Combining Text Summarization and Aspect-based Sentiment Analysis of Users’ Reviews to Justify Recommendations

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Background

**Research Question**

Is it possible to exploit automatic text summarization techniques to generate a natural language justification based on users’ reviews? Is it effective?

Methodology

**ASPECT EXTRACTION**— Exploits Kullback-Leibler divergence. Nouns having a KL-divergence higher than a threshold $\epsilon$ are labeled as ‘aspects’.

**ASPECT RANKING**— Combines KL-divergence and average sentiment of the aspect. Aspects that are frequently discussed with a positive sentiment are identified and exploited.

**GENERATION**— Based on two steps. **Sentence Filtering** and **Text Summarization**. Sentence Filtering identifies compliant sentences (i.e., expressing a positive sentiment, containing a main aspect, having an impersonal style). Text Summarization uses compliant sentences to generate a summary of the reviews. The algorithm builds a centroid vector of all the reviews and identifies sentences that are similar to the centroid and maximize coverage and diversity, as well.

Experimental Design

**Protocol:** User Study in the MOVIE domain. 141 people. 300 movies. ~150k reviews.

**Parameters:** Justification Length (Short=50 words, Long=100) and #Aspects (10 and 30).

**Experiments:** (1) Between-subject experiment on varying of the parameters – (2) Within-subject experiment. Comparison to a baseline exploiting users’ reviews that did not employ text summarization.

**Metrics:** Transparency, Persuasion, Engagement, Trust, Effectiveness. Acquired through questionnaire.

**Technical Details:** CoreNLP + Stanford Sentiment Analysis + Word2Vec for Text Summarization.

Experimental Results

**Findings**

- Long Justifications > short Justifications, on average
- Top-10 > Top 30 aspects
- Top-10+Long best configuration

**Findings**

- Justifications based on text summarization better than review-based baseline

Framework

**Use Case**

MOVIE: The Ring

MAIN ASPECTS: actor - thriller - effects horror - character

OUTPUT: “If you like or love the blood and gore kinds of films, this movie will certainly disappoint you as the focus is on character, story, mood and unique special effects. The Ring is a story about supernatural evil therefore, it is a horror film, done very much in the style of the psychological thriller.”

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