

# Supporting Group Decision Making with Recommendations and Explanations

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## ABSTRACT

In this poster we illustrate the interaction design of a mobile system that facilitates group decision making by allowing group members to be engaged in a discussion which is actively supported by recommendation functions and explanations. The interactions between the users and the system are monitored in order to proactively offer appropriate directions and suggestions. Unlike many state of the art group recommenders, which solely mediates users' preferences and suggest items that are likely to be acceptable by all the group members, our system acts as a facilitator that guides and helps the group members in coming up with an agreement and a final decision.

## Keywords

Group Recommender Systems; Group Decision Support.

## 1. INTRODUCTION

Recommending items to a group has been usually seen as a complicated function due to the fact that conflicting preferences between group members can easily arise. Moreover, group members often change their mind in an unpredictable way while interacting with each others and the system [5]. The research in group recommender systems (GRSs) has already seen some contributions in which the role of the interaction between users and system has been recognized as important for the group members to reach a consensus. For instance, the critiquing technique clearly exemplifies this direction, and it is often implemented in naturalistic negotiations. Specifically, in *Collaborative Advisory Travel System* critiquing is used for allowing each group member to send a "critique" to the other members, thereby sharing thoughts about a specific option [6], and *Where2eat* introduced interactive multi-party critiquing which is an extension of the critiquing concept to a computer-mediated conversation between individuals [4]. Recently, a group decision support environment *Choicla* has been developed that allows the flexible definition of decision functionality in a domain-independent setting [8], [9].

However, in the context of group recommendation still not enough attention has been devoted to understand how the process of making choices in groups can be supported [2]. In fact, social scientists studying group dynamics have stressed the importance of various aspects and steps of the full decision process adopted by a group in determining the quality of the output decision [3]. Motivated by these findings, we therefore here introduce the interaction design of a

mobile system that supports the process of making decision in groups. More concretely, the system aims at supporting tasks that group members are likely to undertake during the decision process such as asking for information, making comparisons, or seeking a rationale for options.

## 2. INTERACTION WITH THE SYSTEM

The motivation underlying our interaction design is derived from studies on the functional theory of group decision making which suggest that it is structured in four stages: *Orientation - Discussion - Decision - Implementation* (ODDI model) [3]. Furthermore, following the indication that decision makers often seek and construct reasons in order to resolve the conflict and justify their choice when they are faced with the need to choose [7], our system aims at supporting the decision process by providing explanations for all the generated recommendations and suggestions.

In the following paragraphs, we describe a typical interaction with our system called STSGroup (South Tyrol Suggests for Group), and we show some of its primary functions. STSGroup is an Android-based mobile application that extends to groups STS [1], a context-aware places of interest (POIs) recommender originally devoted to individuals. Let us assume a tourist or a citizen is looking for a POI (in South Tyrol, Italy) for her group to visit together. With the support of the system, the user is able to:

**Make companions:** this function allows the user to specify her companions through appropriate system screens including: searching companions by user name, sending connection requests and tagging companions. Once a group of people that are connected by the "companion" relation wants to visit a POI, the discussion is ready to start. Note that users can always access functions that are already available in STS; for instance they can specify context variables such as their mood, or browse their (individually) personalized recommendations.

**Start a discussion:** one user (in a group) can autonomously search and propose items that are thought to be suitable for her group of companions. A discussion session is started as soon as a first item proposal is sent to the other group members. The other group members can then browse this proposal and add some others on their own.

**Evaluate proposals:** all proposed items are moved into the group discussion space displayed in a news feed, where group members can react to them by rating them as: likes (thumb up), dislikes (thumb down), or favorites (heart icon). User can also tag proposals with comments and emoticons (see Figure 1a). A summary comparison panel aggregating

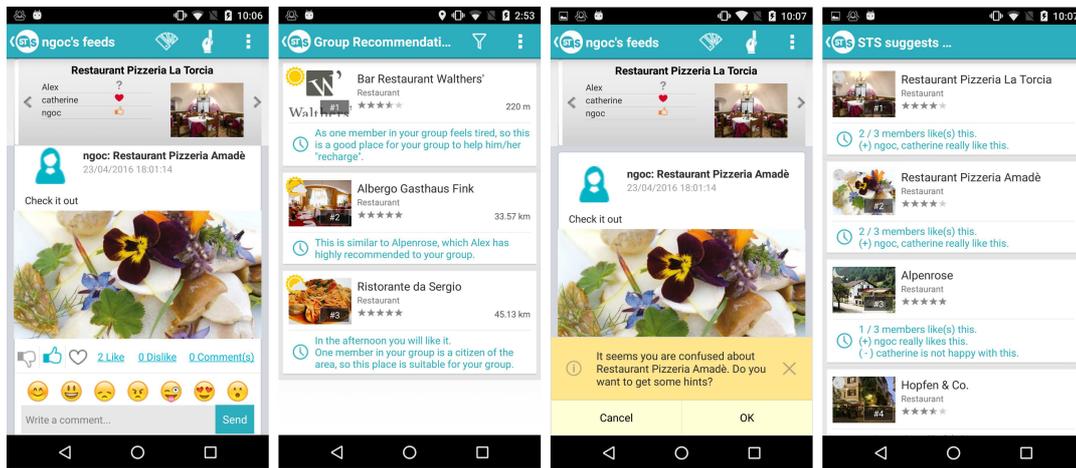


Figure 1: Screenshots of STSGroup, from left to right: (a) Group discussion, (b) New item recommendations for a group, (c) Hint suggestion, and (d) Final choice suggestion.

the members' likes, dislikes and favorites is always shown on the top of the feed in order to keep users aware of the other members' preferences. The panel is updated automatically when there is any change in the preferences expressed by any group member.

**Ask/get recommendations for new items:** during the discussion, in case a user would like to see some more proposals, in addition to those already made, she can ask for new item recommendations (see Figure 1b). The system can also proactively propose new items when it detects that this could be valuable: for instance when users change often preferences for items, showing that they are unsure about the current proposals (see Figure 1c). Recommendations are augmented with explanations that are computed on the base of the group members' actions and contexts and a rationale for the system recommendations is given. Recommendations take into account the discussion and the role of users. For example, the more items a user rates, the higher the importance she will have in the preference aggregation step of the recommendation computation. We also assign a higher importance to users who are in somewhat vulnerable contexts such as bad mood, depression, or tiredness. This means that items similar to what they have proposed are more likely to appear in the recommendation list.

**Hints:** hints are supplementary information about items, which are added automatically by the system to the flow of the comments, or suggestions for better using some of the system functions.

**Ask for a choice:** when facing difficulties in arriving to a final decision, the user can refer to the choice suggestion function (see Figure 1d). At this point the system invokes a preference aggregations strategy, such as *Majority Vote*, and all the proposed items are ranked with respect to it. Explanations are also constructed based on this strategy.

### 3. CONCLUSIONS

In this poster, we have described the interaction design of a new mobile recommender system that supports decision making in groups by offering a variety of recommendation and explanation functions. We have argued that, in order to make a better decision in groups, the system should support

the whole decision process and help group members understand each others. The research is still in progress. We are currently implementing the recommendation algorithms and we will conduct a live user study to evaluate the effectiveness of our design.

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