Seminar Visual Computing: Introduction

Computer Vision Group
and Computer Graphics Group

University of Siegen

April 8, 2020

Overview

- Structure of a scientific paper
- Finding good literature
- Writing the report
- Preparing the presentation
- LaTeX, BibTeX remarks
- Final remarks

Structure of a scientific paper

All following information is specific to Computer Vision and Computer Graphics!

Other disciplines and fields have different cultures, norms, and practices!

The structure of almost all scientific papers:

- Abstract
- Introduction
- Related Work
- METHOD
- Results
- Conclusion
- References

Structure of a scientific paper

- Abstract
  - Short pre-reading summary
- Introduction
  - Description of problem area
  - Rough outline of own approach (in contrast to other approaches)
  - Contributions of this paper
- Related Work
  - Discussion of related publications
  - Categorization of existing approaches
  - Short analysis / listing of shortcomings

Structure of a scientific paper

- METHOD
  - Detailed description of own method
  - Section structure depends on topic
- Results
  - Meaningful results
  - Comparison with competing approaches
  - Discussion of parameters
  - Analysis including limitations / failure cases
- Conclusion
  - Short post-reading summary
  - General remarks on achieved results
  - Mention limitations and future work

Structure of a scientific paper

- References
  - List of cited publications
    - Journal papers: Author(s), Title, Journal, Volume, Issue, Month, Year, DOI (or pages)
      M. Lambers, S. Hoberg, and A. Kolb. Simulation of time-of-flight sensors for evaluation of chip layout variants. IEEE Sensors Journal, 15(7):4019-4026, July 2015. doi:10.1109/JSEN.2015.
    - Conference papers: Author(s), Title, Conference, Month, Year, DOI (or pages)
      M. Keller, D. Lefloch, M. Lambers, S. Izadi, T. Weyrich, and A. Kolb. Real-time 3D reconstruction in dynamic scenes using point-based fusion. In Proc. 3D Vision (3DV), pages 1-8, June 2013. doi:10.1109/3DV.2013.9.
    - Other types: books, book chapters, theses, technical reports, online resource (beware)
  - Papers should cite the original publication of a relevant idea or concept, not secondary literature!

Finding good literature

Recommended search engine: `scholar.google.com`

- Search a specific paper via its title
- Search papers about a specific topic
  - Refine search terms iteratively, start with buzzword variants
  - Pay special attention to high quality papers (see next section)
  - Pay special attention to surveys
- Search forward from a specific paper:
  "Cited by" on `scholar.google.com`
- Search backwards from a specific paper:
  Scan list of references
- Search for author: search term `author:"m lambers"`
- Many papers are behind a paywall, but access is free from within the University network (at home: use VPN)

Finding good literature

Estimate the quality/reliability of a paper

- Quality of publication channel (journal, conference)
  - Know the top journals / conferences in the field
    - Graphics Journals: ACM Transactions on Graphics, IEEE Transactions on Visualization and Computer Graphics, Computer Graphics Forum
    - Graphics Conferences: SIGGRAPH, Eurographics, Pacific Graphics, IEEE Visualization, IEEE Virtual Reality

    Proceedings of these top conferences are published as special issues of these top journals (this is probably a Graphics specialty)
  - Estimate the quality of a publication channel you do not know
    - `scholar.google.com` → Menu → Metrics. Then choose a category (e.g. Engineering & Computer Science), and then a subcategory (e.g. Computer Graphcis).
    - Less accessible alternatives to `scholar.google.com` exist
    - Manual checklist: Double blind review? How many reviewers per submission? Acceptance rate? Professional typesetting quality? ...

Finding good literature

Estimate the quality/reliability of a paper

- Number of citations of the paper (beware!)
  - Numbers from different fields not comparable!
  - Popular topics generate more citations than others!
  - Not meaningful for “young” papers
- Author list (beware!)
  - Known authors sometimes appear on unconvincing papers!
  - Newcomers may publish very good papers!

Finding good literature

Reading a paper

1. Do a quick scan of abstract, figures, key results
   Do not try to understand yet, just get an overview
2. Read Abstract and Introduction sections
   Judge whether this paper is relevant for your task
3. Detailed reading
   Be sure you know enough about related work
   Understand the methods

Goal: quick assertion whether and how the paper is relevant

Writing the report

Proposed approach:

- Draft the Introduction section to establish “storyline”
- Write the structure top-down
  - Section titles (see typical paper structure!)
  - How much space for each section (there is typically a space limit)
- Write the text bottom-up
  - Fill sections with all content you want to put there
  - Refine, restructure, improve
  - Use alternative forms of content presentation where it makes sense
    - Diagrams
    - Flow charts
    - Tables
    - Algorithm / pseudo code
    - Overview image
    - . . .
- Refine Introduction section
- Write Conclusion, Abstract sections

Preparing the presentation

Presentation structure:

- Cover (1 slide)
- Outline (1 slide)
- Motivation (short)
- METHOD
- Results
- Conclusion (short)
- “Thank you” slide (optional, 1 slide)

First rough estimate: one slide per minute.

Preparing the presentation

Presentation hints

- As with report: structure top-down, contents bottom-up
- Add slide numbers
- Use large sans-serif font
- Avoid long sentences, use bullet points
- Use animations sparingly or not at all
- Remember that projectors have notoriously bad contrast
- Do not read speech; practice a free presentation
- Keep the time limit

- Practice! Practice! Practice!

LaTeX, BibTeX remarks

Why LaTeX, BibTeX?

- Professional typesetting quality
- Automatic generation of
  - Table of contents
  - List of figures
  - Index
  - List of references
- Separation of layout and content

→ Well suited for large, complex documents (e.g. thesis)

Your supervisor can help you set up and use LaTeX! Tips:

- Do not fiddle with layout while writing, finish content first
- Use a simple LaTeX setup
  - Editor, `.tex`, `.bib`, maybe `.sty` file. That's it.
  - There is seldom need for complex packages or build systems
- Make sure your BibTeX entries are complete and in good shape. *Never* just copy them from Google Scholar, IEEE Xplore, ACM digital library or similar sources!

Final remarks

Start now!

- Reading and understanding a paper takes a lot of time
- Writing a high-quality report takes a lot of time
- Preparing a high-quality presentation takes a lot of time

→ Make a rough schedule and discuss it as soon as possible with your supervisor

Style hints (for those who want to write in English):

- Strunk and White, The Elements of Style
- John Owens, Common Errors in Technical Writing: `http://www.ece.ucdavis.edu/~jowens/commonerrors.html`
- Michael L. Littmann, Sylistic Comments: `http://cs.brown.edu/~mlittman/etc/style.html`
- Douglas E. Comer, How To Write A Dissertation: `https://www.cs.purdue.edu/homes/dec/essay.dissertation.html`