Basic knowledge and skills for the DEEDS research seminars

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24th April 2019
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Literature Research

1. Literature Research
   - Understanding the topic
   - Different types of literature
   - Finding Publications
   - How to keep track of your references

2. Seminar report

3. Peer reviews

4. Giving a talk
Understanding the topic

How to learn about things you never heard of . . .

- Extract terms from titles and sentences
- Find definitions for such terms
- Make sure all other terms you think you understand are used in the expected way!
- Organize terms, synonyms, antonyms, and their interrelation
Extracting terminology

Extract terms and find definitions, synonyms, antonyms

- http://www.merriam-webster.com
- http://www.wiktionary.org
- http://corpora.informatik.uni-leipzig.de
- http://www.wikipedia.org
- http://www.google.com
Organizing your thoughts on a conceptual level

Writing and drawing

- try to cluster terms (also authors, affiliations, if you have some literature)
- interconnect them according to their relationships
An example


1. Check unknown terms: “dependability”
2. Check known terms: “security”, “evaluation”
3. Organize on a conceptual level
An example

Merriam Webster on “dependable”:

- **Definition:** capable of being depended on; reliable
- **Related:**
  - **Synonyms:** reliable, responsible, safe, secure, trustworthy
  - **Antonyms:** uncertain, undependable, unreliable, unsafe
  - **Related Words:** sound, effective, attested, confirmed, proven, valid, validated, verified
  - **Near Antonyms:** false, debatable, disputable, doubtable, questionable, hazardous, risky
An example

Wiktionary on “dependability”:

- The characteristic of being dependable; the ability to be depended upon.
Corpora on “dependability”:

- Class of frequency: 17 (i.e. “the” has got about $2^{17}$ the number of occurrences than the selected word.)
- Significant cooccurrences of dependability: J.D (392.11), Lexus (300.99), Power (283.38), Associates (264.18), and (188.29), atop (170.22), stands (164.51), Buick (160.93), brand (159.66), luxury (147.44), closely (133), reliability (127.59), vehicle (120.84), quality (116.74)
- Significant left neighbours of dependability: vehicle (236.53), and (235.21), Vehicle (42.33)
- Significant right neighbours of dependability: and (103.87), after (82.43), . (69.31), of (38.13), study (29)
An example

Corpora’s graphical representation of term interrelations:

Graph v.1.6 für dependability

- vehicle
- brand
- ranking
- Associates
- Power
- luxury
- closely
- watched
- slipped
- J.D
- Lexus
- Buick
- atop
- reliability
- quality
Wikipedia on “dependability”:

Dependability as applied to a software engineering is defined by the Network on DEpendable Systems (NODES) as: 

[..] the ability to provide services that can defensibly be trusted within a time-period [..]

This concept can be further extended to encompass mechanisms to increase and maintain the Dependability of a system. Dependability can be thought of as being composed of three elements:

- Attributes – A way to assess the Dependability of a system
- Threats – An understanding of the things that can affect the Dependability of a system
- Means – Ways to increase the Dependability of a system
An example

Google on “dependability”:
- about 10,000,000 results
- first hit: Wikipedia article

Iterate
- for "evaluation"
- evt. terms from the definitions that you cannot understand
An example

Google on “dependability”:
- about 10,000,000 results
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Iterate
- for "evaluation"
- evt. terms from the definitions that you cannot understand
Different types of literature

**Books**
- Contents scope: Broad
- Contents novelty: Low
- Degree of self-containment: High
- Degree of detail: Good

**Theses**
- Contents scope: Narrow
- Contents novelty: Low
- Degree of self-containment: High
- Degree of detail: High
Different types of literature

Books
- Contents scope: Broad
- Contents novelty: Low
- Degree of self-containment: High
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Theses
- Contents scope: Narrow
- Contents novelty: Low
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### Different types of literature

#### Journal papers
- Contents scope: Narrow
- Contents novelty: Medium
- Degree of self-containment: Medium
- Degree of detail: Good

#### Conference papers
- Contents scope: Highly specialized
- Contents novelty: High
- Degree of self-containment: Limited
- Degree of detail: Fair
### Different types of literature

#### Journal papers
- Contents scope: Narrow
- Contents novelty: Medium
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- Contents scope: Highly specialized
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Different types of literature

**Technical Reports**
- Contents scope: Highly specialized
- Contents novelty: High
- Degree of self-containment: Limited
- Degree of detail: High

**Web resources**
- Contents scope: Varying
- Contents novelty: Varying
- Degree of self-containment: High
- Degree of detail: Varying

