Seminar Computational Sociolinguistics (CSL) — Part 4

Basics of Scientific Presentation

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Partly based on slides of Engels (2010) and Becker (2012)

PADERBORN UNIVERSITY

Outline

- **Literature research**
  Types, quality, reading, acquisition, and organization

- **Oral presentations**
  Content, structure, style, talking, and timing

- **Written presentations**
  Content, structure, style, citations, and plagiarism

- **Lecture talks in particular (left out here)**
  Important differences to ”normal“ oral presentations

Literature research

Doing literature research

- **Literature research**
  - Fundamental task in science
  - Time-intensive and tedious — but necessary
  - Often, the first task to be done

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- **Literature research in general**
  - Obtain all information relevant to the scope of the problem
  - Obtain background information
  - Obtain evidence for your or others‘ claims

    ... and similar reasons

- **Literature research in science**
  - Find out if your approach to a problem is new
  - Find alternative approaches or perspectives
  - You are rarely the first to work on a problem

    If you are, what does that tell you?
  - Don‘t reinvent the wheel

Selecting literature

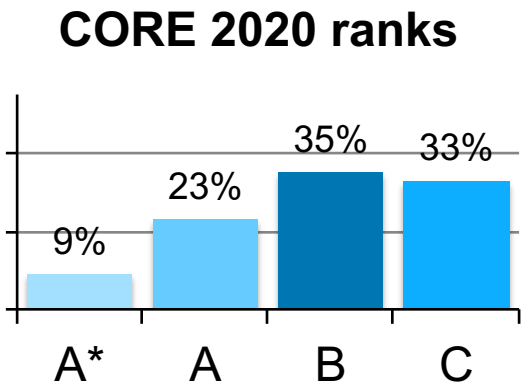
- **Types of literature (and similar)**

1. Books. Theory, basics, approved techniques
2. Scientific journal papers. Completed research lines
3. Conference papers. State-of-the-art research
   In our field, major publication type
4. Workshop papers. New ideas, ongoing research
5. Conference/Online tutorials. Easy access to basics and techniques
6. Popular science magazines. Easy access to research lines
7. Other websites. Anything

- **What type to prefer (in our field)**
  - Generally, literature should be peer-reviewed
    Most literature of types 1–4 is peer-reviewed, but not all
  - Rule of thumb: books ≻ journals ≻ conferences ≻ workshops ≻ tutorials ≻ magazines ≻ websites ≻ other
  - But, for example: top conferences ≻ average journals
    The symbol ≻ stands for ”preferred over“ here

Assessing quality of literature

- **Conference and journal rankings**
  - Top tier ranked A* or A; B still reasonable
  - Unranked conferences/journals may be doubtful
    No ranking achieves complete coverage, though
  - One of the most reputable rankings is CORE
    core.edu.au/conference-portal



- **Number of citations**
  - Roughly indicates importance
  - Rather for *relative* comparisons within a topic
  - Notice: Newer papers naturally tend to have fewer citations
  - Good resource for citation numbers is Google Scholar scholar.google.de
    Journals also have so called impact factors derived from citation numbers

- **Disclaimer**
  - Good and bad research appears at all places
  - Often, only reading helps

Reading and finding literature

- **Reading papers efficiently**
  1. Read abstract, introduction, and conclusion
  2. Look at figures and tables
  3. Decide whether worth reading everything
  4. Read goal-driven
     Specify questions to be answered during reading

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- **Finding the next paper**
  - Follow promising references at the end of a paper
  - Find promising papers citing a paper
  - Learn to identify the best search terms
    Rule of thumb: As specific as possible, but as abstract as needed

- **Getting started in the seminar**
  1. First read the literature that we provide
  2. Then find further literature

Acquiring literature

- **Obtaining papers**
  - Many papers freely available online
  - Others might be free from a university network
  - If neither, maybe your advisors can help

https://pixabay.com

- **Important sources**
  - ACL Anthology for computational linguistics papers aclweb.org/anthology
  - ACM Digital Library for many important computer science papers dl.acm.org
  - dblp for any literature related to computer science dblp.dagstuhl.de
  - Google Scholar for any scientific literature scholar.google.de

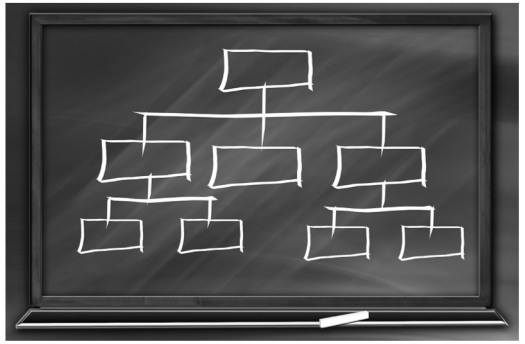
    ... along with general web search

- **Accessing books**
  - Check whether available in the library
  - Some accessible online, for example, on Google Books books.google.de

