

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 a 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
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- 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
 - <https://www.acm.org/publications/proceedings-template-16dec2016>
 - Latex template
 - Word template
- Minimum length: 5 pages excluding references