Author(s): Rahul Sami, 2009

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Implicit ratings

SI583: Recommender Systems
Recap: Eliciting Contribution of Ratings/Feedback

Learning objective:
- Learn how motivating factors are evaluated, what factors have been found to influence people’s contribution, and the design implications of these results.

- Two sets of studies:
  - Slashdot commenting
  - MovieLens research on movie rating contribution
This class: Use of Implicit Ratings/Information

Learning goal:

– ways in which implicit information has been used
– a framework to think about different categories of information [Oard&Kim]
– high-level operation of recommenders using implicit information
Why use implicit information?

- Implicit information: information about users’ preferences and/or item qualities that are inferred by monitoring user’s activities
  - .. *not* derived by asking user how much she liked an item

- advantages and disadvantages?
Useful information in Netnews [Morita and Shinoda]

- Idea: read times of news articles may reflect preference/quality

- Methodology:
  - volunteers use modified software to record read times
  - Later asked to rate articles
  - Check how closely they are correlated
Useful Information in NetNews

- Result: Read times are very highly correlated with stated preference

- Later confirmation by [Konstan et al, CACM ‘97]
  - Recommenders built to use read time information are almost as accurate as recommenders using reported preferences.
Edit Wear and Read Wear [Hill et al]

- Augmenting an editor to
  - track read times for each segment of text
  - show where the most frequently edited/read pieces of information are.
Wear Indicators:
Scroll Bar
Edit and Read Wear: Insights

- Innovative interface for guiding users towards interesting content segments

- Physical media have built in “behavior-based recommenders”
  - goal: reconstruct this in the digital environment

- A slightly different design goal: summarization rather than recommendation
Applications and information examples
A systematic framework [Oard and Kim]

- Types of observable information categorized along two dimensions
  - Purpose
  - Scope/granularity

- More structured than the “implicit/explicit” categorization
## Framework [Oard and Kim]

<table>
<thead>
<tr>
<th>Behavior Category</th>
<th>Segment</th>
<th>Object</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examine</td>
<td>View, Listen</td>
<td>Select</td>
<td></td>
</tr>
<tr>
<td>Retain</td>
<td>Print</td>
<td>Bookmark,</td>
<td>Subscribe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Save, Delete</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>Copy-and-paste</td>
<td>Forward,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quote</td>
<td>Reply, Link</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cite</td>
<td></td>
</tr>
<tr>
<td>Annotate</td>
<td>Mark up</td>
<td>Rate, Publish</td>
<td>Organize</td>
</tr>
</tbody>
</table>

Table 2. Potentially observable behaviors.

Source: Oard and Kim
Prediction and Inference

- Recommendations are based on predictions of particular behaviors, which can also be categorized in this way.
- May be in a different category from the information used to make recommendations.

Examine:
- read times
Reference:
- times
Annotate:
- ratings

source info.

Examine:
- read
times
Reference:
- Annotate:
- ratings

target recommendations
Prediction and inference

- Can use
  - statistical inference between categories
    - “long read times tend to be correlated with high ratings”
  - collaborative filtering prediction algorithms
Prediction and inference

Alternative: flip the order
- collaborative filtering prediction algorithms
- statistical inference between categories
  
  • “long read times tend to be correlated with high ratings”

Examine: read times
Reference: ratings
Annotate: source info.

Examine: read times
Reference: ratings
Annotate: recommendations
Advantages of each method

- Prediction-inference allows for common prediction, followed by personalized inference
  - e.g., Slashdot score is a “prediction” of average reader’s rating
  - A user who liked comments the average reader found bad could adjust the inference made

- Inference-prediction may require less communication
  - assuming many observations go into one inference
Implicit information

- easier to obtain lots of data
- can’t choose format, so requires good inference procedures
- can be built around collaborative filtering algorithms for explicit ratings