Outline

Part 2: Analysis Tasks

Classifying Stance and Analyzing Polarity – Overview

Slides by Henning Wachsmuth and Benno Stein

Introduction

- Stance vs. polarity
- Dialogical and monological argumentation

Overview of existing work

- Common polarity analyses
- Stance in dialogical argumentation
- Stance in monological argumentation

Selected approaches in detail

- Analyzing sentiment flows
- Discourse-level argumentation analysis

Stance Classification vs. Polarity Analysis

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Stance classification: Determining the stance of the author of a text towards a given topic (Somasundaran and Wiebe 2010)

- Topic not necessarily mentioned in the text
- Pro vs. con, sometimes also: none or not relevant
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Stance vs. polarity

- Stance may express polarity on other topic – or none at all
- Stance depends on what author argues to be true
- Still, polarity important for stance

Stance in Dialogical and Monological Argumentation

Stance on "need for university degrees"?

Dialogical argumentation

Alice: *I think a university degree is important. Employers always look at what degree you have first.*

Bob: *LOL ... everyone knows that practical experience is what does the trick.*

Alice: *Good point! Anyway, in doubt I would always prefer to have one!*

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Monological argumentation [convinceme.net]

I would not say that university degrees are useless; of course, they have their value but I think that the university courses are rather theoretical. [...]

In my opinion most of the courses taken by first and second year students aim at acquiring general knowledge, instead of specialized which the students will need in their later study and work. General knowledge is not a bad thing in principle but sometimes it turns into a mere waste of time. [...]

Common Polarity Analysis Approaches

Polarity analysis extensively studied in the last 15 years

- Bag-of-words   (Pang et al. 2002)

- Sentiment lexicons   (Baccianella et al. 2010)

- Aspect-based sentiment   (Wang et al. 2010)

- Discourse structure   (Heerschop et al. 2011)

- Argument-related models   (Villalba & Saint-Dizier 2012)

- Sentiment flow   (Mao & Lebanon 2007)

- Semantic compositionality   (Socher et al. 2013)

- ... and many others...

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Usual challenges

- Mixed and subtle polarities, sarcasm
- Scope of negation
- Unclear opinion targets
- Domain dependency

Stance Classification in Dialogical Argumentation

Exploit connection of aspects and topic

(Somasundaran & Wiebe 2009–2010)

- Features: Aspect-based polarity, discourse relations, subjectivity and arguing lexicons

⇒ Accuracy: 61% – 71%

Bob: *LOL ... everyone knows that practical experience is what does the trick.*

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Exploit other texts of same author

(Ranade et al. 2013)

- Features: Topic-directed polarity, discourse relations
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Exploit opposing views in dialogue
(Hasan & Ng 2013)

- Several standard features in sequence model

$\Rightarrow$ Accuracy: 70% – 75%

> **Alice:** *I think a university degree is important. Employers always look at what degree you have first.*
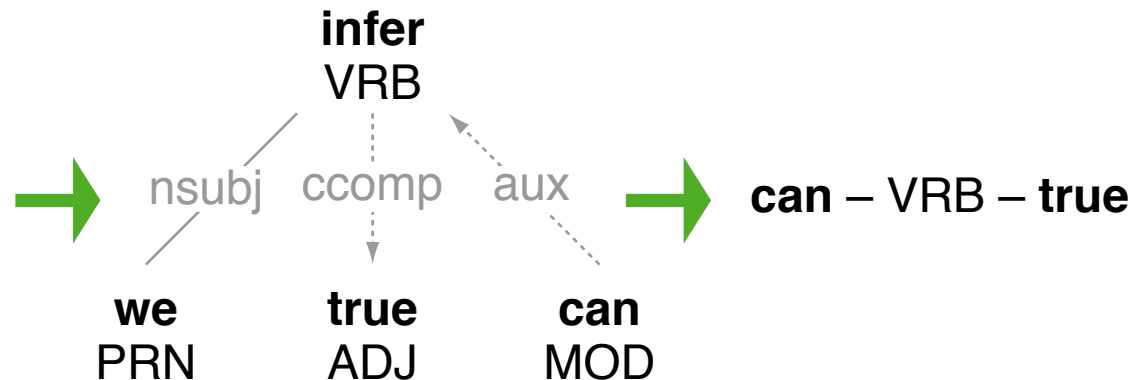>
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Stance Classification in Monological Argumentation

Model arguments in student essays (Faulkner 2014)

- Content: Opinion-bearing and stancetaking words
- Structure: POS-generalized dependency subtrees

[...] So, we can infer that the statement is very true.

