What Matters for Shoppers: Investigating Key Attributes for Online Product Comparison

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Motivation

Information Overload while Shopping

Objective

- Product details/catalog
- Search filters

Subjective

- Customer Reviews
- Feature ratings

Identifying key product attributes improves the overall search & shopping experience significantly:

- Guide sellers to highlight specific product details
- Guide buyers about key aspects to compare products

Problem & Data

Amazon Product Reviews Data [1]

- ~10K products from 10 categories
- Customer Reviews (~116K per product category)
- Catalog attributes + feature ratings (~64 per product)

We propose an approach, ReBARC:

- Domain-agnostic & unsupervised
- Ranks objective & subjective product info based on frequency + sentiment in reviews
- Avoids direct use of noisy review data
  - maps review attribute mentions to catalog data (more reliable + structured)

ReBARC (Review Based Attribute Ranker for Product Comparison)

Popularity based Attribute Ranking

- Get review sentences with useful terms [7] or attributes
- Append product title to sentence sample
- Compute embeddings for sentences + attributes (SentenceBERT [3])
- Rank the top 3 attributes similar to each review sentence, via MMR [6]

Opinion based Attribute Re-Ranking

- Assume: sentiment of review sentence = sentiment of attribute mention in it
- Find sentiment score of each attribute in popularity based ranked list using RoBERTa [2] fine-tuned on SST-2 [4]
- Re-rank attributes based on sentiment score to get final ranked list

Experiments and Results

<table>
<thead>
<tr>
<th>Product Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human imp. attr.</td>
</tr>
<tr>
<td>Home (2319, 61, 150K)</td>
</tr>
<tr>
<td>Electronics (3267, 84, 339K)</td>
</tr>
<tr>
<td>Tools (1218, 76, 291K)</td>
</tr>
<tr>
<td>Beauty (546, 48, 66K)</td>
</tr>
<tr>
<td>Appliances (1104, 78, 91K)</td>
</tr>
<tr>
<td>Avg (all 10 categories)</td>
</tr>
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Conclusions

- ReBARC: an unsupervised approach to identify and rank key product attributes across multiple product categories
- We also studied the correlation between attributes of interest to customers based on reviews, and those available to them for search on shopping websites

Baselines:

1. S: Common online product search filters
2. Q: Online search query auto-completion logs
3. C: unsupervised aspect extraction [5]

ReBARC significantly outperforms strong baselines in finding key attributes via human evaluation

References