User and item level attribute recommendation

The common formulation for any recommendation metric can be expanded to incorporate a weight \( c(u) \) for each user \( u \):

\[
m(r_u) = \frac{1}{|U|} \sum_{u \in U} m(r_u, u) \Rightarrow m(r_u) = \frac{1}{\sum_{u \in U} c(u)} \sum_{u \in U} c(u) m(r_u, u) \quad (1)
\]

We can set different weights for the recommended items that appear in the test set \( I^+(u) \), for the ones that have a non-zero similarity \( I^-(u) \) and the rest of the items \( I^-(u) \):

\[
m(r_u, u) \propto \sum_{i \in I^+(u)} w^+(u, i) + \sum_{i \in I^+(u)} w^-(u, i) + \sum_{i \in I^-(u)} w^-(u, i) \quad (2)
\]

Conclusions

- By exploiting user attributes we can detect if the data show specific biases towards different user groups or characteristics of the users [2].
- Using the item attributes we may be able to obtain a more complete vision about the recommenders. Similar conclusions were obtained in the user study in [1].
- Several issues are still open in RS evaluation, here we show how we can exploit user and item attributes to make an in-depth study about the recommendations produced.