➡️

infer
VRB

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➡️ **can** – VRB – **true**

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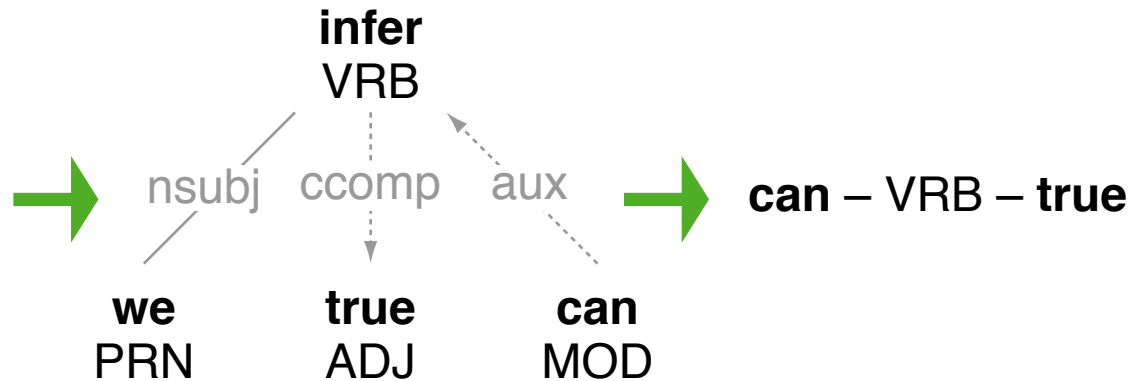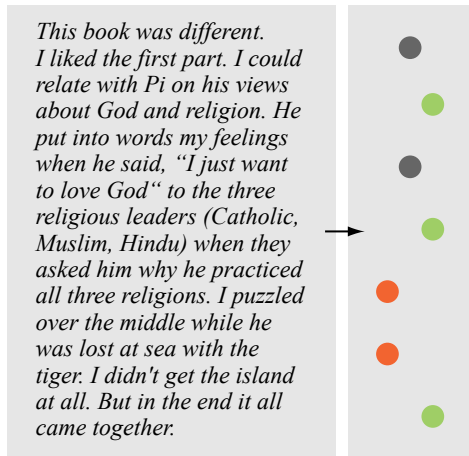*[...] So, we can infer that the statement is very true.*

→

infer
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→   **can** – VRB – **true**

- Features derived from model and topic-directed polarity

⇒ Accuracy: 79% for arguments, 82% for essays

⇒ Modeled structure only "local" (single arguments)

Analyzing Sentiment Flows of Web Reviews

Analyze global discourse-level structure of web reviews (Wachsmuth et al. 2014)

1. Model argumentation
   as a sentiment flow

This book was different.
I liked the first part. I could
relate with Pi on his views
about God and religion. He
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religious leaders (Catholic,
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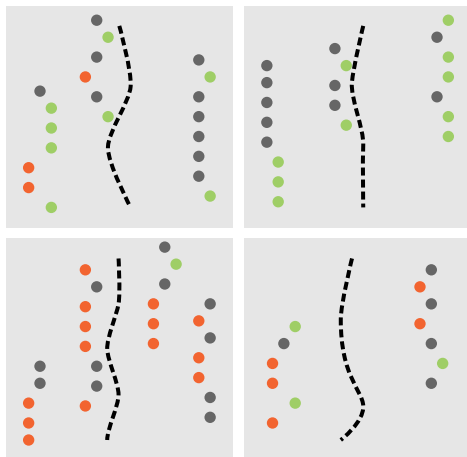# Analyzing Sentiment Flows of Web Reviews

