

Research Methods for Group Recommender Systems

E-Tourism Domain

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BACKGROUND & MOTIVATION





Background

- Importance of recommender systems for groups is increasing
 - Items experienced by groups & social activities (i.e., movies, music, travelling)
 - Social web users form interrelated groups
- Main research focus is on the aggregation techniques
 - No ultimate winner according to Arrow's theorem and group recommender system studies
- Only a few studies that concentrate on decision / negotiation support
- No observational studies on group decision processes in the context of group recommender systems that we are aware of





Motivation



Raising the awareness in the group recommender systems community about the importance of the new analysis type



Engineering research tradition (i.e., prototype building and testing)

- No exploration of the effects of alternative design choices
- No identification of potentially important dimensions



Initiating a design of more effective and novel GRSs

- By understanding groups in action and measuring their behavior
- By identifying concrete opportunities for computerized systems to become more useful to people





Motivation dimensions & issues

Decision making

- Ultimate motivation for GRSs
- Understanding the process and different aspects

Application domain

- E-tourism domain
- Movies vs. tourism destinations

Multidisciplinary approach

 Social disciplines and computer science together

Data collection

 No similar datasets are available in the e-tourism





STUDY PROCEDURE & MEASUREMENTS





Study procedure

- In a cooperation with the International Federation for Information Technologies in Travel and Tourism (IFITT)
- First implementations at: TU Delft, UNI Klagenfurt, UNI Leiden, TU Wien
 - Part of regular lectures
- Three-phases structure
 - Pre-survey questionnaire
 - Data: Individuals' implicit and explicit preferences
 - Differences:
 - Vienna implementation: Destinations ratings
 - Other implementations: Destinations rankings

First study phase

Second study phase

- Group meetings/ discussions
- Differences:
 - Vienna implementation: observation carried out
 - Other implementations: no observation

- Post-survey questionnaire
 - Data: Study experience and feedback
- Differences:
 - No differences in implementations

Third study phase





Study procedure – First study phase



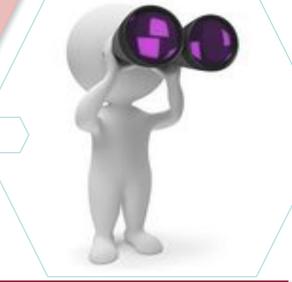
Groups
formations:
4 decision makers
& 2 observers

For decision makers: fill in online prequestionnaire

 Captures individual profiles, preferences and dislikes

For observers: observation training

 How to perform observation in the specific e-tourism context





Measurements – First study phase



Demographic data

 age, gender, country of origin, university and student identification number



17 tourist roles and Big Five Factors

- Short term, tourist behavioral patterns (Yiannakis & Gibson, 2002)
- Openness, Conscientiousness, Agreeableness, Extroversion, Neuroticism



Experience and ratings of ten destinations

 "How many times have you visited each of these destinations?"



Ranking of decision criteria

 budget, weather, distance, social activities, sightseeing and other





Study procedure - Second study phase

Decision makers



destination option

that you as a group

would visit together"

3. Group decision "Discuss and choose task first and second

1. Ten destinations and Wiki pages

> task scenario

"Imagine that you are working on a research paper together with the other group members. Interestingly, your university offers you the opportunity to submit this paper to a conference in Europe. If the paper gets accepted, the university will pay to each group member the

trip to the conference.

In addition, you will be able to spend the weekend after at the conference destination. Ten conferences will take place in European cities around the same summer period"

2. Decision

Audio & behavior (IPA) recording



Interaction process Analysis – IPA

- A method to study small groups and interactions among group members
- Observing "units" of interaction
 - i.e., facial expressions, gestures, body attitudes, verbal acts, etc.
- Twelve categories of behavior
 - 1. Show solidarity "Friendly", 2. Show tension release, 3. Agree, 4. Give suggestion, 5. Give opinion, 6. Give information, 7. Ask for suggestion, 8. Ask for opinion, 9. Ask for information, 10. Disagree, 11. Show tension, 12. Show Antagonism "Unfriendly"



Measurements - Second study phase

Plan for group decision process and duration of different phases

 Orientation, Discussion, Decision and Implementation and evaluation (Forsyth, 2014)



 e.g., leader, follower, initiator, information giver, opinion seeker





Group members' behavior (Bales's IPA framework)



Social decision scheme



Strength of group members' preferences



Study procedure - Third study phase



- 1. For decision makers: fill in the post-survey questionnaire
- Study and task experience

2. For observers: interviews

- Observation task and reports
- Differences between reports
- Behavior of decision makers







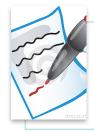
Measurements - Third study phase



The first and the second group choice



Usage of the provided Wiki pages



Description of the decision process



Overall attractiveness of the ten predefined destinations



Satisfaction with the group choice



Difficulty of the decision process



Identification and similarity with the other group members



Assessment of the task



Measurements - Data structure

Big Five Factors Scores

Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism

Tourist Roles Scores

Sun Lover, Archeologist, Anthropologist, Drifter, Seeker, Action Seeker, etc.

