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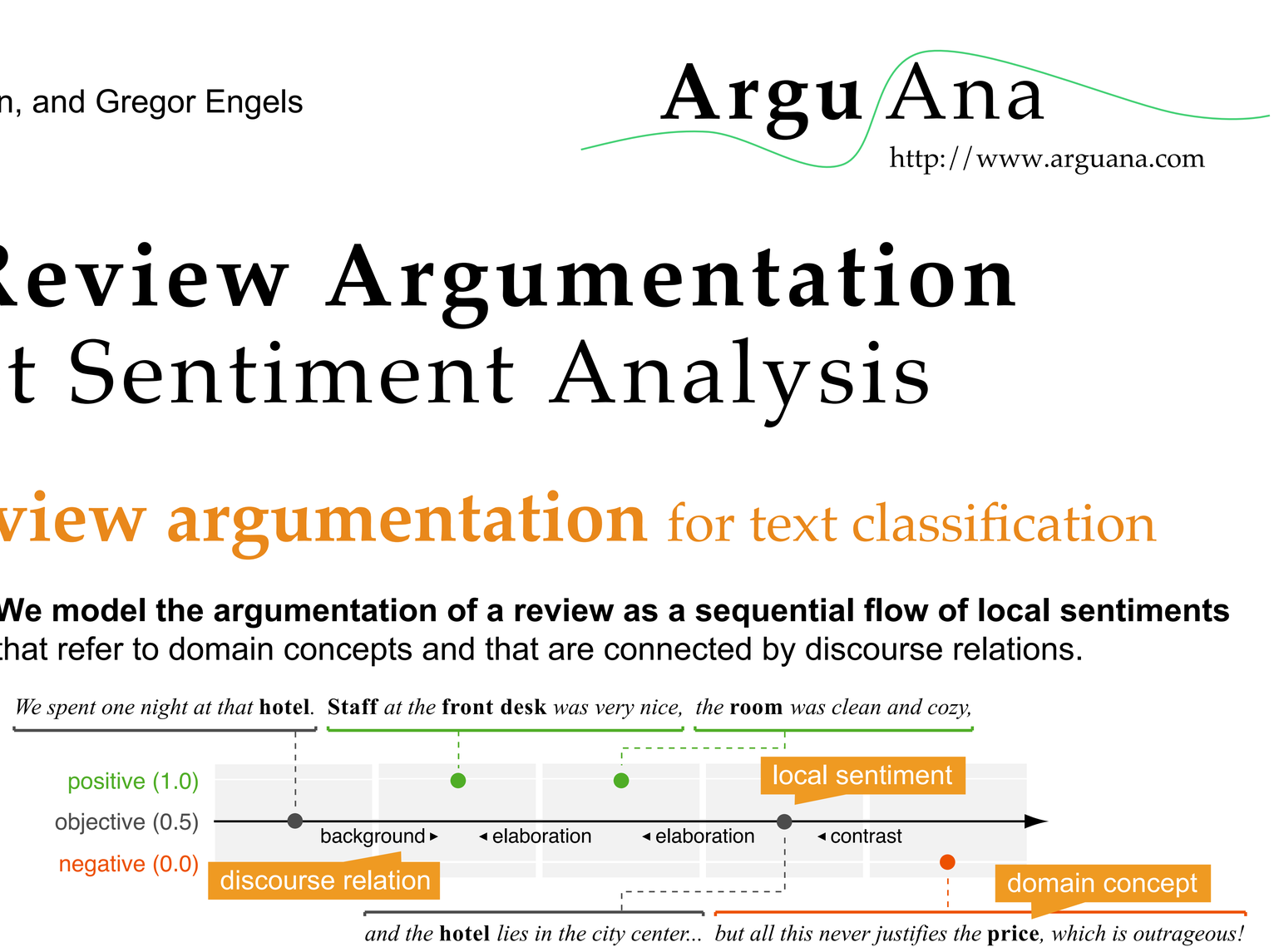
Modeling Review Argumentation for Robust Sentiment Analysis

A shallow model of review argumentation for text classification

Many text classification approaches model a text at the lexical and syntactic level only.

- Effective for narrow-domain texts with explicit class information
- Not effective if class information is represented by an argumentation, as is often the case in reviews
- Not domain-robust
- Results hardly explainable

We model the argumentation of a review as a sequential flow of local sentiments that refer to domain concepts and that are connected by discourse relations.



Hypothesis: An analysis of the argumentation structure of a review allows for a more robust (and explainable) classification of the review's sentiment score.

The first approach to capture the overall argumentation structure

Baseline features typically proposed for sentiment analysis:

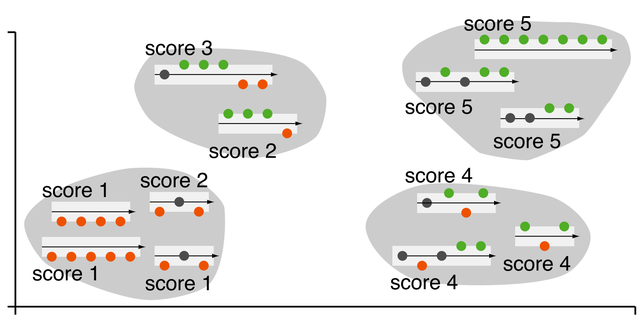
- Word and part-of-speech n-grams
- Character trigrams
- SentiWordNet scores