    Purchasing books can make sense when of continuous importance to you

Organizing literature

- **Literature organization**
  - Maintain overview, start from the beginning
  - ”Extra“ effort will pay off



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- **Create logical folder structure**
  - Build your own view of the field
  - Logically subdivide topics, but don‘t over-engineer

    For instance, ./literature/computational-sociolinguistics/social-bias/ — but maybe not deeper

- **Rename all literature consistently**
  - Simplifies browsing and finding
  - We use <1stauthor><2digityear>-<full-title-lower-case-no-special-chars>.pdf

    For example: ajjour17-unit-segmentation-of-argumentative-texts.pdf

- **Organizing meta-information**
  - Bibliographical information needed when citing literature
  - Store bibtex of literature whenever available

    Learn more on en.wikipedia.org/wiki/BibTeX; many pages such as dblp provide bibtex‘s

Oral presentations

Content of your talk

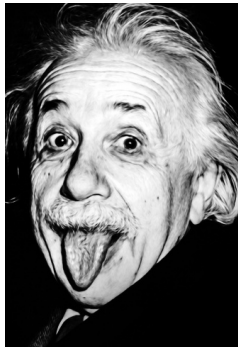
- **Scientific presentation is storytelling**
  - Tell a coherent story with a central theme
  - Plan what points to make and how to get there
  - Make it exciting, show importance
  - Don‘t be complete, be selective
    A bit different for articles (see below) and specific talks like lectures
  - Avoid surprise: Clarify why you tell something

”Sometimes **reality** is too complex. **Stories** give it a form.“

https://de.wikipedia.org

Jean-Luc Godard

- **Science needs to be understood**
  - Adjust complexity to audience
  - Leave out formal things, unless needed
    May be different in articles (see below) and specific talks like lectures
  - Be precise and clear
  - Introduce terms, use consistently
  - Figures and examples help



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Albert Einstein

”Everything should be as **simple** as possible, but **not simpler**. “

Figures

- **Figures**
  - Charts, diagrams, graphs, pictures, drawings, ...
  - Slides are visual
  - Rule of thumb. (Almost) No slide without figure

- **What to use figures for**
  - Primary. Replace text; visually explain concepts, ...
  - Secondary. Support your message with pictures
    (as often done in this presentation)

- **Formatting**
  - Vector graphics whenever possible
  - Others: Optimize sharpness, scale down smartly
    Never scale > 100%; 50% is better than 53% — why?
  - Never squeeze or stretch the aspect ratio
    If needed, cut figures on any side instead
  - Check readability of included text

”a **picture** is worth a **1000 words** “

"**unsharpness** is the mistake that even **lay persons** see"

Herbert Kania

Colors

- **Colors in general**
  - Presentations are visual, make use of colors
  - Fewer colors create a more clear style
  - But natural colors have an appeal, too

- **Font colors for important points**
  - Use colors consistently
  - Not too colorful
  - I use dark blue here for highlighting

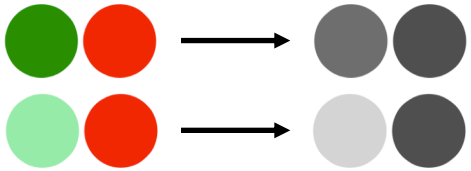
    And a cyan-like color for quotes

Joan Miro

”I try to **apply colors like words** that shape poems, like notes that shape music.“

- **Support your messages**
  - Always the same color for the same concept
  - Can create connections even across slides

- **Color vs. brightness**
  - Think of color blind people — contrast helps



Tables (and matrices)

- **Tables for what?**
  - Presenting numerical results
  - Comparing alternative ideas, approaches, or similar
  - Listing attribute values of multiple instances

    ... and similar

best results for each ranking approach

#	Dimension	τ	best	worst
1	PageRank	**0.28**	**15**	3
2	Number	0.19	6	**1**
3	Sentiment	0.12	12	4
4	Frequency	0.10	11	9
5	Similarity	0.02	9	10
6	Random	0.00	8	7