Destinations Ratings/ Rankings & Criteria Ranking

Individual destinations ratings/ranking
Individual criteria ranking
Group first and second choice
Satisfaction with group choice

Group Member's Behavior

12 behavior categories:
Friendliness, Tension,
Sharing/ Asking for
opinion, information or
suggestion, etc.

Group Members

General data: Student ID, University, Age, Gender, Group ID & Type (observer or decision maker)

Group Member's Experience

Organization, Feedback, Repeat

Group Member's Roles

Roles students played during discussion: Leader, follower, initiator, etc.

Group Discussion

Discussion & decision plan Time duration Decision scheme

Group Dynamics

Group identification: "I see myself as a member of this group" **Group similarity:** "I consider myself similar to the other group members…"

Group Decision Process Difficulty

"Eventually I was in doubt between some destinations."





Preliminary results

FIRST INSIGHTS





First insights - Preliminary results

- High satisfaction for vast majority of users even if their top destination did not get selected by the group
- Group preferences were not just an aggregation of the initial group members' preferences but were rather constructed during the group decision process
 - Commonly used aggregation strategies in group recommender systems were hardly able to predict the groups' choices
- Significant correlations between individual and group characteristics with satisfaction





Group Recommender Systems

IMPLICATIONS





Implications

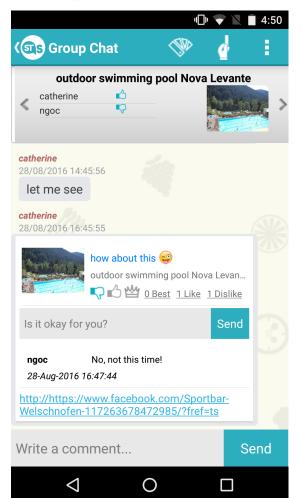
- Choosing and customizing aggregation approach based on specific contextual conditions of groups
- Construction of a more dynamic GRSs
 - System captures user preferences derived from discussion together with baseline user preferences
- Defining the objective for GRS
 - System as a facilitator for the group decision making process vs. a rigid mediator of users' preferences

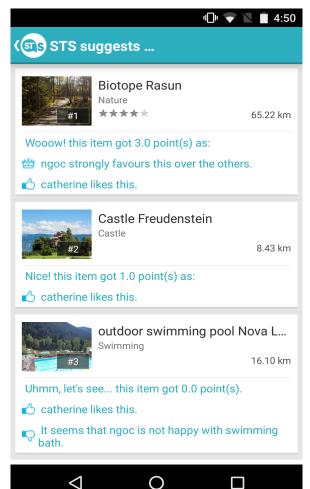


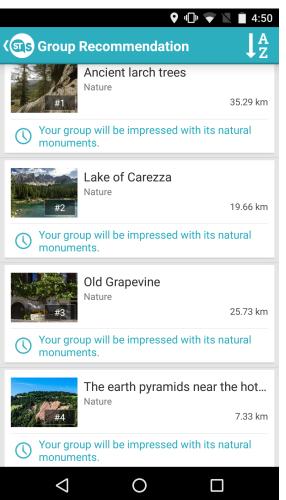


Implications (STSGroup)











Implications (Picture-based approach)

PixMeAway picture set

Please select the most appealing pictures in order of preference.





















Your picture selection

Please select a minimum of 3 and maximum of 7 pictures











































Nature & Recreation

YOUR PROFILE

Click on the stars to adjust your profile. By clicking on the respective type you see its description.

Sun & Chill-Out



Knowledge & Travel

Culture & Indulgence



Independence & History



Social & Sport



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SOCIAL & SPORT

sportive, social, natural, full of energy and positivity.



+ You like:

- + getting to know the country and its people
- + trying local delicacies
- + learing the language and getting in touch with locals
- + working abroad

You don't like:

- ordinary tourist routes
- areas of intense tourism
- big noisy club locations
- VIP parties



www.pixmeaway.com





SUMMARY & CONCLUSION





Summary

- A detailed description of the replicable study procedure and the instruments used for the data collection
- Experimental results showing that certain individual and group characteristics, which go beyond the initial preferences of the individuals and their straightforward aggregation, play an important role in the final choice of the group
- The implications of the observational study for group recommender systems and different aspect that should be considered when building such systems





Conclusion

- GRSs research requires more user centric approach
 - Observational studies to understand what is really happening
 - But also ground truth and datasets construction
- Group decision support in GRSs equally important as other aspects
 - e.g., aggregation strategies
- Two type of individual user preferences in GRSs
 - Independent preferences
 - Dependent preferences constructed during the group interaction





Thank you & Questions

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