category, context, contributions

Second pass [1 hr]
Some results, key ideas of the paper and key evidence

Third pass [variable]
Attention to deal, re-create the paper

How to Read an Engineering Research Paper

Read to answer questions
1. What are motivations for this work?
2. What is the proposed solution?
3. What is the work's evaluation of the proposed solution?
4. What is your analysis of the identified problem, idea and evaluation?
5. What are the contributions?
6. What are future directions for this research?
7. What questions are you left with?
8. What is your take-away message from this paper?
Paper Notes

Things worth remembering
Results, Ideas, Authors, ....

Electronic systems
Could be integrated with References
Figure 1: A map of the test-bed. Each circle is a node; the large number is the node ID, and the superscript indicates which floor of the building the node is on.

Decouto 2003
Figure 2: When using the minimum hop-count metric, DSDV chooses paths with far less throughput than the best available routes. Each line is a throughput CDF for the same 100 randomly selected node pairs. The left curve is the throughput CDF of DSDV with minimum hop-count. The right curve is the CDF of the best throughput between each pair, found by trying a number of promising paths. The dotted vertical lines mark the theoretical maximum throughput of routes of each hop-count.

Decouto 2003
Uncontrolled environment does not imply we cannot do fair comparisons
Wireless Experiments Today

Protocol Comparison Experiments
  Run the new protocol
  Run best-known prior work
  Compare

Simulations + Testbed experiments
Serial Experiments

Run one protocol at a time
Compare the results

Difficult to distinguish the contribution of these variables

Environment
Protocol mechanisms
Repeating Experiments Enough?

High delivery ratio across time
(short experiments can be misleading!)

Delivery ratio across time for Tutornet
Concurrent Experiments

Run multiple protocols concurrently
Compare the results

Advantages
Consistent environment for both the protocols

Concerns
Contention of different types
Evaluation Strategy

Ideally same conclusions from both methods
Evaluating methodologies not protocols
Experiments on Tutornet testbed
Protocols

Collection
CTP [Gnawali 2009]
MultihopLQI [TinyOS 2007]
(LQI)
### Results from Serial CTP vs LQI Experiment on Tutornet

<table>
<thead>
<tr>
<th>Metric</th>
<th>Delivery</th>
<th>Cost</th>
<th>Path Length</th>
<th>Churn/node-hr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CTP</td>
<td>CTP</td>
<td>CTP</td>
<td>CTP</td>
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</tbody>
</table>

Bar chart showing comparisons between CTP and other methods.
Results from Concurrent CTP vs LQI Experiment on Tutornet

- Delivery
- Cost
- Path Length
- Churn/node-hr
Putting Concurrent Methodology to Use: Expts. with External Interference

Engineered Scenario

Both protocols *struggle* in the same environment.
Putting Concurrent Methodology to Use: Experiments in a Dynamic Network

CTP and LQI react differently to dynamics.
Introduction patterns in CS Research papers.

Ideas on improving introductions.