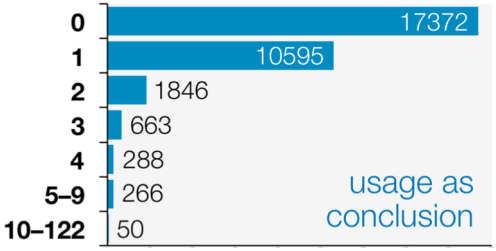
- **Table style**
  - Amount. Show only the most important values, to keep a table easy to digest

    In articles and lectures, comprehensiveness may be preferred, though
  - Alignment. Text left, numbers right
  - Lines. Recommended to use only horizontal lines

    Except for matrices

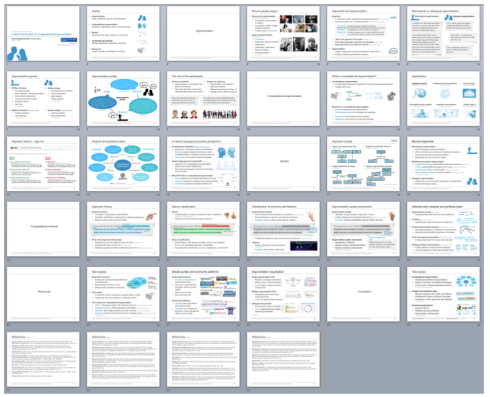
	true	**false**
true	TP	FP
false	FN	TN

- **Tables vs. charts**
  - Prefer tables if exact numbers are important
  - Prefer charts if relative differences should be stressed

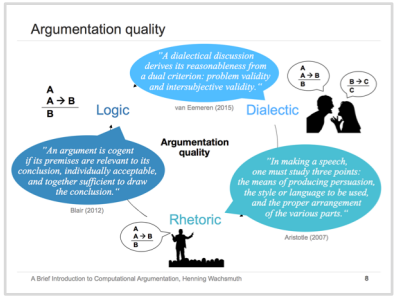


Structure of your slides

- **Overall stucture of presentation**
  - Title slide. Title, authors, maybe date
  - Outline slides. Only for longer talks (as of ~20 slides)
  - Content slides. Your story
  - Conclusion slide(s). Always! Takeaways, outlook
  - References. Prepare, but only show when asked for



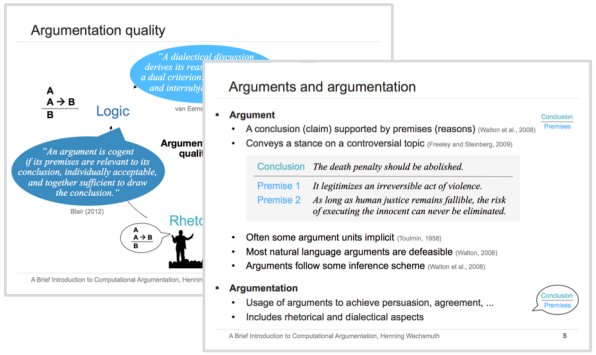
- **Structure of content slides**
  - Header. Clear unique title, should match content of body
    Notice: Titles often not read by the audience
  - Body. Bullet points, figures, tables, etc.
  - Footer. Title, presenter, no date, always page no./progress



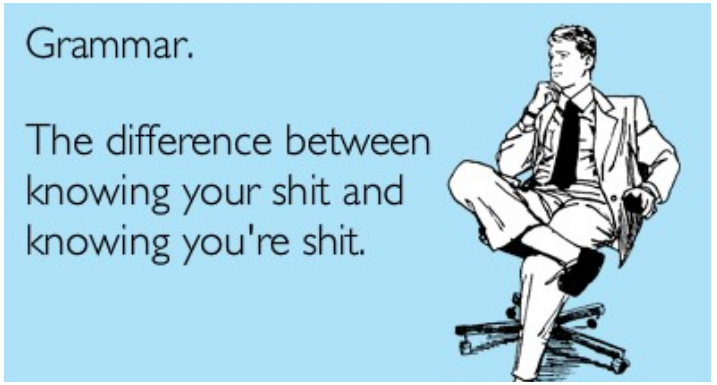
- **Space for separation**
  - Leave space between different slide parts
  - Leave space to slide borders
    Harder to read there + border sometimes clipped

Style of your slides

- **General slide style**
  - Decide what to put on slide and what to say
  - Vary slides to maintain attention
  - Animations only when useful, use consistently
    Avoid playful ones, unless they match your message
  - Clarify what is from you and what from others!
    Also see notes on citations and plagiarism below



- **Text style**
  - Avoid grammar and spelling errors
  - Write key points rather than full sentences
    May be different in specific talks like lectures
  - AIA & AUA
    Always introduce acronyms & Avoid unnecessary acronyms



