We propose a socially and temporally aware model for bartering-based recommendation, for which we introduce three novel datasets from online bartering platforms.

**LIMITATIONS**

- The need of a “double coincidence of wants”
- There is no common measure of value

**PLATFORMS**

<table>
<thead>
<tr>
<th></th>
<th>Users</th>
<th>Items</th>
<th>Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bookmooch</td>
<td>84'989</td>
<td>2'098'699</td>
<td>148'755</td>
</tr>
<tr>
<td>/r/gameswap</td>
<td>9'888</td>
<td>3'470</td>
<td>2'008</td>
</tr>
<tr>
<td>Ratebeer</td>
<td>2'215</td>
<td>35'815</td>
<td>125'665</td>
</tr>
</tbody>
</table>

**PROPOSED METHOD**

\[
\hat{y}_{uj, t, i_k} = \hat{p}_{uj}^T q_{i_k} + \sum_{u_l} \tau_{uj} \delta(t; \tilde{u}_l) + \tau_{ik} \delta(t; \tilde{u}_k)
\]

**SOCIAL BIAS**

\[
S \in \mathbb{R}^{|U| \times |U|}
\]

Directed bias from one user to another (asymmetric).

**TEMPORAL DYNAMICS**

\[
\delta(x; \tilde{x}) = \frac{1}{n} \sum_{i=1}^{n} K_h (x - x_i)
\]

Discard users/items that have been inactive for a long period.

**BIDIRECTIONALITY**

\[
\hat{y}_{uj, t, i_k, i_m} = \frac{1}{2} (\hat{y}_{uj, t, i_m} + \hat{y}_{uj, t, i_k})
\]

Re-rank recommendation vector according to the reciprocal interest: the arithmetic mean of both predicted scores.