Outline

Part 2: Analysis Tasks

2.1 Argument Mining Overview
2.2 Segmenting Texts into Argumentative Units
2.3 Classifying Types of Units
2.4 Identifying Relations between Units
2.5 Classifying Stance and Analyzing Polarity
2.6 Assessing Argumentation Quality
Assessing Argumentation Quality – Overview

Slides by Henning Wachsmuth and Benno Stein

Introduction

• Argumentation quality
• Granularity levels
• Target audience
• Quality aspects

Overview of existing work

• Logical quality
• Rhetorical quality
• Dialectical quality

Selected approaches in detail

• Assessing argument relevance
Scope of Discussion

Many related topics not covered here

• Some may affect argumentation quality, some help to assess it
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- Argumentation quality in natural language
  - Wikipedia quality flaws
  - Logical correctness
  - Argument mining
  - Argumentation schemes
  - Evidence types
  - Deliberative quality
  - Review helpfulness
  - Essay overall quality
  - Review deception
  - Text readability
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Argumentation quality in natural language
What Is Argumentation Quality?

**Argumentation quality:** How “good” is a natural language argument or argumentation?

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(Blair 2012)

“*would convince most readers*“
(Persing & Ng 2015)

“*based on evidence, constructed with perspective, and delivered persuasively*“
(http://researcher.watson.ibm.com/researcher/view_group.php?id=5443)
Alice: Some people say refugees threaten peace, as many of them were criminals. In fact, Spiegel Online just reported results from a study of the federal police about numbers of refugees and crimes: Overall, there is no correlation at all! Rather, the police confirmed that the main reason for committing crime is poverty. So, if you believe the police then you shouldn't believe those people. Syrians are even involved less in crimes than Germans according to the study. So, the more Syrians come to Germany, the more peaceful it gets there, right?
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Bob: The question is here why should I believe the police!? Argument failed :-(
The Role of the Target Audience

Argumentation usually has a particular target audience

- Readers of a news paper
- Potential voters of a political party
- Opponents in a debate
- ...

[Image of diverse people representing different target audiences]
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Different ways of arguing work for different people

- Knowing the audience needed for successful argumentation
- Modeling the audience needed to assess quality?
Three High-level Aspects of Quality

Logic

“A is known to be true, and A implies B. Therefore, B.”
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**Dialectic**

“We agree on A. Also, no one denies that A suggests B. Then, we should conclude B.”
Logical Argumentation Quality – Theory

**Soundness** rather studied in formal argumentation

- Most natural language arguments defeasible  
  (Walton 2006)
- In informal logic, the main quality dimension is cogency
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**Cogency:** Argument has acceptable premises that are relevant and sufficient

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- Acceptability: Worthy of being believed by target audience
- Relevance: Support conclusion
- Sufficiency: Provide enough evidence to draw conclusion
- Sometimes also: Rebuttal, well-formedness  
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**Strength** of arguments often discussed but unclear (Perelman et al. 1969)

**Fallacies:** Arguments with flaws that undermine the reasoning (Tindale 2007)

- Several types, e.g., ad-hominem attack or red herring
- Partly hard to be addressed computationally
Logical Argumentation Quality – Approaches

Evidence quality of student essays
(Rahimi et al. 2014)

• How well does the provided evidence support the thesis? (→ sufficiency)
• Best features: Density and specificity of prompt-related words

⇒ Accuracy: 62% for 4-point scale
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Premise ranking in community question answering
(Braunstain et al. 2016)

• Does evidence from Wikipedia support an answer? (→ relevance)
• Approach: Combining classical retrieval models with support-oriented features

⇒ Precision@5: 0.52
Rhetorical Argumentation Quality – Theory

Aristotle’s work on rhetoric still prevalent  (Aristotle & Kennedy 2007)

• Rhetoric: Ability to know how to persuade
• Means of persuasion + linguistic delivery
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- Logos: Use true and valid arguments (→ soundness / cogency)
- Ethos: Achieve credibility as a speaker/author
- Pathos: Put target audience into adequate emotional state
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• Arrangement: Order topics and arguments properly
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Effectiveness in achieving persuasion main rhetorical quality (van Eemeren 2015)

- Depends strongly on target audience
Rhetorical Argumentation Quality – Approaches

Argumentation-related essay scoring
(Persing et al. 2010, Persing & Ng 2013, 2015, Rahimi et al. 2015)

- Organization, thesis clarity, argument strength
  (arrangement, clarity, effectiveness)
- Tailored features, e.g., discourse function sequences
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Persuasive arguments in “change my view” forums
(Tan et al. 2016)

- How is persuasion achieved? (effectiveness)
- Beneficial: Multiple interactions, appropriate style, high number of participants
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Conversational flow in Oxford-style debates
(Zhang et al. 2016)

- How to win a debate? (→ effectiveness)
- Attacking the opponent’s points better than focus on own points
Dialectical Argumentation Quality – Theory

Dialectical view of argumentation: Resolving differences of opinions on the merit  
  (van Eemeren and Grootenhorst 2004)
  
  • Considered for discussions that aim at agreement
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**Reasonableness** main dialectical quality; emerges from two dimensions (van Eemeren and Grootenhorst 2004)

- Intersubjective acceptability: Arguments acceptable for all participants
- Problem-solving validity: Contribution to resolution
- Effectiveness remains underlying goal (van Eemeren 2015)
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**Convincingness** sometimes discussed as “rational persuasiveness” \(^{(Perelman et al. 1969)}\)

- Aims at universal audience, which has been criticized \(^{(van Eemeren 2015)}\)
- Needs global sufficiency: All objections countered \(^{(Damer 2009, Blair 2012)}\)
Dialectical Argumentation Quality – Approaches

Accepted arguments in debate portals  (Cabrio & Villata 2012)

• Textual entailment to find attack relations
  ⇒ Accuracy: 67%
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- Abstract argumentation framework  (Dung 1995)
  for inferring accepted arguments  (\(\Rightarrow\) intersubjective acceptability)
  - Argument accepted if all arguments attacking it are rejected
  - Rejected if an accepted argument attacks it
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Popular arguments in online debates  
(Boltužić & Šnajder 2015)

- Clustering to determine popular arguments
- Quality nature of popularity questionable  
  (Govier 2010)
Assessing Objective Argument Relevance at Web Scale

Relevant arguments on the web
(AI-Khatib et al. 2016, more to come)

- Construct graph based on arguments mined from all web pages
- Adapt PageRank to assess global argument relevance objectively
  (\(\to\) problem-solving validity)
- Recursive weighting: Argument relevant if many relevant arguments use its conclusion as a premise
Conclusion

How to assess argumentation quality depends on goal

- Several logical, rhetorical, and dialectical quality dimensions
- Also, general text quality important
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Assessment often complex

- May have to consider different granularity levels
- May have to analyze both structure and content (deeply)
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Assessment important in argument search, writing support, ...

- Much theory, not many corpora and approaches yet
- Common view still missing ... but we are working on it :-(
References (1/3)


References (2/3)


References (3/3)


