
What's the Best Music You Have? Designing Music Recommendation for Group Enjoyment in GroupFun

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Abstract

Satisfaction and enjoyment are essential in group entertaining domains in which individuals share their preferences and actively participate in group decisions. Group recommender systems (GRS) do not yet employ methods and features allowing users to discover others' interests in an enjoyable fashion. Based on an in-depth user study and a user-centered design approach, we created GroupFun, a collaborative environment that help groups of friends' arrive at a common decision fostering group enjoyment and offering them a unique, fun music experience. We also conducted a user evaluation consisting in: system usage, questionnaires and open interviews to collect user feedback about our algorithms and interaction. Our results present GroupFun as an enjoyable and entertaining group decision platform which highly motivates users.

Author Keywords

Enjoyment; Music; Negotiation; User Study; User Modeling; Recommender System

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User Interfaces - Evaluation/methodology.

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Introduction

Group decision has long been investigated in many studies during the past years [1]. Voting algorithms helping individuals arrive at a common decision have served as fundamental support for understanding how people perceive others' decisions and a final outcome in a group environment [5]. In the current paper we explore group enjoyment in an interactive music application having as support the outcomes provided by 4 algorithms. Implemented as a Facebook plugin, GroupFun was designed to enable users enjoy their participation from the creation of a group to the update of their decision while having an entertaining group music experience (Figure 1). Both social factors [2, 4] are fundamental for user acceptance and engagement.

In our design of GroupFun we incorporated preliminary user feedback and expectations that we gathered through user surveys. We wanted to support group members' interaction with the system in finding a commonly agreed way for selecting top preferred songs in a music playlist. We were interested in: (1) evaluating users' perceived benefit and satisfaction of the final outcome [1, 6] and (2) analyze unique factors which distinguish GroupFun from similar platforms that users find interesting [7]. Furthermore, we focused our attention on offering them a musical experience that is aligned with the group identity and preferences. Our application features encourage users' participation and engagement in music negotiation scenarios.

Group enjoyment has been traditionally modeled as group satisfaction using a social value function which aggregates individual satisfaction functions [5]. In contrast to previous modeling results and music applications which strive for increased user

participation demanding a lot of user effort and being time-consuming, GroupFun provides a song group-based recommendation list for all of its users allowing them to manage their music library and give ratings to their friends' songs based on self-evaluation and friendship. In the present experiment we used GroupFun to analyze group enjoyment, decision dynamics and user involvement.



Figure 1. GroupFun group interface. Members listen to group songs, see their friends' ratings, and compare outcomes.

In the current study we explore how users perceive the GroupFun recommender system considering 4 preference aggregation algorithms. The main goal of our research is to obtain an in-depth understanding of group enjoyment factors. Our user experiment presents groups of 4 friends in a driving scenario in which an algorithm helps them choose top 7 songs. After merging individual music collections participants discover and evaluate other members' selections through rating. Then they are offered 4 final playlists of songs suggested by 4 algorithms and asked to evaluate group enjoyment from multiple perspectives such as: familiarity, diversity and group decision.

GroupFun overview

GroupFun is a web application that helps a group of friends to agree on a common music playlist for a given event they will attend, e.g. a graduation ceremony. It is a music application that allows individuals to manage and share their favorite music with groups they create or join. In GroupFun users can listen to their own collection of songs as well as their friends' music. With the collective music database, the application integrates friends' music tastes and recommends a common playlist to them. Therefore, the application aims at satisfying music tastes of the whole group by aggregating individual preferences.

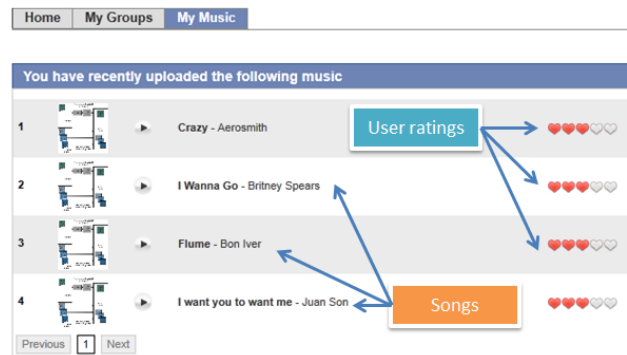


Figure 2. "My Music" page of GroupFun.