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- **Amount of text**
  - Some say 7x7 — maximum 7 bullet points per slide, 7 words per point
  - I'd rather say 3x3 — 3 top-level points with 3 sub-points

Fonts

- **Fonts**
  - Sans-serif fonts (Arial, Verdana, ...) much more readable on slides
    Ambiguity speaks against Arial (”lll“) ... but Arial available on all machines
  - *Serif* fonts (Times, Garamond, ...) are made for printing
    I use them on slides for example texts only
  - Prefer simple fonts
  - Don‘t use too narrow fonts just to save space
- **Font size**
  - This text is written in 26 pt — for titles and stressing
  - This text is written in 24 pt
  - This text is written in 21 pt
  - This text is written in 18 pt — minimum for text that should be read
  - This text is written in 16 pt
  - This text is written in 14 pt
  - This text is written in 12 pt — minimum for extra information that may be skipped
  - This text is written in 10 pt
  - This text is written in 8 pt
  - This text is written in 6 pt — maybe for texts that should on purpose not be readable

Talking and timing

- **Giving a talk**
  - Match words on slides, but complement them
  - No pre-phrased sentences
  - Look at audience, speak to everybody
  - Don‘t be *too* formal, but be serious, avoid slang
    Occasional jokes may be nice, if you know how to use them

- **Timing**
  - Use your time, but stick with time limit
  - Expect ≥ 2 minutes per (animated) content slide
  - Rule of thumb: Audience can read slide twice
  - Leave time for questions and discussion

max.
35 min.
+ discussion

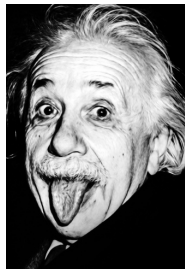
- **Practice your complete talk!**
  - How much time do you need?
  - Does your story work?
  - Can you explain everything well?

Written presentations

Content of articles

- **Most hints on talks also hold for articles**
  See above!
  - Science is storytelling
    Seminar: No scientific novelty expected, rather summarize and discuss
  - Science needs to be understood


https://de.wikipedia.org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t

- **Articles more complete**
  - Tell the whole story, avoid gaps in argumentation
  - But: Include only relevant content
  - Don‘t expect too much prior knowledge
  - But: No details on knowledge that can be presupposed

”Don‘t make me **think.“**


https://commons.wikimedia.org

Steve Krug

- **Articles should be sound**
  - Need to be precise more than in talks
  - Use logical arguments, from broad context to deep details
  - Formalize concepts if needed/helpful

Structure of articles

- **High-level stucture**
  - Title and author information
  - Abstract
  - Usually 4–7 sections
  - References

    ... and sometimes appendices (not in seminar article!)
- **Section structure**
  - Often numbered subsections (2.1, 2.2, ...)
  - If any, subsubsections unnumbered
  - Always have text before sub⁺sections
- **Section headings**
  - Conventional: First is ”Introduction“, last is ”Conclusion“
  - Other sections topic-specific

    Some semi-conventional content sections exist, but not fully match seminar articles
  - Short misleading headings worse than long clear ones

The Impact of Modeling Overall Argumentation with Tree Kernels

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Abstract

Several approaches have been proposed to model either the explicit sequential structure of an argumentative text or its implicit hierarchical structure. So far, the adequacy of these models of overall argumentation remains unclear. This paper asks what type of structure is actually important to tackle downstream tasks in computational argumentation. We analyze patterns in the overall argumentation of texts from three corpora. Then, we adapt the idea of positional tree kernels in order to capture sequential and hierarchical argumentative structure together for the first time. In systematic experiments for three text classification tasks, we find strong evidence for the impact of both types of structure. Our results suggest that either of them is necessary while their combination may be beneficial.

1 Introduction

Argumentation theory has established a number of major argument models focusing on different aspects, such as the roles of an argument's units (Toulmin, 1958), the inference scheme of an argument (Walton et al., 2008), or the support and attack relations between arguments (Freeman, 2011). The common ground of these models is that they conceptualize an argument as a conclusion (in terms of a claim) inferred from a set of pro and con premises (reasons), which in turn may be the conclusions of other arguments. For the overall argumentation of a monological argumentative text such as the one in Figure 1(a), this results in an implicit hierarchical structure with the text's main claim at the lowest depth. In addition, the text has an explicit linguistic structure that can be seen as a regulated sequence of speech acts (van Eemeren and Grootendorst, 2004).

