CISC859: Topics in Advanced Networks & Distributed Computing: Network & Distributed System Security

Term Project Discussion
Outline

- How to write a survey paper
- Possible topics
- How to write a research paper
How to write a survey paper

• Research paper vs. survey paper
  – Research paper: description of your own research, introduce your idea/solution to the research community
  – Survey paper: description of others’ work, a service to the scientific community, other people can read your survey paper instead of 20+ research papers to understand a topic
What subjects should you choose

• You should pick a field if
  – It is important, of course
  – Considerable research efforts and progress have been made
  – It is not mature enough to write a book
  – There are still open challenges or problems to be solved

• You should not pick a field if
  – There are less than 10 papers
  – All the 10s are from the same research group
  – There is already an exhaustive, recent survey,
What should it go into a survey paper

• Or equivalently, what do you want from a survey?

• Introduction
• Terminology
• Research challenges
• Classification, slicing and dicing, taxonomy
• The paper surveys
• Future research directions
Introduction

• A clear description of the field. What is it a subset of? What is the current status?
• Boilerplate is not useful! bla-bla-bla networks have seen a lot of interest in recent years...
• Short history
  – seminal paper, research funding, special event, invention of an algorithm which spurred the development.
Terminology

• Introduce the terminology of the field, describe what the various terms mean.
  – e.g., attack vs. threat, authenticity vs. integrity

• Map the terminological variations-very important
  – Different terms may refer to the same thing
  – e.g.,

• You need to clarify these things, so start by keeping a note of the various

• terms while you are reading papers.
Research Challenges

• The description of the various research challenges of the field.
  – What do people want to achieve in this field?
• This is the hardest to write, because it requires creativity
• “reverse engineering a vision“
• Identify 3-4 main research directions, around which you will organize your papers.
Classification, slicing and dicing, taxonomy

- Sometimes it helps to introduce a new taxonomy that is classification scheme in the field
The paper surveys

• Decide what are you going to tell about each paper.
  – You need to already read the paper in such a way that you know ahead what are you want to tell about them.

• For instance
  – which one of the 3-4 big research directions they tell?
  – what cryptographic techniques they rely on?
  – is this a theory or application paper?
  – is it the continuation of another work? is it an improvement on another work? (you might want to present them in order!!!).
  – do they use theoretical analysis? simulation? hardware testbed? real life deployment?
  – which other technology they compare themselves with?
The paper surveys (cont’d)

• It would help if you would assemble your reading list completely first
  – when you read the papers, you write down the answers to these question, as you read them

• It almost always helps to creat a nice big table to summarize them
Future research directions

• Now readers should have a good understanding about the field
  – Main research directions
  – What have been done

• What are the remaining research challenges?
  – A field with no open challenge is mature
Topics Covered

• Cloud computing
  – Secure outsourced computation
  – Privacy-preserving outsourced computation

• RFID
  – Authentication, counting, etc.

• Block chain

• Anonymous communication

• Social network

• Data aggregation

• Location privacy
Possible topics for survey papers

- Privacy-preserving outsourced computation/query processing
- Verifiable outsourced computation/query processing
- RFID clone detection
- Anonymous RFID counting/estimation
- Sybil/fake accounts detection in social networks
- Social network-based Sybil defenses
- Privacy preserving/differentially private/secure data aggregation
- Location privacy protection mechanism
- Differentially private data publishing
- Crowdsourcing security/privacy
Compile your reading list

• Find ~5 recent papers of the same topic published at premier venues
• Collect all the papers cited by these ~5 papers
  – Go through each of them
  – Not all the papers cited are related to this topic
• Find which other papers have cited these ~5 papers using GoogleScholar
• You should collect at least 20 papers for your survey
How to write a research paper

• Find a research problem
• Come up with a good idea
• Turn your idea into a technical solution
• Evaluate your solution
• Write the paper

• Often a iterative process
• Require much more effort than writing a survey paper
Common components of a research paper

• Introduction
  – Problem, importance, high level idea, your contributions

• Related work
  – Given that there have been ~20 papers in this area, why do we need another solution?

• System/adversary models & design goals
  – Precisely define your problem and what your solution achieve

• Your solution
  – Provide enough details such that others can reimplement your solution based on your paper

• Evaluation
  – Theoretical analysis, simulation studies, testbed implementation & experiments

• Conclusion
Requirement for term paper proposal

• Survey paper
  – Introduction, reading list, tentative classification

• Research paper
  – Problem: motivation, definition
  – Related work: why do we need a new solution
  – High level idea

• 1~2 pages
Final term paper

• Format
  – ACM SIG Proceedings Templates required
  – Latex template
  – Word template

• Minimum length: 5 pages excluding references