

Research Methods in computer science

Spring 2024

Lecture 8

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Agenda

Research Paper Structure

CS Experiments

HW4

Anatomy of a Research Paper

Abstract

Introduction

Related Work

Design and Implementation

Evaluation

Conclusion

Related work variations

Merged with Introduction

Inter-mingled with relevant sections

Placement of Related Work

wrt Review Article

Related work is not literature
review or review paper

Why?

Related Work Regrets

Ideally

- Situate the work in the context of a larger community of scholarship. What's new about this work? What inspired it?
- Provide credit and attribution for methods and ideas that are important to the work, but are not original to the paper.
- Provide concrete support for empirical claims made by the paper.

Reality

- Provide proof that the authors know what they are talking about, because they've clearly read a lot of papers.
- Provide proof that the work "belongs" in your journal or conference, because they cite the bigwigs in your field.
- Provide proof that the authors weren't the first people to make an otherwise unsubstantiated claim.
- Provide lists of people who do related things, so they can be used as reviewers.
- Avoid pissing off the reviewers who do related things, since they might be upset if they weren't cited.

Signs of poor related work

Laundry list of summaries

No explicit relation to the proposed work

Lack of organization

Not putting one's work in the context of the field

Other symptoms

- Old papers

- Papers from limited number of sources

The Body of the paper

Depending on the area of work may describe the proposed algorithm, proofs, systems, implementations

Evaluation

Description of experiments and metrics

Results of experiments

Implications of those results

More applicable to the applied areas of computer science.

Conclusions

Not the same as abstract

Short summary of what you did in the project and the implications of the results

Can include lessons learnt and future directions

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

Paper Introduction

What is the problem?

Why is it interesting and important?

Why is it hard? (E.g., why do naive approaches fail?)

Why hasn't it been solved before? (Or, what's wrong with previous proposed solutions? How does mine differ?)

What are the key components of my approach and results? Also include any specific limitations.

Summary of results and contributions.

HW4

Introduction

Your writeup should answer all the questions we discussed in the stated sequence.