CSC-591/791

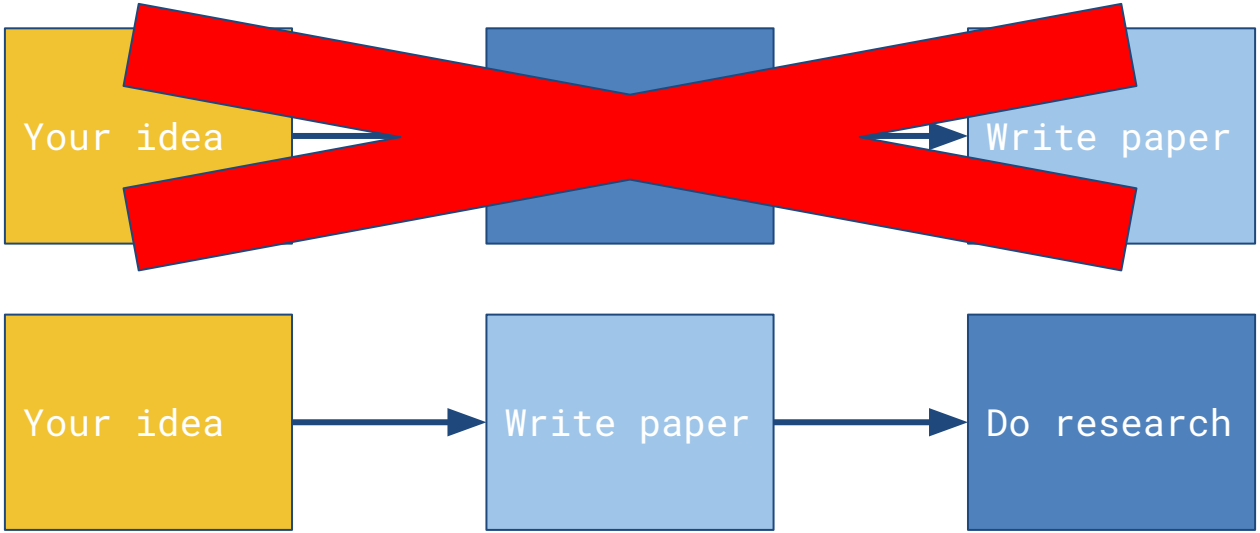
LLMs in Security

Writing papers

Alexandros Kapravelos
akaprav@ncsu.edu

How to write a research paper?

Your writing process



- Forces you to think what you are going to do & write
- If you don’t understand something it comes up early
- Opens the way to dialogue with others
  - Critique
  - Collaboration

Paper narrative

- Identify your **key idea**
- You want to communicate your ideas to your reader and convince them that they are useful and re-usable
- Do not be intimidated
  - You **DO NOT** need to have a fantastic idea before you can write a paper
  - Writing the paper is how you develop the idea in the first place
  - Communicating your research will only make this idea (or the next one) better
- Your paper should have just **one clear, sharp idea**
- You may not know exactly what it is when you start writing; but you must know when you finish

Paper structure

- Title
- Abstract
- Introduction
- Background/Related work
- Body of paper
- Discussion/Limitations
- Related work (if not after intro)
- Conclusions/Summary/Future Work
- Acknowledgements
- Bibliography
- Appendix

Title

- The title states the contribution of a paper in one sentence
- Avoid common phrases like "novel", "performance evaluation" and "architecture"
- It is the most-read part of the paper!

Abstract

- Typically small (~150 words)
- No references
  - it may be used without the main article
- **State the problem, your approach and solution, and the main contributions of the paper**
- Include little (if any) background and motivation
- Be factual but comprehensive
- The material in the abstract should not be repeated later word for word in the paper

Introduction

1. What is the problem?
2. Why is it interesting and important?
3. Why is it hard? (E.g., why do naive approaches fail?)
4. Why hasn't it been solved before? (Or, what's wrong with previous proposed solutions? How does mine differ?)
5. What are the key components of my approach and results? Also include any specific limitations

- ~one page
- State your contributions clearly (bullet list)

Introduction

Hook

Prior work

Idea

Contributions

Background/Related work

1. A list of research works that are related to your paper
2. Provides a critique of the approaches in the literature -> necessary to establish the contribution and importance of your paper

- Bridge the gap between your reader/reviewer and your proposed work
- Hint: In the case of a conference, make sure to cite the work of the PC co-chairs and as many other PC members as are remotely plausible, as well as from anything relevant from the previous two proceedings

Body of paper

- Problem statement
  - Motivation for your work
  - At least one example scenario with figures
- Approach/Architecture
  - Overview of your solution (rationale, concepts & mechanisms)
  - Description of your solution in detail
- Evaluation/Results
  - Convince the reader that your idea works
  - Qualitative analysis (like proof of correctness)
  - Quantitative analysis (like performance analysis)

Discussion/Limitations

- Discussion
  - If you discovered a new attack, how could it be solved in future work?
  - Ethics of your experiments
  - Concerns that the reviewers might have (IRB approval)
- Limitations
  - It is always best to state your limitations and do not allow the reader/reviewer to point them out
  - This gives you a chance to comment on them

Conclusions/Summary/Future Work

- Elaborate on the impacts of using your approach
  - Repeat the main result
- State limitations or disadvantages of your solution
  - provide directions for future research in the field

Acknowledgements

- If your paper was shepherded, thank your shepherd
- Thank anyone that helped this paper become a reality
- Acknowledge the funding sources that allowed you to do this work

Bibliography

- Use bibtex
- Start building your .bib files early
- Use templates to structure the language of proceedings

```
@string{acm-ccs = "Proceedings of the ACM Conference on
Computer and Communications Security (CCS)"}

@inproceedings{paper,
    author = {},
    title = {{}},
    booktitle = acm-ccs,
    year = 2019
}
```

Appendix

- Not required to be read by the reviewer
- No critical information of the paper should be here
  - Appendices should not contain any material necessary for understanding the contributions of the paper
- Examples of good use
  - Long code examples
  - Detailed instructions for reproducing an experiment
  - Detailed protocol descriptions
  - Other low-level but important details

Writing style

- Use clear and precise language
  - short, declarative, active sentences
  - no passive voice
  - careful use of adverbs and pronouns
  - be as explicit/concrete in your statements as you can (simple & direct)
- Present numbers properly
  - write out in letters all positive numbers less than or equal to 10
  - right justify columns of numbers
  - decimal points align
- Make your figures and tables readable
- Describing the obvious parts of the result
- There is no excuse to have spelling errors
  - check with tools before you give your draft to advisor or submission