The Effectiveness of Different Group Recommendation Strategies for Different Group Compositions

Francesco Barile[1], Tim Draws[2], Oana Inel[3], Alisa Rieger[2], Shabnam Najafian[2], Amir Ebrahimi Fard[1], Rishav Hada[4], and Nava Tintarev[1]

[1] Department of Advanced Computing Sciences (DACS), Maastricht University, Netherlands {f.barile,a.ebrahimifard,n.tintarev}@maastrichtuniversity.nl
[2] Department of Software Technology (ST), Delft University of Technology, Netherlands {t.a.draws,a.rieger,s.najafian}@tudelft.nl
[3] Department of Informatics, University of Zurich, Switzerland inel@ifi.uzh.ch
[4] Microsoft Research, Bangalore, India rishavhada@gmail.com

Abstract. Social choice aggregation strategies have been proposed as an explainable way to generate recommendations to groups of users. However, the performance of each strategy is affected by the internal diversity of the group members' preferences. In this work, we evaluate social choice-based aggregation strategies in terms of users' fairness perception, consensus perception, and satisfaction, examining the impact of the level of (dis-)agreement within the group, and investigating the added value of textual explanations. The results of two user studies (N=399 and N=288) show no benefits in using textual explanations, and significant differences in the effectiveness of the social choice-based aggregation strategies. Furthermore, *the specific group configuration* (i.e., various scenarios of internal diversity) seems to determine the most effective aggregation strategy.

Keywords: Group Recommender Systems · Social Choice Functions · Explainable Recommender Systems · Social Choice-based Explanations.

Encore Abstract of the paper "Evaluating Explainable Social Choice-based Aggregation Strategies for Group Recommendation" [1]

1 Introduction

Recommender systems (RSs) help people making choices in domains characterised by a wide range of options, providing suggestions of suitable options for the specific users' preferences. However, in many domains people often consume recommendations in groups rather than individually. Group Recommender Systems (GRSs) [5, 6] are designed to provide recommendations that meet different group members' preferences to support the group decision-making process. In order to provide recommendations to groups of users, Social choice aggregation

strategies have been proposed as an explainable way to to aggregate the individual group members' preferences or recommendations [9, 4, 5, 7]. However, previous user studies have demonstrated that some strategies perform better than others in different experimental conditions, in terms of perceived group satisfaction [5]. In particular, [2] showed that the *intra-group diversity*, in terms of individual preferences, has an impact on the group decision-making performance and each group member's satisfaction, since higher preference diversity generally has negative effects. However, determining which aggregation strategy performs better for a specific group is still an open problem. Finally, if the aggregation strategy results in a recommendation that is not intuitive or not ideal for some group members, an *explanation* could help the group members to make a decision or reach consensus [3, 8, 10].

2   User Studies

In this paper, we present two pre-registered user studies (N=399 and N=288)[5] investigating the performance of different social choice-based aggregation strategies in terms of users' *fairness perception*, *consensus perception*, and *satisfaction*. Furthermore, we study the impact of the level of (dis-)agreement within the group on the performance of several social-choice aggregation strategies. We define this *group configuration* on the basis of the similarity between group members' individual preferences. Finally, we also explore the added value of explanations describing the aggregation strategy used to produce the recommendation. Each study focuses on one of the following research questions: (**RQ1**) *"Do explainable social choice-based aggregation strategies increase users' fairness perception, consensus perception, or satisfaction?"*; (**RQ2**) *"Do explainable social choice-based aggregation strategies increase users' fairness perception, consensus perception, or satisfaction, in complex group recommendation scenarios?"*. In the first study, we found differences between the social choice aggregation strategies for the studied group scenario in terms of users' perceptions of fairness, consensus, and satisfaction. However, in contrast to earlier work [10], we found no added value in accompanying the aggregation strategies with social choice-based explanations. In the second study, we reproduced these findings. Furthermore, our results show differences in the effectiveness of the social choice-based aggregation strategies *depending on the specific configuration of the group for which the aggregation strategies are applied*. A deeper investigation of the performances of the aggregation strategies in the specific group configuration revealed useful insights on which strategies perform better for each group configuration: the Most Pleasure (MPL) strategy performs worst for groups with a member in a minority position, but is one of the best strategies for uniform groups; the Fairness (FAI) strategy has good effectiveness for uniform groups and for groups composed by two coalitions, while for divergent groups the Additive (ADD) strategy obtains the best results.

---

[5] The (time-stamped) preregistrations can be found at https://osf.io/ghbsq and https://osf.io/3dcht/.

References

1. Barile, F., Draws, T., Inel, O., Rieger, A., Najafian, S., Ebrahimi Fard, A., Hada, R., Tintarev, N.: Evaluating explainable social choice-based aggregation strategies for group recommendation. User Modeling and User-Adapted Interaction pp. 1–58 (2023)
2. Delic, A., Masthoff, J., Werthner, H.: The effects of group diversity in group decision-making process in the travel and tourism domain. In: Information and Communication Technologies in Tourism 2020, pp. 117–129. Springer (2020)
3. Felfernig, A., Boratto, L., Stettinger, M., Tkalčič, M.: Explanations for groups. In: Group Recommender Systems, pp. 105–126. Springer (2018)
4. Masthoff, J.: Group modeling: Selecting a sequence of television items to suit a group of viewers. In: Personalized digital television, pp. 93–141. Springer (2004)
5. Masthoff, J.: Group recommender systems: aggregation, satisfaction and group attributes. In: recommender systems handbook, pp. 743–776. Springer (2015)
6. Masthoff, J., Delić, A.: Group recommender systems: Beyond preference aggregation. In: Recommender Systems Handbook, pp. 381–420. Springer (2022)
7. Najafian, S., Herzog, D., Qiu, S., Inel, O., Tintarev, N.: You do not decide for me! evaluating explainable group aggregation strategies for tourism. In: Proceedings of the 31st ACM Conference on Hypertext and Social Media. pp. 187–196 (2020)
8. Najafian, S., Tintarev, N.: Generating consensus explanations for group recommendations: an exploratory study. In: Adjunct Publication of the 26th Conference on User Modeling, Adaptation and Personalization. pp. 245–250. ACM (2018)
9. Senot, C., Kostadinov, D., Bouzid, M., Picault, J., Aghasaryan, A., Bernier, C.: Analysis of strategies for building group profiles. In: International Conference on User Modeling, Adaptation, and Personalization. pp. 40–51. Springer (2010)
10. Tran, T.N.T., Atas, M., Felfernig, A., Le, V.M., Samer, R., Stettinger, M.: Towards social choice-based explanations in group recommender systems. In: Proceedings of the 27th ACM Conference on User Modeling, Adaptation and Personalization. pp. 13–21 (2019)