Our Contribution

A novel explanation interface that particularly fuses the feature sentiments as extracted from reviews into explaining recommendations: sentiment-enhanced organization interface.

Step 1: Feature-based Sentiment Analysis

- **Product Reviews**
- **Text Processing**
  - Sentence segmentation
  - POS tagging
- **Frequency analysis**
  - Frequent nouns and noun phrases identification
  - Feature candidates
  - Grouping synonymous features
  - **Derived Sentiment Score at Feature-Level**
  - **Sentiment score identification**
  - Opinion words extraction

Design Guidelines [1]:

1. Each category title acts as the explanation, to show the pros and cons of the contained products against the top candidate;
2. Each category contains up to six products so as to avoid information overload;
3. The number of attributes accommodated in each explanation is controlled under five;
4. The explanations should be as diverse as possible since it is not informative to have two categories with similar titles.

Step 2: Modeling of User Preferences

A weighted additive form of value functions, grounded on the Multi-Attribute Utility Theory [2]:

\[
\text{utility} = \sum_{i=1}^{m} \left( \sum_{j=1}^{n} \left( w_j \times \text{value function of feature sentiment} \right) \right) + \text{opinion feature's weight}
\]

Step 3: Generation of Category Candidates

Among the 4 products, except the ranked 1st one is left as the top candidate, each of the others is converted into a tradeoff vector.

Step 4: Selection of Categories

A large amount of category candidates produced by association rule mining tool

\[
\text{Score}(C) = \text{Tradeoff utility}(C) \times \text{Diversity}(C, SC)
\]

Organized recommendations (in categories)

Hypotheses for User Evaluation

- **A prototype developed for two product domains: digital camera and laptop**
- **Number of products**
  - Digital Camera: 134
  - Laptop: 139
- **Average number of static attributes per product**
  - Digital Camera: 6
  - Laptop: 7
- **Average number of opinion features per product**
  - Digital Camera: 3
  - Laptop: 4

Hypotheses:

1. **Hypothesis 1** the new interface (shorted as Senti-ORG) would be more effective than the original design (ORG) [1] in terms of aiding users to make accurate and confident decisions.
2. **Hypothesis 2**: Senti-ORG would be more trustworthy than ORG, so that users are more inclined to return to use it.
3. **Hypothesis 3**: Senti-ORG would be more persuasive, given that more users would be prepared to buy product chosen from it.

References