(a) monological argumentative text

(b) sequential structure (ordering in text)

Figure 1: (a) Example text with five argument units, taken from the *Arg-Microtexts* corpus introduced in Section 3. (b) Graph visualization of the sequential and hierarchical overall argumentation of the text.

Figure 1(b) illustrates the interplay of the two types of overall structure in form of a tree-like graph.

Natural language processing research has largely adopted the outlined hierarchical models for mining arguments from text (Stab and Gurevych, 2014; Habernal and Gurevych, 2015; Peldszus and Stede, 2016). However, the adequacy of the resulting overall structure for downstream analysis tasks of computational argumentation has rarely been evaluated (see Section 2 for details). In fact, a computational approach that can capture patterns in hierarchical overall argumentation is missing so far. Even more, our previous work indicates that a sequential model of overall structure is preferable for analysis tasks such as stance classification or quality assessment (Wachsmuth and Stein, 2017).

In this paper, we ask and investigate what model of (monological) overall argumentation is important to tackle argumentation-related analysis tasks. To this end, we consider three corpora with fully

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Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing, pages 2369–2379
Copenhagen, Denmark, September 7–11, 2017. ©2017 Association for Computational Linguistics

Abstract

- **Abstract**
  - A concise high-level summary of the paper
  - Usually 5–10 sentences
- **My view of a good abstract**
  - Motivation and context (1 sentence)
  - Problem and why not solved (1–2 sentences)
  - Question addressed in the paper (1 sentence)
  - Approach in general, some details (2–3 sentences)
  - Evaluation, results, conclusion (1–3 sentences)

  For seminar articles, may differ a bit though
- **My PhD supervisor‘s view**
  - What is the problem? Why is it a problem?
  - What is the solution? Why is it a solution to the problem?

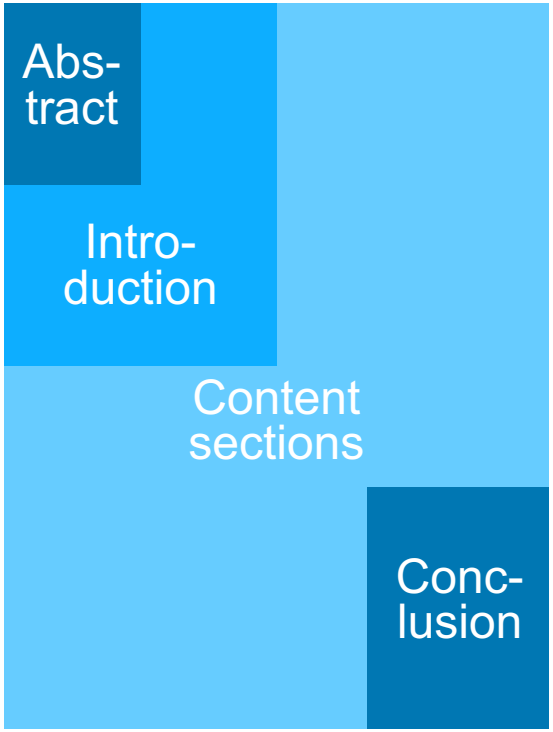
  Notice that this view is NOT in conflict with mine

Abstract

Several approaches have been proposed to model either the explicit sequential structure of an argumentative text or its implicit hierarchical structure. So far, the adequacy of these models of overall argumentation remains unclear. This paper asks what type of structure is actually important to tackle downstream tasks in computational argumentation. We analyze patterns in the overall argumentation of texts from three corpora. Then, we adapt the idea of positional tree kernels in order to capture sequential and hierarchical argumentative structure together for the first time. In systematic experiments for three text classification tasks, we find strong evidence for the impact of both types of structure. Our results suggest that either of them is necessary while their combination may be beneficial.

Sections

- **Introduction**
  - The abstract in more detail
  - Tell the whole story, from context to conclusion
  - High-level, understandable for computer scientists
- **Content sections**
  - The introduction in more detail
  - Elaborate on related work, concepts, models, data, approaches, experiments, and results
  - More technical, for researchers from the area
- **Conclusion**
  - The introduction in less detail
  - Summarize story in retrospective, give outlook
  - Semi-technical



Style of articles

- **Scientific writing style**
  - Write clearly, unambiguously, and concise
  - Don‘t make things complex
    Common misunderstanding!
  - Use impersonal form or ”we“ form
- **Some guidelines**
  - English sentences are short, one statement per sentence
  - Again: Avoid grammar and spelling errors
    Seminar: Too many of them will negatively affect your grade
  - Avoid pronouns with unclear references
  - Use explicit discourse markers, such as ”because“
  - Blurring is non-scientific, such as ”It could be...“
- **Article format in the seminar**
  - Provided template predefines layout and its usage
  - 8 two-column pages of content, 1–2 pages of references