Avoid citing web resources!
Different types of literature

Technical Reports
- Contents scope: Highly specialized
- Contents novelty: High
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Web resources
- Contents scope: Varying
- Contents novelty: Varying
- Degree of self-containment: High
- Degree of detail: Varying

Avoid citing web resources!
### Finding Publications

**ULB/TUfind**
- Provides: Books, PhD theses (TUD), journal papers, conference papers via DB access
- Requires: TUD IP address, evt. library card

[https://hds.hebis.de/ulbda/index.php](https://hds.hebis.de/ulbda/index.php)

**Google scholar**
- Provides: Everything but books, limited \texttt{BIBTeX} entries
- Requires: Time :-)

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http://scholar.google.com/
Finding Publications

**ACM portal**
- Provides: Fulltext of ACM-published papers; abstracts, references, \texttt{BIBTeX} entries for a variety of computer literature
- Requires: TUD IP address

http://portal.acm.org/

**CiteSeerX**
- Provides: Abstracts, references, links to referring literature, few fulltexts, limited \texttt{BIBTeX} entries
- Requires: Time :-)

http://citeseerx.ist.psu.edu/
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Finding Publications

Microsoft academic search

- Provides: Abstracts, references, links to publisher sites, links between researchers and research groups
- Requires: Time :-)

http://academic.research.microsoft.com/

IEEE Xplore

- Provides: Abstracts, references, fulltext and detailed \texttt{BIBTeX} entries for IEEE-published papers
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http://elib1.lhb.tu-darmstadt.de/ieee
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# Finding Publications

## Springerlink
- Provides: Fulltext of selected Springer publications, e.g. LNCS
- Requires: TUD IP address

http://www.springerlink.com/

## Elsevier ScienceDirect
- Provides: Fulltext of selected Elsevier publications, e.g. JSS
- Requires: TUD IP address

http://www.sciencedirect.com/
Finding Publications

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Elsevier Sciencedirect
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- Requires: TUD IP address
http://www.sciencedirect.com/
How to keep track of your references

JabRef

- Reference-DB management software
- Designed for \textsc{BibTeX}, thus based on \textsc{BibTeX} entries
- Platform-independent Java-based freeware
- Several useful plug-ins, e.g. automated \textsc{BibTeX} download from IEEE, ACM, Citeseer

http://jabref.sourceforge.net/
How to keep track of your references

Citavi & EndNote

- Powerful commercial tools
- Free for TUD students: http://www.ulb.tu-darmstadt.de/service/literaturverwaltung_start/citavi_ulb/citavi_ulb.de.jsp

Mendeley

http://www.mendeley.com/
How to keep track of your references

Getting BibTeX entries

- http://www.citeulike.org/
- http://manas.tungare.name/software/isbn-to-bibtex/
Seminar report

1. Literature Research

2. Seminar report
   - Basic structure
   - Typesetting
   - Language
   - Where to get more information

3. Peer reviews

4. Giving a talk
Basic structure

Some things (almost) never change

- Title (& title area/page)
- Abstract
- Introduction
- Body
- Conclusion
- References
Title (& title area/page)

The role of the title
- Attract the reader (know your readers!)
- Describe the paper contents
- Keep it short!

The title area
- Author name(s)
- Author affiliations & contact
- Submission date
Title (& title area/page)

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The title area

- Author name(s)
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- Submission date
Abstract

What to put in an abstract

- Motivation: Why do we care about the problem and the results?
- Problem statement: What problem are you trying to solve?
- Approach: How did you go about solving or making progress on the problem?
- Results: What’s the answer?
- Conclusions: What are the implications of your answer?
Abstract

**Do’s**
- Use plain simple language
- Write it *after* the rest of the paper
- Hint at paper results

**Dont’s**
- Long sentences
- Maths
- Numbered references
Abstract

Do’s

- Use plain simple language
- Write it *after* the rest of the paper
- Hint at paper results

Dont’s

- Long sentences
- Maths
- Numbered references
Introduction

If your reader has survived title & abstract

... you can

1. bore him to death
2. scare him away

with your Intro.

Examples

1. The NH90 is a medium weight multi-role military helicopter that comes in two basic versions: the Tactical Transport Helicopter (TTH) and the NATO Frigate Helicopter (NFH).

