

# Mobile Group Recommendation: Understanding Group Dynamics and Design Challenges

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## 1. INTRODUCTION

Recommendations to individuals have been popular on the Internet for quite some time, ranging from personalized recommendations for products on shopping Web sites like Amazon to custom recommendations for movies on Web sites like Netflix. More recently, the academic community has begun to explore the topic of recommendations made to groups of people [1, 2]. However, very little research up to date has explored the subject of mobile group recommendation. We believe this is an exciting area ripe for exploration by the mobile systems research community. Due to the explosion in popularity of smartphones, we expect mobile computing to be used increasingly and extensively to assist groups of people in making decisions about where and when to rendezvous, e.g., a group of friends out on a weekend evening trying to decide what movie to see or where to eat.

Our interest in this new research direction is to gain a better understanding of mobile group dynamics in the real world, and how these mobile dynamics influence the decision-making process. We face a number of key challenges in pursuing this research. First, group recommendation is already a complex context-aware research task, and this complexity only increases when the influence of mobility-related factors needs to be considered. For example, to what extent do mobile factors affect the group decision-making process? These factors include *proximity* to event choices, geographic *spread* of the users, *exhaustion* of users which we define as the distance traveled by various members before the event, inferred mode of transport, user *sociability* as measured by the number of prior meetings (co-locations) of various users in the groups, etc. In addition, the recommendation may not be confined to just a restaurant or film, but may extend to the composition of the group itself, i.e., the mobile group formation challenge concerns identifying groups and/or recommending whom to invite to an event. Third, privacy is a key concern, especially when the group members know each other only slightly or perhaps not at all. The accuracy of the mobile group recommendation algorithm depends on each member sharing sufficient data, but the system must balance this sharing against the privacy requirements of each member. Finally, a distributed systems implementation of mobile group recommendation needs to jointly achieve high recommendation quality, scalability, and responsiveness while preserving privacy and energy efficiency on the handheld.

To study real world mobile group dynamics, we implemented SocialDining, a mobile application that enables groups to decide together through a voting process the restaurant where they would like to dine as well as which date/time

they would like to meet. SocialDining provides a list of recommended restaurants for the group based on individual group members' restaurants ratings and leaves it to the group of whether to take the recommendation. We conducted a study involving 31 users based on SocialDining for 15 weeks and report our findings for two of the aforementioned mobility factors namely spread and sociability.

## 2. INITIAL RESULTS

Table 1: Impact of user spread on invitation group decisions

Recommendation match?	Median max. distance in km
Yes	3.33
No	2.75

We define user spread as the maximum distance between invitation participants in the two hours preceding an invitation. Table 1 shows that when groups do not use a recommendation for the group decision, users tend to be somewhat closer to each other or less spread than when groups decide to use a recommendation. This suggests that groups with less spread, are less likely to use recommendations.

Table 2: Impact of sociability on invitation group decisions

Recommendation match?	Mean number of meetings
Yes	9.67
No	4.44

We measure sociability based on the number of times the group physically meets within a specified time period. Location traces collected by SocialDining was used to detect these meetings. Table 2 shows that for invitations where the group decision matches a recommendation, participants meet with each other 118% more often than in invitations where a recommendation is not used. This suggests that users who meet more frequently are more likely to use recommendations in SocialDining.

## 3. REFERENCES

- [1] S. Amer-Yahia, S. B. Roy, A. Chawla, G. Das, and C. Yu. Group recommendation: Semantics and efficiency. In *Proc. of VLDB 2009*.
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