Social Collaborative Filtering for Cold-start Recommendations

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Highlights

- **Question:** How to incorporate users’ social information in an implicit (positive only) feedback recommendation setting?
- **Results:**
  - We cast neighborhood-based recommendation in a matrix view and showed how this view allows us to directly incorporate users’ social side information for cold-start recommendations.
  - We showed that Facebook page likes are an extremely valuable source of this user side information.

**Social Cold-start Recommendation**

- **MM:** \(\text{MM} = (\text{IP}, \log \text{IP}, \text{BinIP}, \text{Cos})\)
- **LogIP:** \(\log |r, c|\)
- **BinIP:** \(\begin{cases} 1 & \text{if } (r, c) > \tau \\ 0 & \text{otherwise} \end{cases}\)
- **Cos:** \(\frac{(r, c)}{|r| \cdot |c|}\)

**Evaluation and Analysis**

<table>
<thead>
<tr>
<th>Data Description</th>
<th>100 000 users</th>
<th>30 000 users</th>
</tr>
</thead>
<tbody>
<tr>
<td># users</td>
<td>34,207</td>
<td>10,000</td>
</tr>
<tr>
<td># pages</td>
<td>8,216,898</td>
<td>2,500,286</td>
</tr>
<tr>
<td># pages liked by &gt;5 users</td>
<td>808,270</td>
<td></td>
</tr>
</tbody>
</table>

**Social Cold start recommendation vs. baselines**

**Conclusions & Future Work**

- We showed that social cold-start recommendation using Facebook page likes provides up to 600% improvement over various baselines.
- However, our proposed framework does not jointly leverage both user and item side information, which we plan to explore in future work.