Analyze global discourse-level structure of web reviews (Wachsmuth et al. 2014)

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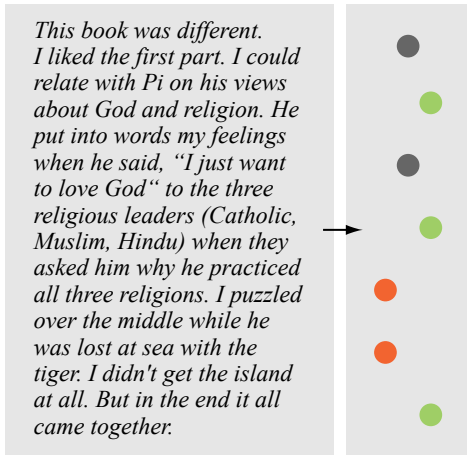
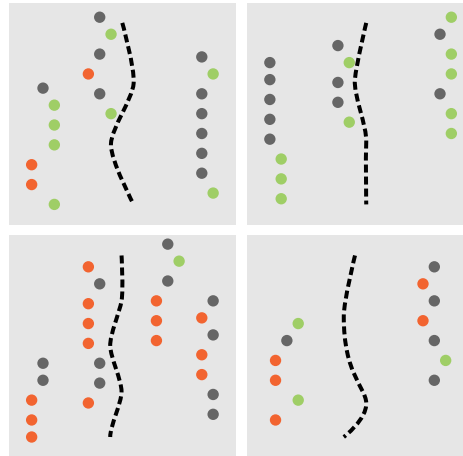### 2. Group training flows to identify flow patterns

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2. Group training flows to identify flow patterns

3. Compute similarity of flow to each flow pattern

Analyzing Sentiment Flows of Web Reviews

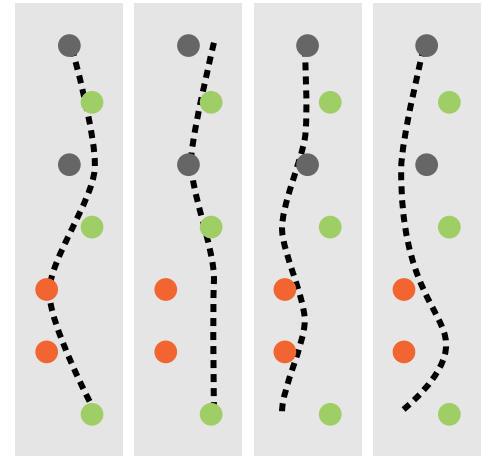## Analyze global discourse-level structure of web reviews (Wachsmuth et al. 2014)

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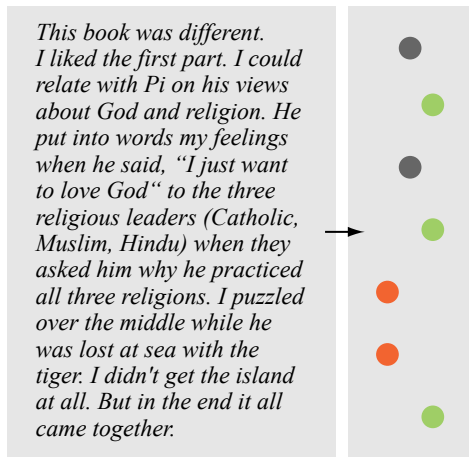
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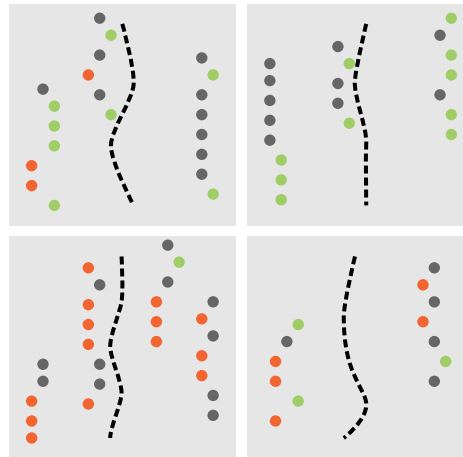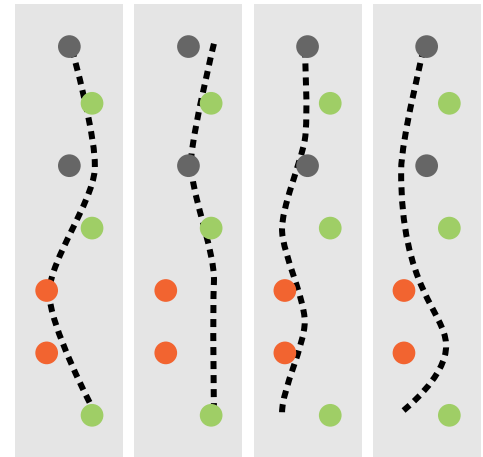3. Compute similarity of flow
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Model general argumentation of web reviews (Wachsmuth et al. 2015)

