ConToVi: Multi-Party Conversation Exploration using Topic-Space Views

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How do we capture the conversation dynamics?
Modeling interactions between speakers
Let’s open the floor for a discussion.
Let’s open the floor for a discussion.
Requirements

Speaker Movement Analysis:
• [R1] Retracing a sequence of speakers and topics over time.
• [R2] Identifying the influence of a speaker on the conversation.
• [R3] Analyzing the control of speakers for a specific topic.

Behavior Pattern Analysis:
• [R4] Exploring speech and argumentation patterns for each speaker and topic.
• [R5] Analyzing the speaker stances at a given point in time towards a given topic.
• [R6] Comparing the pattern similarities of different speakers.
Let’s open the floor for a discussion.
Place on the Discussion Floor: Topic-Space

- Topic length?
- Topic ordering?
Topic-Space View

base-topic

> similarity
Topic-Space View
Speaker and Utterance Positioning
Tasks

• [T1] Exploration of the conversation and overview generation (addressing R1, R2, R3).

• [T2] Analyzing and understanding the speaker movement through topic space for selected speakers (addressing R1, R2, R4).

• [T3] Analyzing the contribution of each speaker to each topic over time (addressing R2, R3, R6).

• [T4] Analyzing the movement and patterns of one speaker in detail (addressing R4, R5, R6).
Topic-Space View

[V1] Discussion Overview with all speakers

[V2] Speaker-Trail-View + Topic-Glyphs

[V3] Utterance-Sedimentation View

[V4] Speaker-Path View for one speaker
Path Interpolation
Path Interpolation

- fachler sierig peter gerd
- folie moment tema herrn_sierig
- prozent neigung satz mitte technik schall transparenz golf
- sicherheit unterschied wahrscheinlichkeit mexiko
- bundesverkehr smi ministerium ausnahmegenehmigung erteilung alternativkonzept
- bahnhof mineralwasser stuttgart grundwasser
- linie oberflache grundwassers skizze
- frage leute herr_geisler herr_palmer
- geisler druck herr_dr_anhydrit
- bahn uberdeckung herr_bitzer rohr
- wasser schicht bild quelle
- beton hohlraum schuttungen blinie
- punkt karte versicherer gipskeuper
- meter zug lokfuhrer bohrung
Discussion Overview
of the Obama vs. Romney Presidential Debates

tax cut deduction trillion
stamp 47 food preserve
crosstalk answer segment question
governor romney afghanistan pakistan
government freedom teacher principle
steel steelworker midwest competition
mr president minute bowie
medicare insurance health care
nation school system young
dodd regulation frank bank
party fight daughter salary
women qualify work ledbetter
candy pb presidential university
job oil year china
iran israel nuclear sanction
east syria assad terror

ROMNEY
OBAMA
MODERATOR
Understanding the Object Positioning in the Topic Space
Understanding the Object Positioning in the Topic Space
Understanding the Object Positioning in the Topic Space
Topic-Glyphs
[V2] Speaker-Trail-View + Topic-Glyphs

tax cut deduction trillion

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job oil year china

iran israel nuclear sanction
east syria assad terror
Following the past Utterances of a Conversation
Following the past Utterances of a Conversation

Utterance-Sedimentation
Utterance-Sedimentation View of the Obama vs. Romney Presidential Debates
[V4] Speaker-Path View for one speaker
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<table>
<thead>
<tr>
<th>Topic</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Ground</td>
<td><img src="image" alt="Common Ground" /></td>
</tr>
<tr>
<td>Assurance</td>
<td><img src="image" alt="Assurance" /></td>
</tr>
<tr>
<td>Consensus Willing</td>
<td><img src="image" alt="Consensus Willing" /></td>
</tr>
<tr>
<td>Immutable Constraint</td>
<td><img src="image" alt="Immutable Constraint" /></td>
</tr>
</tbody>
</table>

**Reason**

**Conclusion**
Argumentation Glyphs

1. Common Ground
2. Assurance
3. Consensus Willing
4. Immutable Constraint
5. Minimal Consensus
6. Regret
7. Actuality
8. Regret Accusation

A. Reason
B. Conclusion
Dr. Heiner Geißler

[Viel Dank.]
[Also die Sache haben wir übrigens gestern Abend miteinander beredet nicht und es war klar nicht wahrr hier Gegenstand einer Schlichtung kann nicht sein BAST mit allen Ergänzungen Zusatz Mitteilungen und Verordnungen die von 2002 bis 2010 dann entwickelt worden sind weil das ja rein zufällig ist nicht wahr.]
[Wenn das in der Öffentlichkeit steht dann hat ja jeder die Möglichkeit punktuell situativ irgendwelche Informationen herauszuholen und stellt die dann dar als ob das der aktuelle Stand wäre.]
[Es ist so ein dickes Buch.]
[Wir können das in der Schlichtung einfach so nicht behandeln.]
[Das haben wir gestern Abend miteinander beredet und haben gesagt die Frage die uns interessiert die fokussieren wir die konzentrieren wir nicht wahr auf die Frage die Herr Conradt formuliert hat nämlich wie verhält es sich mit dem Tippfehler mit Euro und D.Mark.]
[So jetzt Frau Dahlbender.]
Evaluation – Expert Case Study

• Two political science experts studying deliberative democracy

• Observational study using think-aloud-method

• Two real-world debates
  • Presidential Election Debate (Obama-Romney 2012)
  • Project Mediation Debate (Stuttgart 21)

• Verifying eight hypothesis about the conversation dynamics
“The debate starts with small focused discussions and presentations with a smaller number of speakers and then the discussion floor is opened for a broader debate with all participants.”

“Each group of participants [political party] would want to push their own topics.”
“Dr. Geißler [moderator] is steering the conversation through an active moderation style and will be often participating in non-moderational topics and thus contribute to the content of the conversation.”

“The utterances of the moderator will be characterized by linguistic particles establishing a common ground between the counterparts.”
“The moderator might not only be passive, but unheard on several occasions.”

“Throughout the debate, Obama takes a defensive role in contrast to Romney, who is more offensive.”

Romney vs. Obama
Expert Feedback and Conclusion

• The conversation floor metaphor **preserved the mental model** of our users.

• All **levels of detail** provided by the tool were used during the analysis.

• Both experts appreciated the ability to **dig deeper** for more information during the analysis.

• Both experts found **new patterns and outliers**.

• The topic glyphs were helpful to **understand the positioning of points** in the space.

• The argumentation glyphs were used to **identify speech and argumentation patterns**.

• Both experts agreed that the use of ConToVi has an **added value** to their research and saw **potential for future applications**.
Future Work

• Optimize the topic labels and their placement.
• Add a speaker motion interaction to navigate through time.
• Include a measurement of direct speaker interactions.

Contributions

• Topic-Space Views as an alternative to Theme-River-based visualizations for topic-based text exploration.
• Proposing design solutions for overcoming the known drawbacks of radial layouts.
• Integrating motion chart trails into the visualization to allow the animation to be more tractable.
• Using a visual-sedimentation-based metaphor for setting the animation into context of prior utterances.
• Abstraction of speech and argumentation features into tailored glyphs.
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http://visargue.inf.uni.kn/
usr: demo
psw: $VisArgue$