Tables, figures, terms, and footnotes

- **Tables and figures**
  - In articles, just number increasingly
    Figure 1, 2, ... Table 1, 2, ... (NOT: Figure 2.1, 2.2, ...)
  - No included font larger than article font
  - Explain in text *and* in caption
    Rule of thumb: tables/figures should be clear without text

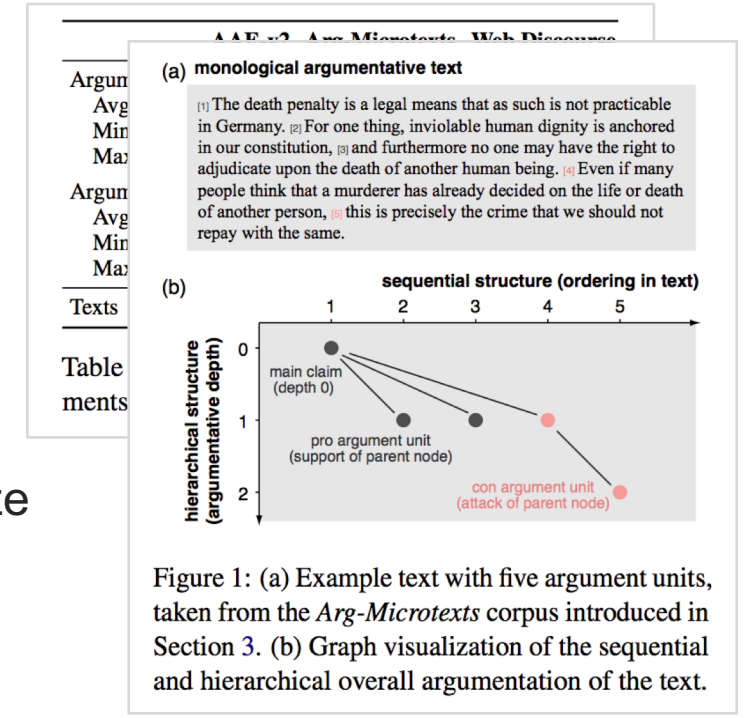
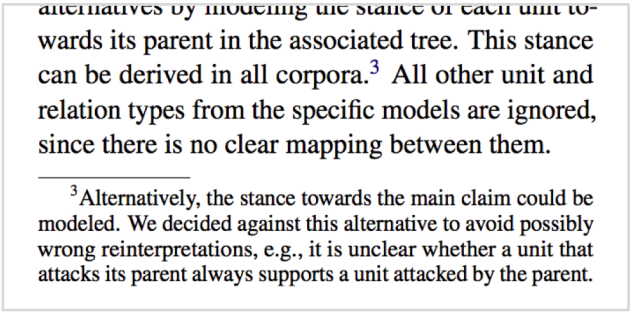


Figure 1: (a) Example text with five argument units, taken from the *Arg-Microtexts* corpus introduced in Section 3. (b) Graph visualization of the sequential and hierarchical overall argumentation of the text.

- **Technical terms**
  - Introduce where needed, don‘t overformalize
  - Use well-defined terms, AIA & AUA
  - Don‘t use synonyms for terms
    Reader is misled to check whether intentional differences exist

- **Footnotes**
  - Only for secondary information
  - Reduce readability, should be the exception
  - Don‘t cite literature using footnotes



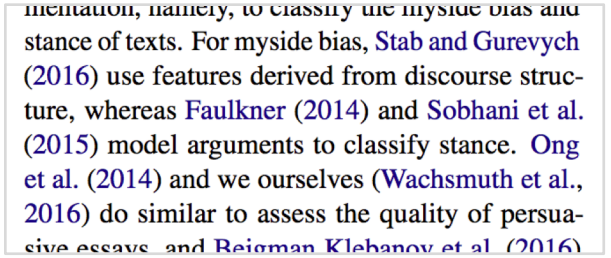
alternatives by modeling the stance of each unit towards its parent in the associated tree. This stance can be derived in all corpora.[3] All other unit and relation types from the specific models are ignored, since there is no clear mapping between them.

[3] Alternatively, the stance towards the main claim could be modeled. We decided against this alternative to avoid possibly wrong reinterpretations, e.g., it is unclear whether a unit that attacks its parent always supports a unit attacked by the parent.