- Abstract flows to generalize across domains (e.g., model changes only)
- ⇒ Accuracy drop in out-of-domain polarity analysis "only" ∅ 11 points (bag-of-words: 24 points)

A Universal Model for Discourse-level Argumentation Analysis

Analyze several argumentation-related flows (Wachsmuth and Stein 2016)

- Types: Sentiment, discourse functions and relations, argument roles
- Granularities: Clauses, sentences, paragraphs
- Tasks: Polarity analysis, essay organization scoring

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Our educational system in one of the largest in the world. It offers variety, diversity but not flexibility and value for money. This is due to the fact that many of our university degree courses are either illegal or award the students with jobless future. They do not motivate students to make further research. Undergraduates are looking forward to receive their degrees for the sake of some future reward.

University degrees are necessary in out materialistic society. However degree levels in vocational subjects, such as art and design, engineering, business studies, and hotel and catering, do not have a future. The role of university degrees has been replaced by the fact that they tell you nothing about a person's true ability and aptitude. They are mark either of success or failure.

Furthermore they are theoretical and do not prepare students for real life. A good education should, among other things, train you to think for yourself. The examination system does anything but that. What has to be learnt is laid down by a syllabus and students are encouraged to memorize. Examinations do not motivate students to make research and read widely, they induce studying for marks instead. They lower the standards of teaching and lead to theoretical degrees that are designed to be put in a frame and to serve as souvenirs.

The most successful Bachelors and Masters or PhDs are not always the best educated. They are the best trained in the technique of working under stress. They live in a world of vicious competition where success and failure are measured. University degrees do anything but prepare them for this competition. They do not prepare students to think for themselves and make their own research on a given subject. They put restrictions to their sphere of knowledge and do not give them any opportunity to widen the already existing theory or amend some of the old things and add some new information.

Many university degrees are a result of a subjective assessment by some examiner who marks stacks of hastily scrawled scripts in a limit amount of time. Students even do not have right to appeal after their examiner's decision. That is why many capable students turn into drop-outs and drop-outs turns into millionaires.

In conclusion I would like to say that only when the university degree courses become more practically oriented and not so theoretical will university degrees have any value and adapt to the need of real life. Furthermore students will be encouraged to make some research on their own, to chose postgraduate courses and to get postgraduate degrees.

Introduction
Rebuttal
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Rebuttal ●
Body ●
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Body ●
Conclusion ●

⇒ Domain robustness of polarity analysis significantly improved

⇒ State of the art in organization scoring

⇒ Flows qualify as a universal model for (shallow) discourse-level analysis

Conclusion

Stance classification is (a little) harder than polarity analysis

- Stance depends on what author argues to be true
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Stance classification is necessary but not sufficient

- Distinguish pro from con arguments
- Derive support and attack relations
- Not: What arguments are relevant for a topic

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