GMAP 2022: Workshop on Group Modeling, Adaptation and Personalization

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ABSTRACT

Group modeling adaptation and personalization is an area explored in parallel by two different research communities. On the one hand, the user modeling community focuses on the preferences aggregation problem: how to combine preferences of individuals in a group so as to personalize, adapt, and explain content for this group to consume or experience? On the other hand, the computer-supported collaboration community focuses on the group formation problem: how to construct a group that will work together efficiently to solve a particular task? This area becomes increasingly significant as work becomes more flexible, online, and distributed. The connecting tissue between both communities is the urgent need to design algorithms, whether for recommending group content or group formations, that steer away from top-down algorithmic decision-making, which has proven to stifle user agency and create power inequalities between users and algorithms. The aim of the workshop is, for the first time, to bring together the two communities working on the two sides of Group Recommendations, with an overall goal to rethink group recommendation and shift paradigms from the current algorithm-centric to a user- and group-centric focus.

CCS CONCEPTS

• **Human-centered computing** → **Social recommendation**; • **Information systems** → **Decision support systems**; **Recommender systems**; **Collaborative and social computing systems and tools**.

1 INTRODUCTION

The way we interact, make decisions, work, study, and socialize is rapidly evolving. Much of our leisure as well as work activities are social. Whether we are planning to watch a movie with our family or work on a joint task, adaptive and personalized systems for groups are becoming increasingly prevalent. From simple chat-based apps to more sophisticated collaborative platforms, it has become almost impossible to imagine our daily lives without relying on such systems. Furthermore, adaptive and personalized systems for groups can already help existing permanent or ephemeral groups to select a restaurant for a dinner, or a destination to travel to for a vacation, a Points-of-Interest tour in a city, a movie to watch, and so on. In this case the system can make recommendations, or a sequence of recommendations (as in a tour) for the group, having the goal to keep all the group members as satisfied as possible with the suggested items [13, 14].

The first, and mostly researched, task of such a system is to combine individual preferences into a group model, based on which items of interest for the whole group could be found. Secondly, as recognized in the more recent works [3, 15, 16], another task is to support the group in their decision-making process, hence not just suggesting an item or a rigid ranked list of items, but rather to truly help the group to reach a joint decision. To increase the effectiveness of these functionalities, the system can make use of various individual, group, interrelationship or even decision-process features, such as, individual personalities [17, 18, 20, 21] group type (for example family, close friends, or colleagues), close, highly emotional or loosely coupled relationships within the group [6, 9, 29], having a well defined, structured decision making-process, or a casual open conversation [7, 14].

From a different perspective, the Group Recommendation problem is addressed by the computer-supported collaboration community, which focuses on the group formation problem. People are increasingly participating in new forms of work, such as crowd-sourcing platforms and the gig economy, while companies are increasingly posting their jobs online to attract the creativity of heterogeneous contributors from all over the world [22]. From individuals completing mini jobs on Amazon Mechanical Turk to ad-hoc groups organised in "crowd farms" to uptake and complete complex software projects, large-scale online work is increasingly gaining track [27, 28]. The pandemic has hastened this transition to intelligent work automation, resulting in a flood of new workers

who have turned to digital labor platforms to repurpose their talents and increase their employability [2, 8]. Due to the scale of the involved users and tasks, online platform work is typically algorithmically mediated [1, 24], in order to manage the hiring, filtering, and placement of the online workers to tasks and, for more complex tasks, to groups. Unfortunately, the majority of these algorithms are designed to supervise work in a top-down and controlling manner, and they rely only on external reinforcement without involving the users in any of the work management processes [19]. For example, most team formation algorithms rely on a fixed, pre-decided, and non-adaptive user model to decide which person should work with whom, and to suggest tasks to the formed groups. The algorithms rarely offer group decision-making support, provide explanations, or adapt their matching decisions based on user input.

With very few and mostly research exceptions ([10, 25, 26]), existing online team formation algorithms are designed to function according to the Taylorism work management style, micromanaging the online workers and distrusting their initiative [12, 30]. Such algorithm design approaches may be appropriate for group tasks that are well-defined and with known knowledge boundaries, such as micro-tasks. They are however highly ineffective for group tasks that are complex, open-ended, and have multiple knowledge inter-dependencies [5]. Examples of such tasks, which require a different and more user-centered approach, include radical innovation, "wicked" problems, large-scale research, and group tasks within the creative industries such as software and game creation, advertising, or art generation. Research shows that these tasks benefit the most from groups that are formed in a way that affords the involved users the freedom to affect the team formation outcome, based on their own experience, creativity or intuition, and to be able to adapt and re-plan the recommended group structures according to the changing needs of the task at-hand. Performance aside, allowing people to affect the decision of who they will be recommended to work with has also been found to increase one's sense of control over their own work and ideas, which in turn promotes creativity, intrinsic motivation, team cohesion, and user well-being [4, 11, 23].