2. Let $\varepsilon_i, i \in \mathbb{Z}$, be independent and identically distributed (iid) random variables and $g$ be a measurable function such that

$$X_i = g(\ldots, \varepsilon_{i-1}, \varepsilon_i)$$

is a properly defined random variable.
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is a properly defined random variable.
Introduction

Two core elements of an introduction

- Problem statement
- Contribution of your paper (less important in this seminar)
<table>
<thead>
<tr>
<th>Research paper</th>
<th>Survey paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Related work</td>
<td>Taxonomy / Classification</td>
</tr>
<tr>
<td>System (error) models</td>
<td>Survey structured according to Taxonomy/Classification</td>
</tr>
<tr>
<td>Proposed solution</td>
<td>Overview &amp; Summary</td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
</tr>
<tr>
<td>Result discussion &amp; threats to validity</td>
<td></td>
</tr>
</tbody>
</table>
Body

Structure your report top down!

- Sections
  - Subsections
  - Paragraphs

Structure your report top down!

- Introduction
  - Problem Statement
  - Research Questions
    - (RQ1) …
    - (RQ2) …
  - Paper Contributions
    - (C1) …
    - (C2) …
Structure your report top down!

- Sections
  - Subsections
  - Paragraphs

Structure your report top down!

- Introduction
  - Problem Statement
  - Research Questions
    - (RQ1) ...
    - (RQ2) ...
  - Paper Contributions
    - (C1) ...
    - (C2) ...
Body

Figures & Tables

- Worth a thousand words
- Require explanation and references in the text
- Use captions
  - *above* tables
  - *below* figures

Footnotes

- Avoid footnotes\(^a\)

\(^a\)they distract the reading flow
Body

Figures & Tables
- Worth a thousand words
- Require explanation and references in the text
- Use captions
  - *above* tables
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Footnotes
- Avoid footnotes\(^a\)
\(^a\text{they distract the reading flow}\)
Intra-report references

- Capitalize proper nouns: “... as discussed in Section 4”
- Don’t capitalize common nouns: “... as discussed in the following sections”

Citations

- Numbers vs. Harvard (author name & publication year)
- Avoid referring to numbered references in text, e.g. “as shown in [23]”
- Use author names as required, e.g. “as shown by Shea & Wilson [23]”
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- Numbers vs. Harvard (author name & publication year)
- Avoid referring to numbered references in text, e.g. “as shown in [23]”
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Conclusion

Conclude the paper by

- summarizing the problem and your contribution
  - emphasize contributions here
  - (emphasize problem statement in the introduction)
- potentially outlining directions of future work in that field
Reference list

Help readers to find the resources you used

- Aim for bibliographical information as complete as possible
- Adhere to what’s required by the template you use
- Add access dates to web resources
- Check the typesetting before submission
Mechanics

Double check before submission

- for spelling mistakes
- typesetting
  - figure & table placement
  - page breaks
  - line breaks & hyphenation
- fonts in figures should be no smaller than fonts in your texts (ideally also use the same font or font family)
- if you are using colors, make sure that the distinction is clearly visible in grayscale print-outs
- print out and check at least once on real paper
Typesetting

The ACM templates

- Author guidelines, example & template files available from
  https://www.acm.org/publications/proceedings-template
- \LaTeX\ (use sigconf option!)

\LaTeX\ vs. Word

- Maths
- \texttt{BIBTeX}
- Plain text format for efficient version control (e.g. SVN)
- Downside: requires time for assembly, compilation, “debugging”
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Language

**English vs. German**

- Most literature is English
- English is spoken by more people than German
- Discuss with your supervisor
- Report and talk in different languages possible
Where to get more information

- Nicholas J. Higham: *Writing for the mathematical sciences*
- http://www.ece.cmu.edu/~koopman/essays/abstract.html
Peer reviews

1. Literature Research
2. Seminar report
3. Peer reviews
   - The peer review process
   - How to write a review
   - Where to get more information
4. Giving a talk
The peer review process of scientific conferences

Submitted papers get

- distributed among the program committee (PC) members
- reviewed by 3-6 peer reviewers

Reviews are

- used by the PC to decide whether to accept or reject the paper
- sent with the PC's decision back to the authors of the submitted paper
The peer review process of scientific conferences

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The peer review process in this seminar

Submitted report drafts get
- distributed among fellow students
- reviewed by two fellow students and the supervisor

Draft reviews are
- only meant to provide feedback to the authors
- a *recommendation* for reconsideration
- being lightly considered by the reviewing students’ supervisors
The peer review process in this seminar

Submitted report drafts get
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- *only* meant to provide feedback to the authors
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How to read a paper

<table>
<thead>
<tr>
<th>Recommended order</th>
<th>Title &amp; Abstract</th>
<th>Introduction</th>
<th>Conclusion</th>
<th>Body of the paper</th>
</tr>
</thead>
</table>

Are the contents of title, abstract, introduction, conclusion, and the body consistent with the respective expectations at each stage?
## Evaluation criteria for papers

