How to write a paper

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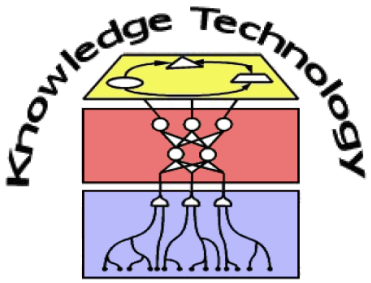

http://www.informatik.uni-hamburg.de/WTM/

Goal of a paper

- Efficient providing of information
  - Presentation of technical aspects
  - Discussion and comparison of different approaches
  - Considerations and recommendations
  - Expositions of conclusions

- In this seminar: Train those skills with adequate material.
- Presentation follows:
  - M. Leone. "*Collected Advice on Research and Writing*". http://www.cs.cmu.edu/afs/cs.cmu.edu/user/mleone/web/how-to.html
  - With material of Prof. H. Karl, Universität Paderborn

Outline

- Structure
- Language
- Citations
- Additional Information
- Conclusion

Word-smithing is a much greater percentage of what I am supposed to be doing in life than I would ever have thought.
DONALD KNUTH

Structure

- Paper is divided in several sections
- Typical structure of a paper (a technical report, a thesis, ...):
  - Title
  - Abstract
  - Introduction
  - Related Work
  - Body
  - Summary, Conclusion, Outlook
  - Appendices (sometimes)
  - Bibliography
- Can change according to the situation

Title and Abstract

- Title
  - Clear description of the topic
  - Is used to attract interested readers
- Abstract
  - Presents the topic of the paper precisely
  - Describes the major theses
  - Sums up the following exposition
  - No background material!
  - Basis for decision to read the paper or to drop the paper
    - Readers are busy people
  - Maybe the most important part

Introduction

- After comprehending title and abstract the reader is able to grasp the idea of the topic
- Introduction
  - Sharpens the focus of the topic
  - Explains why this problem is important and how it is related to other problems
  - Tackles all aspects and background information essential for understanding (but not more)
  - Attract the readers interest to read the complete paper
  - Explain, how the topic will be handled
  - Sums up the topic more detailed than the abstract
  - Gives a readers guide

Related work

- Basis: Gives an overview over other thematically related work, which are imported for comprehensive dealing with the topic
  - Each can be handled in short
- More important: relate those work critically to the in the paper discussed approach
  - Describes pros and cons, other basic assumptions, commonalities, possible syntheses, ...
  - Much more important than “what others have done”
- Sometimes the last section before the conclusion
- Special form: systematic reviews

Body

- The actual core of a paper
  - Describes the assumptions precisely
  - Presents the chosen research method
    - Analysis, simulation, experiment, system modelling
  - Explains the actual investigation or a specific system
    - Setup of an experiment, parameters of a simulation
    - System in a wide scope (Architecture, Method to do X)
  - If possible: Presents results
    - Measurement results
    - Experiences with the proposed architecture or method
  - Often divided in several sub-sections
- In most cases no uniform structure – depends on the topic

Conclusion

- Sums up the results
  - ONLY the results, not the complete work
  - Its not a repetition of the abstract
- Discuss results from a higher perspective and puts it in the broader context.
- Possibly gives recommendations
  - “The proposed method is useful for ...”
  - “The described architecture is lacking, because ...”
- Explains what it new and what one has learned in this work
- Outlines the limitations of the work
- Besides of the abstract the most important part of a paper

Typical structure of review/seminar paper

- Seminar papers aim to evaluate other papers
  - Focus on a critical comparison, not on an own contribution
- Suggested structure:
  - Title
  - Abstract
  - Table of Contents
  - Introduction
  - Evaluation of approaches A, B, C,...
  - Critical discussion
  - Conclusion, Outlook
  - Appendices (for detailed algorithms, tables, descriptions)
  - Bibliography

Figures and Tables

- Precise but informative
  - Visualise important information
  - Visualise complex information
- Self-explanatory
  - Pictures have a description below
  - Tables have a description above
  - Description should be as short as possible and as long as necessary
- Quality matters!
  - Use vector graphics, good contrast, and suitable size
  - Arrange columns/rows of data meaningful

Language

Main goal of the language:

- Precession
  - Use the correct word, the correct description
  - Use a lexicon, not a thesaurus
  - Think about other connotations
  - Avoid synonyms
  - Give sharp and exact details
- Clarity
  - Avoid ambiguities
  - Avoid pronouns
  - In English: Distinguish between “that” and “which”

Language (cont.)

Secondary goal of the language:

- Familiarity
  - Reader should recognise terms and descriptions
  - Define new terms!
  - Be patience with jargon
- Forthrightness
  - Direct language
  - Avoid passive, if you just want to avoid the first person
- Conciseness
  - Exact language, no prose!

A few words about plagiarism

- Most important quality in research: intellectual integrity
  - Cite every used idea, source code, or material
  - Search for a source for used “common knowledge”
  - Quote every copied text passage
  - Avoid long or too many quotes

- Plagiarism can lead to ...
  - fail a module
  - getting exmatriculated due to a cheating attempt
  - loosing degree and minister position

Correct citations

- Complete Reference!
  - Author(s)
  - Title
  - Published in which form? (Book, journal article, conference article, part or chapter of a book, technical report)
    - Title of the journal, of the complete book, etc.
    - Possibly editors
    - Page numbers
  - Year, month, place of publishing
  - Publisher
  - URLs could be useful, but have to be stable
- Highly recommended: tools for the bibliography (i.e. BiBTeX)

Correct Citations (cont.)

- References should simplify the search for a source
- Distinguish:
  - Source citation within the bibliography: Contains all bibliographic information
  - Reference within the text: Index of bibliography
    - Common as a number: [42]
    - Sometimes as abbreviation of author and year: [WW07]
    - Often: Author-Year (Weber and Wermter, 2007)
      - More than two authors: First author et al. (Weber et al. 2007)
  - Formulations:
    - “Weber and Wermter [42] have shown, ...”
    - Not: “[42] discuss ...” (a paper does not discuss)

Summary

- A paper should provide information in a efficient way
  - Everything else is just a means to an end
- Structure of a paper
  - Abstract, Introduction, Body, Conclusion
- Language:
  - Most important: Precision and clarity
  - Instrument of the content
  - Pay attention to the style
  - In the research domain: write in English!
- Cite correctly and completely

The End

Thank you for your attention.

Any question?

Literature :

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