Contextual recommendations: drawbacks found

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Recap

Context in recommender systems can be:

- Fully observable, partially observable, or unobservable
- Static or dynamic

<table>
<thead>
<tr>
<th>How Contextual Factors Change</th>
<th>Knowledge of the RS about the Contextual Factors</th>
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<tbody>
<tr>
<td></td>
<td>Fully Observable</td>
</tr>
<tr>
<td>Static</td>
<td>Everything Known about Context</td>
</tr>
<tr>
<td>Dynamic</td>
<td>Context Relevance Is Dynamic</td>
</tr>
</tbody>
</table>
Recap

Different approaches to using context in recommender systems:

● Contextual prefiltering
● Contextual postfiltering
● Contextual modeling
Recap

Panniello et al. compared pre- and post-filtering methods.

Their results: No clear winner, the answer depends on the post-filtering method used.

To avoid an expensive search for the best post-filtering method, they suggest to first compare pre-filtering with the un-contextual method, and then pick between pre-filtering or a “good” post-filtering method based on the results.
Contextual Prefiltering

- Contextual information is used to select only the most relevant data and filter out irrelevant data before recommendations are generated.
  - users x items x contexts

- A traditional 2D method can be used in ranking.
  - users x items → ratings
Contextual prefiltering

Exact prefilter

- The filter uses exactly the specified context.
- There may not be enough data to accurately predict ratings.
- Some of the specified contexts may be more important than the others. An overly specific contextual condition may not be significant.
- Are there enough items that correspond to the given context?
Contextual Prefiltering

- If a 2D method is used to rank the recommendations, the context won’t affect the ranking.
- A traditional 2D method can perform just as well or even better in some cases.
  - sparsity
- The cold start problem
**Contextual Postfiltering**

- In contextual postfiltering the contextual data is first ignored. The data is first ranked normally, and after that it is adjusted for each customer based on the context.
- Contextual postfiltering also allows using traditional 2D methods for ranking the data.
Contextual postfiltering

- If the data is ranked with a traditional method and only adjusted with the contextual information, there might be data in the recommendations that should have been filtered out.
- The other option is that irrelevant recommendations are filtered out based on the context.
- Combining the both of these methods in the filtering method could be beneficial, but this is not a part of postfiltering.
Contextual postfiltering

- It can be hard to estimate if postfiltering should be used, since prefiltering can be better in some cases. It depends on the application.
- If the data is first ranked with a 2D method and then only adjusted with a context that has no matches, the user will still get recommendations. It could be argued that no recommendations would be better.
Drawbacks in the Comparison of Pre- and Post-filtering

- Panniello et al. have chosen exact prefiltering to represent prefiltering methods, and conclude that the postfiltering method chosen dictates if pre- or postfiltering is better. Why not the prefiltering method?
- They used product categories instead of single items in the comparisons. However, typically single items are recommended
**Drawbacks in the Suggested Approach by Panniello et al.**

Panniello et al’s suggested approach:

It is possible to end up using postfiltering regardless of the result of the comparison. What is the point of comparing then?

Our suggestion: First decide if you would prefer postfiltering.

1. Compare pre-filtering with the un-contextual method
   a. un-contextual method outperforms:
      - use post-filtering
   b. pre-filtering outperforms:

2. Choose a or b
   a. use pre-filtering to achieve “reasonable” results
   b. use post-filtering, but go for the best post-filtering method
Drawbacks in the Suggested Approach by Pannielo et al.

- A better solution could be missed, since not all methods are tested.
- What is a “good” postfiltering method? The article instructs to choose a good postfiltering method, but offers no advice beyond the two compared methods.