Citation

- **Citation**
  - In-text reference to a bibliographic source
  - We use ACL-style: Author names + year

    Other communities use numbers ([1], [2], ...) or acronyms ([ACW17], ...)


mentation, namely, to classify the myside bias and stance of texts. For myside bias, Stab and Gurevych (2016) use features derived from discourse structure, whereas Faulkner (2014) and Sobhani et al. (2015) model arguments to classify stance. Ong et al. (2014) and we ourselves (Wachsmuth et al., 2016) do similar to assess the quality of persuasive essays, and Beigman Klebanov et al. (2016)

- **What to cite**
  - Any reuse, paraphrase, summary, or translation of content from some source

    Content: Text, figures, and tables
  - Rule of thumb: Always clarify what is from you and what from others

    You also have to cite yourself if you reuse your own sources
  - Better one citation too much than one too less

- **How to cite**
  - Direct reuse. Always, put in quotes (possibly shorten with [...]), give source

    Example: Unit segmentation is ”[...] the splitting of a text into argumentative segments“ (Ajjour et al., 2017).
  - Other citations. Give source close-by

    Example: As Ajjour et al. (2017) point out, segmentation is the first task of an argument mining pipeline.
  - Large text portions. Give source once in the beginning

    Example: In the following paragraph, we summarize the segmentation approach of Ajjour et al. (2017).

References

- **List of references**
  - Bibliographical information at end of paper
  - Exactly those references cited in the text
  - Information should be complete and consistent
- **Needed meta-information**
  - All literature. Author, year, title
  - Conferences/Workshops. Proceedings, pages
  - Journals. Journal name, issue, number, pages
  - Books. Edition if any, publisher
  - Only online. Give URL with access date
  - Other meta-information optional
- **Bibtex**
  - LaTeX handles references automatically using bibtex

    See part on organizing literature above

Aristotle. 2007. *On Rhetoric: A Theory of Civic Discourse* (George A. Kennedy, translator). Clarendon Aristotle series. Oxford University Press.

Beata Beigman Klebanov, Christian Stab, Jill Burstein, Yi Song, Binod Gyawali, and Iryna Gurevych. 2016. Argumentation: Content, structure, and relationship with essay quality. In *Proceedings of the Third Workshop on Argument Mining (ArgMining2016)*, pages 70–75. Association for Computational Linguistics.

Stefanie Brüninghaus and Kevin D. Ashley. 2003. Predicting outcomes of case based legal arguments. In *Proceedings of the 9th International Conference on Artificial Intelligence and Law*, pages 233–242.

Chih-Chung Chang and Chih-Jen Lin. 2011. LIBSVM: A library for support vector machines. *ACM Transactions on Intelligent Systems and Technology*, 2(3):27:1–27:27.

Plagiarism

- **Plagiarism**
  - To sell another‘s ideas or expressions as one‘s own
    See en.wikipedia.org/wiki/Plagiarism
  - On purpose or due to lack of giving sources
  - Plagiarism *not* a trivial offense
    In some countries considered as crime
  - Proper citing avoids all plagiarism issues
  - For more information on plagiarism, see the leaflet of our department
    See https://cs.upb.de/fileadmin/informatik/fg/css/computational-sociolinguistics-s21/upb-plagiarism-leaflet.pdf

- **Consequences in the seminar**
  - Major cases lead to failing the seminar (and report to examination committee)
  - Minor cases can still negatively affect your grade

- **My former group…**
  - Does research on plagiarism detection
  - See the tool picapica www.picapica.org

Sum up

Take aways

- **Literature research**
  - Fundamental part of scientific work
  - Literature varies in quality and suitability
  - Find, read, and organize literature efficiently

- **Oral and written presentation**
  - Science is storytelling, needs to be understood
  - Several best practices for content, structure, and style
  - Proper citation is a must
  - Practice presenting early

- **For the seminar**
  - Consider hints in this presentation
  - Notice that some are subjective, much is missing
  - Develop your own way of presenting