GroupFun's structure includes 3 sub-pages: "Home", "My Groups" and "My Music". In the first one, users see 4 playlists: one containing most popular songs, one used at a previous event, another one including recent uploads and the last one from a group party. They can listen to each song in each of the playlists. In the "My Groups" page users create groups, upload and rate their music, invite friends and hear the group's songs

(Figure 1). Finally, in the "My Music" page users see their contribution to GroupFun: for each song the interface displays the associated group, the user rating and its name and artist. Users can also listen to their individual uploads using a wheel-like play button (Figure 2).

User study

In our context we consider enjoyment as the participants' delight in listening to group music. The GroupFun application promotes this by considering social aspects related to the listening activity, which are useful for the acceptance of the group's decision. On the one hand, music familiarity favors members' agreement and, on the other, the diversity of songs allows them to make active decisions offering a wider view of trusted recommendation coming from individuals with same interest. In this setting, external factors such as social factors combine with application-driven factors such as interface design to offer group members an effective space for framing their decisions.

Our goal is to evaluate group enjoyment with respect to the 7-songs recommended by 4 algorithms:

- Alg1=Deterministic Weighted Sum (DWS): select songs with the highest weighted score
- Alg2=Probabilistic Weighted Sum (PWS): use DWS to select songs based on score probabilities [7]
- Alg3=Least Misery (LM): select songs with the highest minimum individual ratings
- Alg4=Probabilistic Selection (PS): probabilistically select songs with equal probability

Participants and groups

We recruited 4 groups (16 individuals) to participate in our user study. All participants were master or graduate students with an average age of 27. Their active involvement in our experiment was rewarded with one music CD.

Experiment setup

All subjects were required to use part of their own collection of music in .mp3 format and, if possible their personal computers or laptops. The evaluation study consisted in 3 parts: (1) extensive use of the system, (2) completion of an online post-study questionnaire and (3) open interviews and discussion sessions.

Group	User1	User2	User3	User4
"Road Trip 2"	2	6	4	7
"Crazy Group"	3	9	6	1
"My Group Drive"	6	7	5	7
"Fantastic Four"	3	4	4	5

Table 1. Number of songs uploaded per user per group.

As a first step of the experiment participants were debriefed on its objective and the upcoming tasks; then they started using the system. We wanted to connect people through music and suggested they imagine the following scenario: a group of 4 friends are driving between 2 cities and listen to group music together for around 30 minutes' drive. The assumption underlying this scenario is that users only need a relatively small number of songs: $7 \text{ songs} \times 4\text{-}5 \text{ minutes/song} = 30 \text{ minutes total listening time}$. All four group members were taking part in the upload, rating, and discussion

process at the same time – 4 by 4 persons. Each of the 4 group members had 1 of the following roles, including one distinctive identity label: 1 driver / 3 passengers. The motivation for users to upload their own favorite music and share it with their friends during is that listening selected music enhances group enjoyment compared with random music from radio stations.

User tasks

Users were asked to evaluate the group songs using a rating scale from 1 ("Strongly dislike it") to 5 ("Strongly like it"). They were free to interact with the system following a series of steps displayed to them. Each subject evaluated all 4 algorithms. First, the drivers proceeded to create groups and invite friends to join. Then all users were asked to upload their music and to give ratings to their songs. 4 interfaces in GroupFun were used to display the final outcomes of the 4 algorithms.

Questionnaire results

All subjects had solid IT experience and frequently used music players such as iTunes, Winamp, Media Player, last.fm, Deezer.fr, etc. In a typical week 10 individuals use music applications for less than 5h, 4 between 5 and 10 hours and 2 between 10 to 15h. In replying to "which factors are most important for a good playlist?" users checked various answers: 6 users: "Many of the songs are suggested by me"; 9 users: "The songs in the playlist are diverse"; 14 users: "The playlist helps me discover new music"; 8 users: "The playlist has a good transition between songs". This insight information allowed us to: (1) understand music factors which drive enjoyment and (2) identify the ingredients for an intelligent algorithm which we plan to develop.

Evaluation of algorithms

We asked all participants to rate the 4 algorithms not according to their own music tastes and songs characteristics but considering the 4 rating aggregation rules (noted with red hearts in the right-hand side of Figure 1). All members in the 4 groups knew each other as colleagues at the university but not as very close friends. Thus, music preferences among them were mostly unknown. In figure 4 with colored lines are presented all of the 16 users' ratings for each algorithm and with a dashed red line the average of all results. The last row shows that the average scores for PWS and DWS are very close: 3.875 vs, 3.687.