### Presentation and English

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unreadable</td>
</tr>
<tr>
<td>2</td>
<td>Major improvements needed</td>
</tr>
<tr>
<td>3</td>
<td>Minor issues</td>
</tr>
<tr>
<td>4</td>
<td>Good</td>
</tr>
</tbody>
</table>

Answer 1 if the contribution is hard/impossible to evaluate due to poor readability. Answer 2 if you think the paper needs extensive changes to improve English and presentation. Layout issues and template violations also count here.
Evaluation criteria for papers

**Technical correctness**

1. Incorrect
2. Questionable
3. Correct

Answer 1 if you think the technical material presented in the paper is factually incorrect. Answer 2 if you have questions about technical correctness (e.g., the description does not convince you or is unclear).
Evaluation criteria for papers

Reviewer expertise in the area

1. Poor
2. Some familiarity
3. Good
4. Expert

Answer 4 if you currently work in this area and know the latest literature in the specific domain of this paper, for example, you have written a paper/thesis on this topic within the last year. Answer 3 if you know the area well but may not be up to date on the latest literature. Answer 2 if you have general familiarity with the area and 1 if you have minimal familiarity with the topic area.
Evaluation criteria for papers

Confidence on the review

1. Weak
2. Average
3. Strong

Answer 1 if you for some reason (lack of domain expertise, rushed review, external reviewer) do not feel very confident on your review. Answer 3 if you are highly confident on your review.
Evaluation criteria for papers

**Overall recommendation**

1. Reject
2. Weak Reject
3. Weak Accept
4. Accept

Answer 1 if you think that the paper fully fails to discuss the topic (as stated in the topic’s description). Answer 2 if you think the paper fails to discuss the topic, but actually could after a major revision. Answer 3 if you think the paper properly discusses the topic, but have few doubts about its technical correctness and answer 4 if only minor changes, e.g. layout and typo fixes are needed.
What goes in a review?

Rough review structure

- Your numerical rating according to the criteria
- Brief summary of the report
- Short description of your overall impression
- Detailed comments justifying your rating
Where to get more information

- On reading (in general): Mortimer J. Adler & Charles Van Doren: *How to read a book*
- On writing (specifically CS reviews): Timothy Roscoe: *Writing reviews for systems conferences*
Giving a talk

1. Literature Research

2. Seminar report

3. Peer reviews

4. Giving a talk
   - Structuring the talk
   - Crafting presentation slides
   - Crafting supporting material for the talk
   - Practice the talk
   - Where to get more information
Structuring the talk

Limiting factor: Time

- plan the precise duration
- adjust focus & level of detail

Limiting factor: Space

\[ \#(slides) = \frac{\text{total duration}}{3'} \]
- avoid more than 7 items per slide
Structuring the talk

**Limiting factor: Time**
- plan the precise duration
- adjust focus & level of detail

**Limiting factor: Space**
- \( \#(slides) = \frac{total \ duration}{3i} \)
- avoid more than 7 *items* per slide
Think before you type!

Sketch the presentation...

- using paper & pencil
- following the sequential presentation flow
- using relocatable cards etc.
Crafting presentation slides

What your slides should be like

- simple
- clear
- illustrative
Crafting presentation slides

What your slides shouldn’t be like: unstructured and lengthy full-text explanations, if anyhow possible using lengthy and complicated hard-to-read-and-comprehend expressions, filling up line after line on your slide and ideally having nothing to do with what you are telling. A good example here would be a story about what you had for dinner for the past week.
Crafting presentation slides

Powerpoint, Keynote, \LaTeX?

- A bad craftsman blames his tools…
- Powerpoint and Keynote
- \LaTeX: check out the Beamer class!
Crafting supporting material for the talk

### Using Handouts
- abstract, summary, evt. tables/figures/data
- not more than 4 pages
- no slide-handouts

### Flipchart and whiteboard usage
- if the beamer fails
- easy and flexible elaborations
- persistence
Crafting supporting material for the talk

Using Handouts
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Flipchart and whiteboard usage
- if the beamer fails
- easy and flexible elaborations
- persistence
Crafting supporting material for the talk

Using video or audio
- make sure beamer, speakers, software work!
- consider playback time
- consider context-switching overhead

Demonstrations
- most illustrative
- setup overhead
- always fail on the day of presentation ;-(
Crafting supporting material for the talk

Using video or audio
- make sure beamer, speakers, software work!
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- consider context-switching overhead

Demonstrations
- most illustrative
- setup overhead
- always fail on the day of presentation ;-)
Practice the talk

Practice!

- where?
- how?
- how often?
Where to get more information

- Garr Reynolds: *Presentation Zen*
- http://www.presentationzen.com/