In this workshop, we cover both lines of research related to adaptive personalized systems for groups. The transversal topic that we are emphasizing is the importance of *putting the user "back in the loop"*, that is, empowering the user to enjoy a level of control in these systems. Hence, we aim to discuss (i) radical new ways to design team recommendation systems and algorithms that afford users the freedom to decide with whom to collaborate with and how, to solve the open-ended problem at hand, all the while guaranteeing the quality of the creative work, and, (ii) models, algorithms and systems that suggest items for groups to experience, through approaches that support joint and incremental group decision-making.

2 FORMAT AND ACCEPTED PAPERS

GMAP 2022 took place as a hybrid workshop. After a short introduction from the organizers, the program included four presentations of original works on the Group Recommendation and Group Formation problems. The workshop ended with the closing remarks from the organizers. Each submitted paper was reviewed by 2 members of the international program committee. The submissions with an

average score above zero (hence, an agreement on accepting the work among the reviewers) were accepted.

The accepted contributions analyze different aspects related to the Group Recommendation and Group Formation problems: (i) the impact of using a decoupled evaluation strategy for the evaluation of group recommendation algorithms, in particular considering robustness against the polarity bias; (ii) an approach for group-aware sequential item recommendation for Multiplayer Online Battle Arena (MOBA) games, which can also be applied to different scenarios (for instance, movie recommendations); (iii) a user study on the group formation problem using a User as Wizard method to analyze the similarity of profiles within and between the formed groups, with particular reference to personality traits such as Openness ad Conscientiousness, and Intellectual Ability; (iv) the evaluation of a solution to support a group recommendation task in the tourism domain, in a scenario in which a single user is interacting with the system to determine the best solution for the group. The accepted contributions are listed below:

- **Patrik Dokoupil and Ladislav Peska**, *Robustness Against Polarity Bias in Decoupled Group Recommendations Evaluation.*
- **Vladimir Araujo, Helem Salinas, Álvaro Labarca, Andrés Villa and Denis Parra**, *Hierarchical Transformers for Group-Aware Sequential Recommendation: Application in MOBA Games.*
- **Federica Vinella, Sanne Koppelaar and Judith Masthoff**, *Forming Teams of Learners Online in a User as Wizard Study with Openness, Conscientiousness, and Intellectual Ability.*
- **Hanif Emamgholizadeh, Barbara Bazzanella, Andrea Molinari and Francesco Ricci**, *Single User Group Recommendations.*

3 ORGANIZATION

- **Federica Lucia Vinella** Ph.D. candidate at the Human-Centred-Computing group. Federica researches user-centered tools that improve group formation and crowd collaboration online. Her research topics include self-organization, algorithms for group formation, choice architecture, and user modeling.
- **Amra Delić** Assistant Professor at University of Sarajevo. She completed her Ph.D. in 2020. under the supervision of Prof. Hannes Werthner, at Faculty of Informatics, TU Wien. Her thesis focused on personalized systems that support group decision-making processes by exploiting various user, group, interrelationship features, as well as the information about the decision-making process itself. Lately, she has broadened her research interests to analyzing the role of explanations in group recommender systems. She has participated in organizing tutorials and workshops at the ACM Recommender Systems Conference, and the Conference on User Modeling Adaptation and Personalization, for which she also acts as a program committee member.
- **Francesco Barile** Assistant Professor at Maastricht University. His research focuses on Explainable Group Recommender Systems: (i) investigating the influence of a group

context on an individual satisfaction, (ii) defining novel aggregation strategies and supporting the Group Decision-Making Process, and (iii) defining strategies for generating explanations for group recommendations systems.

- **Ioanna Lykourentzou** Assistant Professor at Utrecht University. Her research focuses on crowd systems, their potential, and their applications. Ioanna develops methods that help people collaborate, coordinate their efforts and innovate at scale and efficiently, online or within physical spaces. Prior to joining UU, Ioanna worked as senior researcher at the Luxembourg Institute of Science and Technology (LIST), as visiting researcher with the Human-Computer Interaction Institute of Carnegie Mellon University, and as postdoctoral fellow with INRIA Nancy-Grand Est and the Public Research Center Henri Tudor.
- **Judith Masthoff** Professor of Human Centered Computing at Utrecht University and Editor in Chief of the User Modeling and User-Adapted Interaction Journal. Judith works on computer systems that automatically adapt to users. Her research interests include: Intelligent User Interfaces, Personalization, Persuasive Technology, Recommender Systems, Evaluation of Adaptive Systems, e-Health, personalized Transport, Intelligent Tutoring Systems, and Affective Computing.

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