Existing argumentation-based features focus on concentration measures

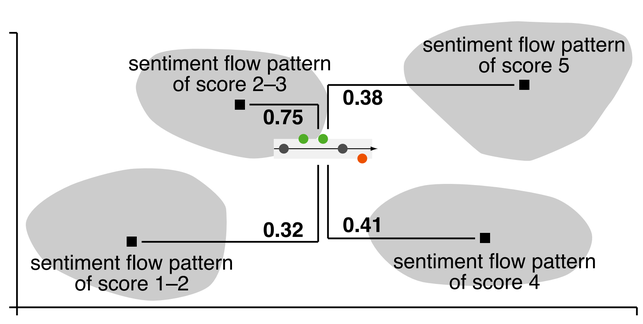
- *Local sentiment* frequencies and local sentiment at specific positions
- Combinations of *discourse relations* and local sentiment
- Combinations of *domain concepts* and local sentiment

We present novel features that capture a review's overall argumentation structure by comparing it to a set of learned *sentiment flow patterns*.

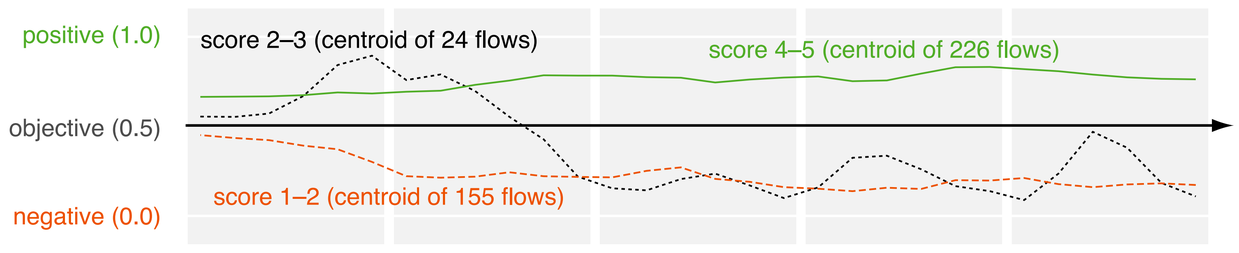
[1] Learn sentiment flow patterns by clustering the sequential flows of reviews with known scores



[2] Compute similarity of each cluster centroid to the sequential flow of a review with unknown score



Example: The three most common sentiment flow patterns from 900 hotel reviews



Evidence that a more domain-robust sentiment analysis is achieved

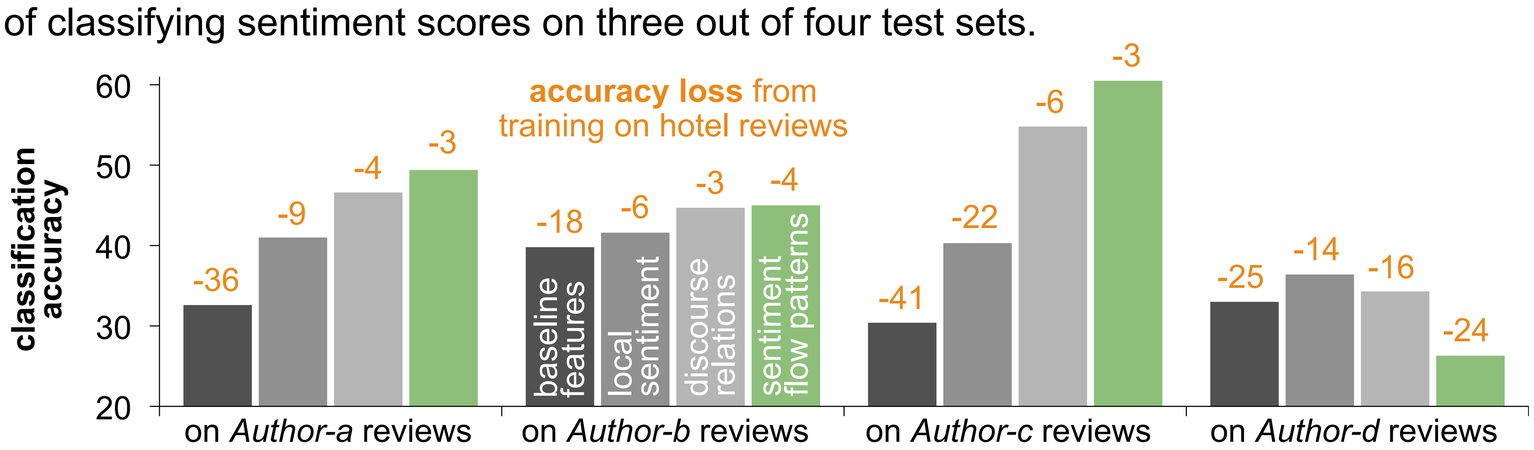
Evaluation of sentiment analysis on two very different English review corpora:

- Hotel reviews, sentiment scale [1, 5] from Wachsmuth et.al., CICLing 2014
- Movie reviews (*Author a–d*), scale [0, 2] from Pang and Lee, ACL 2005

On the poster: out-of-domain experiment with training on hotel reviews and test on movie reviews

More in the paper: in-domain experiments, detailed set-up, explainability, …

The sentiment flow patterns trained out-of-domain retain most of the accuracy of classifying sentiment scores on three out of four test sets.



Outlook: To capture overall argumentation structure in any text classification task, more general patterns are needed, e.g. based on the flow of discourse relations.

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