References

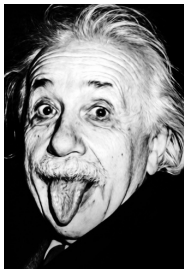
- **Several slides reuse content from:**
  - **Engels (2010).** Gregor Engels. Einführung in wissenschaftliches Schreiben und Präsentationstechniken. Presentation within the Seminar ”Information-Driven Software Engineering“. Paderborn, 2010. https://cs.uni-paderborn.de/fileadmin/informatik/fg/dbis/Lehre/ws10_11/PG_IDSE/Dokumente/2010-04-15_Schreiben_Praesentieren.pdf
  - **Becker (2012).** Steffen Becker. Scientific Working. Presentation within the Seminar ”Model Driven Software Engineering with Eclipse. Paderborn, 2010.www.hni.uni-paderborn.de/fileadmin/Fachgruppen/Softwaretechnik/Lehre/Proseminar_Model_Driven_Software_Engineering/ProSem_MDSD_Guidelines.pdf
- **Examples are taken from:**
  - **Ajjour et al. (2017)**. Yamen Ajjour, Wei-Fan Chen, Johannes Kiesel, Henning Wachsmuth, and Benno Stein. Unit Segmentation of Argumentative Texts. In Proceedings of the Fourth Workshop on Argument Mining, pages 118–128, 2017. http://aclweb.org/anthology/W17-5115
  - **Wachsmuth et al. (2017f).** Henning Wachsmuth, Giovanni Da San Martino, Dora Kiesel, and Benno Stein. The Impact of Modeling Overall Argumentation with Tree Kernels. In Proceedings of the 2017 Conference on Empirical Methods in Natural Language Processing, pages 2369–2379, 2017. http://aclweb.org/anthology/D17-1252

Lecture talks in particular

(left out in seminar)

Specific characteristics of lecture talks

- **Most general hints on talks also hold for lectures**
  See above!
  - Science is storytelling
    Seminar: No scientific break-through expected, rather summarize and discuss
  - Science needs to be understood



- **What's the difference?**
  - A lecture should teach students all basics needed to understand the respective topic
  - In computer science, slides often replace a "real" script
  - Tutorials are used to practice application or similar

- **Consequences**
  - Lectures more complete
  - Lectures should be more interactive
  - Lecture slides should be more sound

Style of lectures

- **Lectures closer to articles**
  - Tell the whole story, avoid gaps in argumentation
  - But: Include only relevant content
  - Don‘t expect too much prior knowledge
  - But: No details on knowledge that can be presupposed

”**Don‘t** make me **think.**“

https://de.wikipedia.org

Steve Krug

- **Lectures more interactive**
  - Ask for questions from time to time, for example after each ”section“
  - Include interactive parts, to raise attention and interest
  - Proactively check the students' understanding
  - Double-check whether people have understood you

- **Puzzled faces should alert you**
  - Try different ways of explaining
  - Give more details or examples

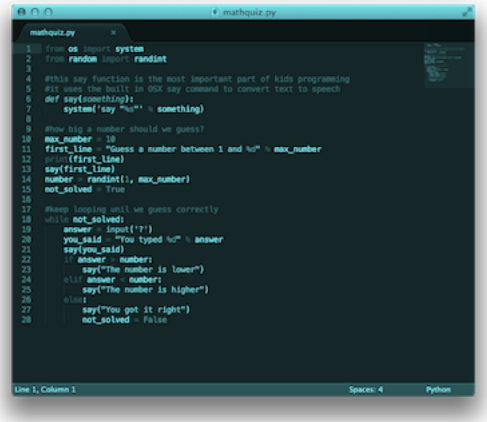
https://pixabay.com

Style of lecture slides

- **Lecture slides more sound**
  - They need to be more precise than in other talks
  - Formalize concepts where it is needed/helpful for full understanding
  - But: Don‘t make things complex (common misunderstanding)
- **Lecture slides serve as a script**
  - Full sentences often make it easier to avoid misunderstandings
    Still: Keep text short, one statement per sentence.
  - Use explicit discourse markers, such as ”because“
  - Blurring is non-scientific, such as ”It could be...“
- **Technical terms**
  - Introduce terms where needed, but don‘t overformalize
  - Use well-defined terms, AIA & AUA
  - Always use the same term for the same concept (no synonyms!)
    Reader is misled to check whether intentional differences exist.

Tutorials: Hands-on experience

- **Programming tutorials**
  - 90 minutes time. Students should learn to develop computational approaches themselves
  - Schedule. Instructions, programming, discussion
  - Rule of thumb. About 60 minutes for programming



- **Preparation**
  - Task. Should address some core ideas of the given topic
  - Code. Create a reasonable template, so students can achieve something
    Prepare one solution yourself that the students see/get afterwards
  - Libraries. Use where understanding is not in the focus (e.g., for machine learning)

- **In the tutorial**
  - Instructions. Give instructions in the beginning, explain what you prepared
  - Handouts. May help to give an overview of concepts or similar
  - Interaction. Proactively approach students, check progress and problems
    Give hints, but don't solve the task for them.