Sentence and Expression Level Annotation of Opinions in User-Generated Discourse

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   - Sentence Level Annotation
   - Expression Level Annotation

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# Title of Cigdem’s Paper

Sentence and Expression Level Annotation of Opinions in User-Generated Discourse

# Contribution

- Introduced a consumer reviews consumer of rateitall & eopinions
- Presented a two level annotation scheme
  - **Sentence level:** (1) relevancy to given topic (2) evaluation of the topic
  - **Expression level:** investigate on-topic sentences containing evaluation (1) properties of semantic orientation and intensity (2) functional components of opinion terms, targets and holders
Task & Significance

Task Specification

1. Filter individual sentences
   - topic relevance
   - existence of opinion and factual information

2. Identify functional components of expressions
   - opinion target
   - opinion holder
   - modifier
   - anaphoric expressions

3. Identify semantic orientation of expressions
   - including negations
   - link to holder and target

Significance

1. Application of fine-grained identification of opinion properties

2. Enhance opinion target extraction and polarity assignment by linking
Explicit expressions of opinions

Private State not open to objective observation or verification

Example

(1) I had a nightmare with Capella University.

Pay attention to function units:
- e.g. opinion holder **the author** in (1) holding attitudes (polarity),
- e.g. **negative attitude** indicated with the word nightmare towards possible targets, e.g., Capella University.
Facts implying evaluations:

Objectively verifiable, but evaluative sentences polar facts.

Example

(2) In a 6-week class, I counted 3 comments from the professors directly to me and two directed to my team.
(3) I found that I spent most of my time learning from my fellow students.
(4) A standard response from my professors would be that of a sentence fragment.

Comparisons:

- Explicit expressions of opinions typically contain specific cues, opinion words with positive or negative meanings. (e.g., nightmare).
- Polar facts evaluations only can be inferred within context of review.
Sentence Level Annotation Scheme

**Definition:**
Strives to identify the sentences containing evaluations about the topic.

**Example**
(5) I am very fortunate and almost right out of high school with a very average GPA and only 20; I already make above $45,000 a year as a programmer with a large health care company for over a year and have had 3 promotions up in the first year and a half.

**Characteristics:**
- Serve for justifying the users point of view or provide a better understanding about her circumstances.
- Not valuable for extracting opinions about a specific topic.
Sentence Level Annotation Scheme

Graph Representation:

- **topic_relevant**
  - (none_given)
  - (yes)
  - (no)

- **opinionated**
  - (yes)
  - (no)

- **polar_fact**
  - (yes)
  - (no)

- **polar_fact_polarity**
  - (positive)
  - (negative)
  - (both)
Expression Level Annotation Scheme

Definition:
Focus on the topic relevant sentences containing evaluations
1. Polar Fact: mark the target and label the polarity of the evaluation
2. Opinionated: mark its opinion expression span, polarity and strength

Example
(12) Since classes already started, CTU told me they would extend me so that I could complete the classes and get credit once I got back.
(13) What they didn’t tell me is in order to extend, I also had to be enrolled in the next semester.
(14) Capella U has incredible faculty in the Harold Abel
(16) I am quite honestly appauled by some of the negative comments given for Capella University on this website.
Sentence Level Annotation Scheme

Graph Representation:

{ marked text span }

annotation_type

(polar_target)

polarity

(positive)

(negative)

(target)

isReference

(false)

(true)

(holder)

(modifier)

(increase)

(decrease)

(negation)

(referent)

(opinionexpression)

(MarkableID)

\(\Delta\) polarity

semantic orientation

(intensity)

\(\Delta\) modifier

not, very, hardly

\(\Delta\) holder

always the author

\(\Delta\) target

make use of ifReference

infer polarity only after considering "modifier", "polarity" and the "strength" together

(positive)

(negative)

(neutral)

(weak)

(average)

(strong)

(MarkableID)

(MarkableID)

(MarkableID)
## Corpus

### Reviews Portals rateitall and eopinions
- Two domains: online universities & online services
- Measuring Agreement: 118 reviews containing 1151 sentences

<table>
<thead>
<tr>
<th></th>
<th>University</th>
<th>Service</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviews</td>
<td>240</td>
<td>234</td>
<td>474</td>
</tr>
<tr>
<td>Sentences</td>
<td>2786</td>
<td>6091</td>
<td>8877</td>
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<tr>
<td>Words</td>
<td>49624</td>
<td>102676</td>
<td>152300</td>
</tr>
<tr>
<td>Avg sent./rev.</td>
<td>11.6</td>
<td>26</td>
<td>18.7</td>
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<tr>
<td>Std. dev. sent./rev.</td>
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<td>16</td>
<td>14.6</td>
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<tr>
<td>Avg. words/rev.</td>
<td>206.7</td>
<td>438.7</td>
<td>321.3</td>
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<tr>
<td>Std. dev. words/rev.</td>
<td>159.2</td>
<td>232.1</td>
<td>229.8</td>
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</tbody>
</table>
Conclusion:

- Topic relevancy: possible to label this attribute reliably.
- Opinion-relevant sentences, either in the form of an explicit expression of opinion or a polar fact, can be labeled reliably in consumer reviews. However, there is a thin border between polar facts and explicit expressions of opinions.
### Inter-annotator agreement on text spans:

<table>
<thead>
<tr>
<th>Span</th>
<th>Exact</th>
<th></th>
<th></th>
<th>Lenient</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>R</td>
<td>F</td>
<td>P</td>
<td>R</td>
<td>F</td>
</tr>
<tr>
<td>opinion expression</td>
<td>0.70</td>
<td>0.80</td>
<td>0.75</td>
<td>0.82</td>
<td>0.93</td>
<td>0.87</td>
</tr>
<tr>
<td>modifier</td>
<td>0.80</td>
<td>0.82</td>
<td>0.81</td>
<td>0.86</td>
<td>0.86</td>
<td>0.86</td>
</tr>
<tr>
<td>target</td>
<td>0.80</td>
<td>0.81</td>
<td>0.80</td>
<td>0.91</td>
<td>0.90</td>
<td>0.91</td>
</tr>
<tr>
<td>holder</td>
<td>0.75</td>
<td>0.72</td>
<td>0.73</td>
<td>0.93</td>
<td>0.88</td>
<td>0.91</td>
</tr>
<tr>
<td>polar target</td>
<td>0.67</td>
<td>0.42</td>
<td>0.51</td>
<td>0.75</td>
<td>0.49</td>
<td>0.59</td>
</tr>
</tbody>
</table>

### Attribute Markables Agreement

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Markables</th>
<th>Agr.</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>polarity</td>
<td>329</td>
<td>0.97</td>
<td>0.94</td>
</tr>
<tr>
<td>strength</td>
<td>329</td>
<td>0.74</td>
<td>0.55</td>
</tr>
<tr>
<td>modifier</td>
<td>136</td>
<td>0.88</td>
<td>0.77</td>
</tr>
<tr>
<td>polar target polarity</td>
<td>63</td>
<td>0.80</td>
<td>0.67</td>
</tr>
</tbody>
</table>

**Table:** Inter-annotation agreement at the expression level
Cigdem’s Toprak and Niklas Jakob

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    (2) functional components of opinion terms, targets and holders

The End