Interviews and discussions

Road Trip 2

Users in the first group perceived the system to recommend songs in a diverse order - e.g. without taking into account music genres. The 1st algorithm produced most diverse recommendations. The whole group agreed that each was familiar with only 30% of the group songs and 70% were unknown to them. Furthermore, they enjoyed a lot all the group songs and added that they matched their interest to a high extent: 3 of 4 users enjoyed discovering their friends' music while 1 user stated that others' songs did not match his/her tastes.

Crazy Group

Users of the second group agreed that they received quite diverse recommendations. Some mentioned that they knew only 30% of the uploaded songs while for others the percentage raised to 60%. They added that "some music was quite good" and that most songs strongly matched their interest. Only a small proportion of songs users did not like at all (10%-20%).

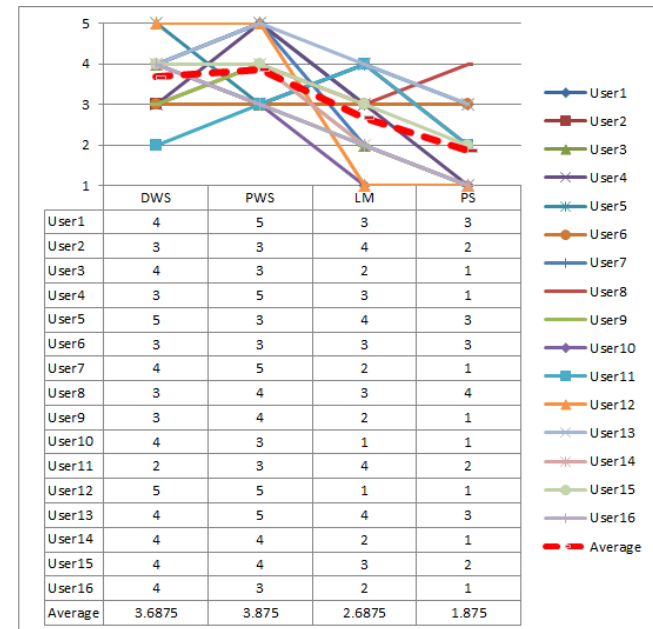


Figure 3. Results of algorithms' evaluation by the 16 users.

My Group Drive

Most members were greatly unfamiliar with the music uploaded in this group. Members acknowledged that they knew only 25% of the songs uploaded by others. They used the word "tolerance" to denote the fact that they were inclined to accept other people's proposals as long as "music fits the context". Most music matched users' interest implying high enjoyment.

Fantastic Four

In this group some users were very familiar with others' songs (80%) whereas some others' listened to only 10% in advance. Only 30% of the songs matched

their interest whereas around 50% were songs they enjoyed listening to in general. For half of the group 20% of the recommended songs were familiar while for others 60% to 70% were already known.

Overall, there are multiple levels of enjoyment that our participants discovered. First, they mentioned enjoying the experience design and evaluation steps. Group enjoyment was highest when each of them starting rating and a continuous flow of new songs was uploaded in the group space. They perceived the activity of rating others' music and listening to their songs using headphones as extremely fun. Most important they asked who was the source or member who suggests both very good and very bad songs. They acknowledged the fact that the moment the group gets together is extremely important influencing to a great extent the enjoyment of a group playlist. Lastly, people experienced browsing through others playlists as a fun and entertaining activity.

Conclusions and future work

The main contribution of this paper is the evaluation of 4 algorithms debating the role of members' preference familiarity and music discovery in a decision making scenario. Our findings point to the fact that incorporating a probability distribution of songs' ratings would enhance group enjoyment and surprise members with excellent recommendations coming from their friends. Preference aggregation mechanisms incorporating weights and social factors worth investigating with the purpose of increasing decision acceptance and group enjoyment.

There are multiple ways in which we plan to extend our development of GroupFun. First, we will consider a

"group-friendly algorithm" which incorporates social factors such as: familiarity, reputation and involvement and allow for mediated negotiation. Secondly, we plan to reach the mobile domain making GroupFun accessible for Android users to create ad-hoc groups and contribute to group music "on the go". This would give us a platform for subsequent improvement of interaction and negotiation automation.

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